



# Mexico

## Entrepreneurship

### Ecosystem Diagnostic



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# Abbreviations and Acronyms

<b>BR</b>	Brazil	<b>LASSO</b>	Least Absolute Shrinkage and Selection Operator
<b>CHL</b>	Chile	<b>Mex\$</b>	Mexican peso
<b>COL</b>	Colombia	<b>MYS</b>	Malaysia
<b>CONACYT</b>	National Science and Technology Council	<b>MSMEs</b>	micro, small, and medium enterprises
<b>CRI</b>	Costa Rica	<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>EFIDT</b>	Fiscal Incentive for Research and Technology Development	<b>PECITI</b>	Special Program for Science, Technology, and Innovation
<b>ENAPROCE</b>	National Survey on Productivity and Competitiveness for Micro, Small, and Medium Enterprises	<b>PEI</b>	Research Incentive Program
<b>ENCRIGE</b>	National Survey on Regulatory Quality and Government Impact on Enterprises	<b>PRI</b>	public research institutions
<b>FDI</b>	foreign direct investment	<b>PROSARE</b>	Program for Operation of the Accelerated System for Firms Start of Operations
<b>GDP</b>	gross domestic product	<b>Q&amp;EHS</b>	quality, environmental, health, and safety
<b>GVCs</b>	global value chains	<b>R&amp;D</b>	research and development
<b>HEI</b>	higher education institutions	<b>ROU</b>	Romania
<b>IADB</b>	Inter-American Development Bank	<b>SARE</b>	Accelerated System for Firms Start of Operations
<b>ICT</b>	information and communication technology	<b>SAS</b>	Simplified Joint Stock Company
<b>IDN</b>	Indonesia	<b>SHCP</b>	Ministry of Finance
<b>INEGI</b>	National Institute of Statistics and Geography	<b>SE</b>	Ministry of Economy
<b>IP</b>	intellectual property	<b>SINAGER</b>	National System for Regulatory Governance
<b>IPO</b>	initial public offering	<b>SMEs</b>	small and medium enterprises
<b>IPN</b>	National Polytechnic Institute	<b>STI</b>	science, technology, and innovation
<b>LAC</b>	Latin America and the Caribbean		

<b>TecNM</b>	<i>Tecnológico Nacional de México</i> (Mexico's National Technological Institute)	<b>VC</b>	venture capital
<b>UK</b>	United Kingdom	<b>VTM</b>	Vietnam
<b>US</b>	United States	<b>WB</b>	World Bank
<b>US\$</b>	United States dollar	<b>WBG</b>	World Bank Group
<b>USMCA</b>	United States-Mexico-Canada Agreement	<b>WIPO</b>	World Intellectual Property Organization

# Executive Summary

**Over the past three decades, economic growth in Mexico has been sluggish—the result of meager productivity improvements.** Between 1991 and 2021, gross domestic product (GDP), per capita, grew at an average rate of only 2.2 percent, which had little impact on the country’s high level of poverty. Also, during this period, total factor productivity growth fell, on average, by 0.45 percent, while GDP grew primarily due to factor accumulation, and especially from the demographic dividend.<sup>1</sup> Moreover, as noted by Iacovone and his co-authors (2022), there are large differences in the productivity performance of states, industries, and firms in Mexico. Importantly, the inability to allocate resources to the most dynamic sectors and firms is a major cause of the low level of productivity growth, which is demonstrated by the large number of very small informal firms. As many as 42 percent of Mexican businesses employ only the owner.

**Indeed, Mexico’s entrepreneurship ecosystem is characterized by the limited entry of high-quality firms, and a large share of low productivity**

**firms that have few prospects for upgrading and growth.** For many of Mexico’s small firms, entrepreneurship seems to result from necessity rather than opportunity. Overall, the country’s firms demonstrate limited growth and upgrading. The average 40-year-old manufacturing plant in Mexico has only doubled in size since it was established, while comparable plants in the United States (US) have grown seven times larger over the same period (Hsieh and Klenow 2014). Also, despite Mexico having free trade agreements with 50 countries,<sup>2</sup> and sharing a border with the US—one of the world’s largest markets—Mexican firms’ internationalization is limited. Most exporters are regionally focused, and few have any connection with local entrepreneurs and suppliers. However, notably, the firms that do manage to integrate into global value chains (GVCs), or export directly, tend to achieve higher growth rates, and have been more resilient during the COVID-19 pandemic.

**The COVID-19 pandemic made boosting entrepreneurship and growth even more**

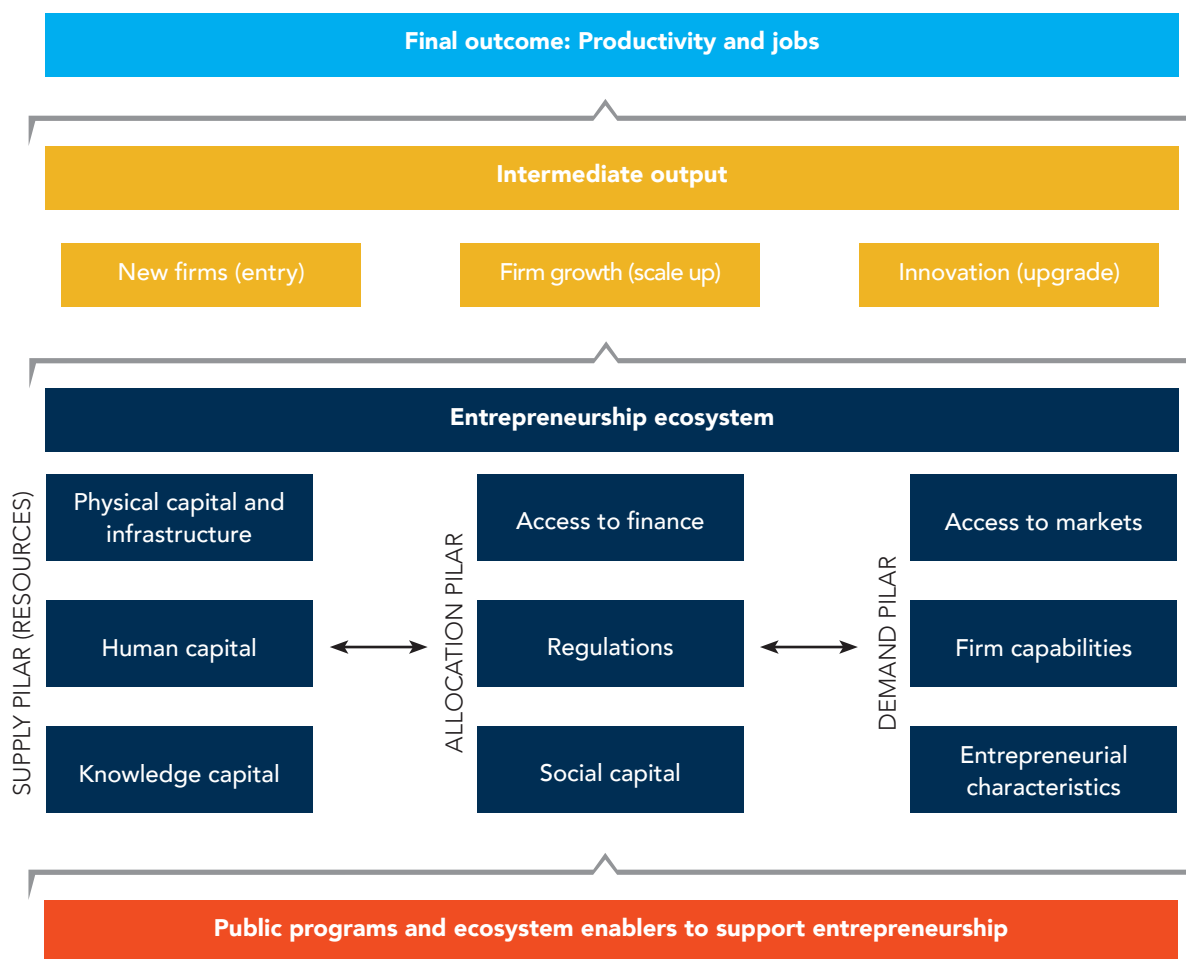
**pressing in Mexico; however, at the same time, the pandemic has opened up new opportunities due to the reconfiguration of global value chains (GVCs).** The COVID-19 pandemic aggravated circumstances for firms, which suffered from lower revenues, and lower levels of employment and remuneration. Also, the creation of formal firms stagnated (López Córdova, Patiño Peña, and Rodrigo 2021). In addition, the pandemic exposed the vulnerabilities of many GVCs, and demonstrated the importance of reducing exposure to the potential decline or halt of business activities in Asia. Reshoring is, of course, one way to reduce such exposure, and Mexico is an obvious destination for reshoring in North America. The greater integration of Mexican firms into GVCs could not only boost their economic activity, but this could have a positive impact, too, on firms' productivity. Thus, the conditions necessary to increase the integration of Mexico's exporters with the local entrepreneurship ecosystem must be developed. Also, improving the environment in southern Mexico to develop more vibrant entrepreneurial ecosystems is necessary to achieve faster and more inclusive growth, and create opportunities for attracting new value chains to the region.

**Entrepreneurship thrives in ecosystems that bring private stakeholders together in a nurturing public policy environment.** Mexico's policy makers can influence the quality of the entrepreneurship ecosystem that determines the probability of generating impactful entrepreneurs. *An impactful entrepreneurship ecosystem* not only facilitates the entry of a high number of formal firms, it also fosters high growth, innovative, and globally integrated firms that can create more, and better-quality jobs. Impactful entrepreneurs need resources that include infrastructure, physical capital (facilities and equipment), human capital, and knowledge, as well as talent and access to markets. Regulations, and access to financial

capital, as well as social capital also affect firms' access to resources. All of these factors influence the entrepreneurship ecosystem, as do market failures (especially information asymmetries, coordination failures, and the inability to gain returns from investments). Mexican policymakers can influence the ecosystem directly through policies and programs, and indirectly through the ecosystem "enablers" that foster entrepreneurship. For Mexico to achieve inclusive and sustainable growth, it is crucial for the country to address the obstacles that prevent the establishment, growth, upgrading, and expansion of more productive firms. Policies also need to be adjusted across regions to account for the differences in local entrepreneurship ecosystems.

**The goals of this report were to understand the obstacles that affect entrepreneurship ecosystems in Mexico, and with this knowledge, inform the design of priority policies and programs that can overcome ecosystem obstacles.** The analysis discussed in this report drew on a new World Bank framework developed to understand entrepreneurship (World Bank 2022a), multiple global and national data sources, and two surveys that were conducted for this study in Mexico. The surveys covered public programs and institutions, as well as non-public "enablers" that support entrepreneurship at the national level, and in three states with diverse characteristics (Chiapas, Jalisco, and Nuevo León). Using the entrepreneurial ecosystem framework depicted below (Figure ES.1), entrepreneurship performance was analyzed in terms of firm dynamics (entry, growth, innovation, and internationalization), as well as the ecosystem that rests on the quality of three pillars: the supply of resources, factors that affect their allocation, and the conditions that determine demand. The analysis in this report used the exact locations of firms to identify clusters of impactful entrepreneurship, and it provided new evidence that resources are not distributed

**Figure ES.1. Entrepreneurial ecosystem framework**



Source: World Bank 2022a.

equally across geographic space in a developing country such as Mexico. This study also assessed the role and quality of public programs, and of the non-governmental intermediary organizations (“enablers”) that help entrepreneurs to overcome market failures.

**This study’s assessment of the pillars of Mexico’s entrepreneurial ecosystem found that in comparison to the country’s global peers, there is substantial need for improvement.** Although Mexico benefits from a large domestic market, and an ample network of free trade agreements

(the most important of which is the United States-Mexico-Canada Agreement [USMCA]), these advantages have not been fully exploited. While Mexico, itself, comprises a market of considerable size, distortions create rigidities in domestic markets, and especially for services. With regard to foreign markets, only 4.6 percent of Mexico’s small and medium enterprises (SMEs) were participating in GVCs in 2018, and they only managed to join GVCs when they were about 10 years old (INEGI 2018). This was the case, despite Mexico’s network of free trade agreements, and its proximity to the enormous market in the

US. Logistics, which are crucial for integrating businesses into GVCs, and exploiting Mexico's large domestic market, demonstrate room for improvement. Mexico's rank in the 2018 Logistics Performance Index (LPI) was 51 out of 160 countries (World Bank 2018), which was substantially below China, and most Organisation for Economic Co-Operation and Development (OECD) countries. This is due, in part, to Mexico's lower-quality trade- and transport-related infrastructure. The regulation of transport networks and other services needs to be strengthened to improve their efficiency. For example, the cost of railway transportation has surged since an anti-competitive railway merger occurred in 2011.<sup>3</sup>

**Many firms in Mexico are financially constrained.** The availability of domestic credit for the private sector (38.3 percent of GDP) falls below what would be expected, given Mexico's GDP, per capita. According to Mexico's 2019 Economic Census (INEGI 2019), only 1 in 10 microenterprises, 1 in 4 SMEs, and fewer than 1 in 3 large firms have access to finance. The financial constraints of young firms are worse (Iacovone et al. 2022). Limited access to finance results from both demand- and supply-side issues: a considerable percentage of firms are not willing to take out bank loans, and institutional conditions (*inter alia* gaps in the credit infrastructure, weak law enforcement, and gaps in the insolvency framework) discourage banks from offering more credit. The venture capital market has grown in recent years, but it is largely focused on fintech and e-commerce, which provide quicker returns, and this leaves many potential sectors unserved.

**Mexico's human capital needs to be strengthened to create a more solid foundation for a dynamic entrepreneurial ecosystem.** Although Mexico's total expenditure on education is 3.2 percent of GDP, which is only slightly below the

OECD average of 3.4 percent, the gaps in coverage and quality are significant (OECD 2021a). According to the latter study, about 30 percent of Mexico's formally registered firms reported that an inadequately educated workforce is a major constraint, and this percentage is above what would be expected for a country with Mexico's level of development.

**Stronger managerial skills are needed to improve firms' innovation, productivity, and GVC integration.** Investments in innovation and research and development (R&D) need to rise significantly in Mexico. The country spent just 0.28 and 0.3 percent of GDP on R&D, respectively, in 2019 and 2020, and very little of this was funded by the private sector. Moreover, university-industry collaboration is limited; in 2021, Mexico ranked 84<sup>th</sup> out of 127 countries on university-industry collaboration, which is behind six other countries in Latin America and the Caribbean, and most OECD countries (WIPO 2021). These weak linkages prevent the country from leveraging university knowledge and transforming it into innovation.

**Weaknesses in the rule of law, concerns about public safety, and the costs of regulatory compliance are important obstacles to firms' performance and growth in Mexico.** In 2020, only 40 percent of firms in Mexico expressed a high level of confidence in the fulfillment of contract obligations, which likely discourages potential investors (ENCRIGE 2020 [INEGI 2020a]). Close to 35 percent of firms in Mexico also listed public safety as a recurrent problem for them, and for micro, small, and medium enterprises (MSMEs), the prevalence of crime increases with size. Despite the progress achieved since Mexico's landmark 2018 legislation—the General Act for Better Regulation—was put in place, the cost of complying with regulations appears to be a continuing obstacle to firms' growth.

## Spatial and sectoral characterization of impactful entrepreneurship

**Entrepreneurship in Mexico generally lacks dynamism, but important differences exist across sectors and regions.**<sup>4</sup> Differences in productive capacities between manufacturing and services in Mexico are substantial, with the former generating almost 60 percent more value added, per worker, than the latter. The top exporting sectors within manufacturing have shown substantial growth in both employment and exports,<sup>5</sup> and even some lower value-added activities such as agroindustry show potential for export growth. Across the services sector, dynamism varies substantially.

**Geographic differences are significant in Mexico, with the northern, north-Pacific, and central regions showing more dynamism and higher industrialization than the southern region.**<sup>6</sup> While firms in the north employ 9 workers, on average, and firms in the north-Pacific and central regions employ approximately 5 workers, firms in the south employ only 3.4 workers, on average. In manufacturing, the differences are far more acute, with approximately 47 employees per plant in the north, and fewer than 3 per plant in the south. Nearly 6 percent of all manufacturing firms in the north export, compared to just 0.1 percent in the south. The north also displays the strongest managerial skills. Regional differences in manufacturing have widened over time as the north has become more competitive.

**In Mexico, clusters of impactful entrepreneurship in manufacturing are disproportionately located in the largest cities, which suggests strong benefits from agglomeration, and that the factors supporting impactful entrepreneurship are likely only found in some cities.** As is the case across the world, economic activity tends to concentrate in Mexico's largest cities

(Grover, Lall, and Maloney 2022). For example, manufacturing firms tend to locate in Mexico's larger cities, and these are also the better-performing manufacturing firms. The metropolitan areas of Mexico City, Guadalajara, Monterrey, Puebla, Queretaro, León, San Luis Potosi, Chihuahua, and Tijuana, which is on the US border, are the only ones that contain clusters of firms with all five types of impactful entrepreneurship (new and existing formal businesses, high-growth firms, innovative businesses, and exporters).<sup>7</sup> Similar complementary factors seem to be driving the different dimensions of impactful entrepreneurship, and these are likely found in only a few very large municipalities.

**This study's spatial assessment of manufacturing entrepreneurship examined three industries that have been at the center of discussions between the governments of Mexico and the United States.** These comprise information and communication technology (ICT), pharmaceuticals and medical equipment, and agroindustry. The first two are viewed as industries for which reshoring to North America has good prospects, whereas agroindustry could leverage entrepreneurship in less developed regions of Mexico. While the three industries account for comparable shares of value added, the characteristics of the average establishment in each industry differ markedly, with ICT, and pharmaceuticals and medical equipment contributing 16 and 5 times more, respectively, than the value added by the average manufacturing plant. In contrast, the value added by the average agribusiness firm is only 80 percent of the average manufacturing firm. Employees are relatively more skilled in pharmaceuticals and medical equipment, and especially so in ICT. The industries that have larger and more productive businesses also exhibit more impactful entrepreneurship with regard to formality, high growth, innovation, and exports. While the share of high-growth firms in agribusiness is only

6.3 percent, this jumps to 11.2 percent in ICT. Although only 0.3 percent of agribusinesses register patents, this share rises to 1.9 percent for pharmaceuticals and medical equipment, and 2.3 percent for ICT.

**Across the three industries, the most dynamic and higher value-added establishments are clustered in Mexico's largest cities, but their geographical patterns of agglomeration vary somewhat.** Regarding the average value added per worker in clusters in large cities, this is comparable across the three industries, which indicates that given the right environment, clusters in agroindustry are as productive as those in more technologically complex industries. Even though the most dynamic clusters are in the largest municipalities, geographical patterns of agglomeration differ across the three industries. In agroindustry, clusters of enterprises are found in all states, but the largest cluster is in metropolitan Guadalajara. Clusters of agribusinesses are important in the south, but they tend to be smaller if compared to other states.<sup>8</sup> Clusters of pharmaceutical firms are concentrated in fewer states, and many are found in the south (in Merida, Yucatan, Tuxtla Gutierrez, and Chiapas). Mexico City, however, hosts the largest cluster. With regard to ICT, clusters are found primarily in the largest cities and metropolitan areas (Mexico City, Guadalajara, Monterrey, Queretaro, Puebla, and Chihuahua), and along the border with the US. The largest ICT cluster is in the Tijuana-Mexicali corridor.

**Local drivers of entrepreneurship are shaping regional agglomerations, with access to skilled labor and the quality of infrastructure and institutions appearing to be the more important drivers.** The localization patterns of manufacturing activity, which are documented, above, suggest spatial differences in the quality of the drivers of entrepreneurship. This applies both across and

within regions (the north, north-Pacific, center, and south). Local conditions strongly influence the life cycle of a business from entry and formalization, to scale up, and eventually innovating and exporting. The analysis in this study suggests that the availability of skilled labor, access to quality infrastructure, and the quality of local institutions are the main correlates for the localization of impactful manufacturing firms at every stage of their life cycle. In addition, access to knowledge positively correlates with innovation, and access to finance positively correlates with the entry of formal firms. Distance from the US border correlates negatively with formal, high-growth, and export-oriented clusters.

**The north ranks first for many of the drivers that are most closely linked to dynamic entrepreneurial locations, whereas the south has the largest gaps.** The north has stronger university-industry linkages and patenting, and fewer problems with access to finance and skills. As a result, the north has higher entry rates for formal firms that scale up, and eventually upgrade and export, directly, or through integrating into GVCs. The central region also has clusters of impactful entrepreneurship, but generally ranks behind the north. The north-Pacific region (where Guadalajara is located) tends to be closer to the national average for several entrepreneurial drivers. However, the central and north-Pacific regions surpass the national average on university-industry collaboration. The south has more gaps for all of these drivers, which explains its weaker entrepreneurship ecosystem. Hence, to foster impactful entrepreneurship, policy interventions need to address the barriers that are specific to a location, and consider both the gains from agglomeration, as well as the complementary policies that are needed to extract those benefits, and avoid the negative externalities of congested locations (for example, lack of: housing, local infrastructure, schooling, and waste management).



## Entrepreneurship support policies and enablers

**A host of public and non-public initiatives that seek to nurture entrepreneurship and firms' development coexist in Mexico, but multiple shortcomings hamper their effectiveness.** Prevailing weaknesses limit the entry of new and more productive firms; impede the scaling up of existing firms; reduce firms' innovative capacity; and dilute the ability of Mexican firms' to take advantage of opportunities in global markets. Notably, public interventions to support entrepreneurship and firms' growth need to focus on addressing specific institutional or market failures, such as excessive regulation that impedes the creation of new firms, or lack of information and information asymmetries. Internationally, there is ample evidence that well-intentioned interventions to support firms and entrepreneurs often actually discourage firms' growth, or they simply provide transfers to recipients, without stimulating any entrepreneurial activity. Conversely, some programs have proven to be effective in promoting entrepreneurship and firms' growth—for example, ones that improve managerial capabilities or that dispel information asymmetries in export or financial markets (such as credit bureaus).<sup>9</sup> Based on such evidence, revising public programs and taking advantage of the role that non-governmental actors can play in promoting entrepreneurship, could help to spur job creation, as well as economic growth. To that end, this study took a close look at 128 public programs, both at the federal and subnational levels, as well as 51 initiatives run by non-public entities. As previously noted, at the subnational level, to compare entrepreneurial ecosystems with different degrees of maturity, this review focused on the states of Chiapas, Jalisco, and Nuevo León; and at the sectoral level, this review analyzed initiatives that target ICT, pharmaceuticals and medical equipment, and agroindustry.

**At the federal level, the budgetary resources to spur firms' entry, scaling up, and innovating have diminished, significantly, in recent years.** The budget allocated to the Ministry of Economy, which is the main ministry in charge of entrepreneurial development, declined by 62 percent between 2017 to 2022. In 2022, the ministry's budget covered staff costs and current expenditures, but no resources were allocated to programs that support entrepreneurship and innovation. Budget cuts have been compounded by redirecting resources to programs that target low-income groups, such as microcredit provision. These programs, which have merit from a social development perspective, were used during the COVID-19 pandemic to mitigate the latter's impact on low-income households. However, programs that target micro and small enterprises merely because of their size may not allocate scarce resources to the most productive activities, and to the enterprises that are capable of generating and sustaining more and better jobs (Grover, Medvedev, and Olafsen 2019).<sup>10</sup> Beyond the Ministry of Economy, the programs to foster innovation and R&D, which the National Science and Technology Council (CONACYT) administered, have also been scaled down or terminated. Public development banks (in particular, *Nacional Financiera* [NAFIN] and *Banco Nacional de Comercio Exterior* [BANCOMEXT]) have helped to connect firms to financial markets, but recent indicators suggest a decline in the credit portfolio of some financial institutions. Also, the provision of credit guarantees could be improved by focusing on the younger and more innovative companies that lack access to finance.

**Budget cuts at the federal level have, in turn, affected the efforts of local governments and non-public enablers to support entrepreneurship.** For example, Jalisco benefited from CONACYT and Ministry of Economy programs that supported innovation and software development, but these were eliminated in recent years, or they

suffer from an inadequate budget. To fill this void, the State of Jalisco has launched new initiatives, but these have much less funding. Similarly, non-public enablers in Jalisco and Nuevo León, many of which relied on federal government funding, are trying to compensate for cuts by developing partnerships with international organizations.

**In addition to the impact of budgetary cuts, lack of continuity is a problem as programs are often affected by both federal and subnational electoral cycles.** Most of the public programs that were assessed in this study are relatively new; more than half (58 percent) began operating in 2018, or later. At the federal level, 51 percent of the public programs active in 2022 were created between 2018 and 2022. In Monterrey, in Nuevo León, 63 percent of the programs have been created since October 2021, when an election was held, and public administration changed.

**Public programs tend to support existing companies, and pay comparatively little attention to technology-based firms and startups.** At the subnational level, some regions, such as Chiapas, have ecosystems that are at an incipient stage, with little participation of, and linkages with stakeholders, which often greatly reduces the creation of startups and innovation. Conversely, the states of Jalisco and Nuevo León have several initiatives that target these types of companies, and these states' entrepreneurship ecosystems have been boosted through collaboration with public and non-public actors, such as universities, multinational companies, and business associations. With support from the federal government, such experiences could be documented and then adapted to the specific needs of other regions in Mexico.

**Non-public enablers' initiatives focus on supporting startups and the internationalization of technology (tech)-based firms, and, thus, they complement public programs.** Such

initiatives to support the development of tech-based firms and startups are taking place in collaboration with large companies and international organizations, including universities. Some multinational companies and other organizations are already implementing open innovation challenges and initiatives to match their needs with local companies and entrepreneurs, and these rely on the existing entrepreneurship ecosystem. Furthermore, the venture capital sector in some regions of the country is growing and maturing, with an increasing number of funds investing in startups and "unicorns" (a startup with a value over US\$1 billion).

**Due to the ongoing restructuring of global value chains, strengthening internationalization programs has become even more important.** Successful participation in the global economy requires vibrant entrepreneurial ecosystems that enable a greater number of productive firms to be created and thrive. But these ecosystems also benefit from interventions that are specifically intended to attract foreign direct investment (FDI), promote exports, and increase local firms' domestic value added. However, linkages between international investors and local firms remain modest because the public resources to build such linkages, and increase domestic value added have declined, which has undermined government efforts to deepen Mexico's participation in global value chains.

**Lastly, the process of formulating programs, from design and implementation to monitoring and evaluation, exhibits several weaknesses, and this applies to both public and non-public initiatives.** Few programs carry out a diagnostic that provides the information needed for effective design. Also, the type of monitoring indicators that programs use focus primarily on activities or outputs, with few programs evaluating impact. To improve policy formulation and

interventions, the authorities should consider carrying out evidence-based program design, monitoring implementation and results with robust evaluations, and then looping back to improve future interventions. Such a system could help to make better use of scarce public resources, and shield successful interventions from changes in public administrations.

## Policy recommendations

**To improve the quality, scale-up, and internationalization of firms, a holistic and coherent strategy to foster the entrepreneurship ecosystem is needed.** This strategy could address regulatory and institutional gaps, as well as improve the quality, funding, and mix of public entrepreneurship programs. Mexico could enhance entrepreneurship quality by rebalancing the mix of entrepreneurship programs to target existing firms and startups that have ambitions to scale up. Mexico could also foster greater internationalization in order to better leverage Mexico's free trade agreements and its unique geographic position, with both Atlantic and Pacific coasts, and a border with the US.

**While public interventions could help to address market failures related to entrepreneurship, high-quality program design and implementation are critical for impact, as is a strong monitoring and evaluation framework that guides program design and adjustments.** Funding needs to be aligned with targets, and programs need to be consistent and last long enough to allow interventions to yield results, and for ecosystems to mature. Subnational governments also need to embrace a more active role in the development of local entrepreneurship ecosystems; collaborate with the private sector; and as part of the state's development strategy, complement federal initiatives. At the subnational level, strategies will need to be adjusted to match local ecosystems' level of maturity, endowments, and

market opportunities. International experience suggests that there is no clear line of separation between national and subnational competencies in entrepreneurship and innovation support programs, and that policy can benefit when different levels of government cooperate with each other. Although approaches vary across the world, with regard to innovation, many countries target their larger-scale projects at the national level, and especially projects that involve the production of knowledge. Conversely, subnational governments tend to target innovation with smaller programs that are more focused on technology diffusion, technology parks, networking and brokerages services, incubation, and cluster development. There are also examples of joint national and subnational programs that target cluster development.

The recommendations, below, on fostering greater access to finance, building firms' capabilities, promoting innovation, improving the business regulatory environment, facilitating access to external markets, and strengthening the policy-making process, seek to inform the development of national and subnational strategies that will foster the establishment, growth, upgrading, and expansion of more productive and innovative firms.

## Expand access to finance

To mitigate the financial constraints that hinder the entry and growth of quality firms:

1. Revise credit guarantee funds to focus on younger, innovative, and new firms with riskier projects, and firms that lack an established reputation and adequate collateral (young, innovative, or tech-based firms with no tangible assets).
2. Encourage the use of movable assets and other innovative mechanisms as collateral (for example, future cash flows, inventories, or sales).

3. Improve the quality of information available for credit evaluations by enhancing credit bureaus' standards for firms, and promoting the use of alternative data.
4. Evaluate the outcomes of seed and venture capital funds (fund of funds, or co-investment funds) that are aimed at high potential and tech-based startups, and assess how these instruments can be reinvigorated.
5. Strengthen the insolvency regime, *inter alia*, by streamlining procedures, further strengthening protection for secured creditors, investing in the capacity of institutions, and setting guidelines for out-of-court procedures.

### Strengthen firms' capabilities and skilled labor

To address gaps in firms' capabilities and skilled labor:

1. Enhance management capabilities by providing incentives (for example, through vouchers) for insourcing professional managers and/or a consulting firm's services.
2. Boost the digitalization of MSMEs through self-diagnostic tools that are complemented with vouchers or matching grants to implement a digital upgrade.
3. Strengthen the quality and relevance of the skills acquired in tertiary and secondary education by ensuring a greater market focus; upgrading curricula to include digital technology, languages, and soft skills; and expanding entrepreneurship education programs.
4. Assess the skills gaps in priority industries; set up programs to close these gaps; and do so in collaboration with training and vocational education institutions, universities, and the private sector.

### Incentivize private innovation and tech-based startups

To stimulate innovation in the private sector and generate greater linkages with public research institutions:

1. Promote greater investments in R&D and stronger university-industry collaboration by evaluating the constraints in the current R&D tax credit program, as well as the benefits of alternative instruments (for example, matching grants).
2. Stimulate SMEs' adoption of technology and their incremental innovation by providing matching grants and reviewing relevant national as well as international experience on technology adoption and innovation.
3. Enhance the capabilities of technology transfer offices (TTOs) and networks, and promote the development of platforms that encourage university-industry knowledge transfer and cooperation.
4. Leverage public procurement to stimulate innovation and technology transfer, while at the same time addressing crucial challenges related to the delivery of public services, healthcare, and energy, as well as solving environmental problems. Also, in designing programs, apply lessons learned through previous experience in Mexico and other OECD countries.
5. Complement seed and venture capital initiatives with support for incubators and business accelerators that provide mentoring, and facilitate networks and financing for innovative and tech-based startups.
6. At the subnational level, leverage federal innovation programs more effectively, and complement these with local resources to create a mix of programs that are suitable for the specific local context, and the development of local clusters.

## Improve the regulatory environment

To enhance contract enforcement and regulatory quality, while reducing compliance costs:

1. Strengthen the capabilities of the judicial system, *inter alia*, through training, the establishment of standards, and the creation of specialized courts such as those that are already operating in some states (for example, the State of Mexico); and promote alternative dispute resolution mechanisms.
2. Further strengthen the three pillars (policies, institutions, and tools) of the National Indicator of Regulatory Improvement, and especially the pillars at the subnational level.
3. Continue piloting the deployment of SINAGER (National System for Regulatory Governance) in the short term, and scale up its development in the medium term.
4. In a much larger number of municipalities, facilitate the registration of firms and regulatory compliance by implementing SARE (Accelerated System for Firms Start of Operations), PROSARE (Program for Operation of the Accelerated System for Firms Start of Operations), and the Simplified Construction License.

## Facilitate the internationalization of firms

To increase the number of direct exporters and the integration of more SMEs into GVCs:

1. Implement more comprehensive supplier development programs in close collaboration with the private sector, including conducting diagnostics, and providing support to enhance firms' capabilities, and matchmaking with exporters. Potential suppliers could include, *inter alia*, firms that provide intermediate

inputs, business services, and technology solutions. A second phase or an extension of the program could help firms with direct exports.

2. Enhance market intelligence and information on the regulatory and procedural aspects of exporting, directly, and on integrating into GVCs.
3. Improve competition in the logistics market; reduce friction in multimodal transportation; and in particular, consider regulating interconnection services between railway networks, and establishing transparent booking systems for port services. Addressing bottlenecks that affect the southern states should be a priority.

## Design, implement, and evaluate programs that foster entrepreneurship

To enhance the effectiveness of federal and subnational public programs, utilize program design, implementation, and evaluation practices that are based on good national and international examples:

1. Provide programs with a long-term vision as it takes time to build capacities and develop the entrepreneurship ecosystem.
2. Align budgets with program objectives and targets.
3. Identify potential complementarities, duplications, and gaps between different policy instruments.
4. Enhance collaboration between government agencies at the federal and subnational levels, and with non-governmental enabling organizations (for example, between the Ministry of Economy and CONACYT, and between these two, and subnational entities).
5. Design programs with robust monitoring and evaluation mechanisms.

6. Link the provision of funding for intermediary organizations that support entrepreneurship (for example, incubators and business accelerators) to their use of a strong monitoring and evaluation framework; and foster the dissemination of their good practices.

ecosystems, endowments, and market opportunities; and identify how best to leverage federal initiatives, and complement these with local resources.

2. Strengthen cluster development by improving the links between government, academia, and industry, as well as linkages among firms, and build managerial and technological capacities that are relevant for the cluster.

## Adapt subnational entrepreneurship strategies to the local context

1. Design subnational entrepreneurship strategies that match the maturity of local

**Table ES.1.** Policy recommendations

Area	Short term (< 2 years)		Medium to long term (> 2 years)	
	Action	Impact	Action	Impact
Holistic entrepreneurship strategies	Develop a comprehensive and coherent strategy at the federal level that fosters growth-oriented entrepreneurship.	High	Implement the strategy for growth-oriented entrepreneurship.	High
			Support subnational governments in integrating entrepreneurship into the state's development strategies.	High
Access to finance	Enhance credit guarantee programs to encourage financing for younger, innovative, and new firms that have limited collateral and/or a limited credit history.	High	Develop new types of collateral (for example, receivables, or future purchase contracts).	High
			Foster the development of seed and venture capital funds to support startups and tech-based firms.	High
	Enhance the quality of information available for a credit evaluation (for example, alternative sources of data).	High	Enhance the insolvency regime to encourage lending, and improve resource allocation across firms.	Medium
Firm capabilities	Strengthen management capabilities by providing incentives for insourcing professional managers and/or a consulting firm.	High		
	Boost digitalization of MSMEs through self-diagnostic tools, complemented with vouchers or matching grants.	High		
	Assess the skills gaps in priority industries, and in collaboration with vocational education institutions, universities, and the private sector, set up programs to close these gaps.	High	Strengthen the quality and relevance of the skills acquired in tertiary and secondary education by ensuring a greater market focus, and upgrading curricula to include digital, language, soft, and entrepreneurship skills.	High

Area	Short term (< 2 years)		Medium to long term (> 2 years)	
	Action	Impact	Action	Impact
Innovation and startups	Evaluate the constraints in the current R&D tax credit program, as well as alternatives for inducing higher investments in R&D, and stronger public-private collaboration.	High	Foster public procurement innovation initiatives, starting with pilots in a few ministries (for example, health or environment).	Medium
	Review and strengthen programs that foster technology adoption and more incremental innovation.	High	Strengthen institutions (such as technology transfer offices) and platforms that facilitate technology transfer.	Medium
			Promote incubators and accelerators, and require them to have a strong monitoring and evaluation framework if they want support.	Medium
			<i>Federal/subnational level:</i> <ul style="list-style-type: none"> <li>■ Complement federal programs with local resources, and pursue a mix of policies that suit the local context and priorities.</li> <li>■ Strengthen cluster development by nourishing linkages between government, academia, and industry, as well as between firms, and build clusters' managerial and technological capacity.</li> </ul>	High
Business enabling environment			Improve contract enforcement by strengthening the capabilities of the judicial system (inter alia through training and the establishment of specialized courts), and promoting alternative dispute resolution mechanisms.	Medium
			Further strengthen the National Indicator of Regulatory Improvement, and especially at the subnational level.	High
	Facilitate firms' registration and regulatory compliance by implementing SARE and PROSARE in more municipalities.	Medium	Continue the expansion of the SARE and PROSARE initiatives.	Medium

Area	Short term (< 2 years)		Medium to long term (> 2 years)	
	Action	Impact	Action	Impact
Internationalization of firms	Beginning with priority industries, improve efforts to increase domestic value added in exports by piloting a supplier development program that is based on a solid diagnostic, and international best practices.	High	Scale up supplier development programs to other industries, and to activities with greater value addition.	High
			Pilot new initiatives that foster exporting capabilities.	High
			Enhance market intelligence and export promotion efforts.	
			Improve competition in the logistics market, and reduce friction in multimodal transportation, and especially in the south.	High
Program design, implementation, and evaluation	<i>Federal level:</i> <ul style="list-style-type: none"> <li>Reinforce the design, implementation, and evaluation of federal programs, starting with a review of priority objectives and instruments.</li> </ul>		<i>Federal level:</i> <ul style="list-style-type: none"> <li>Build on CONEVAL's experience with social development to instill the practice of evaluating entrepreneurship development.</li> </ul>	High
	<i>Subnational level:</i> <ul style="list-style-type: none"> <li>Strengthen collaboration between local governments and the private sector to address bottlenecks in fostering entrepreneurship.</li> </ul>	High	<i>Subnational level:</i> <ul style="list-style-type: none"> <li>Align program instruments with new subnational strategies, and incorporate strong design, implementation, and evaluation tools.</li> </ul>	

## Notes

1. INEGI. 2022. Tables on Total Factor Productivity. Website accessed October 22, 2022. <https://www.inegi.org.mx/temas/ptf/#Tabulados>

2. Ministry of Economy. 2015. "Foreign Trade, Countries with Treaties and Agreements Signed with Mexico [*Comercio Exterior, Países con Tratados y Acuerdos Firmados con México*]." Website accessed October 22, 2022. <https://www.gob.mx/se/acciones-y-programas/comercio-exterior-paises-con-tratados-y-acuerdos-firmados-con-mexico>.

3. World Bank Group. 2019a. "Mexico – Policy Notes."

4. While *establishment* was the unit of observation in this study's micro-data, the terms *business*, *firm*, *plant*, and *establishment* are used interchangeably in this report, unless noted otherwise.

5. These sectors, which comprise aerospace, motor vehicles and auto parts, household appliances, and computer equipment and semiconductors, account for only 3 percent of firms, but 33 percent of value added in manufacturing.

6. In this report, the northern region comprises the states of Baja California, Baja California Sur, Chihuahua, Coahuila, Nuevo Leon, Sonora, and Tamaulipas; the north-Pacific region comprises the states of Aguascalientes, Colima, Durango, Jalisco, Nayarit, Sinaloa, and Zacatecas; the central region comprises Mexico City and the states of Mexico, Guanajuato, Hidalgo, Michoacan, Morelos, Puebla, Queretaro, San Luis Potosi, and Tlaxcala; and the southern region comprises the states of Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, and Yucatan.

7. In this report, a cluster is defined as a spatial agglomeration of plants within a radius of 30 kilometers (km),



and with a minimum size above the 90th percentile in the distribution of the number of plants across municipalities (with this minimum varying across categories).

**8.** The forthcoming IFC study, “Mexico’s Southern States”, also noted that the southern states have potential in the agribusiness sector.

**9.** For a discussion of the evidence, see World Bank (2021).

**10.** Grover, Medvedev, and Olafsen. 2019. *High-Growth Firms: Facts, Fiction, and Policy Options for Emerging Economies*.

# 1. Entrepreneurship Ecosystem in Mexico: A Cross-Country Analysis

## Key Questions

Chapter 1 examines the entrepreneurship ecosystem in Mexico through a cross-country comparison that is based on a conceptual framework, which covers entrepreneurship outcomes and its three structural pillars: supply factors, demand factors, and the allocation of resources. This analysis used both firm-level data and cross-country indicators. According to the findings, Mexico's entrepreneurship ecosystem is characterized by a small share of high-quality firms, and a large share of low-productivity firms, which face important challenges that impede them from scaling up, upgrading, and internationalizing. These challenges include financial constraints, difficulties in finding adequately qualified human capital, limited managerial skills, weaknesses in the rule of law, and the high cost of regulatory compliance.

This chapter addresses the following questions:

- How is Mexico performing with regard to its entrepreneurship outcomes, both in terms of quantity (the number of firms entering), and quality (the number of firms scaling up, internationalizing, and innovating)?
- What are the most relevant challenges that Mexico's entrepreneurship ecosystem faces with regard to:
  - ▶ Supply factors—especially human capital and knowledge capital?
  - ▶ Demand factors—access to markets, and the capabilities of existing firms?
  - ▶ Allocation of resources—access to finance, the regulatory environment, and social capital?

## 1.1 Introduction

**Over the past three decades, economic growth in Mexico has been sluggish.** Between 1991 and 2021, Mexico's gross domestic product (GDP), per capita, grew at an average rate of only 2.2 percent, which had little impact on the country's high poverty level. Within Mexico, the central and northern regions have benefited much more from investment and trade flows, while the southern states have lagged behind. Generally speaking, few enterprises in the southern states have links with international markets.

**Slow productivity growth is the main cause of Mexico's poor economic performance.** Between 1991 and 2021, total factor productivity growth fell, on average, by 0.45 percent, while GDP grew primarily due to factor accumulation, and especially due to Mexico's demographic dividend.<sup>1</sup> Moreover, as noted by Iacovone and his co-authors (2022), there are large differences in the productivity performance of states, industries, and firms, and the differences in firms' productivity have increased in recent decades (1993–2018). Importantly, the inability to allocate resources to the most dynamic sectors and firms is a major cause of Mexico's low level of productivity growth. This is demonstrated by the large number of very small, informal firms. In 2019, microenterprises and small establishments (ones with five or fewer workers), which are primarily informal, and have low growth potential, accounted for a very large share of establishments (89.3 percent), and a relatively large share of employment (30.9 percent). However, these enterprises accounted for only a small share of value added (11.5 percent). Conversely, large firms (ones with more than 250 workers) accounted for a disproportionately small share of all the firms (0.2 percent), but they had a large share of employment (31.6 percent), and accounted for a large share of value added (49.9 percent).

**Although the COVID-19 pandemic has made boosting growth and entrepreneurship even more pressing in Mexico, the pandemic has also opened up new opportunities due to the reconfiguring of global value chains (GVCs).** In 2020, primarily due to the pandemic, Mexico's GDP declined by 8.1 percent, however, in 2021, it bounced back by 4.8 percent, and it was expected to grow by 1.8 percent in 2022.<sup>2</sup> As a result of the pandemic, firms suffered from lower revenues, and many exhibited lower levels of employment and remuneration, and the creation of formal firms stagnated (López Córdova, Patiño Peña, and Rodrigo 2021). The most important factors mitigating the pandemic's impact on firms were: having higher productivity prior to the crisis, having access to finance and export markets, and using digital technology. The pandemic exposed the vulnerabilities of many GVCs, and made clear, the importance of reducing exposure to the challenge of production in Asia decreasing or coming to a halt. Reshoring is, of course, an important way to reduce such exposure, and Mexico is an obvious destination for reshoring in North America. The Inter-American Development Bank has estimated that reshoring opportunities could, potentially, increase the annual exports of Latin America and the Caribbean by around US\$35.3 billion.<sup>3</sup>

**Mexico needs to take action to foster entrepreneurship by better leveraging its free trade agreements (which involve 50 countries) and the new opportunities offered by reshoring, and broadening economic opportunities across the country.** Greater integration of firms into GVCs could not only have a positive impact on their productivity, it could boost Mexico's economic activity. However, most exporters are regionally focused, and few have any connection with local entrepreneurs and suppliers. The conditions to facilitate the greater integration of exporters into local entrepreneurship ecosystems need to be developed. Also, in southern Mexico,

to attract new value chains to the region, an environment that nurtures more vibrant entrepreneurial ecosystems needs to be created.

**Entrepreneurship thrives in supportive ecosystems, and the quality of the ecosystem determines the probability of generating impactful entrepreneurs.** The term, *impactful entrepreneurship*, applies not only to the high entry of formal firms, but also to high growth, innovative, and globally integrated firms (see Box 1.1 for the definitions of different types of entrepreneurship). To become impactful, entrepreneurs need resources (such as finance, infrastructure, physical capital (facilities and equipment), human capital, and knowledge); access to markets; and a supportive regulatory environment. For Mexico to achieve inclusive growth, it is crucial for the country to address the obstacles that prevent the establishment, growth, upgrading, and internationalization of more productive firms. Doing so will

improve the environment for building firms' capabilities, facilitate the more efficient allocation of resources, and decrease productivity gaps across regions, sectors, and firms. Also, government policies will need to be adjusted across regions so that they take into consideration the differences in local entrepreneurship ecosystems.

**This report provides a comprehensive assessment of Mexico's entrepreneurial ecosystem to inform and prioritize policies that develop and support impactful entrepreneurship.** The report draws on the World Bank Entrepreneurship Diagnostic Framework (World Bank 2022a), multiple global and national data sources, and two surveys that were conducted for this report. The surveys covered public and non-public institutions that support entrepreneurship at the federal level in Mexico, and in three states with varied characteristics (Chiapas, Jalisco, and Nuevo León). This chapter provides an overall

### Box 1.1. Different types of entrepreneurship

- **Necessity or push entrepreneurship:** These enterprises are created because they are “the best option available” to an entrepreneur due to her/his particular conditions, such as recently losing a job, needing to supplement household income, and/or needing to gain flexibility to attend to personal or household demands.
- **Opportunity or pull entrepreneurship:** These enterprises are created to take advantage of a unique market opportunity.
- **Impactful entrepreneurship:** These enterprises have a positive impact due to productivity increases and/or job creation. Typically, these are high-growth firms\* that tend to be more innovative, more connected to global value chains, and more likely to benefit from agglomeration.

Sources: Trish Cotter. 2001. “Necessity vs Innovation-based entrepreneurs.” Global Entrepreneurship Monitor; and World Bank. 2022a. “Entrepreneurship Ecosystems and Digital Businesses: Diagnostic Toolkit.”

Note: \* According to Grover, Medvedev, and Olafsen (2019), there are at least three ways of defining high growth firms: i) absolute definitions, such as OECD's, which defines a firm as high growth if it has 10 or more workers, annual revenue that is four times the national per capita income, and growth of more than 20 percent, per year, for three or more years; ii) relative definitions, such as a defined top percentile of firms—for example, the top 10th percentile or the top quartile of firms; and, iii) a distributional definition that is based on the specific properties of the distribution of firms, which usually combines elements from the absolute and relative definitions, and is computationally intensive. For the purposes of this report, although no clear criteria have been set, the term “high-growth firms” generally applies to firms with outstanding performance (the absolute definition). In some cases, this report refers to high-growth firms as those that are within a specific percentile of firms' distribution.

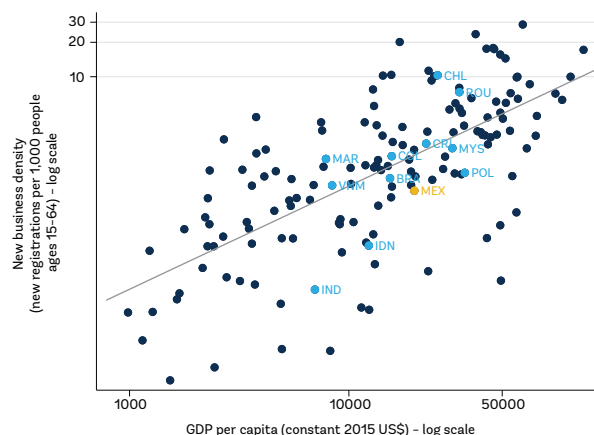
assessment of entrepreneurship performance in Mexico, the structural challenges that confront entrepreneurs, and how these challenges compare with Mexico’s peers. Chapter 2 analyzes the differences in impactful entrepreneurship across sectors and local ecosystems, with a special focus on manufacturing, and it discusses the potential drivers of the spatial allocation of manufacturing entrepreneurship. Marked differences in local entrepreneurship ecosystems imply that there are regional differences in policy priorities. In Chapter 3, this report assesses the overall mix and quality of policy instruments that foster entrepreneurship at the federal level, and in the three aforementioned states, as well as the functioning of non-government intermediary institutions that support entrepreneurship or are ecosystem “enablers”. Chapter 4 presents the policy recommendations emerging from this analysis.

## 1.2 Weak entrepreneurship outcomes

**Mexico’s entrepreneurship ecosystem is characterized by the limited entry of high-quality firms, and a large share of low value-added firms, with low growth prospects.** Mexican firms’ internationalization is limited, but those firms that manage to integrate into GVCs, or export directly, tend to achieve high growth rates. Mexican firms’ level of innovation is low, and, thus, the upgrading of Mexican firms is uncommon.

**The entry of productive firms is limited, and for many small firms, entrepreneurship seems to result from necessity rather than opportunity.** Although, on aggregate, the entry and exit of establishments in Mexico is not significantly different from the US, small establishments in Mexico, which are typically informal, display lower entry and exit rates than in the US (Busso, Levy, and Torres 2019). Moreover, the entry and exit rates of smaller firms in Mexico have been declining over time, which widens the gap with the US. Young

**Figure 1.1. Density of new businesses relative to GDP per capita (2018 or latest available)**



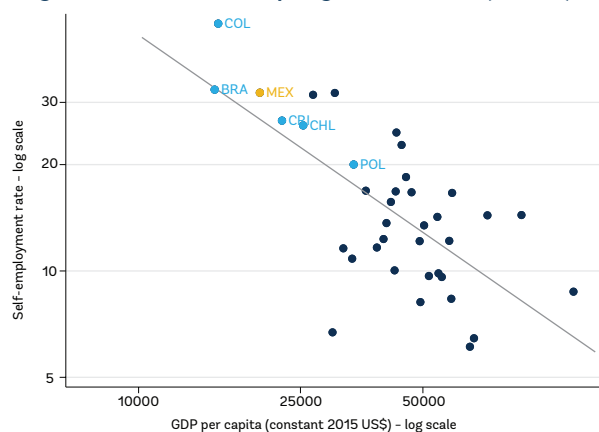
Source: World Bank. Entrepreneurship Database. <https://www.worldbank.org/en/programs/entrepreneurship>.

Note: The countries used in the analysis as global peers for comparison comprise: BR–Brazil; CHL–Chile; COL–Colombia; CRI–Costa Rica; IDN–Indonesia; MYS–Malaysia; ROU–Romania; and VNM–Vietnam.

establishments in Mexico exhibit lower exit rates, too, as well as lower job creation and destruction rates. Furthermore, Mexico’s rate of formal firm registration is below par, given the country’s stage of development (Figure 1.1). This pattern could be explained, in part, because small firms are established, primarily, due to necessity. As many as 42 percent of Mexican firms employ only the owner (INEGI 2019), and the rate of self-employment is higher than what would be expected given Mexico’s GDP, per capita (Figure 1.2). Also, as shown in ENAPROCE 2018 (INEGI 2018), 53 percent of microenterprises either have no accounting records, or they keep them informally in a notebook. This suggests that many of these newly created firms are operating informally, which means that they face significant challenges with regard to growth.

**Informality creates a series of distortions that go beyond hindering the growth of informal firms.** First, informality enables low-productivity firms to stay in the market, while higher-productivity firms are driven out, and this reduces

**Figure 1.2. Self-employment rate (2019)**



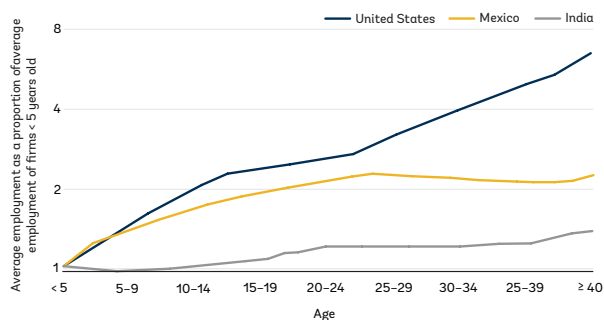
Source: World Bank. World Development Indicators Databank. <https://databank.worldbank.org/source/world-development-indicators>

aggregate productivity (Levy 2018). Second, high-productivity formal firms are more likely to exit than is the case with high-productivity informal firms, while low-productivity formal firms are less likely to exit than is the case with low-productivity informal firms. Both trends, combined, point to an “aggregate productivity reducing” exit of firms in Mexico, instead of the expected “aggregate productivity enhancing” exit. With regard to entry, Levy (2018) found that low-productivity informal firms capture a large amount of resources, and thus firms’ entry is not necessarily productivity enhancing. To sum up, this means that informality hinders aggregate productivity through the exit of firms, and potentially through their entry.<sup>4</sup>

**Mexico’s firms have limited growth prospects.**

Using data from the 1999 and the 2004 Mexican Economic Census, Hsieh and Klenow (2014) found that the average 40-year-old manufacturing plant in the US employs more than seven times as many workers as the average US plant that is 5 years old or younger. However, 40-year-old manufacturing plants in Mexico are only about twice the size that they were when they were established, and they largely stopped growing after 20 to 25 years. Similarly, the 2018 ENAPROCE survey (INEGI 2018)

**Figure 1.3. Mexican manufacturing plants show limited growth compared to US manufacturing plants**



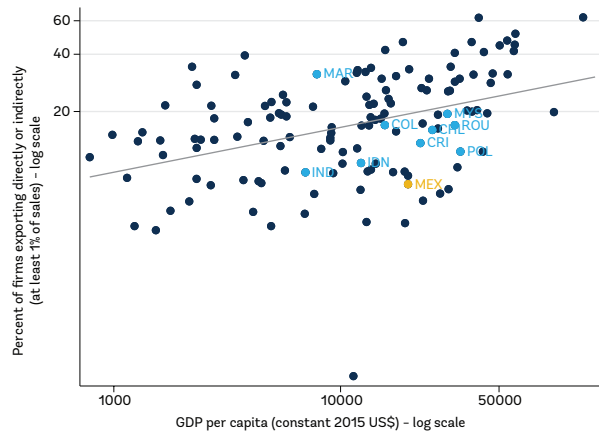
Source: Hsieh and Klenow (2014).

found that 22.5 percent of microentrepreneurs have no aspirations to grow. The next section provides more detail on the growth constraints that firms face in Mexico.

**Mexico’s broad network of free trade agreements has not resulted in broad GVC participation or high domestic value addition.**

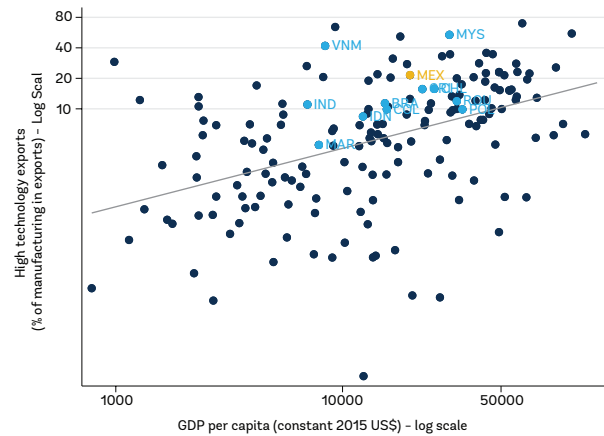
A very limited number of Mexico’s enterprises export, or are integrated into GVCs. Mexico has signed free trade agreements that include 50 countries, but its exports lag behind its relevant peers (Figure 1.4). Only 8.3 percent of firms in Mexico export at least 1 percent of their sales, either directly or indirectly. However, for the 3,385 firms with exports higher than 1 percent of their sales in 2013 and 2018, exports grew at an average annual rate of 9.6 percent over this period. The percentage of firms exporting high-technology products surpassed their expected shares, given Mexico’s GDP (Figure 1.5). However, these high-quality firms can also improve, substantially, since the domestic value added of Mexican exports (measured as forward GVC participation) is the second lowest, among 64 countries (including the 38 OECD members), which puts Mexico behind only Malta (Iacovone et al. 2022).

**Figure 1.4.** Percentage of firms exporting directly or indirectly (2019)



Source: World Bank Enterprise Surveys (2019 or latest year available). <https://www.enterprisesurveys.org>

**Figure 1.5.** High-technology exports (% of manufactured exports, 2020)



Source: World Development Indicators Databank. (2020 or latest year available). <https://databank.worldbank.org/source/world-development-indicators>.

**Innovation in Mexico is low and does not promote firms' upgrading.** According to the 2018 ENAPROCE (INEGI 2018), in 2016 and 2017, only 12 percent of microenterprises and 10 percent of SMEs introduced some kind of innovation (product, process, method of organization, or marketing). The low level of microenterprises' innovation is not surprising given that 60 percent of them do not even use the internet. In 2017, only 6.2 percent of SMEs registered or initiated the registry of a trademark, patent, model, or industrial design, and 97 percent of SMEs have never acquired, adapted, generated, patented, developed, or sold technology. Furthermore, according to ESIDET 2017 (INEGI 2017),<sup>5</sup> only 4.4 percent of SMEs implemented a research and development (R&D) project.

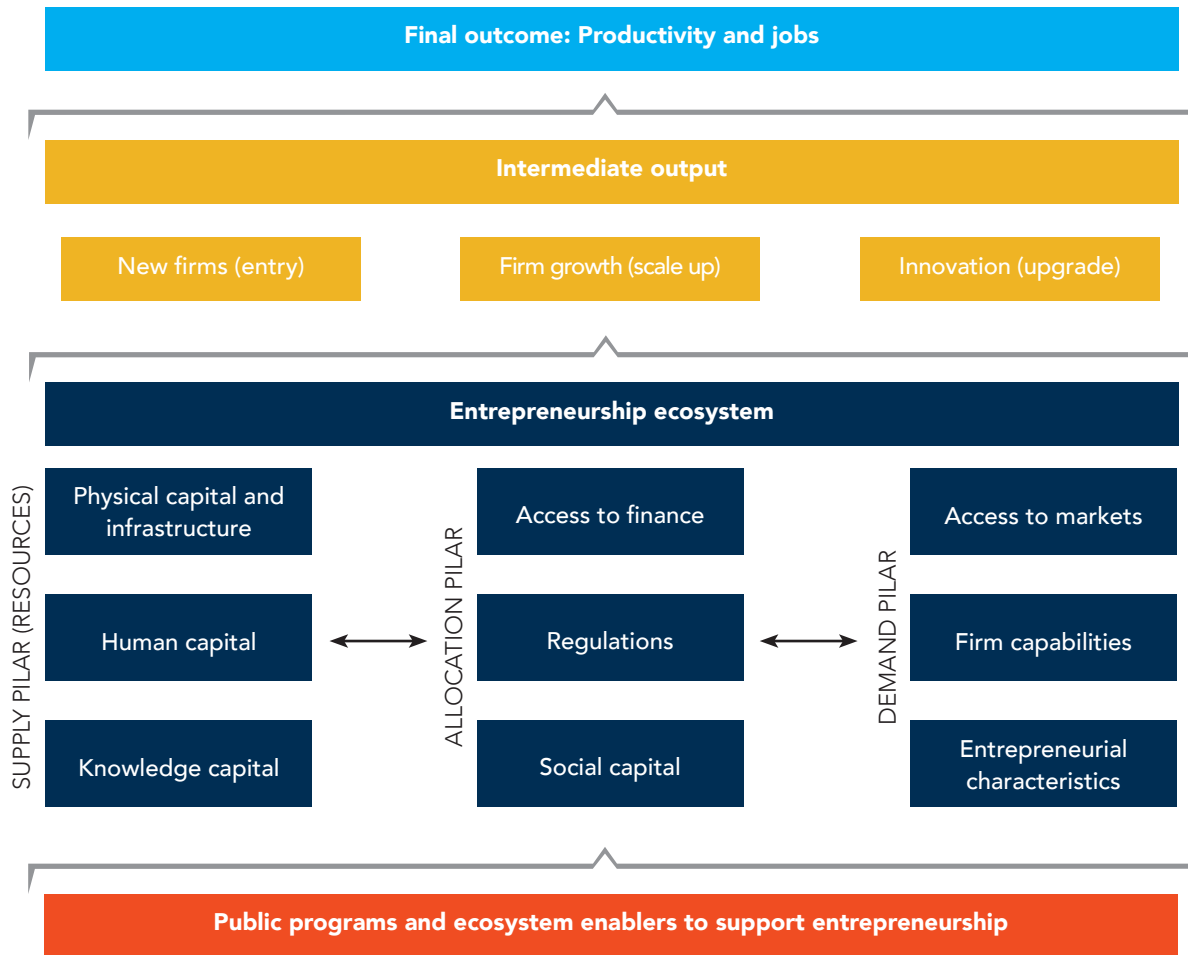
### 1.3 The pillars of the entrepreneurial ecosystem from an international perspective

Mexico's weak entrepreneurial outcomes presented, above, result from the interaction of supply factors, demand factors, and

the environment in which firms operate. Entrepreneurs flourish in ecosystems where complementary factors and institutions allow the transformation of ideas into the production and sale of goods and services. Understanding the quality of Mexico's entrepreneurial ecosystems, and the inefficiencies and obstacles faced by entrepreneurs while trying to start a business, and convert (new) ideas into (new) goods and services, and market (sell) these, requires an analysis of: (i) factor markets that provide access to basic production resources such as labor and human capital, as well as entrepreneurial characteristics and firm capabilities; (ii) access to knowledge, finance at affordable rates, and markets; and (iii) institutions that facilitate the process of creation, production, marketing, and enable the flow of ideas, technology, talent, and resources (World Bank 2022a). The conceptual framework for this is summarized in Figure 1.6, and the analysis of Mexico's entrepreneurial ecosystem follows this figure.

This assessment of the pillars of Mexico's entrepreneurial ecosystem, compared to its peers, points to underutilized opportunities

**Figure 1.6.** Entrepreneurial ecosystem framework



Source: World Bank 2022a.

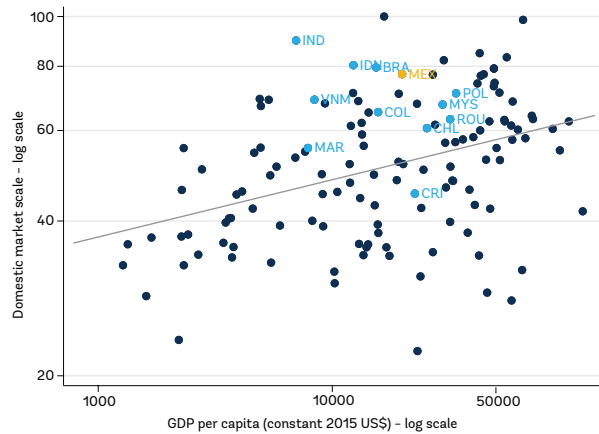
**and substantial scope for improvement.** Although Mexican firms have access to large domestic and foreign markets, these opportunities are not being exploited to their full potential, and the supporting logistics needed to penetrate markets are inadequate. Lack of access to finance and to human capital constrains firms’ ability to scale up and upgrade. Efforts to innovate also remain low, and could occur in a more efficient manner, which would help firms to upgrade. Most innovation is funded by the public sector in Mexico, while in most Organisation for Economic Co-operation and Development (OECD) countries, the state finances only a small share. Finally, gaps in

the rule of law, and public safety issues impose additional costs on firms, which further hinder their potential growth.

**Mexico benefits from having a large domestic market, and an ample network of free trade agreements—the most important of which is the United States-Mexico-Canada Agreement (USMCA)—but these advantages are not adequately exploited.** Mexico, itself, comprises a market of considerable size, which is greater than its relevant peers (Figure 1.7). With regard to local competition, however, the OECD’s *Indicators of Product Market Regulation* database,<sup>6</sup>



**Figure 1.7. Mexico benefits from a large domestic market (2020)**



Source: Global Innovation Index 2020 (Cornell University, INSEAD, and WIPO 2020).

lists Mexico as below the OECD average for two high-level indicators: distortions induced by state involvement, and barriers to domestic and foreign entry.<sup>7</sup> With regard to foreign markets, ENAPROCE 2018 (INEGI 2018) revealed that only 4.9 percent of SMEs were participating in GVCs, and they were not able to join until they were about 10 years old. Also, the Mexican Economic Census 2019 (INEGI 2019) indicated that only 0.23 percent of firms operating in 2019 were exporters, and their exports comprised, on average, only 13.6 percent of their sales. This was the case, despite Mexico’s ample network of free trade agreements; its proximity to the US, which is one of the largest global markets; and its strategic geographic position, with both Atlantic and Pacific coasts. This implies that to leverage its growth, Mexico is not fully exploiting all of the export market opportunities generated by its strategic geographic location, and its numerous free trade agreements.

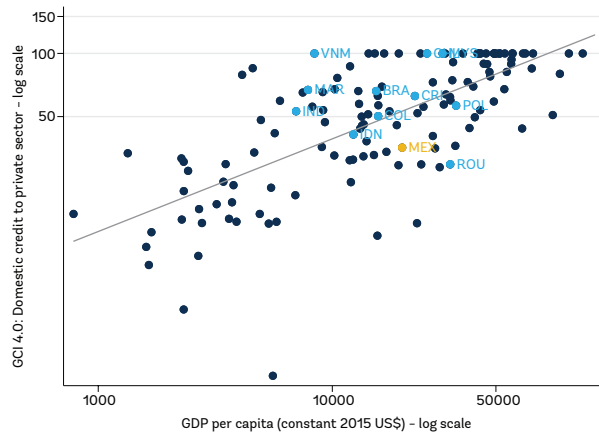
**Efficient logistics are crucial for reducing the costs of integrating businesses into GVCs, and exploiting Mexico’s large domestic market.** According to the 2018 Logistics Performance Index (LPI),<sup>8</sup> of 160 countries, Mexico’s rank is 51, and

its score of 3.05 is slightly above the average for upper-middle-income countries (2.76), but substantially below China’s score of 3.61, and that of most OECD countries. For the LPI’s sub-scores, Mexico received the highest score for timeliness, and the lowest scores for customs efficiency, and the quality of trade- and transport-related infrastructure.

**The regulation of transport networks and other services needs to be strengthened to reduce market power abuses and incentivize efficiency.** For example, since an anticompetitive railway merger occurred in 2011, the cost of railway transportation has increased, rapidly. This has outpaced increases in other transport sectors, and raised costs in the economy as a whole. This could have a pervasive negative impact on other transportation and logistics subsectors, and, of course, on the cost of transporting raw materials, intermediate inputs, and final goods. Furthermore, this could negatively impact the integration of Mexican firms into GVCs.<sup>9</sup>

**Lack of access to finance is an obstacle to firms’ growth in Mexico.** The availability of domestic credit for the private sector (38.3 percent of GDP) falls below what would be expected, given Mexico’s GDP per capita (Figure 1.8).<sup>10</sup> Only 1 in 10 microenterprises, 1 in 4 SMEs, and fewer than 1 in 3 large firms have access to finance in Mexico (Economic Census 2019 [INEGI 2019]). Furthermore, 26.2 percent of SMEs that need to invest in equipment, vehicles, facilities, or training are unable to do so because they lack the necessary finance (ENAPROCE 2018 [INEGI 2018]). According to the World Bank Enterprise Surveys (various years), a higher number of Mexican firms (29.6 percent in 2010) identified credit as a major constraint in 2010, compared to regional peers such as Chile (17.6 percent) in 2010 or Colombia (22.7 percent) in 2017. Using data from the 2018 ENAPROCE, Iacovone and his co-authors (2022) found signs of financial

**Figure 1.8.** Domestic credit provided to the private sector (as % of GDP, 2019)

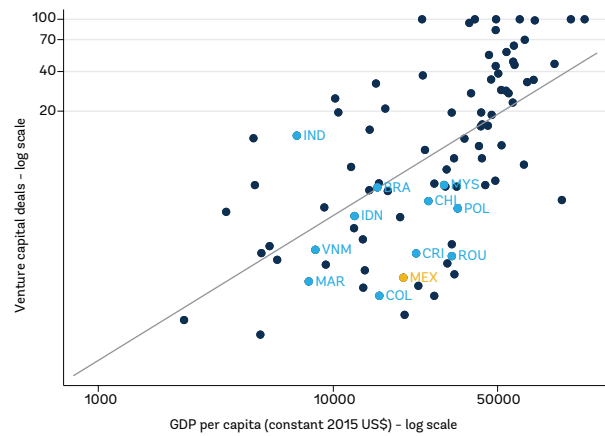


Source: Global Competitiveness Index 2019, WEF (World Economic Forum). 2019. *The Global Competitiveness Report 2019*.

constraints, which were worse for young firms; and that having access to finance resulted in increases in firms' capital, labor force, and total factor productivity. Data from the 2018 Economic Census (INEGI 2018), also show that better access to finance at the municipal level leads to higher turnover (entry plus exit rate), and increases in the intensity of churning that are typically related to reductions in factor misallocation. Additionally, the analysis found that the availability of local sources of finance results in larger firms, with higher productivity levels. All of these data indicate that access to finance is a crucial driver of firms' growth in Mexico, and that when firms face financial constraints, their growth and productivity is constrained.

**Limited access to finance reflects the convergence of demand and supply side issues: a considerable percentage of firms are not willing to take out bank loans, and at the same time, institutional conditions discourage banks from offering more credit.** On the demand side, when asked if they would accept bank credit under current market conditions (mainly the interest rate), 74 percent of respondents from microenterprises, and 60.2 percent from SMEs stated that

**Figure 1.9.** Venture capital deals (2020 or the latest year available)



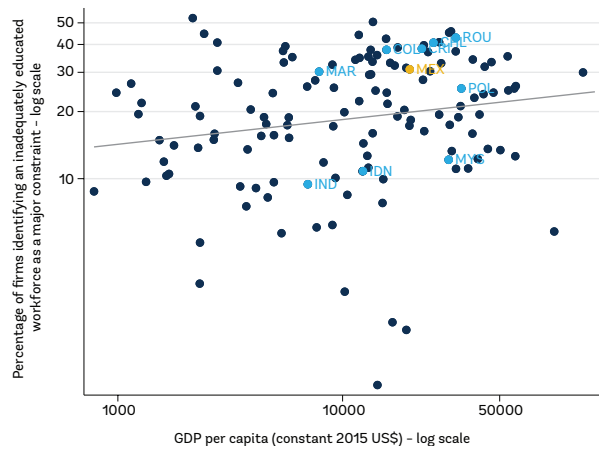
Source: Global Innovation Index 2020 (Cornell, INSEAD, and WIPO 2020).

they would not (ENAPROCE 2018); 58 percent of respondents from microenterprises, and 50 percent from SMEs stated that they consider credit expensive; 34 percent of respondents from SMEs, and 20.1 percent from microenterprises stated that they do not need credit; and 15 percent of respondents from microenterprises, and 6 percent from SMEs stated that their reason for not accepting credit is their distrust of banks. On the supply side, the problems hindering credit growth are: information asymmetries (credit information bureaus in Mexico have focused more on individuals than on firms); weak law enforcement (and consequently less chance of repayment); lack of collateral; and gaps in the insolvency framework.

**The venture capital market, which could be an alternative source of finance, is underdeveloped in Mexico.** Although venture capital could be an alternative to institutional finance, and especially for innovative projects, startups, and projects with a higher level of risk, the number of venture capital deals in Mexico is considerably below what would be expected, given the country's GDP per capita, and the venture capital deals in regional and global peers such as Brazil, Chile,

**Figure 1.10. Human capital in Mexico**

**a. Percentage of firms identifying an inadequately educated workforce as a major constraint (2019)**

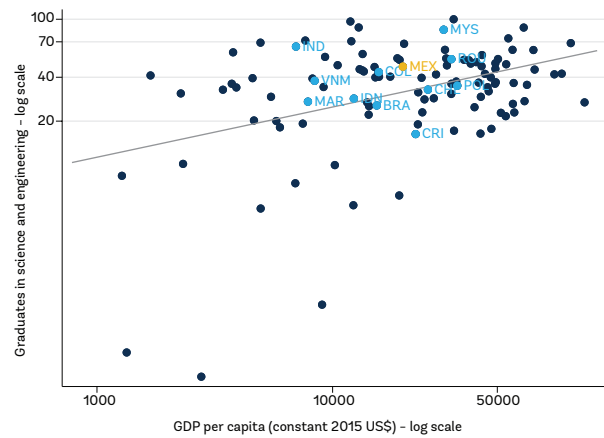


Source: World Bank Enterprise Surveys (2019 or latest year available). <https://www.enterprisesurveys.org/en/enterprisesurveys>

Costa Rica, India, Indonesia, and Poland (Figure 1.9).

**Mexico’s human capital needs to be strengthened to create a more solid foundation for a dynamic entrepreneurial ecosystem.** Although Mexico’s total expenditure on primary, secondary, and post-secondary education is 3.2 percent of GDP, which is only slightly below the OECD average of 3.4 percent, the gaps in coverage and quality are significant.<sup>11</sup> In 2016, secondary education in Mexico was available for just 84.3 percent of those age 12 to 14, which was 8.2 percentage points below the average for OECD members.<sup>12</sup> The results of the OECD Program for International Students Assessment (PISA) in 2018 indicated that the average reading, mathematics, and science scores of Mexican secondary students were 14 percent below the OECD average, and the second lowest result for these three subjects. The rate for tertiary graduates as a percentage of those age 25 to 34 was 27 percent, compared to the average of 47 percent for OECD countries.

**b. Science and engineering graduates (2020 or the latest year available)**

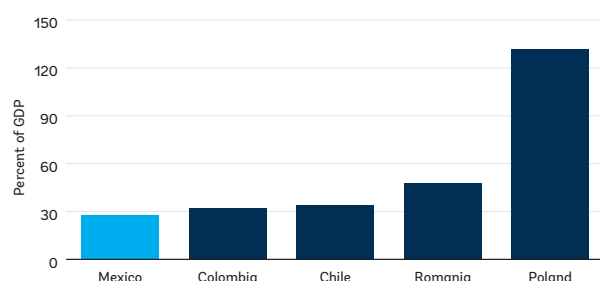


Source: Global Innovation Index 2022 (WIPO 2022). <https://doi.org/10.34667/tind.46596>

However, the percentage of science and engineering graduates as a percentage of all tertiary education graduates in 2022 was slightly above the average for Mexico’s GDP, per capita (Figure 1.10, panel b). Furthermore, on the 2018 ENAPROCE (INEGI 2018), SMEs listed important weaknesses in new hires’ soft skills (28 percent reported lack of discipline, 22 percent reported lack of a proactive approach with their job, and 13 percent reported lack of capacity to solve problems). Two other weaknesses that SMEs listed for graduates seeking jobs were their lack of knowledge of other languages (primarily English), and lack of specific technical-practical skills.<sup>13</sup> Weaknesses for these indicators explain why about 30 percent of Mexico’s formally registered firms reported that an inadequately educated workforce is a major constraint, and this is above what would be expected for a country with Mexico’s level of development (Figure 1.10, panel a).

**Despite efforts to increase R&D expenditure over the past decade, in 2019 and 2020, Mexico**

**Figure 1.11. Gross domestic spending on R&D (% of GDP, 2019)**



Source: OECD Data website: <https://data.oecd.org/rd/gross-domestic-spending-on-r-d.htm>

spent just 0.28 and 0.3 percent of GDP,<sup>14</sup> respectively, on R&D, which is substantially below what would be expected, given Mexico's GDP, per capita, and the R&D spending of relevant peers (Figure 1.11). Moreover, only a fifth of the resources invested in R&D came from the private sector, which is substantially less than the approximately two thirds of private R&D finance in Mexico's OECD peers.<sup>15</sup> Although Mexico outperforms its global peers with regard to the QS World University Ranking average score for its top three universities, university-industry collaboration is limited; Mexico ranks 84<sup>th</sup> out of 127 countries, which is behind six other countries in Latin America and the Caribbean (LAC), and most OECD countries (WIPO 2021).<sup>16</sup> These weak linkages prevent the country from leveraging its universities and transforming their research into innovation.

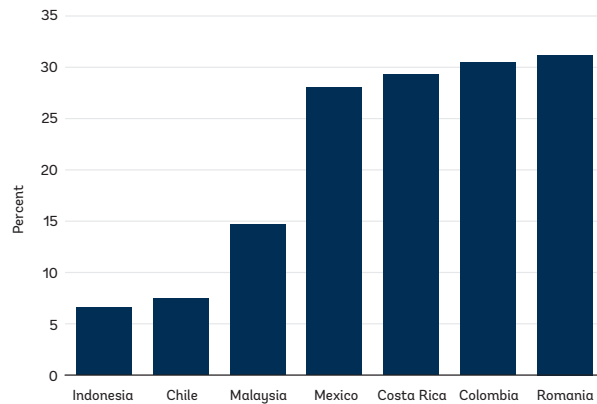
**Firm capabilities, and particularly those for innovation, could be enhanced in Mexico by improving managerial skills.** As Cirera and Maloney (2017) argue, management is a key driver of innovation and firm-level productivity, so the low returns from innovation (and thus, the low incentive to invest in innovation) could be explained by the lack of good managerial and organizational capabilities. Good managerial practices in Mexico are associated with higher productivity, growth,

trade, and innovation (Bloom et al. 2022). Based on data in the 2018 ENAPROCE survey, Bloom and his co-authors (2022) found that the quality of enterprise management in Mexico differs substantially from that in the US. The best managed firms in Mexico (ones in the 90th percentile) are similar to the US median. Firms in the US apply about 60 percent of the most structured managerial practices, while Mexican firms apply only about 40 percent of these. Moreover, when comparisons between the US and Mexico are limited to manufacturing enterprises, Mexican firms' distribution of managerial practices not only shifts to the left of US firms' distribution, but Mexico also displays greater dispersion, which implies that a large number of poorly managed manufacturing firms coexist with a small number of well-managed ones. The best managerial practices for manufacturing appear to be concentrated in Mexico's northern region, where exporting activity and integration into GVCs is greater, and this has likely forced these firms to adopt managerial practices that are consistent with their international counterparts. In contrast, the score for management practices in the services sector is lower than in manufacturing, and the best practices appear to be concentrated in the central region, which has the largest domestic market. Importantly, the firms with the worst management practices are those that are family owned and managed.

**The cost of complying with regulations also appears to an obstacle to firms' growth.** In the 2018 ENAPROCE survey (INEGI 2018), when asked whether or not they were interested in growing, about 22.5 percent of microenterprises stated that they were not interested in growing, and 47.4 percent stated that they were satisfied with their current situation. Of the remaining microenterprises, 24.5 percent<sup>17</sup> stated that they did not want to grow due to administrative costs, and 5.8 percent were concerned about the costly formalities<sup>18</sup> that would arise if they grew. This suggests

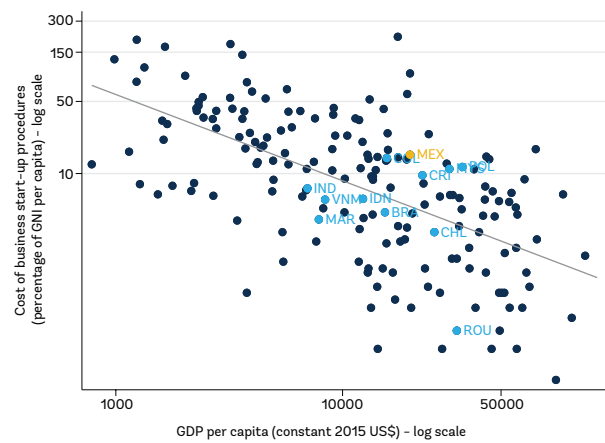
**Figure 1.12. Business registration constraints and costs**

**a. Firms identifying licensing and permits as a major constraint (2019)**



Source: World Bank Enterprise Surveys (2019 or latest year available).

**b. Cost of registering businesses (% of gross national income, per capita, 2019)**



Source: World Bank Enterprise Survey (2019 or latest year available).

that regulations might be hindering firms' growth. In their responses in the ENCRIGE 2020 survey (INEGI 2020a),<sup>19</sup> 28.2 percent of firms stated that complying with regulations, getting licenses and permits, and undergoing government inspections all comprise obstacles to fulfilling their business objectives. The percentage of firms identifying licensing and permits as a major constraint in Mexico is four times the percentage in Chile, and twice the percentage in Malaysia (Figure 1.12, panel a). The cost of registering businesses is also higher than what would be expected for Mexico's GDP, per capita (Figure 1.12, panel b). According to the National Commission for Regulatory Improvement (CONAMER), between 2019 and 2020, the cost of fulfilling federal regulations was the equivalent of 3.4 percent of GDP.<sup>20</sup> Although important progress has been made, the need to further reduce regulatory costs, and especially those at the subnational level, is significant. The General Act for Better Regulation (2018) requires government at the national, state, and municipal levels to implement policies that improve regulations across three pillars: institutions, policies, and processes. According to the National Observatory for Better

Regulation, by 2019, progress in improving regulations at the three levels was 86 percent, 51 percent, and 29 percent, respectively.<sup>21</sup> Although some progress has been made through systems such as SARE and PROSARE that have enabled firms to register more easily, the number of municipalities with these programs needs to increase, substantially.<sup>22</sup>

**Weaknesses in the rule of law and concerns about public safety are important obstacles to firms' performance and growth in Mexico.** Only 40 percent of firms in Mexico expressed a high level of confidence in the fulfillment of contract obligations.<sup>23</sup> This lack of confidence likely hinders potential investments, as well as agreements between firms that could contribute to their growth, upgrading, and innovation. Close to 35 percent of firms in Mexico also listed public safety as a recurrent problem for them. This constitutes a serious problem since of the 18 percent of surveyed microenterprises that indicated that they were not interested in growing, about 22.5 percent reported that this was due to their concerns about public safety. For MSMEs, crime

prevalence increases with size. In 2019, 29.6 percent, 48.3 percent, and 56.4 percent of micro, small and medium-sized firms, respectively, were victims of crime (INEGI 2019). The rate of victimization appears to stop increasing with large firms (51.5 percent), which is likely because they have more resources to invest in security. In addition, retail firms were more likely to report being victims of crime (34.2 percent) than was the case with firms providing services (27.8 percent), and those engaged in manufacturing (25.4 percent). Lack of public safety (or the perception of it) can seriously impact the capacity of regions to attract investment and human capital.

## 1.4 Conclusions

**Mexico's entrepreneurship ecosystem has gaps that result in weak entrepreneurial outcomes, which are demonstrated by the large number of low value-added firms, and the limited number of firms that scale up, innovate, and export.**

Despite Mexico's strategic position, and its wide array of free trade agreements, the internationalization of firms is inadequate when compared to the country's peers. Mexico's entrepreneurial ecosystem demonstrates considerable scope for improvement across the three key pillars (supply, allocation, and demand). Among others, inefficiencies in logistics increase the cost of accessing external markets, whereas lack of access to finance is a barrier to scaling up and innovation. Improvements in human capital would also contribute to higher productivity and innovation. Efforts to innovate are not only low, but inadequate university-firm links hinder the transformation of knowledge into innovation. Despite advancements since the General Act for Better Regulation came into force in 2018, further regulatory simplification could decrease firms' costs even more.

However, national trends mask the wide variation across local entrepreneurship systems, which are discussed in detail in Chapter 2.

## Notes

1. INEGI. n.d. Tables on Total Factor Productivity: <https://www.inegi.org.mx/temas/ptf/#Tabulados>, accessed October 26, 2022.
2. World Bank. 2022b. "Country-by-country analysis and projections for the developing world: Latin America and the Caribbean." *Macro Poverty Outlook – October 2022*. [https://www.worldbank.org/en/publication/macro-poverty-outlook/mpo\\_lac](https://www.worldbank.org/en/publication/macro-poverty-outlook/mpo_lac)
3. IADB (Inter-American Development Bank). 2022. "Nearshoring can add annual \$78 bln in exports from Latin America and Caribbean." *News Release*. June 7, 2022. <https://www.iadb.org/en/news/nearshoring-can-add-annual-78-bln-exports-latin-america-and-caribbean>.
4. See Santiago Levy. 2018. "Chapter 5: Misallocation and Firms Dynamics" in *Under-Rewarded Efforts. The Elusive Quest for Prosperity in Mexico*.
5. INEGI. 2017. *Encuesta sobre Investigación y Desarrollo Tecnológico – ESIDET 2017* (Survey on Research and Development and Technological Development).
6. See OECD. *Indicators of Product Market Regulation Database*. Accessed March 13, 2023. <https://www.oecd.org/economy/reform/indicators-of-product-market-regulation/>
7. Ibid.
8. World Bank. 2018. "Country Scorecard: Mexico 2018." *Logistics Performance Index*. <https://lpi.worldbank.org/international/scorecard/column/254/C/MEX/2018/R/LAC/2018/I/UMC/2018>
9. World Bank Group. 2019a. "Mexico – Policy Notes."
10. World Bank. 2020. "Crédito interno al sector privado (% del PIB) – Mexico, 1997–2020 (Domestic Credit to the private sector [% of GDP] – Mexico, 1997–2020)." <https://datos.bancomundial.org/indicador/FS.AST.PRVT.GD.ZS?locations=MX>
11. OECD (Organisation for Economic Co-operation and Development). 2021. "Education at a Glance 2021: OECD Indicators. Mexico." <https://www.oecd-ilibrary.org/sites/2a39f90d-en/index.html?itemId=/content/component/2a39f90d-en>
12. School enrollment, secondary (% net) – OECD members. World Bank Data. <https://data.worldbank.org/indicator/SE.SEC.NENR?locations=OE-MX>.

**13.** According to the OECD (2017b) about 26 percent Mexican workers are over-educated for their job, and 31 percent are under-educated; also, about 40 percent of the workers who are tertiary education graduates work in an occupation that is unrelated to their field of study. Firms reported, too, that they have problems finding enough skilled labor for their needs.

**14.** World Bank Open Data database. CONACYT's *Programa Especial de Ciencia, Tecnología e Innovación (PECITI) 2021–2024* [Special Program for Science, Technology, and Innovation 2021–2024] has set 0.33 percent of GDP as the objective for R&D expenditure by 2024. <https://conacyt.mx/conacyt/peciti/>

**15.** CONACYT. *Programa Especial de Ciencia, Tecnología e Innovación (PECITI) 2021–2024*. [Special Program for Science, Technology, and Innovation 2021–2024]. <https://conacyt.mx/conacyt/peciti/>

**16.** The six LAC countries are Brazil, Chile, Colombia, Costa Rica, Jamaica, and Uruguay.

**17.** Responses on the ENCRIGE 2020 survey (INEGI 2020a) indicated that the cost of fulfilling regulations in 2020 was about Mex\$34,000 for microenterprises, Mex\$287,000 for small firms, Mex\$1 million for medium-sized firms, and Mex\$2.3 million for large firms.

**18.** The number of regulations and processes with which firms must comply increases with size. Based on responses in the ENCRIGE 2020 survey (INEGI 2020a), microenterprises had to fulfill an average of 16.3 processes in 2020, which increased, respectively, to an average of 38, 65.4, and 98.4 processes for small, medium-sized, and large firms.

**19.** ENCRIGE 2020, which INEGI conducted in 2020, surveyed more than 34,000 firms. This survey generated

statistics on the experiences and perceptions of firms when they request public services and carry out procedures that involve the government, as well as the perceptions of firms about the regulatory framework that governs existing firms, and those that intend to establish themselves in Mexico.

**20.** Between 2019 and 2020, the cost of fulfilling state-level regulations was 1.3 percent of state GDP, while the cost of fulfilling regulations at the municipality level was the equivalent of 3.4 percent of local GDP. <https://www.gob.mx/conamer/documentos/grafica-1-carga-regulatoria-como-del-pib>

**21.** See *Observatorio Nacional de Mejora Regulatoria* [National Observatory for Better Regulation]. 2019. "Reporte de Resultados Estatales. Indicador Subnacional de Mejora Regulatoria, 2019." [Subnational Regulatory Improvement Indicator: State Results Report 2019].

**22.** As of September 2022, only 87 municipalities had a SARE or PROSARE license, while 95 municipalities had an expired license. This means that out of around 2,500 municipalities in Mexico, only 182 (7.3 percent) have, or had, a functioning SARE or PROSARE license. The SARE license allows municipalities to open a one-stop-shop (SARE office) for registering low-risk firms at the municipality level, and enabling them to begin operating within three days. A municipality's PROSARE license (i) re-certifies functioning SARE offices for three more years, when they have a license that is about to expire; and (ii) allows non-operational SARE offices to re-open, and operate for three more years.

**23.** INEGI. 2020a. *Encuesta Nacional de Calidad Regulatoria e Impacto Gubernamental en Empresas (ENCRIGE) 2020* (INEGI 2020).

# 2. Spatial and Sectoral Characterization of Impactful Entrepreneurship

## Key Questions

Chapter 2 examines the subnational landscape of businesses in Mexico, with a focus on clusters of impactful entrepreneurship in manufacturing. The chapter first documents differences in entrepreneurship across sectors and regions. It then uses the exact location of each plant, as recorded in the 2019 Mexican Economic Census (INEGI 2019), to identify spatial agglomerations of impactful manufacturing such as high-growth firms, innovative businesses, and exporters. This spatial analysis includes a *deep dive* into three industries with varying degrees of technological complexity: information and communication technology, pharmaceuticals and medical equipment, and agroindustry. The chapter ends with an assessment of the potential drivers of the spatial allocation of impactful manufacturing in Mexico.

The main findings in this chapter are as follows: firms in manufacturing grow much faster during their life cycle than those in services; the dynamism of manufacturing firms differs across regions, and the regional differences seem to have widened over time as the north has become more competitive; the largest cities in Mexico are the ones clustering high-growth and innovative firms, and firms engaged in global markets, and in high-value added economic activities; clusters in low valued-added activities can be as productive as clusters in higher value-added activities; and the availability of skilled labor, access to quality infrastructure, and the quality of local institutions seem to be the main correlates for the localization of impactful entrepreneurship at every stage of a firm's life cycle. However, studies also indicate that for agglomeration to generate the expected benefits, complementary policy interventions are



needed (for example, ones that support housing, schooling, local infrastructure, and waste management). In summary, Chapter 2 aims to answer the following questions:

- What are the most dynamic manufacturing sectors in Mexico?
- How do manufacturing businesses differ across regions in Mexico?
- Where do the most dynamic manufacturing firms agglomerate in Mexico?
- Across industries in Mexico, are there differences in their agglomeration patterns?
- Do the agglomeration patterns of manufacturing in Mexico correlate with differences in the quality of entrepreneurial drivers across geographic space?

**Entrepreneurship in Mexico generally lacks dynamism, but important differences can be found across sectors and geographic regions.**<sup>1</sup> Young businesses in Mexico create jobs at a relatively low rate; a high percentage of businesses employ only the owner; and, on average, over their life cycle, enterprises only double their number of employees. Only a small number of Mexican businesses participate in the global market, and few introduce a new process, product, or organizational innovation. However, there are significant differences across Mexico's sectors and geography. For example, manufacturing establishments in the northern region grow at a pace comparable to those in the US. Also, businesses engaged in manufacturing grow at a faster pace than those in services, and export-oriented manufacturers and, in particular, those in aerospace and motor vehicle production (including auto parts), tend to have even higher growth rates.

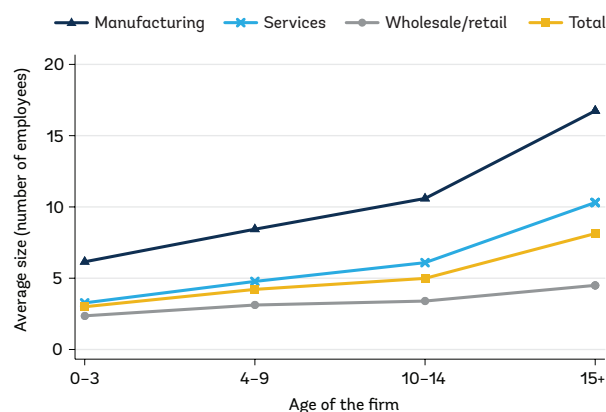
**To help inform policy interventions that support enterprise development, this chapter analyzes the differences in impactful entrepreneurship across both sectors and geographic regions in Mexico.** The term *impactful entrepreneurship* applies not only to the establishment of a large number of formally registered firms, but also to a large number of firms that are growing, innovative, and globally integrated. Identifying geographic regions with impactful entrepreneurship, and more generally, assessing local patterns of impactful entrepreneurship, can shed light on the quality of the underlying conditions for entrepreneurship across

geographic areas. This, in turn, can inform the design of more effective policy interventions. Section 2.1 of this chapter provides an analysis of differences in impactful entrepreneurship across geographic regions and sectors, and this is followed by a spatial assessment of entrepreneurship in manufacturing (section 2.2). Section 2.3 is a “deep dive”, which examines three industries with varying degrees of technological complexity that could play a critical role under the United States-Mexico-Canada Agreement (USMCA). These industries are information and communication technology (ICT), pharmaceuticals and medical equipment, and agroindustry—an industry that could become a lever for impactful entrepreneurship in Mexico's less developed regions. Section 2.4 examines the potential drivers of manufacturing agglomeration across different regions in Mexico, and section 2.5 summarizes the main findings in this chapter.

## 2.1 Differences in entrepreneurship across sectors and regions

**Differences in the productive capacities of manufacturing and services in Mexico are substantial.**<sup>2</sup> Manufacturers employ, on average, twice as many workers as service businesses (including wholesalers and retailers), and manufacturers generate almost 60 percent more value added per worker. Over their life cycle, manufacturers expand, on average, by a factor of around three, while firms in services grow at a significantly slower pace

**Figure 2.1. Firms in manufacturing grow much faster than those in services (2019)**



Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: This figure shows the average number of workers (salaried and non-salaried) throughout the lifecycle of firms for different sectors, as reported in the 2019 Mexican Economic Census. The life cycle of firms was smoothed out using least squares.

(Figure 2.1). However, only 1.4 percent of businesses in manufacturing export directly to other countries (with exports averaging 24 percent of sales, and 52 percent of total exports). For services, the number of direct exporters is even lower at .09 percent. These figures indicate significant potential to connect more businesses to the global economy.

**Export-oriented manufacturers tend to exhibit significant dynamism, and even some lower value-added manufacturers show potential for more growth.**

The top exporting sectors in manufacturing such as aerospace, motor vehicles and auto parts, household appliances, and computer equipment and semiconductors, account for only 3 percent of Mexico’s manufacturing businesses, but generate 37 percent of employment, and 33 percent of value added. These sectors also exhibit significant growth in both employment and exports. In aerospace, approximately 18 percent of businesses were in the top decile of the Mexican firms that achieved high employment growth between 2013 and 2018 (Figure 2.2, panel a). ICT’s share of high-growth firms was lower, at 11 percent, but the sector exhibited a relatively high

share of new exporters (Figure 2.2, panel d). In contrast, lower value-added activities, such as food processing and apparel production tended to have higher rates of entry (Figure 2.2, panel c), but fewer high-growth firms. However, despite the lack of new exporters, agroindustry’s share of exports more than tripled between 2013 and 2018 (Figure 2.2, panels b and d), which suggests the potential for even greater impactful entrepreneurship in agroindustry.

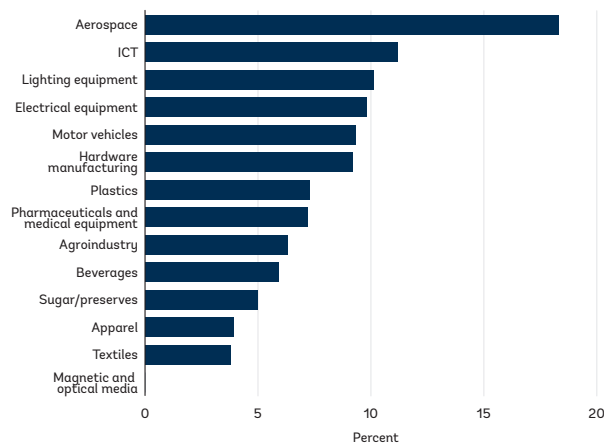
**Heterogeneity in services is substantial.** Service activities, which are in the bottom 10 percent of the distribution of value added per worker (mainly businesses in food preparation services and some categories of the entertainment industry) account for 12.5 percent of the total value added in services, and their value added per worker averages just 38 percent of the average value added per worker in services. In contrast, the value added per worker in transportation is more than six times the average for services, but, respectively, air and rail transportation account for just 4.6 and 2.1 percent of value added in services. The top exporting services<sup>3</sup>—computer system design, management consulting services, and engineering (with 5.7 percent, 2.2 percent, and 1.4 percent of total exports within services, respectively, and value added per worker of 44 percent above the average)—only account for 9.5 percent of value added in services.

**Geographic differences are significant, with Mexico’s northern, north-Pacific, and central regions showing more dynamism and higher industrialization than the southern region.**

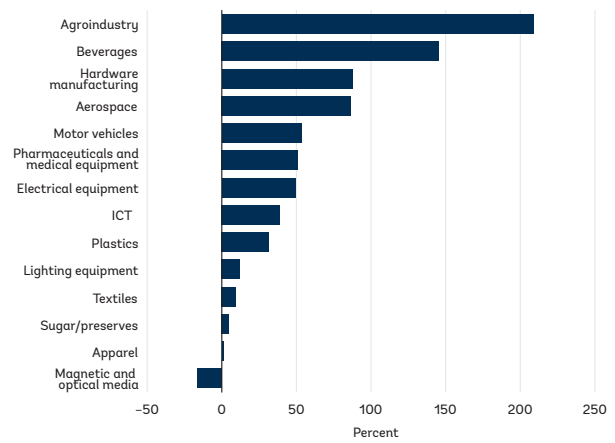
<sup>4</sup> Overall firm entry and exit rates do not differ markedly across regions, but the quality of firms does. In the south, firms in services enter at higher rates, while firms in manufacturing enter at significantly lower rates in comparison to the rest of the country (Figure 2.3, panel a). Based on the average size of establishments, differences in the potential for scale-up are even more significant. While, on average, firms in the north employ 9 workers, and firms in the

**Figure 2.2.** Top exporting sectors exhibit high dynamism but growth in lower value-added manufacturing has been significant

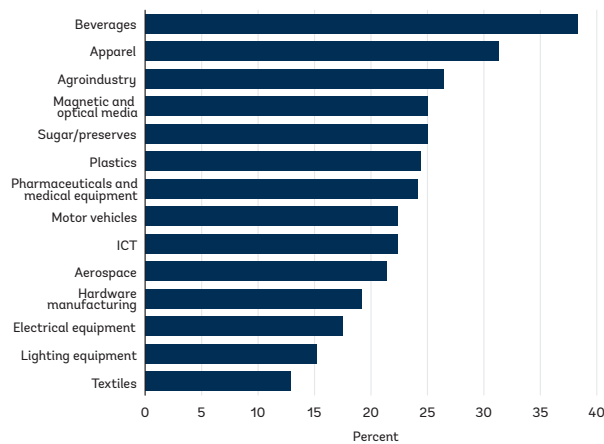
**a.** Share of high growth firms between 2014 and 2019



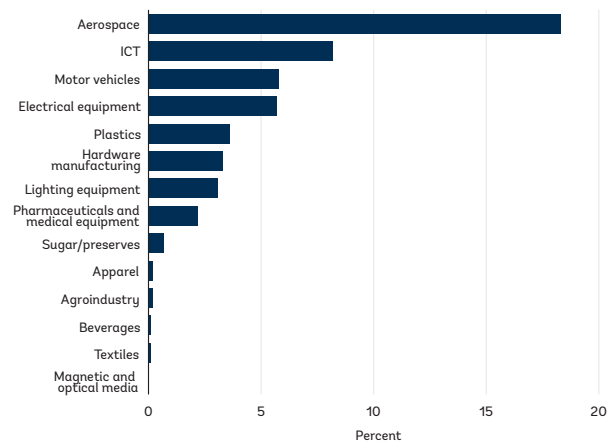
**b.** Growth in exports (among exporters) between 2014 and 2019



**c.** Share of new establishments between 2014 and 2019



**d.** Share of new exporters between 2014 and 2019



Source: WBG staff computations, using data from the 2014 and 2019 Mexican Economic Census (INEGI 2014 and 2019).

Note: High-growth firms were those in the top decile of employment growth between 2014 and 2019. In each sector, growth in exports comprised firms exporting in both years. New exporters were those that were not exporting in 2014, but were exporting in 2019.

north-Pacific and central regions employ approximately 5 workers, firms in the south employ only 3.4 workers (Figure 2.3, panel b). In manufacturing, the differences are even greater, with approximately 47 employees per plant in the north, and fewer than 3 in the south. Similarly, the contribution of manufacturing to economic activity differs

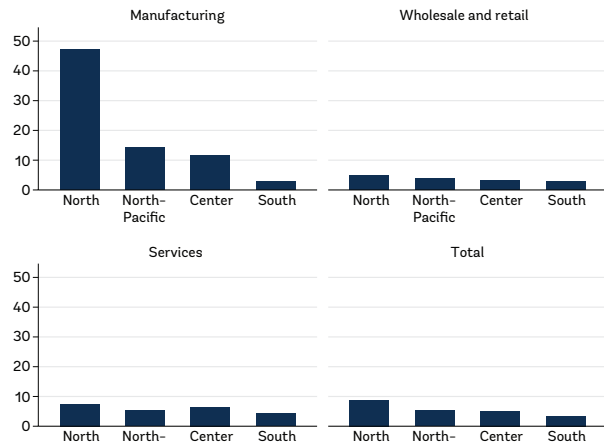
substantially across regions. In the north, manufacturing accounts for close to 33 percent of employment, and 45 percent of value added, while in the south, manufacturing accounts for less than 10 percent of employment, and 10 percent of value added (Figure 2.3, panel c). Manufacturers' exporting potential also varies significantly across regions. In

**Figure 2.3.** Regions show significant differences in entrepreneurship dynamism, and especially in manufacturing

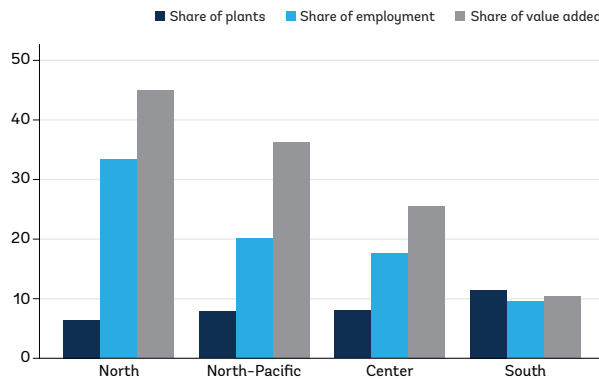
**a. Five-year entry rates (2014–2019)**



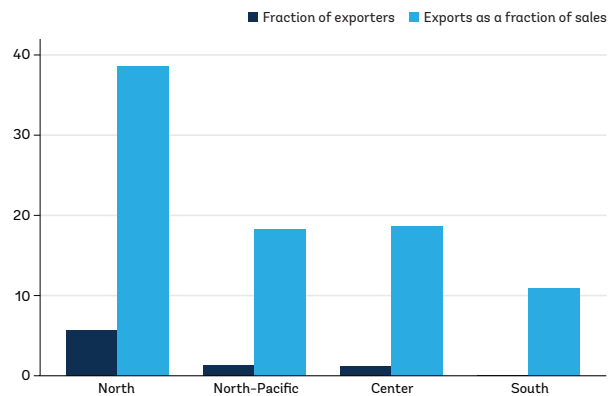
**b. Average establishment size (2019)**



**c. Contribution of manufacturing in each region (2019)**



**d. Exports in manufacturing (2019)**



Source: WBG staff computations, using data from the 2014 and 2019 Mexican Economic Census (INEGI 2014 and 2019).

Note: Panel a shows the fraction of establishments that did not exist in the 2014 Economic Census, but were operating in the 2019 census. Panel b shows the average number of workers (salaried and non-salaried) by region and sector in the 2019 Economic Census. Panel c shows the share of manufacturing plants, the share of employment in manufacturing, and the share of manufacturing value added in each region. Panel d shows the fraction of exporters in manufacturing and exports as a fraction of sales in manufacturing in each region.

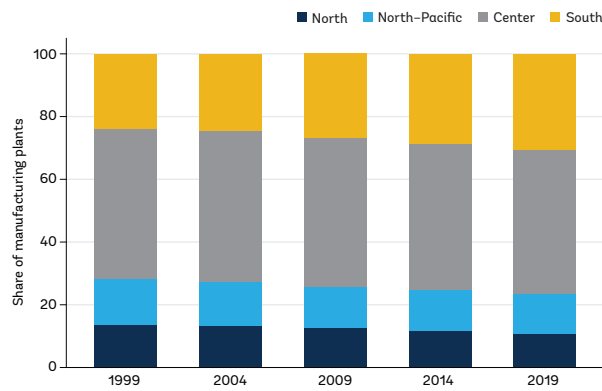
the north, barely 6 percent of manufacturing firms export, and exports comprise almost 40 percent of total sales, whereas in the south, exporting manufacturers comprise only 0.1 percent of all firms, and their exports average only 11 percent of total sales (Figure 2.3, panel d).

**Regional differences in manufacturing potential have widened over time as the north has**

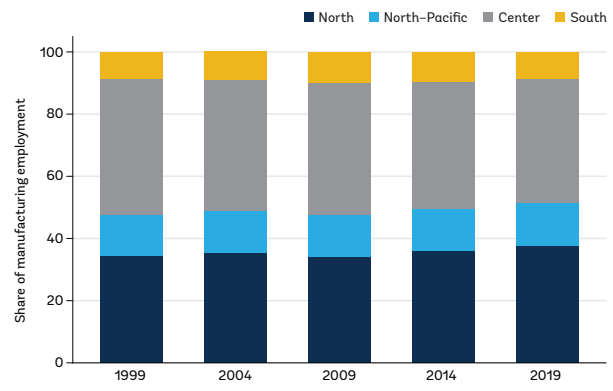
**become more competitive.** Over the past 20 years, the allocation of manufacturing businesses and employment across Mexico has remained relatively constant. States in the south have slightly increased their share of manufacturing firms (Figure 2.4, panel a), but the distribution of employment across regions has remained relatively constant as the average size of manufacturing plants in the south has fallen slightly (Figure 2.4,

**Figure 2.4.** The regional distribution of manufacturing employment has not changed much, but productivity has improved significantly in the north

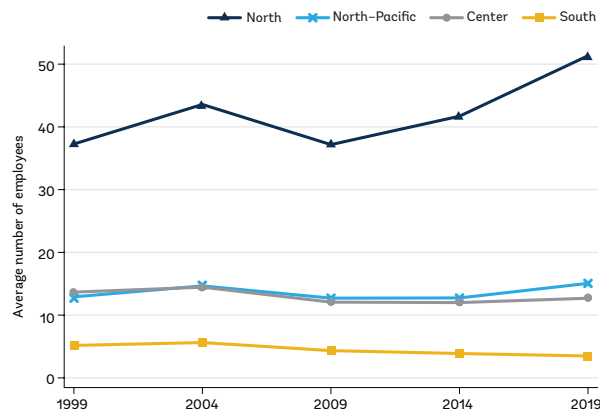
**a.** Distribution of manufacturing plants across regions (1999–2019)



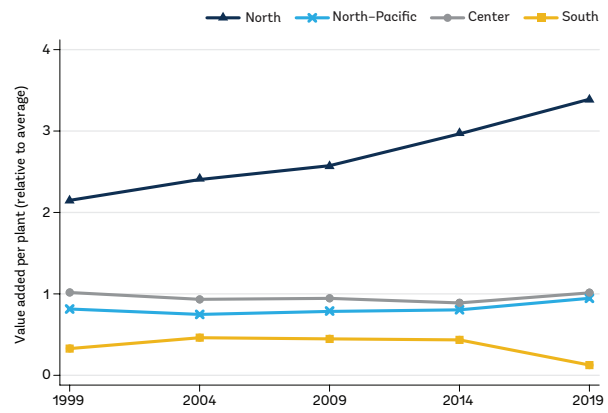
**b.** Distribution of manufacturing employment across regions (1999–2019)



**c.** Average employment in manufacturing plants (1999–2019)



**d.** Value added per establishment in manufacturing (1999–2019)



Source: WBG staff computations, using data from INEGI's Mexican Economic Censuses of 1999, 2004, 2009, 2014 and 2019.

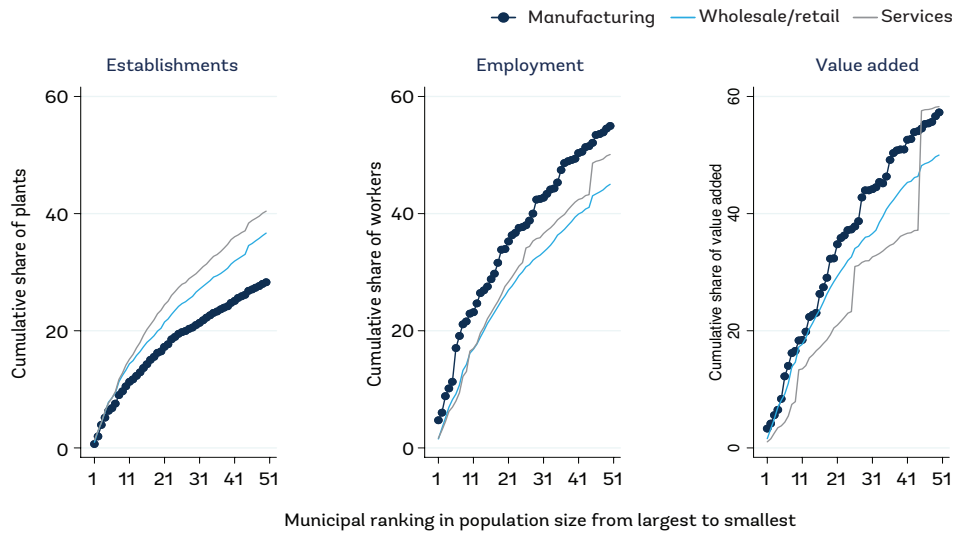
Note: Panels a and b show the distribution of manufacturing establishments and manufacturing employment across regions in each wave of the Establishment Census. Panel c shows the evolution in the average number of workers (salaried and non-salaried) in manufacturing establishments in each region across waves of the Establishment Census. Panel d shows the evolution in the average value added per manufacturing plant in each region (as a fraction of the average value added per manufacturing plant) across waves of the Mexican Establishment Census.

panels b and c). In contrast, the productivity and size of manufacturing plants in the north grew substantially between 1998 and 2018, although with some volatility (Figure 2.4, panels c and d). In particular, the average value added per plant in the north grew from 2 to 3.5 times the national average over this period, while value added remained relatively constant in the rest of the country.

## 2.2 The spatial assessment of manufacturing entrepreneurship

In Mexico, economic activity has increased with the growth in population density, but manufacturing is more concentrated in large cities. Across the world, economic activity tends

**Figure 2.5.** The largest municipalities, combined, account for larger shares of employment and value added in manufacturing when compared with wholesalers, retailers, and other services (2019)



Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: This figure shows the total share of plants, employment, and value added in the top 50 municipalities by population size. In each panel, municipalities are first sorted from the largest to the smallest in population size, and then their cumulative share of businesses, employment, or value added is computed. For each value on the x-axis, the y-axis shows the total share accumulated in the municipalities up to that population size.

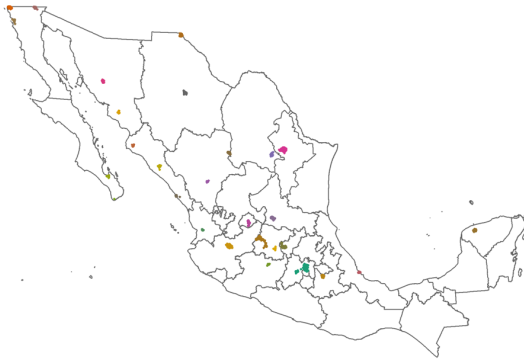
to concentrate in the largest cities (Grover, Lall, and Maloney 2022). Similarly, in Mexico, the share of businesses, employment, and value added has increased, along with population density. In manufacturing, however, the largest cities account for disproportionately high shares of employment and value added (Figure 2.5). For example, Mexico’s 10 most populated municipalities account for 23 percent of employment in manufacturing, but only 16 percent of employment in wholesale and retail, and 17 percent of employment in services.

**The largest cities in Mexico have the most dynamic manufacturing firms, and together they account for a significant share of manufacturing value added.** In Mexico, impactful entrepreneurship in manufacturing tends to agglomerate in the main cities, with different dimensions of potential clustered in the same location (Figure 2.6). While clusters of impactful entrepreneurship account for

only 4 percent of establishments, in manufacturing, they account for 53 percent of employment, and 56 percent of value added.<sup>5</sup> The identification of spatial clusters in this report did not rely on the distribution of businesses across administrative divisions, but instead identified the exact location of each plant, which was recorded in the 2019 Mexican Economic Census (one of the few datasets in an emerging market country to offer this level of detail). The metropolitan areas of Mexico City, Guadalajara, Monterrey, Puebla, Queretaro, León, San Luis Potosi, Chihuahua, and Tijuana, which is on the US border, have clusters of new formal businesses (Figure 2.6, panel a), existing formal businesses (Figure 2.6, panel b), high-growth firms (Figure 2.6, panel c), innovative businesses (Figure 2.6, panel d), and exporters (Figure 2.6, panel e). This suggests that similar complementary factors are driving the differing dimensions of impactful entrepreneurship and that these complementary

**Figure 2.6.** Impactful manufacturing entrepreneurship is clustered in the main Mexican cities and metropolitan areas (2019)

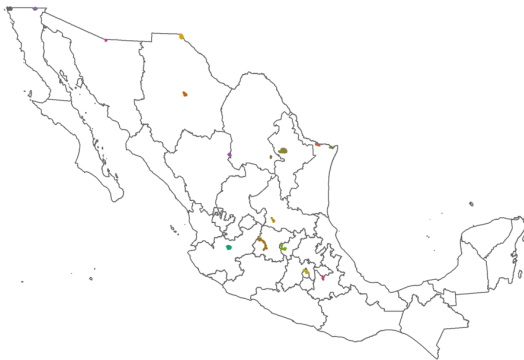
**a.** Entry of formal firms



**b.** Formal businesses



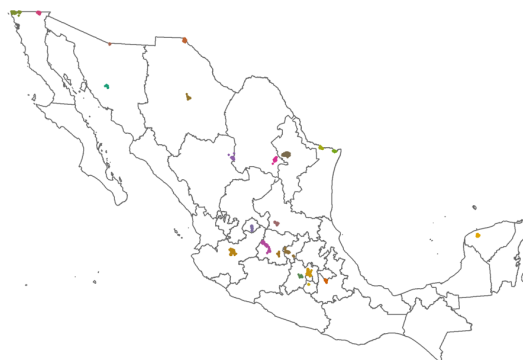
**c.** High-growth firms



**d.** Innovative businesses



**e.** Exporters



Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Clusters were identified using a machine learning algorithm for two main parameters—the radius and the minimum number of points (plants in a cluster). The radius determined the size of the neighborhood to examine in order to find firms with the same characteristics, and the minimum points' parameter determined the minimum number of firms required in the neighborhood for this to be considered a cluster. The radius was set at 30 kilometers (km). The minimum points were defined separately for each characteristic, and they were set at the 90th percentile of the distribution of the number of establishments with the specific characteristic across the municipalities. Firms located on the border of the radius were not considered to belong to the cluster. Panel a presents data on firms that are younger than 3 years of age, and registered with the social security administration. Panel b presents data on firms registered with the social security administration. Panel c presents data on firms in the top decile of employment growth between 2014 and 2019. Panel d, on innovative firms, presents data on firms with patents registered in any year between 2016 and 2018 (as reported by the respondent). Panel e presents data on exporting firms.

**Table 2.1.** Data on agroindustry, pharmaceuticals and medical equipment, and ICT compared to other manufacturing sectors (2019)

Sector	Share of plants	Share of labor	Share of value added	Average number of employees	Value added per plant	Share of workers in managerial positions	Share of salaried employees	Average wage of a production worker
Agroindustry	4.9	4.0	3.9	12.0	0.8	22	58.0	0.93
Pharmaceuticals and medical equipment	0.8	4.7	4.0	86.7	5.0	18	85.6	1.04
ICT	0.2	6.4	3.5	426.2	15.9	16	82.7	1.05
Others	94.1	84.8	88.6	13.2	0.9	15	71.0	1.00
All manufacturing sectors	100	100	100	14.6	1.0	16	71.9	1.00

Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Salaried employees are those that have a directly dependent relationship with establishments. The share of labor corresponds to the share of workers (both salaried and non-salaried). The average number of employees also includes non-salaried workers. Value added per plant, and the average wage of a production worker at the sectoral level, are presented relative to the average value for the manufacturing sector.

factors are likely found in only a limited number of municipalities. Nearly every state in the country has clusters of new and existing formal firms, including states in the south, which is consistent with the findings of Iacovone and his co-authors (2022), who have documented the fast-growing municipalities in the south that have caught up with Mexico's productivity frontier. However, high-growth firms, innovative firms, and exporters tend to cluster in a few large cities, which are mainly in the north, north-Pacific, and central regions; only Yucatán in the south exhibits a cluster of exporters.

## 2.3 The entrepreneurship spatial assessment in agroindustry, pharmaceuticals and medical equipment, and ICT

The spatial assessment of entrepreneurship in manufacturing examined three industries with

**varying degrees of sophistication that could play a critical role under the United States-Mexico-Canada Agreement, or that are potential levers of entrepreneurship in less developed regions.** These comprise information and communication technology (ICT), pharmaceuticals and medical equipment, and agroindustry.

**Agribusinesses, businesses manufacturing pharmaceuticals and medical equipment, and businesses in ICT account for comparable shares of value added, but the characteristics of the average plant differ markedly.** Firms in agroindustry contribute, on average, 80 percent of the value added of the average firm in Mexico (Table 2.1). They tend to be small (around 12 employees, on average) and employ a significant percentage of informal (non-salaried) employees. Firms in pharmaceuticals tend to employ more workers and have relatively more skilled workers (proxied by the average wage of a production worker), and they contribute five times the value



**Table 2.2.** Entrepreneurship assessment in agroindustry, pharmaceuticals and medical equipment, and ICT (2019)

Sector	Share of new formal plants	Share of formal plants	Share of high-growth plants	Share of exporters	Share of plants with patents
Agroindustry	0.7	6.8	6.3	0.4	0.3
Pharmaceuticals and medical equipment	4.3	30.5	7.2	7.4	1.9
ICT	8.5	65.1	11.2	36.1	2.3
All manufacturing sectors	1.4	9.0	5.2	1.4	0.2

Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: “New plants” were those three years old or less in 2019. “Formal” refers to compliance with the social security administration. “High-growth plants” were those in the top decile of employment growth between 2014 and 2019. “Patents” refers to patents registered between 2016 and 2018 (as reported by the respondent).

added of the average manufacturing firm. Firms in ICT account for only 0.2 percent of the establishments in manufacturing, but they contribute, on average, 16 times the value added of the average manufacturing firm. Production workers in the ICT industry (those who are not in managerial positions) are relatively more skilled, with earnings 5 percent higher than the earnings of the average Mexican worker in manufacturing.

**Industries characterized by larger and more productive businesses also exhibit more impactful entrepreneurship with regard to formality, high growth, innovation, and exports.** The rate of formal business creation in agribusiness is less than 1 percent, while in pharmaceuticals and medical equipment, the rate is three times the average, and in ICT, it is six times the average (Table 2.2). Although in agribusiness only 0.3 percent of firms report registering patents, in pharmaceuticals and medical equipment, the share of firms seeking patents is close to 1.9 percent, and it is 2.3 percent for ICT firms. Similarly, while the share of high-growth firms is only 6.3 percent for agribusiness, and 7.2 percent for pharmaceuticals and medical equipment, the share almost doubles to 11.2 percent for ICT.

**Across the three industries—agribusiness, pharmaceuticals and medical equipment, and ICT—the most dynamic and higher value-added establishments are clustered in the most dynamic locations in Mexico.** The spatial allocation of these businesses shows that higher value-added activities are clustered in fewer and larger locations, including some in the south. This suggests that the factors supporting more complex economic activities are likely found only in the more dynamic cities. In agroindustry, clusters of enterprises are found in all states; many states have multiple clusters; and this is especially the case in Mexico’s central and southern regions (Figure 2.7, panel c). However, the largest agribusiness cluster is located in metropolitan Guadalajara. This cluster accounts for 4.6 percent of firms, and 8.4 percent of employment in the industry. In contrast, agribusiness clusters in the south are substantially smaller—accounting for only 1.1 percent of employment in the industry in Chiapas, 0.8 percent in Yucatan, 0.5 percent in Veracruz, 0.4 percent in Tabasco, and only 0.1 percent in Campeche.<sup>6</sup> Clusters of pharmaceutical firms are located in fewer states, but many are found in the south (in Merida, Yucatan, Tuxtla Gutierrez, and Chiapas),

**Figure 2.7.** Higher value-added economic activities tend to cluster in larger cities (2019)

**a. ICT**



**b. Pharmaceuticals and medical equipment**



**c. Agroindustry**



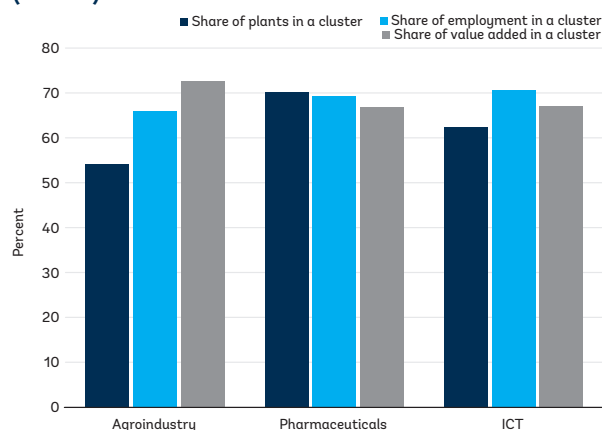
Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Clusters for each industry were identified using a machine learning algorithm for two main parameters—the radius and the minimum number of points (plants in a cluster). The radius determined the size of the neighborhood to examine in order to find firms in the same industry, and the minimum points' parameter determined the minimum number of firms required in the neighborhood for this to be considered a cluster. The radius was set at 30 km. The minimum points were defined separately for each industry, and set at the 90th percentile for the distribution of the number of establishments in the industry across municipalities. Firms located on the border of the radius were not considered to belong to the cluster. Panel a presents data on the ICT industry, which includes the NAICS codes: 3341 (computer and peripheral equipment manufacturing), 3344 (semiconductor and other electronic component manufacturing), 3352 (household appliance manufacturing), 334220 (radio and television broadcasting and wireless communications equipment manufacturing), and 334310 (audio and video equipment manufacturing). Panel b presents data on the pharmaceutical and medical equipment industry, which includes the NAICS codes: 3254 (pharmaceutical and medicine manufacturing), 3391 (medical equipment and supplies manufacturing), and 334519 (other measuring and controlling device manufacturing). Panel c presents data on agroindustry, which includes the NAICS codes: 3115 (dairy product manufacturing), 3116 (animal slaughtering and processing), and 3117 (seafood product preparation and packaging).

and in small- and medium-sized cities such as Puebla, Queretaro, Leon, and Irapuato (Figure 2.7, panel b). Mexico City has the largest cluster of pharmaceutical firms: 21.6 percent of firms, and 12 percent of the industry's employment. With regard to ICT, clusters are found primarily in the largest cities and metropolitan areas (Mexico City, Guadalajara, Monterrey, Queretaro, Puebla, and Chihuahua), as well as along the border with the US (Figure 2.7, panel c). The largest ICT cluster is in the Tijuana-Mexicali corridor, and accounts for 18.7 percent of firms, and 19.7 percent of the industry's employment.

**Businesses in agroindustry, pharmaceuticals and medical equipment, and ICT appear to be more productive when they are clustered together, which suggests important gains from close proximity.** In Mexico, businesses found in clusters tend to have a large share of employment, and of value added (Figure 2.8). In agribusiness, clustered enterprises account for 66 percent of employment, and 73 percent of value added. With regard to pharmaceuticals and medical equipment, and ICT, clustered businesses account for nearly 70 percent of employment, and of value added. In addition, establishments clustered in a densely populated municipality are more productive when compared to establishments in the same industry and in locations of the same size (and potentially in the same city), but which are not part of a cluster. This indicates significant benefits from the agglomeration of economic activity. For example, for manufacturing establishments in the top 10 percent of labor productivity, those located in larger cities are, on average, more productive; however, productivity is significantly higher if establishments are spatially close to other high productivity manufacturers (regardless of their economic activity), and this is the case even when controlling for city size (Figure 2.9, panel b). The gains from business agglomeration are significant even in lower value-added activities. The average

**Figure 2.8. Most employment and the most value added is generated in clusters (2019)**



Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Employment includes both salaried and non-salaried workers.

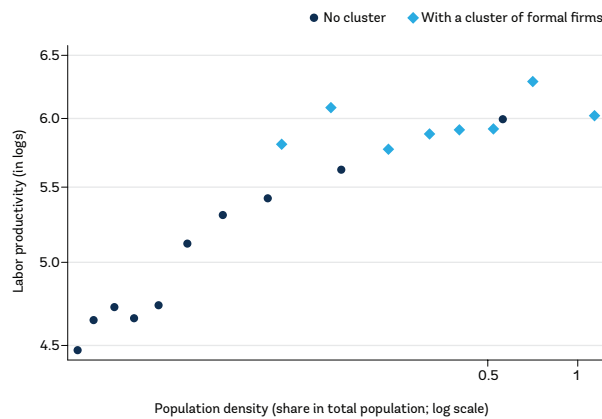
value added per worker in clusters in large cities is comparable across agroindustry, pharmaceuticals, and ICT (Figure 2.10), which suggests that some clusters in agroindustry are as productive as clusters in more technologically complex activities such as pharmaceuticals and ICT.

## 2.4 Potential drivers of the spatial allocation of entrepreneurship

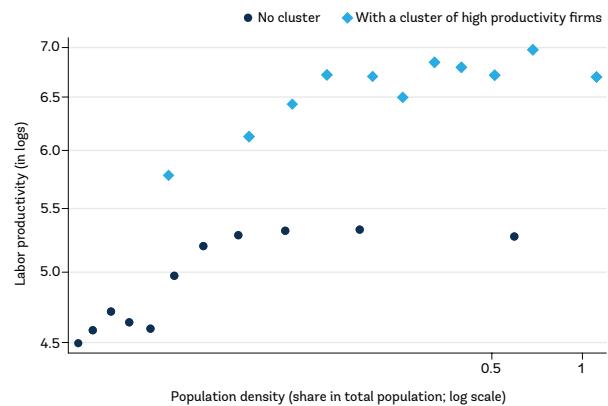
**The agglomeration patterns of manufacturing activity documented above suggest that the factors that are conducive to impactful entrepreneurship differ across regions in Mexico.** The life cycle of a business from entry and formalization to scaling up, and eventually innovating and exporting, is highly influenced by local conditions. Firms need resources: physical infrastructure (for example, energy, water, and transportation), physical capital (facilities and equipment), human capital, and knowledge. Some of these resources might be acquired in distant markets, but local

**Figure 2.9. Agglomeration leads to large productivity gains (2019)**

**a. Formal firms**



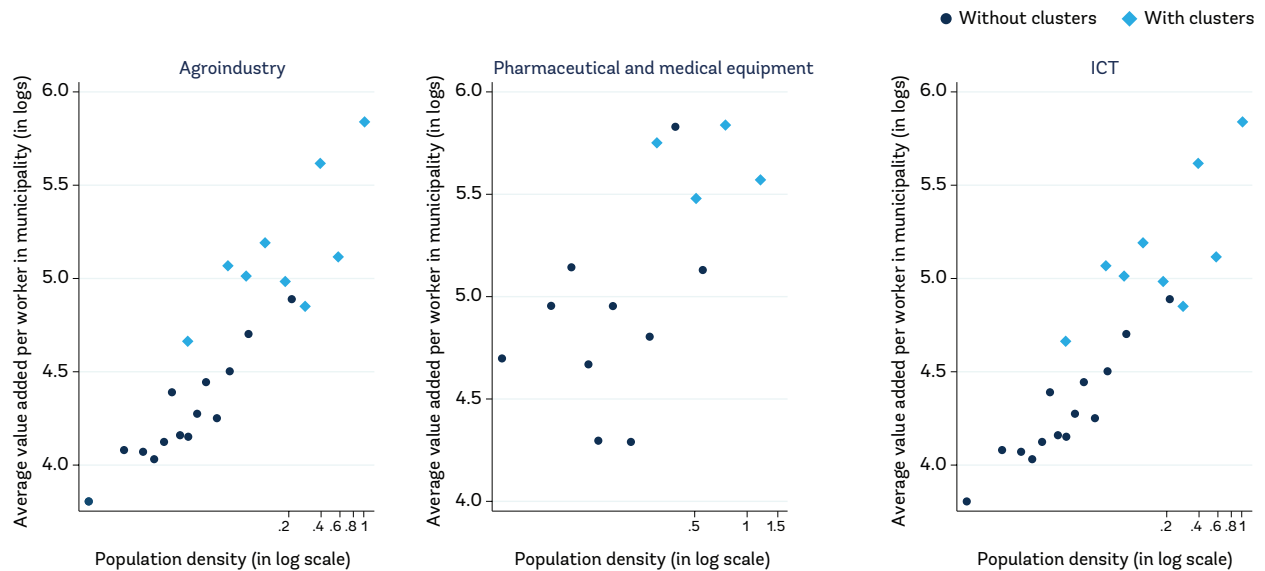
**b. High productivity businesses**



Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Binned scatter plots using municipalities with a population above 25,000. In panel a, the x-axis shows the population density (measured as the share of the total population) across municipalities, and the y-axis shows the average value added per worker (in logs) across establishments in a cluster of formal firms, and outside the cluster (but possibly in the same municipality). Similarly, on the y-axis, panel b shows the average value added per worker (in logs) across plants in a cluster of high productivity plants (in value added per worker), as well as outside the cluster (but possibly in the same municipality).

**Figure 2.10. Clusters in low value-added sectors can be as productive as clusters in higher value-added sectors (2019)**



Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Binned scatter plots. In each panel, the x-axis shows the population density (measured as the share of the total population) across municipalities, and the y-axis shows the average value added per worker (in logs) across establishments in the municipality that belong to a cluster in each industry, and those in the industry that are outside the cluster (but possibly in the same municipality).

conditions will still influence the cost and ease of producing goods or providing services. Talent and knowledge, for example, are challenged by the cost of mobility. Similarly, the ease of accessing material inputs and transporting final products to other markets, and physical infrastructure such as electricity are, to a large extent, highly influenced by local surroundings. Multiple aspects of the business environment such as regulations, institutions, and public safety also have important local dimensions. The localization patterns of manufacturing activity in Mexico, which are documented above, point to spatial differences in the quality of entrepreneurial drivers, both across and within geographic regions (the north, north-Pacific, center, and south). Many of the factors that are critical to help strengthen manufacturing ecosystems require investment, human resources, and time to mature. Understanding the main drivers of impactful manufacturing across geographic space can help to better design interventions, and target support by focusing policies on the needs and potential of different locations.

**In Mexico, the availability of skilled labor, access to quality infrastructure, and the quality of local institutions seem to be the main correlates for the localization of impactful manufacturing firms at every stage of their life cycle.** A least squares analysis was combined with results from a LASSO (a machine learning technique that is helpful for identifying the predictors of a variable) to identify factors that are associated with entrepreneurship outcomes across geographic space.<sup>7</sup> The selection of potential factors was informed by the literature, including recent in-depth studies on the determinants of productivity growth in Mexico (Levy 2018; Iacovone et al. 2022; and Bloom et al. 2022). The fraction of skilled workers (those with a college degree or more) positively correlates with the likelihood that a municipality has clusters of impactful manufacturing businesses at every stage of their life

cycle from entry, to formality, to scale-up, to innovation, and to exporting (Table 2.3). These data could indicate that lack of talent is constraining manufacturing clusters' growth in Mexico. Measures of the quality of local physical infrastructure positively correlate with whether a municipality has a cluster of new formal firms, existing formal firms, high-growth firms, and/or innovative firms. Proxies for the quality of local institutions statistically correlate with the agglomeration of high-potential manufacturing businesses at critical stages of their life cycle (entry, scale-up, and exporting). Proxies for access to finance statistically predict only the potential for formal firms' entry, while distance to the border with the US negatively correlates with formal, high-growth, and export-oriented clusters. Access to knowledge (proxied by the share of researchers per capita) is positively associated with innovation (negative correlation with entry could indicate that resources were reallocated from young businesses to more mature ones). Other factors such as access to material inputs or technology, demand for the final product, and taxes and regulations do not statistically correlate with the spatial patterns of manufacturing activity.

**Regional entrepreneurship agglomerations are shaped by local conditions.** The north is the top-ranking region for many of the drivers that are more closely linked with dynamic entrepreneurial locations. According to the Mexican Economic Census 2019 (INEGI 2019), the northern region had the highest percentage of manufacturing establishments that collaborate with universities (1.22 percent between 2016 and 2018, which was more than twice the national average); patent registration was about twice the national average; and lack of access to finance that kept 20.5 percent of firms from undertaking projects, was the lowest percentage across Mexico's four regions.<sup>8</sup> The north also had the lowest percentage of firms that found the cost of material inputs to be an issue

**Table 2.3.** Correlation between entrepreneurship outcomes in manufacturing and potential drivers across municipalities (2019)

Factors	Likelihood of the municipality exhibiting a cluster for each entrepreneurship outcome				
	Formal entry	Formality	Scale-up	Innovation	Exports
Human capital: Share of employees in manufacturing with a college degree or more	+	+	+	+	+
Access to material inputs: Fraction of businesses that report costs of material inputs as a barrier					
Access to technology: Fraction of businesses that report lack of access to technology as a barrier					
Knowledge: Share of researchers per capita	-			+	
Infrastructure: Fraction of households with fiber-optic internet	+	+		+	
Demand: Fraction of businesses that report low demand as a barrier					
Competition: Fraction of businesses that report unfair competition as a barrier					
Access to finance: Fraction of businesses with a loan	+				
Taxes and regulations: Ease of starting a formal firm					
Institutions: Fraction of businesses that report corruption as a barrier	-		-		-
Distance to the US border		-	-		-
Population density	+	+	+	+	+

Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: The table shows the intersection of results from a least squares and a LASSO analysis. The table shows the correlation between the likelihood of the municipality exhibiting a cluster of manufacturing entrepreneurship in each dimension (entry, formality, scale-up, innovation, and exports), and the potential drivers shown in a multivariate least squares analysis that also controlled for population density. The table shows only those drivers, which according to the LASSO analysis, have predictive power. Formal entry and formality correspond to firms complying with social security regulations; scale-up corresponds to high employment growth (in the top decile of employment growth); and innovation corresponds to firms with patents.

(13.7 percent versus 17.1 percent at the national level),<sup>9</sup> and this region is the closest to the US border. As a result of all of these drivers of firms' performance, the north had higher entry rates of formal firms that scale up (Figure 2.3, panels a and b), and eventually upgrade and export, directly (Figure 2.3, panel d), or export, indirectly, through their integration into GVCs.

**The central region of Mexico also displays clusters of impactful entrepreneurship, although it lacks some of the natural advantages of the north, while the north-Pacific region is closer to the national average on several drivers.** The central region, which has a high percentage of economic units and workers, also has a dynamic entrepreneurial ecosystem, but it generally lags behind the north. The north has the highest percentage of firms, which indicates that finding available labor (42.7 percent versus 39.6 percent, nationally) and qualified labor (14.9 percent versus 12.6 percent, nationally) was a relevant factor in determining location.<sup>10</sup> Collaboration with universities,<sup>11</sup> and registering patents or trademarks for products and processes,<sup>12</sup> were both slightly above the national average. Lastly, the north-Pacific region (where the city of Guadalajara is located) ranks below the national average with regard to the percentage of firms for which an adequate supply of qualified labor was relevant in determining their location.<sup>13</sup> The high cost of material inputs is an issue for firms in the north-Pacific region,<sup>14</sup> but this is less frequently a problem than in the central region, and more frequently a problem than in the north. University-industry collaboration and patenting activity are both above the national level in the north-Pacific region, although R&D spending is lower than in the northern and central regions.

**These drivers also explain why the south exhibits fewer and smaller agglomerations, relative to the rest of the country, and lags behind**

**other regions on impactful entrepreneurship.** The south had the lowest percentage of MSMEs reporting that the availability and qualifications of labor were an important factor in choosing their location, which suggests that fewer projects were leveraging skilled labor than in the other regions.<sup>15</sup> With regard to knowledge, the region had the lowest level of university-industry collaboration (equivalent to 30 percent of the national average), and the lowest level of patent registration (equivalent to 27 percent of the national average).<sup>16</sup> At the same time, the south had the highest percentage of firms reporting that the cost of material inputs was a barrier,<sup>17</sup> which could reflect the longer distance to the US border, as well as the lack of gas pipelines, both of which are critical for the entry and scaling up of manufacturing firms. In addition, the southern region has the highest percentage of MSMEs reporting that they could not undertake a project due to lack of financing (28 percent versus 22.9 percent for the national average).<sup>18</sup> Greater gaps in the entrepreneurial drivers explain the weaker entrepreneurial ecosystems of the south, in comparison to the rest of the country, and this results in lower entry of productive and formal firms, and lower shares of high-growth and exporting firms (Figures 2.4 to 2.6).

## 2.5 Conclusions

**In Mexico, manufacturing firms are positively sorted into clusters—in both quantity and quality—and these clusters potentially matter for productivity.** Evidence on the sorting of firms across geographic space is relatively limited, and available mainly for high-income economies (Combes et al. 2012, for France; De la Roca and Puga 2017, for Spain; and Oberfield et al. 2020, for the US). The analysis in this chapter used the exact locations of firms to identify clusters. The results show that manufacturing firms also tend to gravitate in both numbers and quality to Mexico's larger cities. Larger cities in Mexico not only exhibit larger shares of employment and value

added (sorted by quantity), but also cluster high-growth and innovative firms, firms engaged in global markets, and firms in higher-value added economic activities (sorted by quality). Moreover, the analysis of firms in agribusiness, medical equipment and pharmaceuticals, and ICT suggests that, potentially, there are important gains from agglomeration. When businesses in an industry are located in larger cities, their productivity increases. Also, relative to plants outside the cluster (in the same city or in cities of comparable size), their productivity is even higher when they are clustered together with other establishments in the same industry. However, more analysis is needed to validate these results with other manufacturing activities, and to disentangle the role of factor endowments, relative to sorting and agglomeration effects.

**Differences in agglomeration patterns across regions in Mexico suggest that factors conducive to impactful entrepreneurship are not uniformly distributed across the country.** Agglomeration of the different dimensions of impactful entrepreneurship in a very limited number of cities (Mexico City, Guadalajara, Monterrey, Puebla, Queretaro, León, San Luis Potosi, Chihuahua, and Tijuana) suggests that growth, innovation, exports, and technologically complex activities such as ICT require similar complementary factors, which are not uniformly distributed across geographic space and, instead, are likely clustered in specific locations. The correlates presented in this chapter suggest that the quality of local physical infrastructure, the quality of local institutions, access to material inputs, access to finance, and the availability of skilled labor are potential drivers for the location of manufacturing. Actual estimates of the causal impact of each of these drivers could be further explored in a future analysis. However, differences in these factors across regions are substantial, and these differences help explain why the south has fewer

business agglomerations, and generally lower value-added activities (such as agribusiness). Some clusters of formal businesses, exporters, and pharmaceutical firms, however, are found in the South, which is consistent with what Iacovone and his co-authors (2022) found across municipalities regarding convergence.

**To foster impactful entrepreneurship, policy interventions need to address barriers that are specific to a location, and to the lifecycle of firms, and consider both the gains from agglomeration but also the complementary policies that are needed to avoid potential congestion effects.** History and geography are important determinants for the spatial allocation of economic activity (Grover, Lall, and Maloney 2022). At the same time, when a location manages to develop the required capabilities to produce a relatively complex product, businesses and resources can more easily move into other complex or more technologically advanced products (Hausmann et al. 2013). As the location develops, the demand for knowledge, technology, and human capital increases, with the potential to generate more ideas, and in turn, more impactful entrepreneurship in an endogenous growth cycle. Policy interventions intended to promote impactful entrepreneurship need to be developed with consideration of the barriers that are specific to the lifecycle of firms (from entry to growth, innovation, and global integration), as well as to each location. Also interventions need to ensure that the necessary complementary policies are in place to mitigate potential congestion effects (Iacovone et al. 2022; Grover, Lall, and Maloney 2022), while also leveraging the more developed clusters to potentially capture wider spillover effects. Recent analytical frameworks such as the one developed by Grover and her co-authors (Grover et al. 2022) could be complemented with the results in this chapter to comprehensively estimate the impact of any spatially targeted intervention and to



identify complementary policies that would also need to be in place to address potential negative externalities from agglomerations (such as lack of housing, local infrastructure, schooling, waste management, and so on).

## Notes

**1.** While the *establishment* is the unit of observation in the data, the terms *business*, *firm*, *plant*, and *establishment* are used interchangeably in this report, unless noted otherwise.

**2.** The analysis in this section uses establishment-level data from the 2019 Mexican Economic Census (INEGI 2019). The census was implemented in 2019 (between February and July), but the data on sales, employment, and value added correspond to annual figures for the 2018 calendar year.

**3.** Transportation accounts for 67 percent of total exports within services, while other sectors such as insurance and financial services only account for 6 percent.

**4.** For the purposes of this report, the northern region comprises the states of Baja California, Baja California Sur, Chihuahua, Coahuila, Nuevo Leon, Sonora, and Tamaulipas; the north-Pacific region comprises the states of Aguascalientes, Colima, Durango, Jalisco, Nayarit, Sinaloa, and Zacatecas; the central region comprises Mexico City, and the states of Mexico, Guanajuato, Hidalgo, Michoacan, Morelos, Puebla, Queretaro, San Luis Potosi, and Tlaxcala; and the southern region comprises the states of Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, and Yucatán.

**5.** A cluster is a spatial agglomeration of plants within a radius of 30 km (with GPS coordinates translated into a Cartesian plane), and a minimum size above the 90<sup>th</sup> percentile in the distribution of the number of plants across municipalities (with this minimum varying across categories).

**6.** The forthcoming IFC study, “Mexico Southern States Deep Dive”, also identified a strong potential for agribusiness in the southern states.

**7.** A binary indicator on whether the municipality exhibits a cluster of entrepreneurs was regressed, based on the list of drivers. A similar specification was estimated in the LASSO to identify the predictors of the dependent variable. Table 2.3 presents the intersection of the two sets of results. Each entrepreneurship outcome was analyzed separately.

**8.** INEGI. 2018. ENAPROCE 2018.

**9.** INEGI. 2019. Economic Census 2019.

**10.** INEGI. 2018. ENAPROCE 2018.

**11.** According to INEGI’s Economic Census 2019, 0.52 percent of manufacturing establishments in the central region collaborate with universities versus an average 0.5 percent at the national level.

**12.** According to INEGI’s Economic Census 2019, 0.38 percent of manufacturing establishments in the central region have filed a patent or trademark for a product or process, versus an average 0.35 percent at the national level.

**13.** According to INEGI’s Economic Census 2019, 36.8 percent and 10.5 percent of firms, respectively, mention the availability and qualifications of labor as a determining factor for location, versus 39.6 percent and 12.6 percent, respectively, at the national average.

**14.** According to INEGI’s Economic Census 2019, 16.2 percent of firms in this region listed the high costs of material inputs as an issue, versus 17.1 percent at the national level.

**15.** INEGI. 2018. ENAPROCE 2018.

**16.** INEGI. 2019. Economic Census 2019.

**17.** INEGI. 2019. Economic Census 2019.

**18.** INEGI. 2018. ENAPROCE 2018.

# 3. Supporting Entrepreneurship Ecosystems

## Key Questions

This chapter analyzes the instruments available to support entrepreneurship in Mexico by mapping the relevant public programs and initiatives implemented by non-public institutions (ecosystem enablers). The analysis considered both the entrepreneurial outcome sought (entry, scale-up, innovation, or internationalization), and the beneficiary segment (MSMEs, technology-based companies, or startups). This analysis found that the public resources available to spur entrepreneurship have diminished in recent years, and that initiatives tend to target existing companies. Also, public initiatives tend to provide comparatively little support to technology-based firms and startups, although these are the types of firms with the potential to create more and better employment opportunities through higher value-added activities. Non-public enablers are also contributing to the entrepreneurship ecosystem, primarily by supporting startups and the internationalization of firms, but their support tends to focus more on developed ecosystems. This chapter addresses the following questions:

- What is the current policy mix of public and non-public programs that support the creation, growth, innovation, and internationalization of firms in Mexico?
- How do federal and state programs complement each other? How do state programs adapt to the different maturity levels of entrepreneurship ecosystems across states?
- Are the public programs targeting all types of beneficiaries, such as MSMEs, technology-based companies, and startups?
- Are entrepreneurship support programs following best practices in design, implementation, and governance?
- What are the characteristics of entrepreneurship ecosystem enablers in Mexico, and how are they allocating resources to support entrepreneurship?

## 3.1 Introduction

**As discussed in previous chapters, some pillars of entrepreneurship ecosystems in Mexico remain weak, and there are substantial regional disparities.** Although in some regions, efforts to improve key conditions are occurring due to the participation of multiple public and non-public enablers, in most regions of Mexico, entrepreneurship ecosystems are still at an early stage, and they lack the necessary conditions for “take-off”.

**An adequate policy mix, which is complemented by non-public enablers, could contribute to addressing the barriers that hinder the development of entrepreneurship ecosystems.**

To promote firms’ creation, growth, and innovation, entrepreneurship ecosystems should be fostered by public and non-public actors through their interaction, collaboration, complementarity, and joint allocation of resources. Nevertheless, public interventions to support entrepreneurship and firm growth must focus on addressing specific institutional or market failures. Such failures include, among others: excessive regulation that impedes the operation of existing firms or the creation of new ones; lack of information and information asymmetries; missing markets in the supply of services and inputs; high costs in searching for new markets; and uncertain returns on investment in new technologies or in quality certification and compliance. Internationally, there is ample evidence that well-intentioned interventions to support firms and entrepreneurs often actually discourage firms’ growth, or they simply provide transfers to recipients, without stimulating any entrepreneurial activity. The latter often occurs when benefits (for example, tax breaks) apply only to firms under a certain size. Conversely, some programs have proven to be effective in promoting entrepreneurship and firms’ growth—for example, ones that improve managerial capabilities or that dispel information

asymmetries in export or financial markets (for example, credit bureaus).<sup>1</sup>

**This chapter presents the analysis carried out for this study with a sample of public and non-public initiatives that are supporting entrepreneurship ecosystems and firms’ growth in Mexico.** This mapping was carried out with two complementary questionnaires—one that targeted public initiatives, and one that targeted non-public initiatives such as incubators, venture capital funds, and industry associations, which, collectively, this report calls “non-public enablers”. The analysis covered programs operating at the federal level, as well as ones in the main cities of three Mexican states: Guadalajara and Zapopan<sup>2</sup> in Jalisco; Monterrey in Nuevo León; and Tuxtla Gutiérrez in Chiapas. In selecting these localities, this study sought to capture differences between regions, as well as between entrepreneurial ecosystems with different degrees of maturity. In addition, this study analyzed initiatives that target three sectors—information and communication technology (ICT), pharmaceuticals and medical equipment, and agroindustry. For a description of the methodology, and a list of the initiatives mapped, see Appendix 2. In total, information was collected for 128 public programs and 51 non-public programs.

## 3.2 Agencies involved in supporting entrepreneurship

**The Ministry of Economy, the National Council for Science and Technology (CONACYT), as well as two public development banks, NAFIN and Bancomext, are the main federal agencies supporting firms’ creation and growth.** These agencies have their own objectives, but they collaborate in implementing some initiatives. The Ministry of the Economy provides the primary support for firms at all stages of their life cycle; *Nacional Financiera* (NAFIN) provides a range of financial

and technical services for SMEs, including loans and credit guarantees; and *Banco Nacional de Comercio Exterior* (Bancomext) finances companies' integration into GVCs, and their participation in foreign trade. CONACYT, which oversees federal government scientific and technological policies, grants scholarships for postgraduate study, supervises 26 research centers and the National System of Researchers, and implements programs that foster firms' innovation. At the subnational level, the secretariates of economic development and state councils or the secretariates of science, technology, and innovation are the main public agencies involved in supporting firms' creation and growth.

**In recent years, entrepreneurship support agencies have been affected by budget cuts.** In Mexico, as in other countries, political and economic cycles have a major impact on the continuity and budgets of entrepreneurship programs. Both at the federal level, as well as local levels, changes in government administrations result in changes in plans and programs, whereas changes in economic conditions have an impact on the budgets allocated for programs. The three levels of government—federal, state, and municipal—have implemented new initiatives to address firms' barriers to entry, scaling up, innovation, and internationalization.<sup>3</sup> However, in recent years, budget constraints have limited initiatives designed to foster business creation, improve access to finance, and encourage innovation.

**The budget of the Ministry of Economy, which is the most important public agency concerned with entrepreneurship policies, decreased by 62.3 percent over five years from 2017 to 2022.**<sup>4</sup> In 2022, no budgetary resources were allocated for the matching grants programs and trust funds,<sup>5</sup> which were intended to address the market failures that hinder firms' creation and growth (Table 3.1). Also, budgetary resources must be

used during the current fiscal year, and cannot be carried over to subsequent fiscal years.<sup>6</sup>

**Between 2019 and 2022, a significant amount of federal resources were allocated to livelihood programs through the provision of microcredit, and subsidies for microenterprises and self-employed workers.** In 2020 and 2021, the Ministry of Economy's budget was largely allocated to the *Créditos a la Palabra* program for microenterprises and self-employed workers (US\$280 million in 2020 and 2021). In 2022, the program was transferred to the Ministry of Welfare. Also in 2022, according to information presented in the federal government budget (*Presupuesto de Egresos de la Federación*), the Ministry of Economy's budget for promoting innovation, entrepreneurship, and SMEs' growth was reduced to zero. In 2022, the initiatives implemented by the Ministry of Economy were either financed through its operating budget or with resources that had already been invested in the trust funds implemented by the development banks (and that were primarily intended to offer credit and guarantees).

**There has also been a reduction in CONACYT's programs that target firms' R&D, and innovation.** Between 2018 and 2019, the Innovation Stimulus Program (*Programa de Estímulos a la Innovación* [PEI]) came to an end (Table 3.1). This grant program was intended to foster enterprises' innovation activities (primarily their collaboration with universities and research centers), and to finance 23 sectoral innovation funds, and CONACYT's joint trust funds with other public agencies.<sup>7</sup> The PEI's annual average budget between 2015 and 2018 was around US\$140 million, and over this period, an average of 600 companies were supported each year. Although the Fiscal Incentive for Research and Technology Development (EFIDT) was created in 2017, few companies have benefited from this (an average

**Table 3.1.** Public sector budget for the Ministry of the Economy and selected items for CONACYT, NAFIN, and Bancomext (millions of current Mex\$, 2017–2022)

	2017	2018	2019	2020	2021	2022	% 2022/ 2017
Ministry of the Economy							
Total	9,525	9,578	9,056	6,256	6,538	3,587	-62%
Staff salaries and benefits	3,328	3,350	2,860	2,539	2,573	2,663	-20%
Other current expenditure	1,632	1,622	1,551	857	823	877	-46%
<b>Of which current expenditures on program administration were:</b>							
<i>Unidad de Inteligencia – Global initiatives to promote exports</i>	0	0	0	0	9	6	
Export promotion – IMMEX, PROSEC, and DRAWBACK	48	51	44	38	42	48	0%
<i>Unidad de Desarrollo Productivo (including MiPYMES MX)<sup>a</sup></i>	190	192	161	100	102	87	-54%
<b>Grants and trust funds</b>	4,477	4,564	4,579	2,825	3,100	0	-100%
<i>Programa Nacional de Financiamiento al Microempresario</i>	0	0	3,183	0	0	0	
<i>Prosoft-Innovación</i>	204	215	341	175	0	0	-100%
Grants for entrepreneurship	3,715	3,895	621	0	0	0	-100%
Trust funds for credit, guarantees, and capital	112	50	25	25	0	0	-100%
<i>Proméxico</i>	241	241	164	0	0	0	-100%
<i>Créditos a la Palabra and Tandas para el Bienestar</i>	-	-	-	2,500	3,100	0	
<i>Programa para la Productividad y Competitividad (PPCI)</i>	155	163	245	125	0	0	-100%
CONACYT							
<i>Programa de Estímulos a la Innovación (PEI), disbursed (approved projects)</i>	1,741 (421)	1,594 (503)	0 (0)	0 (0)	0 (0)	0 (0)	-100%
EFIDET, disbursed (approved projects)	658 (45)	331 (17)	406 (31)	105 (2)	144 (11)	380 (12)	-42% (-73%)
<i>Fondos Mixtos</i>	1,385	2,054	1,565	1,139	166	n.a.	-88% <sup>b</sup>
<i>Fondos Sectoriales</i>	11,915	11,361	9,227	9,631	8,873	n.a.	-26% <sup>b</sup>
NAFIN (credits and credit guarantees)	546,534	553,742	485,973	435,083	403,465	n.a.	-26% <sup>b</sup>
BANCOMEXT (financing to private sector)	248,552	270,689	263,267	217,202	257,659	n.a.	4% <sup>b</sup>

Source: *Presupuesto de Egresos de la Federación, Secretaría de Hacienda y Crédito Público (2017–2022)*; CONACYT funds reports, and NAFIN and Bancomext annual reports.

Notes: n.a. = not available. The rate was calculated using 2021 data when 2022 data were not available.

a. It was the National Institute for Entrepreneurship until 2020.

b. The rate was calculated using 2021 data when 2022 data were not available.

of only 21, per year, between 2019 to 2021), versus the number of projects supported by PEI with its budget.<sup>8</sup>

**The credits and guarantees provided by NAFIN also declined from 2019 to 2021, while Bancomext increased its allocation of credit to the private sector.** According to NAFIN’s Annual Report, in 2021, the total for all credit and guarantees was Mex\$406 billion, which was 6.9 percent less than in the previous year (Table 3.1). Similarly, in 2019 and 2020, the credit and credit guarantees allocated by NAFIN declined. Website information for Bancomext indicates that a large amount of its funds went to the private sector, with US\$1.5 billion allocated in the first semester of 2022. In 2021, as economic activity recovered following the COVID-19 pandemic slow down, the portfolio of the *Cadenas Productivas* (Productive Chains) program saw a 29 percent increase in its balance, and a 28 percent increase in its operations in comparison with the same period in the previous year.

**Mexico’s states have also been negatively affected by the decrease in federal programs for entrepreneurship and innovation.** For example, Jalisco was an important beneficiary of some of the programs that were discontinued: the Innovation Stimulus Program (PEI) and *Fondos Mixtos*<sup>9</sup> (which were both CONACYT’s programs), and *PROSOFT-Innovación*<sup>10</sup> of the Ministry of Economy. To fill this void, the State of Jalisco has launched new initiatives that largely focus on reinforcing linkages within the entrepreneurial ecosystem, but the budget for these is quite limited.

**Non-public enablers, many of which have relied on federal government support programs, are now competing for resources and trying to compensate through partnerships with international organizations.** Some subnational non-public organizations in Nuevo León, Jalisco,

and Chiapas are collaborating with multinational companies, as well as with local universities, and universities in California, Massachusetts, Colorado, and Texas. In addition to increasing and diversifying their sources of revenue, non-public organizations have had to expand their offerings to other Latin American countries.

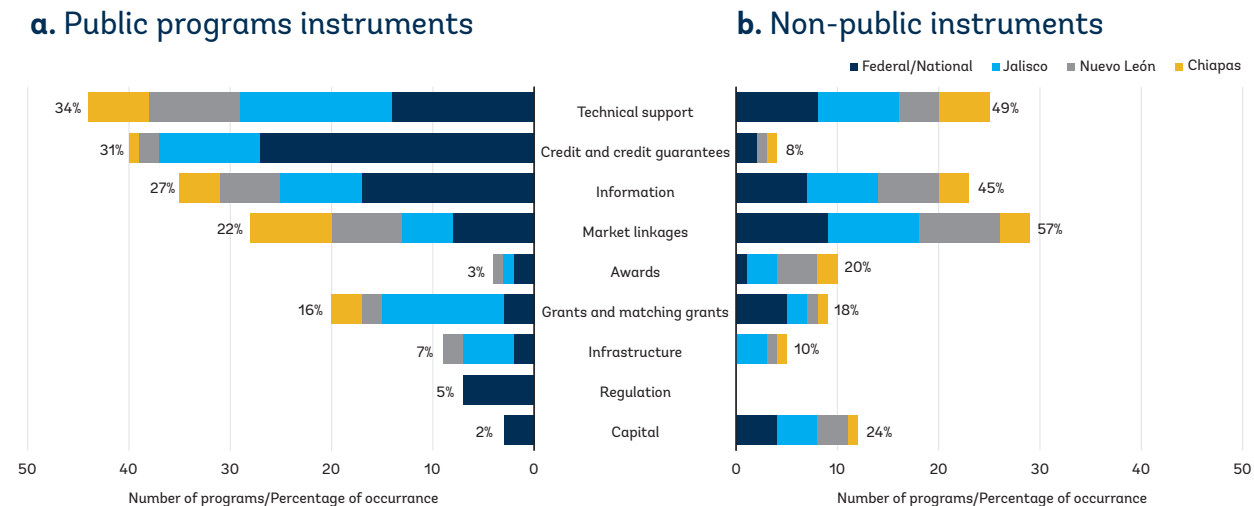
**Political cycles have also had an impact on the continuity of programs to support entrepreneurship.** Most of the public programs that this study mapped at the federal and subnational levels in Mexico are relatively new. Fifty-eight percent of active public programs began in 2018 or later, although a few started in the 1990s. At the federal level, 51 percent of public programs active in 2022 were created between 2018 and 2022. In Monterrey and Nuevo León, where the public administrations changed in October 2021, 63 percent of the programs were created after that. Conversely, 20 percent of the non-public initiatives this study mapped were started between 2001 and 2010, 29 percent were started between 2011 and 2017, and 51 percent were started between 2018 and 2022. Regarding the non-public initiatives mapped in Nuevo León, a large percentage (82 percent) were created between 2018 and 2022.

## Instruments

**A range of financial and non-financial instruments, or combinations of the two, are used by the public sector, although non-financial instruments are used more frequently.** Regarding financial support, the most common instruments are credit and grants, whereas the most common types of non-financial support are technical assistance and information. See Figure 3.1.

**The most common instruments at the federal level are credit and credit guarantees, information, and technical assistance.**<sup>11</sup> Of 65 federal programs, 20 (31 percent) provide credit

**Figure 3.1.** Instruments used to foster the creation and growth of firms



Source: Interviews conducted by the World Bank in 2022 with administrators of public and non-public programs, and the collection of on-line information. Sample size: 128 public programs and 51 non-public programs.

Note: The total does not add up to 100 percent because some programs reported having more than one instrument.

and credit guarantees, which are implemented through development banks; 26 percent provide technical assistance; a similar percentage offer information; and 14 percent foster linkages within the ecosystem. Most of the programs with the last three intervention mechanisms use digital platforms to offer training and information (see Figure 3.1, panel a). In the three states, and the selection of municipalities surveyed for this study, the provision of information, technical assistance, and linkages are the most frequently used instruments. The use of these instruments partly reflects adjustments due to budget cuts since they can be implemented directly by public servants using limited resources from operational expenditures. However, for programs that use digital platforms, it has been more difficult to identify users/beneficiaries, and measure program impact.

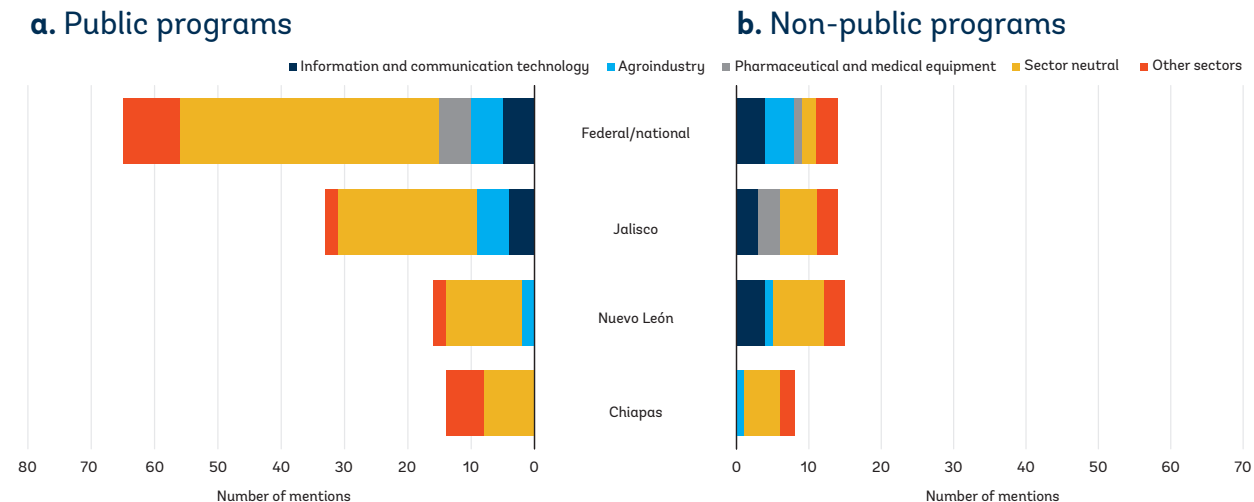
**Non-public enablers aim to help companies at the key stages of the entrepreneurship process.** The non-public organizations operating at the

national level, and in the three states covered in this study, listed their provision of the following types of initiatives: management and business training programs; incubation and acceleration services; venture capital focused on different stages of firms' development (seed, and series A, B, and C financing);<sup>12</sup> open innovation competitions; intellectual property protection; innovation awards; networking; and demand-supply initiatives. These initiatives seek to fill gaps or complement those offered by public programs, and are better positioned to provide mentoring support to firms and startups. They can also adapt more rapidly to global technological trends because of their international networks and market knowledge.

## Sectoral focus

**Two thirds of all of the programs mapped in this study tend to be sector neutral.** At the federal level, only one of the mapped programs had a unique sectoral focus, which was providing credit

**Figure 3.2. Number of programs with a sectoral focus**



Source: Interviews with administrators of public and non-public programs conducted by the World Bank in 2022, and the collection of on-line information.

Note: The sample covered 128 public programs and 51 non-public programs.

for medical equipment through NAFIN. A third of all of the programs mapped focus on more than one sector, of which nine target agroindustry, and 12 target ICT (Figure 3.2). Those programs target all phases of a firm’s life cycle, and the most frequently used instrument is credit. Among the other sectors targeted were the automotive, aerospace, electric-electronic, energy, and transport sectors. At the subnational level, most programs had a sectoral focus that matched the state’s comparative advantage. In Nuevo León, two out of 16 programs targeted ICT; in Jalisco eight of the 33 programs targeted ICT or agroindustry. None of the public programs mapped in Chiapas had a sectoral focus. Most of the mapped non-public programs were agnostic, or targeted sectors other than ICT or agroindustry (59 percent), while 22 percent targeted ICT, 12 percent targeted agroindustry, and 8 percent targeted pharmaceuticals and medical equipment. The other important sectors that were targeted by non-public programs were the energy,

electronics, and automotive sectors, as well as tech-based firms in industry, fintech, and e-commerce.

### 3.3 Programs by entrepreneurship ecosystem outcome

**This section analyzes programs according to the entrepreneurial outcome sought, and the target beneficiaries.** Entrepreneurial ecosystem outcomes are categorized as *entry*, *scale-up*, *innovation*, and *internationalization*. Startups differ significantly from firms in the scale-up phase and, in turn, the former differ from firms in the innovation or internationalization phases. Conversely, technology-based companies and startups differ from traditional SMEs, and face a different set of market challenges. Hence, they require a different set of support programs and initiatives from government and non-public ecosystem actors. For example, non-public initiatives that support technology-based firms, focus on transforming their research and/or technology into high



**Table 3.2.** Classification of program support by firm segment and entrepreneurship ecosystem outcome

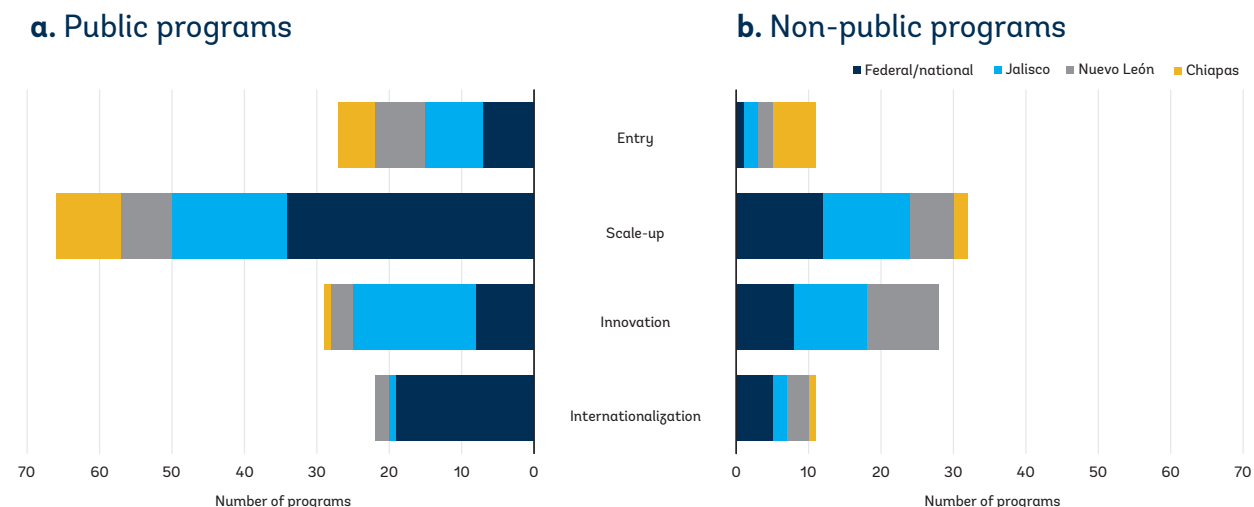
OUTCOME	FIRM SEGMENT		
	MSMEs	Tech-based firms*	Startups
Entry	Formalization	Technology Transfer Office Services (HEI and PRI Spinoffs)	Bootcamps
	Information and entrepreneurship training		Mentoring and specialized business services
	Incubators for traditional businesses	High-impact business incubators	
	Subsidies and microcredit		Seed grants and angel investors
	Trademark registration		
Scale-up	Managerial skills training programs	Executive and specialized training	Acceleration services
	Subsidies and credit	Credit, credit guarantees, and other financial instruments	Venture capital (seed, angel, and Series A, B, and C)
	Crowdfunding and crowdsourcing		
	ISO Certifications and Compliance (Q&EHS)		
		Industry Standards and Special Certifications	
Innovation	Innovation methodology training		
	Digital transition	Digital transformation	
	Credit		VCs (seed, angel, and Series A, B, and C financing)
		Intellectual property strategy (patent)	
		Multinational companies' Open Innovation Challenges	
	Innovation awards		
Internationalization	Fairs and promotional events		International networking events
	Credit guarantees and other financial instruments such as factoring		Local and international VCs (seed, angel, and Series A, B, and C financing)
		Support for integration into GVCs	

Source: Authors' elaboration based on World Bank (2019b and 2021).

Note: Color classification: light yellow = public programs; medium yellow = public and non-public programs; dark yellow = non-public programs. HEI = higher education institutions; PRI = public research institutions; Q&EHS—quality, environmental, health, and safety.

\* Firms that offer high technology products or services such as product design, simulation, and automation; engage in biotechnology research, lab testing, and advanced materials development; and/or provide advanced information technology and consulting. These can either be spin offs from university researchers, or firms that develop or offer technology-based products and/or services.

**Figure 3.3. Programs by intermediate outcome and region**



Source: Interviews with administrators of public and non-public programs conducted by the World Bank, and the collection of on-line information. Sample size: 128 public programs and 51 non-public programs.

impact products and services with a strong market. Table 3.2 presents the description of each group and the main purpose of the supporting initiatives. Although there is a broad offering, as noted in the previous section, many of the federal programs have undergone significant budget cuts.

**Scale-up was the most common intermediate outcome that this study identified for public and non-public initiatives.** *Firm growth* was mentioned for half of all of the public programs reviewed by this study, but there were some differences across the three selected states. In Jalisco, the most expected outcome was innovation; in Nuevo León entry and scale-up were the most expected outcomes; while in Chiapas, scale-up was the most important outcome. At the federal level, almost 30 per cent of the initiatives had increasing firms' direct or indirect exports (internationalization), as their intermediate outcome.

### 3.3.1 Entry

The public sector in Mexico is supporting the creation of companies in traditional sectors,

but initiatives aimed at startups' and tech-based firms' entry are less common. Public resources available to foster firms' entry and growth primarily offer training and information through digital platforms. However, a few initiatives offer finance and support in the early stages (incubation) of the tech-based companies and innovative startups that are capable of generating and sustaining more, and better jobs.

Both at the national and subnational levels, the public sector is supporting the creation of companies in traditional sectors. Some initiatives such as *MiPYMES MX*, which facilitate firms' entry into traditional sectors, are implemented by the Ministry of Economy, while subnational governments offer information, webinars, and support for trademark registration. The states of Nuevo León and Chiapas have the largest number of these programs, and some promote youth entrepreneurship.

The federal government has also implemented regulatory reforms to facilitate firms' entry and registration. The Rapid Business Opening

System (*Sistema de Apertura Rápida de Empresas* [SARE]) provides a one-stop service for enterprise registration at the municipal level; and a law, which was approved in 2016, allows for a new type of company or simplified joint-stock company (*Sociedad por Acciones Simplificadas* [SAS]), and has introduced some interesting features: a single owner may incorporate a business; no minimum capital is required; the company can be set up and incorporated in one day, at no cost; and the streamlined process is undertaken, digitally, through the Public Registry of Commerce, rather than in front of a notary or attorney.

**However, public sector support for the entry of innovative startups is limited, and appears to be poorly targeted with regard to catering for companies' size, their technology-readiness level, and other features.** At the federal level, a few initiatives' primary objective is the creation of impactful entrepreneurs. One of these is a joint program with the government of the United Kingdom, which was implemented in 2016, with support from the Newton Fund. The Leaders in Innovation Fellowships Programme targets spinoffs and startups (science or technology-based companies with high growth potential). It also targets researchers, engineers, and/or technologists who are developing projects with technological and innovative content, and who are seeking private capital financing.

**The Ministry of Education is making some efforts to support the creation of tech-based firms.** The National Polytechnic Institute (IPN) and *Tecnológicos Nacionales* (TecNM) have relevant entrepreneurship and technology development initiatives. The first, at the national level, has a strong technological component through its Technology Incubator, and the second, which functions at the regional level, operates not only in large cities, but also in small cities, in less-developed regions of the country.<sup>13</sup> Besides providing graduate programs, TecNM offers business

incubation, and advisory, mentoring, and intellectual property (IP) protection services. Additionally, in 2021, TecNM began creating innovation centers for the automotive and aerospace industry (CIIA). By 2022, five centers had been created in collaboration with the Mexican Federation of the Aerospace Industry (FEMIA). This demonstrates an important effort by the federal government to promote entrepreneurial culture, and to spur innovation at a regional level.

**At the subnational level, of the three locations analyzed in this study, startups were being launched primarily in Jalisco and Nuevo León, and these were following global trends in creating enterprises with significant impact.** These states are building dynamic entrepreneurship ecosystems to foster startups, and non-public actors are participating in the creation of impactful enterprises. Jalisco and Nuevo León have identified the main actors participating in their innovation ecosystem. These are high-quality universities; public research centers that are connected, nationally, and internationally; national and multinational corporations; clusters;<sup>14</sup> business incubators; venture capital funds; entrepreneurs; and local governments.

**At the municipality level, of the cities mapped in this study, Zapopan, in Jalisco, stands out for its initiatives that foster technology-based entrepreneurship.** Three programs in Zapopan (*Reto Zapopan*, *Sinapsis*, and *Laboratorio de Innovación de Zapopan*) focus especially on developing the entrepreneurial and innovative capacities of young people. These programs offer training, mentoring, and access to facilities for developing prototypes. *Reto Zapopan* has provided business incubation and acceleration opportunities for about 60 entrepreneurs, which were selected from some 2,000 proposals that were received not only at the municipality and state levels, but also from other countries.

**Of the non-public initiatives at the subnational level, several networks of incubators foster regional entrepreneurship ecosystems.** Incubators, which are a key method for developing successful new firms, are operated by *RedIncuba* in the State of Jalisco, and by the State Incubators Network Association (*Red de Incubadoras del Estado* [REI]) in the State of Nuevo León. Most of these incubators are located in clusters, and in public and private universities, and they help entrepreneurs to identify their potential customers, and construct a team that supports the operation and development of the company. Incubators also help to identify possible sources of funding from public and private sources, and they provide linkages with other entrepreneurs and service providers.

### 3.3.2 Scale-up

**Efforts to help firms to scale up comprise the largest number of programs, and these focus primarily on building SMEs' capacity.** Most of these initiatives aim to reach a large number of firms and help them to comply with market and industry requirements, and reach a stable, sustainable activity level. These programs provide training for implementing new administrative practices and management methodologies, or offer support in adopting digital technologies that improve business efficiency and competitiveness. These programs are often jointly sponsored by local governments and private corporations, and they usually charge participants a fee.

**At the federal level, the Ministry of Economy offers information and training through *MiPYMES MX*.** This is a digital platform that provides business tools and content to develop and strengthen MSMEs' business and digital capabilities. Part of the training is conducted through webinars, with content that was created collaboratively with local and international organizations

such as *Mercado Libre*, Google, and Microsoft. The platform also has two business directories: *Directorio de Empresas Artesanales*, which is focused on the handcraft sector; and *Directorio MiPYMES MX*, a comprehensive directory of business sectors.

**NAFIN, which improves access to finance, uses its own resources as well as trust fund resources from the Ministry of Economy to extend credit guarantees.** However, the targeting and design of the credit guarantee program could be enhanced so that it reaches companies that are more financially constrained such as younger and innovative ones with limited collateral and a limited credit history. Some of the products are offered in collaboration with state governments. NAFIN has also implemented additional financial products for SMEs. The most noteworthy is the factoring services platform or *Cadenas Productivas* (Productive Chains) program, which is an accounts receivable program for the SME suppliers of large firms. These instruments are based on the liquidation value of the underlying receivables, rather than on the creditworthiness of the SME, and they provide an alternative for firms with limited access to credit.

**At the subnational level, SMEs are the target for the largest number of public initiatives, and the State of Jalisco has the largest budget.** The Jalisco Fund for Business Development (FOJAL), which had a budget of US\$11 million in 2022, offers a wide range of programs that cover the different stages of companies' development, including providing them with direct credit and credit guarantees, as well as training and advisory services. FOJAL also has a program that targets women-owned SMEs. In Nuevo León, *Impulso Nuevo León* (FOCRECE), offers a credit guarantee scheme for SMEs that provides them with up to US\$250,000. One of the new initiatives implemented by the state government that demonstrates the strong linkages of the ecosystem, is

the Consulting and Training Program for SMEs, which in 2022 planned to reach 1,150 SMEs. In operating this program, which is based on the Small Business Development Center model, the government works closely with the state's four main universities (*Universidad Autónoma de Nuevo León, Tec de Monterrey, Universidad de Monterrey, and Universidad Regiomontana*).

**At 49 percent, management and business training is the most common service that non-public enablers provide to help MSMEs to scale up.** Training programs that target MSMEs are managed by local chambers of commerce and industry associations, and these are provided in collaboration with local universities and government institutions. Six out of all of the initiatives (23 percent) target MSMEs in traditional sectors, as well as self-employed workers. These include three initiatives for women entrepreneurs, and two for tech-based firms. These programs primarily provide basic training for enhancing operational efficiency and business management, but some of them focus on using digital and business management tools, quality compliance, finance, marketing, and sales. In some cases, such as those in Nuevo León and Jalisco, the government offers credit to the companies that achieve the highest training program scores. In Nuevo León, an industry association runs one of the SME development programs in which, along with training, some companies receive financing from a state government credit program that is based on their training program scores.

**Expanding access to markets, and most often domestic markets, is another primary outcome of the non-public initiatives that target SMEs' scale-up, and these are primarily implemented in collaboration with multinational companies.** Programs that aim to increase access to domestic markets comprise more than half of the initiatives aimed at SMEs (57 percent), and most use digital

tools and e-commerce platforms. Most of these tools have been launched since the beginning of COVID-19 pandemic. One important characteristic of these initiatives, which improves firms' access to local markets and their capabilities, is that they are implemented in collaboration with large private companies such as Amazon, Google, Visa, and Mercado Libre. Also, in Nuevo León, a suppliers' directory was created by an industry association to offer information to multinational companies about the products and services that are available locally. At both the national and sub-national level, non-public enablers are offering acceleration services to SMEs. This study's mapping exercise found two accelerators targeting SMEs that offer networking, training, and mentoring.

**In Chiapas, public and non-public actors are jointly implementing initiatives.** Most of these programs are the result of partnerships that bring together the state government, federal government, and international organizations. These primarily focus on training to strengthen firms' capabilities and facilitate the use of digital tools such as Google for Mexico, the VISA-ENKO platform, and the use of Amazon's and Mercado Libre's e-commerce platforms. One of the initiatives that is promoted by the *Instituto Mexicano de la Propiedad Industrial* (IMPI), which is the agency in charge of intellectual property in Mexico, is conducted in collaboration with the states to support firms in registering their trademarks. The *Marca Chiapas* (Chiapas Brand) is a civil society and state initiative that promotes the distinctive label—"Mexico Chiapas Original"—as a state brand that is synonymous with high quality. The initiative focuses its efforts on granting the Chiapas Brand and regulating its use to improve the quality and competitiveness of Chiapas' products and services, as well as promote them in national and international markets (See Box 3.1).

### **Box 3.1. Marca Chiapas**

By 2022, *Marca Chiapas*, which was started in 2009, had certified 1,909 products and services for 367 Chiapas companies, of which 56 percent were led by women entrepreneurs. The brand also has a “green” label for products and services that have an organic or sustainability certification. The brand’s regulatory council, which is comprised of 23 entrepreneurs, representatives from eight business organizations, and two public universities, has six committees that focus on coffee, food, amber, crafts, tourism, and culture.

*Marca Chiapas*, which is granted for free, supports its companies with training to improve the quality and commercial success of their products and services; promotes these in regional and national exhibitions; provides support for marketing and accessing finance; and mentors businesses to help them obtain the brand’s certification.

Source: <https://marcachiapas.com/>

**Non-public programs that target tech-based firms are being implemented by clusters, in collaboration with foreign universities and Mexico-US organizations such as the US-Mexico Science Foundation (FUMEC).** One example is the program in the State of Nuevo León that is provided by the local IT cluster. This program extends free online support for cluster members, mentors top management, and provides innovative business tools. Another example is the country-wide program offered by a network of international technology mentors that, among others, supports companies through: facilitating their access to international markets, advising them on business strategy development, and providing linkages with universities and research centers.

**Among the non-public initiatives, several venture capital funds were identified at both the national and regional levels.** The presence of organizations that help entrepreneurs to access financing to start, develop, and scale up their companies is critical for achieving dynamic entrepreneurship ecosystems. One third of the non-public institutions mapped in this study reported that they provide venture capital funds. Six of these were at the national level, four were

in Nuevo León, and five were in Jalisco. Of these, seven venture capital funds focus on early stage investment (seed and angel investment); four focus on series A, B, and C investment; and four are corporate venture funds. The Mexican Association of Private Venture Capital (AMEXCAP), which has more than 70 venture capital firm members, has invested US\$275 million in more than 1,000 companies. According to the last Endeavour Intelligence Report,<sup>15</sup> in 2022, venture capital investment in Mexico totaled US\$3,685 million (89 percent of which was allocated to the e-commerce and fintech industries). In 2018, venture capital investment was US\$170 million; in 2019, it was US\$631; and in 2021, it was US\$1,162 (Endeavour and Glisco Partners 2022). In comparison, in 2021, agro-tech and health-tech businesses, respectively, received a mere 0.3 percent, and 1.7 percent of venture capital investment.

**In the last decade, the federal government in Mexico has sponsored several public venture capital and seed funds to create a more vibrant venture capital industry (Table 3.3).** Several national agencies (the Ministry of Economy, NAFIN, and CONACYT) are involved in this initiative (*Fondo de Capital Emprendedor*), as well

**Table 3.3.** Public seed and venture capital funds in Mexico

Year of creation	Name	Agencies involved	Type	Resources from	Seed	Early	Growth
2004	Entrepreneurs Fund <sup>a</sup>	CONACYT–NAFIN	Direct investments	CONACYT	X	X	
2010	Mexico Ventures <sup>b</sup>	Ministry of Economy – CMIC-NAFIN	Direct investments + Fund of Funds	Ministry of Economy – NAFIN-CAF		X	X
2012	Seed Capital Co-Investment Fund <sup>c</sup>	Ministry of Economy – NAFIN	Direct investments + Fund of Funds	SE-NAFIN –FOJAL – FONDESOS	X		
2013	Entrepreneurial Capital Ecosystem Development Program <sup>d</sup>	Ministry of Economy	Fund of funds	Ministry of Economy	X	X	
2018	Pacific Alliance Venture Capital Fund <sup>e</sup>	Ministry of Economy	Direct investments	FOMIN, IFC, Ministry of Economy, and BANCOLDEX	X	X	

## Sources

a. CONACYT, *Fondo Emprendedores* ([http://2006-2012.conacyt.gob.mx/fondos/institucionales/Tecnologia/Avance/Paginas/AVANCE\\_Fondo-Emprendedores-CONACYT-NAFIN.aspx](http://2006-2012.conacyt.gob.mx/fondos/institucionales/Tecnologia/Avance/Paginas/AVANCE_Fondo-Emprendedores-CONACYT-NAFIN.aspx)), and NAFIN's Annual Reports for various years.

b. CMIC or *Fondo de Fondos's* Investment Vehicles ([https://www.nafin.com/portalInf/content/banca-de-empresas/capital/fondo\\_fondos.html](https://www.nafin.com/portalInf/content/banca-de-empresas/capital/fondo_fondos.html)) and NAFIN's Annual Reports.

c. Guidelines for NAFIN's Seed Capital Co-Investment Fund ([https://www.nafin.com/portalInf/files/secciones/banca\\_empresas/pdf/capital\\_emprendedor/Lineamientos\\_Semilla\\_Ultima\\_Version.PDF](https://www.nafin.com/portalInf/files/secciones/banca_empresas/pdf/capital_emprendedor/Lineamientos_Semilla_Ultima_Version.PDF)) and NAFIN's Annual Reports.

d. Guidelines for NAFIN's Entrepreneurial Capital Ecosystem Development Program ([https://www.nafin.com/portalInf/files/secciones/banca\\_empresas/pdf/capital\\_emprendedor/Lineamientos\\_Unicos\\_Ultima\\_Version.pdf](https://www.nafin.com/portalInf/files/secciones/banca_empresas/pdf/capital_emprendedor/Lineamientos_Unicos_Ultima_Version.pdf)) and NAFIN's Annual Reports.

e. Pacific Alliance Venture Capital Fund (<https://alianzapacifico.net/financiacion-en-la-alianza-del-pacifico-fondo-de-capital-emprendedor-y-red-de-inversionistas-angeles-ap/>, [https://alianzapacifico.net/wp-content/uploads/OnePager\\_FCE.pdf](https://alianzapacifico.net/wp-content/uploads/OnePager_FCE.pdf))

Note: CMIC is *Corporación Mexicana de Inversiones de Capital o Fondo de Fondos* [Mexican Capital Investment Corporation or Fund of Funds]. This is a vehicle of the federal government that was created in 2006 to foster the venture capital industry in Mexico. CAF is formally called the Development Bank of Latin America.

as several international organizations.<sup>16</sup> These funds, which are managed by NAFIN, make direct investments in startups, and co-investments in private venture capital funds. In 2013, the Ministry of Economy launched the program, Development of the Entrepreneurial Capital Ecosystem. This supports the creation of new fund managers for seed and early-stage financing by providing co-investment capital with a capped return (if the fund generates returns over a certain threshold, the fund of funds only gets up to 8 percent, and the other investors in the fund share the excess

return). One of the key rules is that this fund must be invested in high impact companies with significant operations in Mexico. By 2020, the fund had invested in 38 funds, which, in turn, had invested in 265 companies. However, as of June 2022, of the fund's total assets of US\$193.4 million, a significant percentage had not been invested.<sup>17</sup>

**The 2018 FinTech Act has opened alternative funding sources, and especially those for young, innovative firms.** The FinTech Act (2018) introduced a relatively robust regulatory

framework for innovative crowdsourcing platforms (*Institución de Financiamiento Colectivo*), including ones for debt, equity, joint ownership, or royalties.<sup>18</sup> Although the initial licensing process was slow, by late 2021, 14 of these had been authorized, and one had received conditional authorization from the National Banking and Securities Commission (NBSC). Another 11 platforms were operating under the transitory provisions of the Fintech Act.<sup>19</sup> At the subnational level, the government of Nuevo León is working with local private agents to develop a crowdfunding platform.

### 3.3.3 Innovation

**Most public sector investment is concentrated in the initial phases of the innovation process, including building knowledge, human capital, and the infrastructure for research; however, links with industry are marginal.** The initial phases of the innovation process have received a greater percentage of the total budget, which has created an imbalance in the innovation function. In 2022, the 26 Public Research Centers had an annual budget of US\$286 million, and this had increased very little over the previous 10 years. However, in 2022, the National System of Researchers (SNI)<sup>20</sup> had a budget of US\$363 million, and a budget of US\$622 million for its postgraduate scholarship program.

**The initiative, Fiscal Incentive for Research and Technology Development (EFIDT), has not been successful in reaching a large group of firms.** Between 2019 and 2022, EFIDT, which is an incremental R&D tax credit, had a large budget capped at US\$75 million, annually. However, this scheme primarily benefits large companies that have experience conducting research activities, and it is mainly used as an incentive to complement a firm's own resources when it conducts incremental innovation projects. Also, between 2019 and 2021, the number of projects approved,

annually, totaled an average of only US\$10.8 million (on average, 14 percent of the annual budget).<sup>21</sup> Thus, interventions by EFIDT do not appear to have been successful in stimulating R&D.

**With the aim of creating technology-based firms, some non-public initiatives are offering technology transfer services.** This mapping study reviewed two programs related to technology transfer (one from Jalisco and one at the national level). The aim of these programs is to align the expectations and interests of researchers with social and industry needs, protect researchers' intellectual property, and identify market opportunities. These initiatives also support researchers in: creating spinoffs (technology-based firms); integrating their technology package; designing their business model; identifying the resources required to develop their technology; and helping them with licensing agreements or alliances.

**Although the IP protection system in Mexico has been strengthened with changes in the law, and new digital tools to facilitate IP protection, technology transfer remains a weak point at the federal level.** The Mexican Institute of Industrial Property (IMPI), which is responsible for the registration of trademarks, designs, and patents, as well as IP enforcement, has recently digitalized its procedures, created a digital tool for trademark searches (called MARCia), and launched multiple webinars with information on procedures for IP registration in Mexico and abroad. However, generally, government incentives are lacking for universities and research centers to engage in technology transfer, and for companies to access the services and technologies offered by these institutions.

**The government of the State of Jalisco is deeply engaged in innovation programs, and has a solid institutional framework.** Jalisco has created a Secretariat for Science, Technology, and



### Box 3.2. UNE – University Business Linkages (Monterrey, Nuevo León)

The UNE program in Nuevo León is an initiative of MTY Universities for Founders. It was set up by the MIT REAP Monterrey program to help firms find solutions to their technological problems from the most important universities in the state on Nuevo León. UNE is led by The Extended Group of Universities, a committee of executives chosen by six academic institutions (*Universidad de Monterrey (UDEM), Tecnológico de Monterrey, Universidad Regiomontana (U-ERRE), Universidad Autónoma de Nuevo León (UANL), CECyTE, and Universidad del Norte*).

UNE, which is free, began operating in 2022 with resources provided by each university. In mid-2022, UNE had 55 projects, which included 21 requests from three companies and two clusters, and 19 linkage projects. The demands primarily relate to Industry 4.0, logistics, health-tech, agroindustry, and food-tech.

Source: MTY Universities for Founders. <https://mtyufounders.com/une/>

Innovation (SICYT), on which the State Council of Science and Technology (COECYTJAL)<sup>22</sup> depends. Programs such as *From Science to the Market, the Network of Innovation Centers, the Open Platform for Innovation, and Development of Jalisco*, as well as an initiative to support intellectual property protection, are among the many initiatives implemented by the State of Jalisco. The nature of these programs and their distribution of resources reflect the importance which Jalisco gives to attracting and developing high-tech or innovative firms and entrepreneurs, as well as maintaining Jalisco as a state with one of the most active and integrated innovation ecosystems.

**Jalisco also has some initiatives to foster IP protection.** Through the *Fondo Jalisciense a la Propiedad Intelectual*, the state government offers technical and economic support for IP protection. In addition, COETCYJAL has an initiative that links companies and researchers with law firms and service providers with IP experience, and particularly with experience protecting inventions and copyrights for computer programs. The state government is also fostering the development of IP protection skills in law firms and IP service providers.

**At the subnational level, there are non-public innovation initiatives, too, that aim to link industries that have specific technological needs with universities that have the required capabilities.** The UNE program, a collaborative initiative of six universities, was established in the State of Nuevo León to facilitate university-industry collaboration. Companies specify their technological needs (problems) and the UNE program connects them with suitable university research experts. Two types of linkages are supported by the UNE program: research projects that are at the ideation stage, and technology projects with a functional prototype. Once the match is made, the project team is connected to an incubator, accelerator, or technology transfer office that will support the team in developing the business, and commercializing the project (see Box 3.2).

**On the demand side, this study identified some open innovation challenges launched by multinational companies.** These initiatives focus on technology-based companies to help them solve specific problems, expand their development capacity, and rapidly assimilate new technologies into their line of products or services. Once the technology-based company has been selected,

### **Box 3.3. Guadalajara Connectory, Bosch Mexico (Guadalajara, Jalisco)**

Guadalajara Connectory is a Bosch Mexico corporate initiative that offers a co-creation space and an Internet-of-Things (IoT) incubator to develop cutting-edge technology, and offer opportunities to network with IoT experts. Connectory (which combines the words “connection” and “factory”) fosters collaboration, networking, problem solving, and a new way of working in the age of connectivity.

Guadalajara Connectory, which has a space of about 2,000 square meters, provides the resources necessary (UX Lab, IoT Lab, monthly Connectory talks, #juevesdecomunidad, fitfest, hackathons, and other instruments) to educate and enable diverse groups of startups, students, entrepreneurs, universities, and corporations to collaborate in building IoT solutions for mobility, “smart cities”, mining, agriculture, and Industry 4.0. Since 2017, Guadalajara Connectory has trained 3,000 entrepreneurs and more than 60 companies.

Currently there are five Connectory spaces across the world: Stuttgart, Guadalajara, Chicago, Curitiba, and Shanghai.

Source: Guadalajara Connectory: Co-creation and Community Space. <https://guadalajaraconnectory.com/>

some of the initiatives offer a coaching program. Guadalajara Connectory, which was created by the company, Bosch Mexico, is a good example of this kind of initiative (See Box 3.3).

**An increasing number of large Mexican and multinational companies have launched innovation competitions for specific industries or technological needs (three national programs, five in Nuevo León, and two in Jalisco).** Some of the topics covered in these competitions are agroindustry, IoT, artificial intelligence, digital transformation, and the United Nations’ Sustainable Development Goals. These competitions have been widely advertised to attract project proposals from startups, technology-based firms, entrepreneurs, and universities. Most competitions offer “bootcamps” to the selected companies, as well as provide support throughout the acceleration process from a specialized mentoring team that will help to mature a proposal, design a business model for scaling up, and/or link a company with a venture fund. Also, two of the initiatives

have their own co-working spaces (one in Nuevo León and one in Jalisco). There are two similar programs in Nuevo León, where an IT cluster and an association of private and public universities, match the specific demands from local industry with their technologies’ portfolio, and connect the company team with their own incubators, accelerators, or technology transfer offices.

### **3.3.4 Internationalization**

**The number of initiatives helping companies in Mexico to internationalize has increased, but some important federal initiatives have been cut back.** A large number of initiatives seek to foster exports and the internationalization of Mexican firms so that they can take full advantage of Mexico’s participation in several free trade agreements (primarily the Mexico-United States-Canada Agreement). At the federal level, the Ministry of Economy offers training and information on the export process through initiatives such as *Ruta para exportar*, *Comercia MX*,

*Exporta MX*, *Aprendiendo a exportar*, and the National Information Service on Foreign Trade (SNICE). However, these initiatives are not reflected in the federal budget—primarily because the main instruments used by the Ministry of Economy are information sharing, training, technical assistance, and the organization of business-to-business events, and these do not require much funding to reach a significant number of beneficiaries. This is especially the case with programs implemented through digital platforms. Other important initiatives to support supplier development and exports (such as *Programa para la Productividad y Competitividad* [PPCI]) have suffered cutbacks, which is not consistent with the goal of improving Mexico’s position in global markets.

**At the federal level, to foster Mexican exports, three programs to support trade facilitation have been operating for a decade or more.** These are the Manufacturing, Maquiladora,<sup>23</sup> and Export Service Industry (IMMEX) program, the Sectorial Promotion Program (PROSEC), and the Duty Drawback program. While, collectively, these do not have a large budget (US\$2.4 million in 2022, which was used primarily for program supervision and management), such programs provide important support for beneficiary companies. In May 2022, IMMEX had 5,203 active participants, which directly employed 2.8 million workers in more than 18 states, and they earned US\$17.7 billion in income from foreign markets (INEGI 2022).

**Bancomext<sup>24</sup> offers credit and a range of financial products for export firms and their suppliers.** This development bank is in charge of a financing program that provides support for MSMEs that are linked to the value chains of exporting firms, and firms that are interested in exporting. *Impulso T-MEC*, for example, offers finance for working capital, machinery, and

equipment that will increase companies’ productive capacity. Bancomext targets 15 strategic sectors: electronics, agroindustry, automotive, aerospace, plastics, pharmaceuticals, communications, medical equipment, medical devices, capital goods, audio and video, and metal fabricating. The bank also offers international factoring to exporters—an instrument that provides an alternative for firms that have limited access to credit.

**Some non-public initiatives are supporting technology-based companies in creating business alliances, and mentoring them to gain access to international markets and GVCs.** These programs are organized by foundations, clusters, technology transfer offices, and corporations. They also have partnerships with local or international universities that focus primarily on mentoring technology entrepreneurs in developing soft skills; managing talent, operations, and finance; defining the company’s business model; marketing and identifying potential customers; agile project management; and developing intellectual property strategies. techBA, which was created, and is operated by FUMEC, is a good example of an internationalization initiative for technology-based companies (See Box 3.4).

**International networking events that target entrepreneurs and startups are gaining importance and attracting a large number of national and international participants.** This study found that 29 percent of the non-public initiatives it assessed conduct events and awards ceremonies (two operate nationally, seven in Nuevo León, four in Jalisco, and two in Chiapas). Two major networking events, Talent Land in Jalisco and IN-CMty in Nuevo León, target entrepreneurs and startups, and have a number of sponsors and a large number of participants. The other non-public initiatives are boot camps.

### Box 3.4. techBA, FUMEC's Technology Business Accelerator

techBA was set up in 2004 by the US-Mexico Foundation for Science (FUMEC), which works primarily with businesses that are successfully serving the local market, and it encourages them to develop a global vision, and succeed in highly competitive international markets. With support from Mexico's Ministry of Economy, techBA provides customized consulting services that strengthen the entrepreneurial, technological, and innovative capacity of technology-based SMEs, and it facilitates their internationalization and establishing links with GVCs.

techBA, which has eight locations in Mexico in areas with high-technology businesses, has supported more than 5,000 US and Mexican companies since 2004; and of these companies, 800 have connected with international markets, and 400 have received capital investment. The sectors of interest are: software & AI, advanced manufacturing, aerospace, automotive, Industry 4.0, health-tech, the "Circular Economy," and sustainable technologies.

Prior to 2020, techBA had a total of US\$1.1 million in federal government grants for its annual operating budget, however, due to budget constraints that began in 2020, the program has restructured and now focuses its internationalization services on the US-Mexican border region and Latin America

Source: techBA. <https://techba.org/>

Note: FUMEC is a bi-national non-profit organization that was created in 1992 during the North American Free Trade Agreement (NAFTA) negotiations. Its mission is to foster binational competitiveness by using science and technology to solve problems and seize opportunities, and its vision is to turn the US and Mexico into the most inclusive, competitive, and sustainable region.

**Half of the enablers that responded to this study's questionnaire mentioned that they have extended their initiatives to other Latin American countries.** This approach has created a new source of income, and had a positive effect in Mexico by attracting foreign entrepreneurs that set up exporting businesses. Mexico has become the first international destination for Latin American entrepreneurs due to the country's common language, similar culture, and geographic location that makes it a gateway to the US (Endeavor 2022). According to the Endeavor Intelligence Unit (Endeavor 2022), "31 percent of all tech companies are owned by foreign entrepreneurs who have raised venture capital." Also, program managers of these companies identify corporate sponsors to co-finance their initiatives,

and international universities that strengthen collaborative activities.

## 3.4 Program design and implementation

**In Mexico, the institutional capabilities needed to design and implement effective programs to build the entrepreneurial ecosystem are weak.** Several of the public programs analyzed in this study exhibited gaps in their design or implementation, and/or they lacked an adequate monitoring and evaluation framework. Fewer than half of the programs mapped by this study <sup>25</sup> conducted a diagnostic before they were designed, and in some cases, such as that of EFIDT, the low rate of firms' participation

calls for revising programs' design and selection criteria, and identifying alternative mechanisms for stimulating private R&D. Also, frequently, the potential for duplicating or developing synergies with other programs was not considered during program design.

**Only 38 percent of programs have published their program's criteria.** Although not all programs are required by law to publish their operating rules, all of them should consider publishing at least some operational criteria or guidelines. Along with other information, they need to publish their program's objectives, requirements, selection criteria, the type and amounts of support provided, and their application deadlines. Most of the programs that lack published operational guidelines are the ones that provide information or training through open digital platforms. Although some of these ask users to register, this is not mandatory. As a result, information about the number of beneficiaries is not accurate, and evaluating the platform's impact is difficult.

**Only 31 per cent of the programs created before 2021 have conducted an impact evaluation.** For instance, *Fondo de Capital Emprendedor*, which has been operating for almost two decades, has not conducted an impact evaluation. Although most programs reported that they have performance indicators, only 20 percent of programs have impact indicators, and most of these are only output and/or outcome indicators.

**At the subnational level, the government of the State of Jalisco has established good accountability practices and transparency.** *Mis programas*<sup>26</sup> is a website that offers information on every program implemented by the state government, and these are classified according to their implementing agency and type of program. Information on the budget, type of support, rules of operation, indicators, and other program

information are updated frequently. The website is easy to access, and its content is easy to download.

**Four out of five non-public programs report that they periodically measure their key performance indicators, but few conduct rigorous impact evaluations.** At the federal level, 100 percent of government programs report monitoring performance indicators. In Nuevo León, this figure was 80 percent, and for both Jalisco and Chiapas, the figure was 67 percent. However, very few non-public enablers (only 23 percent) perform rigorous impact evaluations to assess their success. Even though randomized control trials, which compare a control group with a treatment group, are considered best practice for generating high quality evidence, such rigorous impact evaluations are rare, and are more commonly conducted by public programs or non-profit organizations that need to demonstrate their impact to donors and taxpayers. Private sector organizations would benefit from being able to identify which initiatives are likely to have the greatest impact. Conducting an impact evaluation enables an organization to improve and remain relevant, build its case for sponsorship, and attract high-quality entrepreneurs.

## 3.5 Conclusions

**Despite the efforts of federal and local governments, as well as non-governmental enablers to build robust entrepreneurial ecosystems around the country, their current programs exhibit several weaknesses.** Some shortcomings clearly limit the entry of new and more productive enterprises; they hamper the scaling up of existing firms; they reduce firms' innovative capacity; and they dilute the ability of Mexican businesses to take advantage of opportunities to participate in global markets. Reforming public programs to take advantage of the role played by non-governmental stakeholders in promoting entrepreneurial

activities could help to spur job creation and economic growth.

**The public resources available to spur firms' entry and growth have diminished in recent years. This is exemplified by the decline in the Ministry of Economy's budget for promoting entrepreneurship when compared with the budget increase for microcredit programs.** The latter, which have merit from a social development and inclusion perspective, were increased during the height of COVID-19 pandemic to mitigate the impact of the illness on low-income households. Nevertheless, programs of a similar nature, or that target micro and small enterprises merely because of their size may not be capable of generating and sustaining more and better jobs.<sup>27</sup> In addition to budget cuts, this study found that programs at both the federal and subnational levels clearly lacked continuity, which affects their impact.

**From their design and implementation, to monitoring and evaluation, both public and non-public initiatives demonstrate several weaknesses.** Prior to designing their programs, few initiatives carried out a diagnostic to gain the information they needed to design a successful program. Although programs had the types of indicators used for monitoring activities or outputs, very few conducted impact evaluations. Requiring a system that includes evidence-based program design, with monitoring of programs' implementation and results, and conducting robust evaluations that loop back to improve future interventions, would achieve better use of scarce public resources, and mobilize funding for non-public initiatives. In addition, the complementarities across multiple instruments need to be assessed.

**In general, public programs support existing companies, and pay comparatively little attention to technology-based firms and startups.**

However, through their higher value-added activities, the latter types of firms have the potential to create more and better employment opportunities. At the subnational level, some regions, such as the State of Chiapas, have ecosystems that are at an embryonic stage, with little participation of, and linkages with stakeholders, which limits the entry of firms, and the creation of innovative startups. Conversely, the states of Jalisco and Nuevo León have implemented good practices that target innovative firms and startups, and the two states have improved entrepreneurship ecosystems through collaborating with public and non-public actors and subnational governments. These examples should be documented so that with federal government support, they can be replicated in other regions of Mexico, and help to reduce income disparities.

**Non-public enablers are also contributing to entrepreneurship ecosystem development, primarily by supporting startups and the internationalization of firms; however, their support tends to be focused on the more developed ecosystems.** Non-public initiatives are most often linked with large companies, national and international universities, and international or US-Mexico organizations such as the US-Mexico Science Foundation (FUMEC). These initiatives include business incubators and accelerators, and technology transfer programs. Multinational companies and various organizations are also holding innovation competitions to support startups and SMEs. In addition, the venture capital sector in Mexico is growing, and an increasing number of funds are investing in startups and unicorns in the more developed ecosystems. For example, this study observed this in Jalisco and Nuevo León. However, growth has been highly concentrated in a couple of sectors (e-commerce and fintech), with very limited investment in other important and strategic technology areas.

## Finally, strengthening the internationalization of programs has become increasingly important, given the ongoing restructuring of GVCs.

Successful participation in the global economy requires vibrant entrepreneurial ecosystems that facilitate the creation of more productive firms that have export capabilities. However, the number of direct exporters in Mexico remains low, and the linkages between foreign direct investment and local firms is modest. Despite governments' intention to boost exports, the public resources available to develop exporters' capabilities, and expand domestic value added in exports have declined.

## Notes

1. For a discussion of the evidence, see World Bank Group (2021).

2. The Zapopan municipality is part of the Guadalajara metropolitan region in the State of Jalisco.

3. This refers to the integration of firms into GVCs or increasing direct exports.

4. Based on information from the Ministry of Finance (SHCP) for various years of the *Presupuesto de Egresos de la Federación* [Federal Expenditure Budget].

5. The Ministry of Economy has some joint initiatives with *Nacional Financiera* (NAFIN) or other development banks, and CONACYT to allocate some resources to provide credit, guarantees, venture capital, and matching grants. While the innovation trust funds with CONACYT were discontinued, some trust funds with NAFIN are still active.

6. Financing through trust funds has some advantages, as the schedule for transferring resources to beneficiaries is not constrained by the fiscal year, which is especially important for innovation projects that usually require "patient" investment.

7. In collaboration with other public agencies, sectoral funds allocate resources for research and development with a sectoral focus. For example, the Ministry of Energy has a sectoral fund to promote research, technology adoption, and innovation with regard to renewable sources of energy, energy efficiency, the use of clean technologies, and the diversification of primary energy sources.

8. In 2018, the last year that the PEI was implemented, 503 projects received support for a total of US\$80 million. Conversely, in 2021, only 14 projects were supported by EFIDET, for a total of US\$7.2 million.

9. *Fondos Mixtos* was designed to facilitate the co-investments of the federal government (CONACYT) and subnational governments to promote science, technology, and innovation at the state and municipal levels. In October 2020, Congress discontinued *Fondos Mixtos*.

10. The *PROSOFT-Innovación* program used two initiatives: a program for the development of the software industry (which was mainly focused on the adoption and development of ICT), and a program to foster innovation in firms.

11. Thirteen types of instruments were considered: factoring, tax incentives, public procurement, infrastructure, grants and matching grants, credit, capital, prizes, loan guarantees, regulation, linkages or matchmaking, technical assistance, and information.

12. **Seed capital** is money raised in the early stage of a startup, and some may come from "angel investors"—professional investors with a high net worth, who invest in return for shares in the business. Seed capital generally covers the essentials of a startup such as a business plan, initial operating expenses, and R&D costs. **Series A financing** refers to an investment in a privately-held startup that has shown progress in building its business. It often follows seed capital. **Series B financing** is the second round of investment, including from private equity investors and venture capitalists, when the company has accomplished certain milestones. **Series C financing** is for successful companies looking to develop new products and expand into new markets. It is focused on scaling the company quickly. After a Series C round, many companies will pursue an initial public offering (IPO), while others may need to raise **Series D, E, or F** rounds of financing in order to expand.

13. TecNM is a technological higher education system comprised of 126 federal technological institutes and 122 decentralized technological institutes.

14. A cluster is a dense network of companies and institutions in a specific geographic area. It comprises production companies, suppliers of raw materials, service providers, companies in related fields, and public institutions (for example research, training, and standard-setting institutions). A cluster has three types of connection: (i) vertical along the supply chain; (ii) horizontal between

manufacturers of complementary products; and (ii) institutional between companies and public institutions.

**15.** Endeavour and Glisco Partners. 2022. "Insights: Venture Capital and Growth Equity Ecosystem in Latin America 2022." Website accessed March 16, 2023. <https://endeavor-eiumx.super.site/productos/entrepreneurial-phenomenon/ecosistema-de-venture-capital-y-growth-equity/ecosistema-de-venture-capital-y-growth-equity-en-latin-america-actualizacin/venture-capital-growth-equity-ecosystem-in-latin-america-2022-update>

**16.** *Fondo de Capital Emprendedor* trust is operated jointly by the Entrepreneurs Fund, Mexico Ventures, the Seed Capital Co-Investment Fund, the Entrepreneurial Capital Ecosystem Development Program, and the Pacific Alliance VC Program.

**17.** NAFIN's Trust Funds Reports. Second Quarter 2022 report (Excel table: *Fideicomiso de Capital Emprendedor's* net worth) (<https://www.nafin.com/portalfn/content/nafin-en-cifras/fideicomisos.html>)

**18.** In joint ownership or royalty crowdfunding platforms, investors acquire a percentage of an asset, share, royalty, earning, and/or loss, depending on the outcome of one or more of the crowdfunding applicant's ventures.

**19.** The transitory provisions have been extended several times for different reasons.

**20.** According to its 2022 operational rules, the SNI offers pecuniary bonuses for scientific activity. These bonuses are granted monthly, and calculated according to a combination of an *ex-post* peer review, and a bibliometric assessment of the researchers, which is based on certain criteria: scientific output (evidence of the creation of knowledge in the researcher's field), participation in academic activities (teaching and thesis direction), academic initiatives, collaboration with research centers and higher education institutions, and popularization of

science. The members admitted are ranked in one of five categories: Emeritus researcher, SNI III (seniors), SNI II (established), SNI I (early-stage), and candidates (young researchers).

**21.** Source: CONACYT, *Estímulo Fiscal a la Investigación y Desarrollo de Tecnología* (EFIDT). (<https://www.estimulosfiscales.hacienda.gob.mx/es/efiscales/efidt>). The reduction in number of approved projects may be due to the design of the selection process, which is something that the agencies involved in implementation need to revise.

**22.** COECYTJAL (*Consejo Estatal de Ciencia y Tecnología del Estado de Jalisco*) is a decentralized organization of the State of Jalisco, and its objective is to assist the Secretary of Science, Technology, and Innovation in developing initiatives for application in the state that are related to research; scientific, technological, and educational innovation; entrepreneurship; social development; the protection of intellectual property, and the development and transfer of knowledge and technology.

**23.** A *maquiladora* is a foreign-owned exporting factory operating in Mexico.

**24.** *Banco Nacional de Comercio Exterior* (BANCO-MEXT), a development banking institution, is an entity of the Federal Public Administration in Mexico.

**25.** Only the programs that returned their questionnaire were considered in this study, since only for these was there any certainty about the information on their monitoring and evaluation activities and mechanisms.

**26.** *Mis Programas*. 2022. *Mis Programas* (Spanish). Jalisco State. Website accessed December 12, 2022. <https://programas.app.jalisco.gob.mx/programas/sistemaDeProgramasPublicos>.

**27.** See Grover, Medvedev, and Olafsen (2019).



# 4. Policy Recommendations

## Key Questions

Chapter 4 presents evidence-driven policy recommendations, which are based on the analysis undertaken for this report, as well as on consultations held with the national and sub-national public agencies, and the non-public actors that are responsible for the programs that support entrepreneurship in Mexico. To summarize, improving the quality, scale-up, and internationalization of firms, requires a comprehensive and coherent strategy to strengthen the entrepreneurship ecosystem. Important elements to consider in this strategy are: improving access to finance, enhancing firms' capabilities, incentivizing innovation and impactful entrepreneurship, and strengthening the business enabling environment. Also, it is important to enhance the quality of program design and implementation, as well as make effective monitoring and evaluation frameworks an integral part of the initiatives that support MSMEs.

This chapter aims to answer the following questions:

- How can the current policy mix be strengthened to better address the gaps in impactful entrepreneurship?
- How can the design, implementation, and evaluation of entrepreneurship programs be enhanced to achieve greater impact?
- How can subnational governments and ecosystem enablers complement federal actions to improve the entrepreneurial ecosystem in Mexico?

## 4.1 Introduction

Mexico's entrepreneurship ecosystem is characterized by a few high-growth and innovative firms, while the majority of firms have few or no employees, other than the owner, and they appear to have been set up out of necessity. The analysis presented in this report shows that a number of structural obstacles explain why Mexico's entrepreneurial ecosystem lacks the capacity to support firms in scaling up, upgrading technologically, and internationalizing. Some of these structural obstacles result from, or are aggravated by, market failures such as information asymmetries, inability to take advantage of all of the returns from innovation, and coordination failures (such as the inability of stakeholders to take concerted actions that would benefit all of them). Also, considerable regional and sectoral differences in firms' capabilities and performance make conditions worse. Government initiatives can foster improvements in the entrepreneurship ecosystem through regulatory, institutional, and infrastructure changes, as well as implementing programs that stimulate agents in the ecosystem to change their behavior and improve their capacity. However, it will take some time for such government programs to achieve impact and develop the ecosystem capabilities needed for impactful entrepreneurship. Moreover, as Chapter 3 suggests, government programs need a holistic strategy for entrepreneurship development, as well as continuity, and improvements in program design, implementation, and evaluation. Additionally, the policy and funding mix needs to be adjusted to pay greater attention to, and provide more funding for programs that focus on growth-oriented firms versus ones set up only out of necessity. In the medium to long term, the former will create more and better-quality jobs. Government interventions also need to take into account the differences in entrepreneurial ecosystems' development at the local level.

To improve the quality, scale-up, and internationalization of firms, a comprehensive and coherent strategy to foster the development of the entrepreneurship ecosystem is needed. This strategy will need to address regulatory and institutional gaps, and improve the quality, funding, and mix of public entrepreneurship programs to target firms and startups with ambitions to scale up, innovate, and internationalize.

**While public interventions can help address market failures related to entrepreneurship, for programs to have an impact, they must be well designed and implemented, and have a strong monitoring and evaluation framework that guides effective program design and adjustments.** Funding needs to be aligned with targets, and greater program consistency over time is necessary to allow interventions to yield results, and for ecosystems to mature. Also, as part of a state's development strategy to complement federal initiatives, in collaboration with the private sector, subnational governments need to embrace a more active role in the development of local entrepreneurship ecosystems. In addition, subnational strategies need to be adjusted to suit the maturity of local ecosystems, endowments, and market opportunities.<sup>1</sup>

**International experience suggests that there is no clear line of separation between national and subnational competencies in providing entrepreneurship and innovation support programs, and that sometimes programs are better implemented when they are shared across different levels of government.** Policy can benefit, too, when national and subnational governments cooperate. Although country approaches vary considerably, with regard to innovation, many countries support larger-scale projects at the national level, and especially those projects that involve the production of new knowledge. Conversely, subnational governments support

smaller programs that are more focused on technology diffusion, technology parks, networking and brokerage services, incubation, and cluster development. There are examples, too, of cluster development programs that are shared by national and subnational governments.

The recommendations below on fostering greater access to finance, building firm capabilities, promoting innovation, improving the business regulatory environment, facilitating access to external markets, and strengthening the policy-making process are intended to guide the development of national and subnational strategies that foster the creation, growth, upgrading, expansion, and internationalization of more productive firms, and, in turn, more and better quality jobs.

## 4.2 Access to finance

**There are signs that financial constraints are hindering the entry and growth of quality firms in Mexico.** For about a third of firms in Mexico, credit is a major constraint. In addition to Mexico's low level of domestic credit as a percentage of GDP when compared with the country's peers, markets for alternative financing sources are underdeveloped. Chapter 2 discussed how access to finance is an important driver for formal firms' entry, and that the gap in access to finance is most acute in the south, where the entry of high-quality firms is the least. Credit constraints are the outcome of both demand-side and supply-side challenges. For example, on the demand side, firms consider that the interest rates are too high, and also they lack collateral. Conversely, on the supply side, information about firms is inadequate, and contract enforcement is weak. Various public programs offer credit and guarantees (mainly through development banks), as well as fostering seed and venture capital funds, but the results suggest that some programs need improvement. Although there has been a considerable increase in private investment in venture capital (VC)

funds, this is concentrated in just two areas (fintech and e-commerce), and only a small number of startups (89). Public initiatives to foster startup financing and the VC industry (such as the Co-investment in Seed Capital Fund, Development of the Entrepreneur Ecosystem Fund, and Mexico Ventures Fund) have lost momentum in recent years. The public sector could play a more active role in advancing the VC market frontier in other sectors that might be riskier, and might take more time to get products to market (for example, other areas of the ICT industry, health technologies, and agricultural technologies for adapting to climate change).

**Addressing financing constraints entails a multi-pronged approach.** The strategy for entrepreneurship development will need to make regulatory and institutional changes to enhance, among others, insolvency and credit infrastructure frameworks, and improve the performance of the credit guarantee products and initiatives that promote alternative financing instruments. The shorter-term credit support for microenterprises, which has rapidly expanded in recent years, needs to be balanced with the development of financial products that support the growth and upscaling of higher productivity firms. In the medium term, this approach will create better-quality jobs. These programs would also benefit from evaluations to assess their impact, and over time, these would improve program designs and results.

## Recommendations

- **Enhance the design of credit guarantee funds to encourage the financing of new, younger, innovative, and/or technology-based firms that lack tangible assets to use as collateral.** Based on the eligibility requirements of government-supported credit programs, banks usually provide credit to a small set of firms, which are often the least

credit constrained. Through guarantee funds, the government could provide financial institutions with incentives by sharing the risk of financing young, innovative, and/or tech-based firms, with no credit history. NAFIN, BANCOMEXT, and the Ministry of Economy have guarantee funds that are often complemented with subnational funds (for example, FOJAL in Jalisco and FOCRECE in Nuevo León). However, the eligibility criteria for these funds frequently favor firms with a longer credit history. Also, more recently, some programs have favored microenterprises, and missed the opportunity to finance new firms, and especially the innovative firms and startups with high potential to grow and create better quality jobs. Guarantee programs also need guidelines on program graduation, which would encourage financial institutions to strengthen their risk management tools, and provide financing for new firms, as well as foster innovative, and younger firms that have not developed a credit history, as yet.

- **Develop new types of collateral.** Encouraging the use of movable assets as well as other innovative forms of collateral such as future cash flows, inventories, or sales, would improve firms' access to finance, and, thus, the scaling up, upgrading, and internationalization of the smaller, younger, and technology-based firms that have growth potential, but few or no immovable assets.
- **Enhance the quality of the information available for firms' credit evaluation.** Credit bureaus in Mexico have focused on consumers rather than on firms, which means that the latter often have inadequate credit histories.<sup>2</sup> Credit bureaus need better information standards for firms, and particularly for MSMEs, so that financial institutions have better information when deciding whether or not to provide credit. Also, through open finance and open banking, which are still

under development, access to alternative data on MSMEs could complement the information that financial institutions use in making decisions to provide credit. Financial authorities and credit bureaus need to collaborate to explore both the legal and operational requirements for gaining more information on potential borrowers.

- **Foster the development of seed and venture capital funds (fund of funds, or co-investment funds) to support high potential startups and tech-based firms.** International experience shows that government-funded mechanisms have helped to catalyze the venture capital market and attract private investors.<sup>3</sup>
- **Enhance the insolvency regime to promote the better allocation of resources across firms, and also encourage lending.** Although the insolvency framework has improved since the passage of the *Ley de Concursos Mercantiles*,<sup>4</sup> in 2000, and its subsequent amendments, the act still has a number of elements that discourage borrowers from going through the procedures to obtain credit, and that leave creditors inadequately protected, and both problems reduce access to finance. First, the amendment of 2007 introduced the possibility of expediting the procedures for cases where a previously approved plan to reorganize a company was developed before the initial filing; however, to encourage much more use of this scheme, more clarity is needed on the voting regime. Other changes are also needed to strengthen the protection for secured creditors and increase their participation during the insolvency and reorganization proceedings.<sup>5</sup> Procedures could be streamlined, too. In particular, alternatives need to be explored for expediting the examination process, and reducing the procedural burden, and especially the burden on MSMEs. In addition, the insolvency system needs to be enhanced by: investing in

improving the capacity of the institutions and agents responsible for handling cases; allowing some courts to specialize in insolvency; providing relevant training for judges, conciliators, and liquidators; and regulating and supervising the insolvency practitioners to ensure that they are adequately qualified. Finally, guidelines for out-of-court procedures could be adopted as many OECD countries have done (for example, the United Kingdom and Spain). This would enable debtors and creditors to undertake the restructuring process, informally, which could then be approved, later, in court.

### 4.3 Firm capabilities

**Addressing gaps in managerial capabilities and skilled labor are crucial to foster firms' growth and innovation.** As noted in Chapter 1, limited managerial capacity in Mexico means that the country's best managed firms are only at an average level when compared with the managerial capacity of firms in the United States. In addition, variation in management capacity is much greater across firms in Mexico. Family firms, in particular, tend to have the weakest management practices. Management quality affects both firms' productivity and the capacity of firms to innovate. At the same time, important skill gaps impact firms' performance. Geographically, gaps in access to skilled labor and management are more acute in the south, whereas manufacturers in the northern region have the best management—possibly because they have benefited from integration into global value chains. Improving the education system will require a long-term effort, although important steps could be undertaken in the short to medium term. The government needs to also develop initiatives to enhance managerial skills, and induce changes in behavior through providing more information, as well as vouchers and matching grants that would help to overcome market failures.<sup>6</sup>

## Recommendations

- **Enhance management capabilities by providing incentives for insourcing professional managers and/or consulting firms.** As noted above, family firms tend to have particularly weak managerial practices, and these could be improved with support from external management professionals (Bloom, Sadun, and Van Reenen 2015). A “voucher” (or “matching grant”) program could offer the right incentives for SMEs to hire professional managers.<sup>7</sup> Business consulting programs for SMEs could also be developed that would help firms, first, by conducting a diagnostic, and then by providing support to implement the diagnostic's recommendations. Offering the services of a management consulting firm to a group of firms needs to be considered as it would be a more cost-effective way to achieve the desired impact (Iacovone, Maloney, and McKenzie 2022). A government program that covers part of the cost for management consulting services could encourage firms to participate, and to commit to implementing the recommendations. Such programs could use individual private consultants, consulting firms, or incubation centers, and the government could provide firms with lists of certified consultants. The program could also offer more than one approach to accommodate differing management capabilities, including support for transitioning toward Industry 4.0 technologies.<sup>8</sup>
- **Boost the digitalization of MSMEs with self-diagnostic tools that are complemented with vouchers or matching grants.** A study by Iacovone and his co-authors (2022) found that the adoption of ICT improved firms' performance when this was complemented with other organizational changes.<sup>9</sup> Digitalization also increased the resilience and expansion of firms during the COVID-19 pandemic.

However, only three out of every 10 firms offer digital sales, and microenterprises are the least likely to do so (López Córdova, Patiño Peña, and Rodrigo 2021).<sup>10, 11</sup> Self-diagnostic tools, and especially those for general business functions, could potentially attract a wide range of MSMEs by helping them to identify areas of their business where digital transformation could help them to make improvements, including improvements in basic managerial capabilities. Jalisco, for example, offers a tool called *Chequeo Digital*, which allows firms to self-diagnose their level of digital maturity. The diagnostic tool could be complemented by providing a “voucher” or matching grant program that would support the implementation of a digital transformation action plan.

- **Strengthen the quality and relevance of the skills acquired in tertiary and secondary education.** A large percentage of the firms surveyed during the 2010 World Bank Enterprise Survey in Mexico (World Bank 2010) identified an inadequately skilled workforce as a major constraint, and they reported that they often have to retrain recent graduates so that they have the skills and competencies required by the firm. Reducing the skills gap is a long-term endeavor; however, in the short to medium term, important gains could be achieved by aligning upper secondary and tertiary education more closely with firms’ requirements. In addition, the focus on digital, language (particularly English), and soft skills (problem-solving, self-discipline, and a proactive attitude) should increase, and entrepreneurship education programs need to be expanded, and included more systematically in educational institutions’ curricula. CONALEP (the National College of Professional Technical Education) and *Tecnológico Nacional de México* (tertiary education) are examples of educational institutions that work closely with the private sector.

- **Assess the skills gaps in priority industries, set up programs to close these gaps, and do so in collaboration with training and vocational education institutions, universities, and the private sector.** The ongoing High Level Economic Dialogue between Mexico and the United States has identified industries with potential for reshoring to North America. These include semiconductors, information and communication technology, and medical equipment and pharmaceuticals. The priority assigned to these industries could galvanize cooperation between the public and private sectors in Mexico to close the skills gaps that hamper the development of these industries.

## 4.4 Incentivize innovation and startups

**Expenditures on innovation are low, in general, and on research and development (R&D) in particular, and these expenditures could be better allocated.** As discussed in Chapter 1, R&D expenditure is below what would be expected, given Mexico’s GDP per capita. Furthermore, the public sector accounts for the bulk of R&D expenditure, while in most OECD countries, the private sector primarily funds R&D. Also, SMEs’ expenditure on R&D needs to be encouraged. Despite Mexico having 26 research centers and national laboratories, university-industry collaboration is low by international standards, which means that the country is missing an opportunity to convert public research investments into commercial innovation. The public sector could help stimulate firms’ interest in innovation and foster greater linkages between public research institutions and the private sector. If adequately designed and implemented, such initiatives could help to overcome numerous market failures (such as positive spillovers, coordination failures, and information asymmetries in

export and financial markets), which result in underinvestment in innovation, and the lack of more innovative and technology-based firms. The private sector—and particularly large and innovative firms—could also involve more SMEs in innovation through promoting open innovation initiatives such as competitions. As local innovation ecosystems differ markedly across Mexico, state governments need to adapt their innovation strategies to local conditions and opportunities so that these are as effective as possible.

## Recommendations

- **Evaluate the constraints in the current R&D tax credit program, as well as alternatives for increasing investments in R&D, and stronger public-private collaboration.** Incomplete appropriation of returns to R&D investment by firms can lead to their underinvestment in R&D. The literature on OECD countries supports providing R&D tax incentives (Cirera et al. 2020), and this is especially the case with firms that already conduct R&D activity.<sup>12</sup> Evidence from four developing countries suggests positive, but smaller additionality, although in the case of Mexico, every dollar of firms' tax savings increased their spending on R&D by US\$0.48 above the amount that they would have spent (Calderón-Madrid 2010). More recent information, however, suggests that Mexico's current tax incentive program (EFIDT) should be assessed to understand its constraints, and its limited reach and impact.<sup>13</sup> Over the period, 2019 to 2021, the average yearly amount for approved tax credits was about US\$10.8 million, which is too small an amount to achieve meaningful impact. Preliminary information also suggests that the EFIDT program is mainly reaching large firms that have existing R&D projects. An assessment of the program would shed light on its additionality, and the prospects for incentivizing further private sector investments in R&D—including by innovative SMEs—and promoting stronger university-industry collaboration. Alternative mechanisms for fostering R&D such as providing matching grants should also be explored. The provision of matching grants for R&D is generally more useful for smaller and younger firms as it may take years for them to generate enough taxable income to be incentivized by an R&D tax credit. SMEs and younger firms also tend to have more problems accessing finance. Instruments to foster R&D (whether tax incentives or direct support through matching grants) need to incorporate incentives for greater industry-academia collaboration in their eligibility criteria, so that they remedy critical coordination failures in the innovation system.
- **Foster technology adoption and more incremental innovation through matching grant support.** Matching grants could increase the willingness of firms to invest in non-R&D innovation in the presence of externalities. However, the evidence about impact is mixed, and it appears to be highly influenced by the design of the instrument, and how it is implemented (Cirera et al. 2020).
- **Support private open innovation initiatives by complementing them with government resources or programs.** Large firms, including multinationals, have launched competitions to identify technology-based SMEs that could meet their specific needs or solve their problems. Such initiatives increase SMEs' innovation, and accelerate their integration into GVCs. The government could engage new large, and multinational firms in such initiatives by creating awareness, and providing some matching funds for open competitions.
- **Leverage public procurement to foster innovation.** The three levels of government could use public procurement, strategically,

to foster R&D and innovation, while at the same time, addressing crucial challenges related to the delivery of public services that are concerned with health, energy, the environment, and other public needs. To stimulate incremental, to more complex innovations, a wide range of instruments could be used from commercial to pre-commercial procurement.<sup>14</sup> An OECD study (2017a) provides evidence that governments across the OECD, as well as some in developing countries, are increasingly using public procurement as an instrument to promote innovation.<sup>15</sup> These initiatives could also be designed to promote university-industry collaboration. Mexico piloted some public procurement innovation programs in the mid-2010s, but these have not been scaled up or continued. Successfully implementing such initiatives requires the relevant government agencies to collaborate well, build the capacity of public officials, and—very importantly—reduce public procurers’ risk aversion. In addition, attracting SMEs might require introducing special provisions such as reducing the administrative burden in the procurement process, adjusting selection criteria (without reducing technical standards), and designing SME-friendly payment schemes.

- **Strengthen the institutions and platforms that facilitate technology transfer.** Technology transfer is a weak link in the innovation system. Greater university-industry collaboration could be promoted through multiple instruments that foster innovation (including in the design of R&D tax credits, innovation grants, as well as other measures that stimulate firms’ demand for technologies developed in universities and research centers, including public procurement innovation programs). In addition, effective technology transfer offices (TTOs) in universities and research centers could become valuable brokers in linking the demand and supply sides of knowledge and technology services; and contributing to new

research contracted by the private sector, the dissemination and commercialization of technologies, and the generation of new spin offs. In order to pool services, and increase the quality and impact of TTOs, countries are increasingly supporting the improvement of TTOs’ capabilities through networks and alliances with universities and research centers, rather than through more traditional models that are based on individual TTOs at each university, which can be costly to maintain. Examples such as the Technology Transfer Hubs in Chile, and the Regional OTRIs (*Oficinas de transferencia de resultados de investigación*) in Colombia, are good practices that can be considered.<sup>16</sup> Complementing the role of TTOs, new digital platforms are emerging that help with the matchmaking between universities and industry. These platforms enable the former to advertise their knowledge and inventions, and the latter to advertise their needs. Such platforms are also valuable for small-scale entrepreneurs. Expert Connect, for example, is a digital platform that presents the profiles of more than 45,000 research and engineering experts working in research organizations in Australia. Through an open competition, the Mexican government could provide some seed funding that could incentivize the formation of TTO alliances and/or platforms, and facilitate university-industry collaboration and technology transfer.

- **Promote incubators and accelerators.** As well as efforts to promote the venture capital industry, the Mexican government could provide capacity development grants for ecosystem enablers in states with few of these. This initiative could solicit matching funds from local or state governments, corporations, and/or venture capital funds. Matching funds, and especially those from non-public actors, would signal commitment and potential.
- **States could better leverage federal programs by complementing them with local**



**resources that are allocated according to policies that suit the state's specific context.** States with less developed entrepreneurial ecosystems could adopt policies that focus more on programs that provide managerial and digital technology training. States with more mature ecosystems could promote more complex forms of innovation and technology transfer that foster the creation of technology-based firms. The former *Fondos Mixtos* program, which facilitated co-investments from the National Science and Technology Council (CONACYT), and subnational governments to promote science, technology, and innovation (STI), needs to be reconsidered, as this could enable states to leverage federal resources for meeting needs that are specific to their own entrepreneurship ecosystem. While some states actively used this instrument in the past (for example, Jalisco), states with less capacity were not able to utilize it very much. A program like *Fondos Mixtos* could achieve more impact if it were accompanied by technical assistance, and the sharing of relevant experience among the participating states.

Of the three states reviewed in Chapter 3, Jalisco has a well-defined innovation policy, but it needs to evaluate the adequacy of financing in relation to the policy's goals, and this is especially important, given that less funding is available at the federal level. The State of Nuevo León, which has a large endowment of human capital, and a strong academic and entrepreneurial sector, is still in the process of defining its STI policy and the role of its STI council. In defining its STI policy, complementarities with programs at the federal level need to be explored. Chiapas could focus on building the foundations of its innovation and entrepreneurship ecosystem by: building firms' capabilities through promoting their adoption of technology; encouraging greater links among actors in the ecosystem; leveraging private

sector resources through collaboration; and attracting new institutions (for example, technology centers and business incubators) that could bring in new knowledge and practices.

## 4.5 Business enabling environment

**Gaps in the rule of law and regulatory compliance affect the performance of local entrepreneurship ecosystems in Mexico.** As discussed in Chapter 1, public safety and crime are major concerns for firms, and especially for MSMEs, as the likelihood of being a victim of crime increases with a firm's size, and this reduces firms' incentive to scale up and upgrade. While addressing this challenge is beyond the scope of this study, progress on this front is crucial to create a more robust entrepreneurship ecosystem. In addition, when entering contracts, about 60 percent of firms do not have a high level of confidence that their contracts will be honored. As a result, to avoid disputes, some commercial transactions and investments do not materialize. Also, as noted Chapter 1, there is substantial need to improve the quality of regulations and reduce the costs of regulatory compliance. As discussed in Chapter 2, the quality of local institutions correlates with the development of impactful manufacturing firms at every stage of their life cycle. While the General Act for Better Regulation (2018) is considered a hallmark piece of legislation, internationally, as noted by the National Observatory for Better Regulation, its implementation has been limited, and especially at the subnational level.<sup>17</sup>

### Recommendations

- **Improve the enforcement of contracts.** To enhance contract enforceability, the capabilities of the judicial system need to be strengthened, *inter alia*, through training and the establishment of standards, as well as the creation of

specialized courts—something that has already occurred in some states (for example, in the State of Mexico). In addition, the federal government needs to promote alternative dispute resolution mechanisms, which have been successfully implemented in the OECD, as well as in some developing countries. Setting up these mechanisms requires defining the necessary technical standards, and training professional mediators who can facilitate commercial dispute resolution.

- **Further strengthen the three pillars (policies, institutions, and tools) of the National Indicator of Regulatory Improvement at the federal level, but especially, at the subnational level.** At the policy level, in the short to medium term, the 32 state-level local Systems for Better Regulation need to become fully operative. *Inter alia*, in the short term, this requires embedding the principles for Better Regulation in law in all 32 of Mexico's states, and providing, at the state level, a clear description of the local requirements needed to abide by the Better Regulation Act.<sup>18</sup> Regarding the institutional pillar, an authority to foster better regulation at the local level will need to be identified, and have the mandate and capacity to foster local public agencies' regulatory improvements. Regarding the tools pillar, in the medium to long term, the State-level Registries of Procedures will need to become public, functional, and linked to the National Catalogue of Processes, Regulations, and Services. Very importantly, as required by the General Act for Better Regulation, regulatory impact assessments need to be undertaken before approving any regulations. Improvements in the tools pillar will be the most visible to citizens and businesses.<sup>19</sup> This will require a special effort to ensure that more progress is achieved with this pillar. The yearly report by the National Observatory for Better Regulation provides a comprehensive assessment of

regulatory policies, institutions, and tools at the state level, and this needs to become a useful guide for local authorities, as well as a catalyst for change.<sup>20</sup> Close collaboration with CONAMER (the National Commission for Better Regulation) will help subnational governments to advance faster. Among others, CONAMER can facilitate states and municipalities learning from best practices.

- **Continue the deployment of SINAGER (the National System for Regulatory Governance).** SINAGER is an effective tool for improving regulations at each level of government, as well as their coordination. The progress achieved through putting the first phases of the system in place in two states could provide valuable lessons for expanding the system to other states. SINAGER could be instrumental, too, in helping to build subnational regulatory agencies' capacity to implement better regulatory tools.
- **Facilitate the registration of firms and regulatory compliance at the municipal level by streamlining regulatory processes.** The number of municipalities with an updated license to operate SARE (*Sistema de Apertura Rápida de Empresas* [Accelerated System for Firms' Start of Operations]); PROSARE (*Programa de Reconocimiento y Operación del SARE* [Program for Operation of the Accelerated System for Firms' Start of Operations]); and the Simplified Construction License needs to be expanded to reduce the cost and time involved in registering firms. The use of SAS (*Sociedad por Acciones Simplificadas*) to incorporate firms needs to be encouraged.

## 4.6 Internationalization of firms

Despite Mexico's participation in broad networks of free trade agreements, few firms

**export directly or are integrated into GVCs.** However, the percentage of firms exporting advanced technology is above what would be expected for a country with Mexico's GDP per capita. On average, exporting firms are growing at a rate of 9.6 percent, annually, but SMEs' integration into GVCs is a slow process that takes an average of 10 years. Some sectors have higher potential for North American integration, but this varies markedly across regions; in the north, 5.7 percent of manufacturing establishments export versus only 0.1 percent in the south. Close proximity to the border with the US is one of the main drivers for exports. Some sectors appear to have greater potential for integration within North America (for example, ICT, pharmaceuticals, and agroindustry). As Chapter 3 indicated, exporting or integrating into GVCs is the main objective of about 46 percent of the public programs reviewed in this study. However, these programs mainly provide information and technical support rather than strengthening firms' capacity to export.

## Recommendations

- **Implement comprehensive supplier development programs that include diagnostics, support for enhancing firms' capabilities, and matchmaking of firms with exporters.** Current initiatives could be enhanced by providing more holistic support that includes: i) conducting diagnostics of firms' capabilities (managerial, technical, training, certification, and so) relative to export market needs; ii) providing support for upgrading firms' capabilities; and iii) matchmaking suppliers with large companies.<sup>21</sup> The diagnostic phase could also help to identify firms that meet minimum qualifications, and are more likely to integrate successfully into GVCs. This program would require a close partnership with the private sector during its design and implementation. Through mentoring schemes, entrepreneurs

in emerging regional ecosystems could learn from the progress achieved in more mature regional ecosystems. A second phase or an extension of the program could help firms to export directly through adopting an "export business model".<sup>22</sup> This program could benefit from lessons learned in a recent pilot conducted in Argentina (Iacovone 2020).<sup>23</sup>

- **Enhance market intelligence and export promotion efforts to deepen firms' GVC participation.** The supplier and export development programs discussed above need to be complemented with: i) stronger provision of market intelligence; ii) guidance and information on the regulatory and procedural aspects that are relevant for integrating into GVCs (which is the focus of the programs that are currently in place); and, iii) export promotion. These actions would allow Mexican firms to take advantage of the current market trends in nearshoring and reshoring, and facilitate their integration into GVCs.
- **Improve competition in the logistics market and reduce friction in multimodal transportation.** More efficient logistics and less friction in multimodal transportation would contribute to reducing the development gaps between regions that are accentuated by their distance from the US border, and this would improve the availability of inputs and the ability to ship products to their relevant markets.

## 4.7 Program design, implementation, and evaluation

**Despite good intentions, policies and programs have not been guided by a higher-level entrepreneurship strategy.** Under the current policy mix, fostering improvements in entrepreneurship quality and growth has not received sufficient attention. In addition to the needed

regulatory and institutional improvements, which were noted above, rebalancing program support, and increasing the funding available for quality and growth-oriented firms appears to be necessary, too. However, increasing funding might not have the desired impact, unless the funding is coupled with stronger mechanisms that support programs during their design, implementation, and evaluation stages. As noted in Chapter 3, only 20 percent of the public programs that support MSMEs are based on a diagnostic, only 54 percent collect some feedback from beneficiaries, and only 20 percent conduct an impact evaluation. These conditions make it challenging to understand whether programs are tackling the right problems, whether they need adjustment, whether their level of funding is appropriate, and, ultimately, whether they should continue.

**Regional and sectoral differences need to be considered when designing and implementing programs.** As Chapter 2 stressed, across Mexico's regions there are important variations in entrepreneurship outcomes, and in the quality of the drivers of entrepreneurship. While the northern region has a rather dynamic ecosystem, with more high-quality entrants that scale up faster, and eventually upgrade, this is not the case with firms in the rest of the country; performance in the north-Pacific and central regions is closer to that of the national average. The south trails other regions on almost all entrepreneurship outcomes: firms tend to be smaller when they launch, they generate less value added per worker, they grow at a slower pace, and they rarely upgrade. The analysis in Chapter 2 of the drivers of firms' entry, scaling up, upgrading, and internationalization at the regional level helps to explain the regional differences in firms' outcomes. Variations at the sectoral level are also important: manufacturing firms are larger on entry, they grow faster than firms in retail and services, and they produce about 60 percent more value added than businesses in services.

When designing programs to promote entrepreneurship, these sectoral and regional differences need to be considered. Moreover, regional differences call for subnational entrepreneurship strategies that suit local endowments and market opportunities, and these should enable states to leverage federal support more effectively, and complement this with local resources.

## Recommendations

- **Develop a federal strategy to foster the entrepreneurship ecosystem that has priorities and targets for the short, medium, and long term.** The strategy needs to have coherent objectives, target indicators, and policy instruments, and be developed in consultation with the states and the private sector. The analysis and recommendations provided in this report can help to inform this strategy, and in developing the strategy, consider whether certain sectors (for example, ICT, pharmaceuticals, and agroindustry) merit special attention due to new opportunities under the United States-Mexico-Canada Agreement, and reshoring initiatives.
- **Reinforce the process of program design, implementation, and evaluation to increase the effectiveness of entrepreneurship support.** Public agency interventions can help to address the market failures related to entrepreneurship, but their effectiveness is determined by the quality of the design and implementation process. Moreover, adequate monitoring and evaluation are essential for assessing impact. Based on the gaps highlighted in Chapter 3, the following are recommended, and also apply to public interventions at the subnational level:
  - ▶ As a starting point, **review existing diagnostics to identify the nature of the problems and market failures** that must be considered when designing the program.

- ▶ While developing the program's design, **align the program's objectives with the findings of the diagnostic/s, and the higher-level objectives of the entrepreneurship strategy.** Explore which instruments are better suited to address the problems, and review previous programs' experiences to understand what has, and has not worked, and why. Identify the program's complementarities with other policy instruments.
- ▶ **Endow the program with a long-term vision.** The development of effective entrepreneurship ecosystems is a long-term process. Hence, the program's design must consider this, and allow for greater program continuity (but with program adjustments that are based on the results of monitoring and evaluation tools).
- ▶ **Align budgets to achieve the desired program impact.** In recent years, the funding allocated for most entrepreneurship programs has drastically declined, which has spread resources very thinly, and raised questions about whether programs can achieve meaningful change. Revising the overall policy mix, ensuring the complementarity of policy instruments, and providing adequate funding for individual instruments is very much needed.
- ▶ **As part of program design, define clear, transparent, and rigorous entrepreneur selection criteria.** Where possible, programs need to adopt selection approaches that signal the quality of candidates wanted<sup>24</sup> (for example, business plan competitions or a funneling approach that requires candidates to undergo different phases of selection in order to receive support). These will help to drive resources to those candidates that are likely to achieve the greatest impact.
- ▶ **Leverage the private sector—clusters, industry associations, and platforms—to disseminate knowledge and technologies, and, where relevant, engage the private sector in program implementation.** Technology extension services, for example, need quasi-industrial structures and specialized consultants to be effective. Joint implementation with non-public entities can also help to address coordination failures.<sup>25</sup> Transparency and accountability mechanisms are needed as well to avoid public and non-public sector conflicts of interest.
- ▶ **Embed a robust monitoring and evaluation framework (preferably an impact evaluation) in the design of programs.** Clear indicators and measurement tools are needed to assess impact and the need for program adjustment, continuity, or closure.<sup>26</sup> However, as discussed in Chapter 3, only 20 percent of the programs reviewed in this study conducted an impact evaluation.
- ▶ **Improve coordination with the non-public ecosystem enablers that manage entrepreneurship programs, and help to strengthen their monitoring and evaluation capacities.** As noted earlier, ecosystem enablers can be better leveraged to foster the development of the entrepreneurship ecosystem, in general, and help implement certain public program initiatives. However, strengthening enablers' monitoring and evaluation systems is necessary to provide more information on the ecosystem, as well as on the effectiveness of enablers' programs, and the public sector could facilitate this.
- **Subnational governments need to embrace a more active role in the development of local entrepreneurship ecosystems as part of their state's development strategy.**

While some states have been proactive in developing their innovation and entrepreneurship plans/priorities (for example, Jalisco), other states (for example, Chiapas) have not explicitly considered them in their development strategies. As a result, these states did not leverage federal programs as much, or complement these with their own resources. Strategies at the state level need to vary according to the maturity of the local ecosystem, endowments, and market opportunities, as well as consultation with the local private sector. More developed ecosystems could advance further with regard to innovation and technology transfer, and the formation of technology-based firms. Conversely, more nascent ecosystems need to develop a policy mix that is more focused on management and technology extension programs, as well as invest in basic technological infrastructure that supports their priority sectors (for example, agroindustry in Chiapas). Clusters, industry associations, and digital platforms are tools that subnational governments could leverage to disseminate knowledge and technology. In parallel, the federal government could facilitate learning across states, and support states that need help in developing their entrepreneurship strategy. Instruments such as *Fondos Mixtos* were valuable in adapting federal support to state priorities. However, to be more effective, *inter alia*, the less developed states require adequate resources and assistance to help them to better articulate their needs, and utilize federal instruments.

## Notes

1. Recommendations for the subnational level in this report were informed by the analysis in Chapter 2, which comprised a review of the public and non-public programs that support entrepreneurship in the states of Chiapas, Jalisco, and Nuevo León, as well as other sources. This review illustrates the diversity of local entrepreneurship ecosystems within Mexico. Jalisco, which is a state with a sophisticated and dynamic entrepreneurial ecosystem, has well-defined policies and a very active network of intermediary organizations that support the ecosystem. Nuevo León also has a sophisticated and dynamic ecosystem, although since new state authorities took office in October 2021, they have yet to define a set of entrepreneurship policies. Finally, Chiapas has a more basic entrepreneurial ecosystem, with multiple challenges as well as areas of opportunity.
2. *Círculo de Crédito* and *Buró de Crédito* assist the consumer credit market with comprehensive credit information and other value-added services.
3. The Yozma Fund in Israel is emblematic of this kind of instrument. This fund is one of the few that sought to attract foreign investors due to the expertise that they could bring to the domestic venture capital market.
4. Business Reorganization Act.
5. Among others, creditors' approval of the selection of the insolvency representative, and of the sale of a substantial portion of the debtor's assets should be required. In the case of reorganization, the law should ensure that dissenting creditors obtain at least as much as what they would receive in a liquidation.
6. Various market failures justify such interventions, including information asymmetries and positive externalities. Inducing more firms to upgrade their managerial capacity could have wider impact because the knowledge instilled in firms that use better management practices could spill over to other firms.
7. Either a voucher or a matching grant could be offered, but the former is simpler to administer, given that the amounts would be small (typically, no more than a few thousand dollars). Vouchers are automatically provided if an applicant meets the criteria, and they typically focus on making incremental improvements in managerial practices. Although vouchers are simpler to administer, they should still be subject to random audits to ensure

that the resources are being used as policymakers intended.

**8.** Among others, NAFIN and BANCOMEXT offer open online courses to strengthen managerial capabilities. Measuring the demand for specific modules could reveal what are the most common weaknesses that firms, themselves, identify. At the local level, there are also relevant efforts to draw lessons from: the ICT Cluster in Monterrey (CSOFTMty), *Universidad Autónoma de Nuevo León* (UANL), *Tec de Monterrey*, *Universidad de Monterrey* (UEM), and *Universidad Regiomontana* (UERRE); as well as the CSOFTMty MOBI program conducted with Santa Clara University (California). Besides helping to identify the most important gaps in managerial skills, these initiatives could also be a first point of contact with firms, as well as a tool to characterize the types of firms that want to improve their managerial capabilities.

**9.** Iacovone et al. (2022) showed that in China, the adoption of ICT increased workers' productivity in firms that were operating in sectors with strong competition, as the firms were encouraged to make complementary changes in their practices.

**10.** Only one in three enterprises increased their use of digital technology during the COVID-19 pandemic. Of the firms that experienced a decline in revenue, employment, and wages due to the pandemic, those that implemented digital sales experienced lower reductions than the firms that did not implement digital sales.

**11.** For example, the probability of adopting online sales was nearly 23 percent for microenterprises versus nearly 30 percent for large firms (López Córdova, Patiño Peña, and Rodrigo 2021).

**12.** The findings of Veugelers (2016) and Dechezleprêtre et al. (2016) suggest that tax incentives increased R&D spending by firms that were already investing in R&D, but tax incentives were less effective in fostering R&D in firms that were not conducting R&D. Fraizo, Guzman, and Stern (2019) found that state-level R&D tax credits in the US were associated with a significant long-term impact on both the overall quantity, and quality-adjusted quantity of entrepreneurship, with most of the effect materializing more than five years after the policy was enacted.

**13.** CONACYT. 2023. *Estímulo Fiscal a la Investigación y Desarrollo de Tecnología* (EFIDT).

**14.** Pre-commercial procurement is the procurement of R&D with risk-benefit sharing between the government and the bidder in order to develop solutions that are not yet available in the market.

**15.** These policies led to ground-breaking solutions such as liquid light-emitting diodes (LEDs), electric cars, and robotic bed-washing facilities in hospitals, as well as more incremental innovations such as hybrid lighting on communal roads in Jarosaw Commune in Poland that lacked a conventional electricity supply. See OECD (2017 a) for more examples.

**16.** Mexico has also had some experience with the implementation of initiatives to foster technology transfer. In 2012, the FINNOVA program (CONACYT and the Ministry of Economy) implemented an initiative to foster the creation and development of Knowledge Transfer Offices and other types of support for academia-industry collaboration. The program was suspended, but the federal government could consider creating an initiative now with the same objectives, but suited to the current context.

**17.** See *Observatorio Nacional de Mejora Regulatoria* [National Observatory for Better Regulation]. 2019. *Indicador Subnacional de Mejora Regulatoria: Reporte de Resultados Estatales 2019* [Subnational Regulatory Improvement Indicator: Report on State Results 2019].

**18.** The public administrations of states and municipalities and their agencies, and attorneys general at the state level are all responsible for implementing the Systems for Better Regulation.

**19.** According to the *Observatorio Nacional de Mejora Regulatoria* [National Observatory for Better Regulation] in 2019, of the three pillars, the tools pillar had shown the least progress.

**20.** According to the *Observatorio Nacional de Mejora Regulatoria* [National Observatory for Better Regulation]. 2019. *Indicador Subnacional de Mejora Regulatoria: Reporte de Resultados Estatales 2019* [Subnational Regulatory Improvement Indicator: Report on State Results 2019], there are considerable differences in the progress states have achieved in implementing better regulatory policies. In 2019, Colima, Nuevo León, Yucatán, Querétaro, and Sonora (the top 5 performers) achieved an average of 78.2 percent with regard to meeting the targets set for improvements in the three pillars, while Zacatecas, Guerrero, Tlaxcala, Oaxaca, and

Baja California (the states with the lowest performance) achieved an average of only 28.7 percent. Also, across the 32 states, the tools pillar showed the least progress (36 percent), while the policies and institutions pillars averaged 79 and 68 percent, respectively.

**21.** Some lessons could be derived from a review of programs such as the Program for Industrial Productivity and Competitiveness (*Programa para la Productividad y la Competitividad Industrial – PPCI*), the Program for the Development of the Software Industry and Innovation (ProSOFT), as well as the supplier development program of the former National Institute for the Entrepreneur (*Instituto Nacional del Emprendedor – INADEM*).

**22.** Various studies in OECD and developing countries show evidence of firms learning to export, as well as firms' conscious decision to upgrade prior to exporting (see, for example, Iacovone and Smarzynska Javorcik 2012; and Areti, Love, and Roper 2021). In addition, Artopoulos, Friel, and Hallek (2010) noted that firms that implement changes in their production and marketing (adopt an "export business model") are more successful in entering and surviving in global markets.

**23.** A pilot conducted in Argentina was successful in strengthening export managerial practices (Iacovone 2020). Although, its full impact on exports could not be assessed due to the COVID-19 pandemic, the pilot

showed a high correlation between the index on export managerial practices and export performance, which suggests that through strengthening export managerial practices, the probability of starting to export could rise by 7 percent, and the value of existing exporters could rise by 25 percent (Iacovone 2020).

**24.** For example, *Microcreditos para el Bienestar* (Welfare Microloans) requires beneficiaries: (i) to be age 30 or older; and (ii) own a microbusiness that has been operating for more than six months, and is not agricultural. However, it is not clear whether formal registration of the business is verified, or its capacity to repay the microloan.

**25.** Cirera, Comin, and Cruz. 2022. "Bridging the Technological Divide: Technology Adoption by Firms in Developing Countries."

**26.** Chapter V of the "Act to Promote the Sustained Increase of Productivity and Competitiveness of the National Economy" (*Ley para Impulsar el Incremento Sostenido de la Productividad y la Competitividad de la Economía Nacional – 2015*), requires evaluating and promoting programs that increase productivity and competitiveness (especially in lagging regions). Fulfilling this requirement needs evidence such as an impact evaluation.



# Appendix 1. Location of ICT, Medical and Pharmaceutical, and Agroindustry Clusters

**Table A1.1.** Main ICT clusters

State	Municipality	Share of plants	Share of labor	Share of value added
Baja California	Mexicali	4.16	4.73	5.15
Baja California	Tecate	2.34	1.08	0.86
Baja California	Tijuana	12.21	13.92	9.98
Chihuahua	Chihuahua	1.95	3.67	2.57
Chihuahua	Juárez	8.31	14.55	11.68
Ciudad de México	Iztapalapa	1.95	0.27	0.11
Ciudad de México	Cuauhtémoc	1.95	0.09	0.10
Jalisco	Guadalajara	2.73	0.61	0.99
Jalisco	Tlajomulco de Zúñiga	1.82	3.34	3.00
Jalisco	Tlaquepaque	1.95	0.24	0.20
Jalisco	Zapopan	4.16	6.19	8.26
Nuevo León	Apodaca	3.51	5.04	9.77
Nuevo León	Monterrey	2.21	0.05	0.04
Puebla	Puebla	1.69	0.04	0.05
Querétaro	Querétaro	2.47	2.65	3.12
Sonora	Nogales	3.25	3.26	2.62
Tamaulipas	Matamoros	2.08	2.74	2.02
Tamaulipas	Reynosa	3.64	8.00	6.56
	Outside clusters	37.66	29.53	32.92
	Total	100	100	100

Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Clusters for each industry were found using a machine learning algorithm. The algorithm requires two main parameters—the radius and the minimum points. The radius determines the size of the neighborhood in which to look for firms in the same industry, and the minimum points parameter determines the minimum number of firms required in the neighborhood in order to be considered a cluster. The radius was set to 30 km. The minimum points were defined, separately, for each industry, and were set at the 90<sup>th</sup> percentile of the distribution of firms across municipalities that have firms in the respective industry. Firms on the border of the radius were not considered to belong to the cluster. The ICT industry comprises the NAICS codes: 3341 (Computer and Peripheral Equipment Manufacturing), 3344 (Semiconductor and Other Electronic Component Manufacturing), 3352 (Household Appliance Manufacturing), 334220 (Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing), and 334310 (Audio and Video Equipment Manufacturing).

**Table A1.2.** Main pharmaceutical and medical equipment clusters

State name	Municipality name	Share of plants	Share of labor	Share of value added
Aguascalientes	Aguascalientes	1.02	0.05	0.02
Baja California	Mexicali	1.90	3.67	1.54
Baja California	Tijuana	4.39	20.51	10.90
Coahuila de Zaragoza	Torreón	0.75	0.06	0.03
Chiapas	Tuxtla Gutiérrez	0.82	0.04	0.01
Chihuahua	Chihuahua	1.16	2.20	0.78
Chihuahua	Juárez	1.60	13.73	7.24
Ciudad de México	Azcapotzalco	1.05	0.57	1.65
Ciudad de México	Coyoacán	1.67	3.80	6.35
Ciudad de México	Gustavo A. Madero	1.33	0.12	0.04
Ciudad de México	Iztacalco	0.65	0.93	1.04
Ciudad de México	Iztapalapa	2.72	1.28	1.38
Ciudad de México	Álvaro Obregón	1.02	0.43	1.07
Ciudad de México	Tláhuac	0.58	0.05	0.03
Ciudad de México	Tlalpan	0.99	1.09	1.80
Ciudad de México	Benito Juárez	2.65	1.70	2.34
Ciudad de México	Cuauhtémoc	6.94	0.67	0.50
Ciudad de México	Miguel Hidalgo	1.39	1.26	0.92
Ciudad de México	Venustiano Carranza	0.65	0.10	0.31
Guanajuato	Irapuato	0.82	0.06	0.02
Guanajuato	León	2.04	0.31	0.21
Jalisco	Guadalajara	4.45	3.14	4.09
Jalisco	Tlaquepaque	0.85	1.03	0.43
Jalisco	Zapopan	2.89	3.42	4.22
México	Ecatepec de Morelos	1.33	0.08	0.04
México	Naucalpan de Juárez	0.92	2.05	3.40
México	Nezahualcóyotl	0.75	0.02	0.00
México	Tlalnepantla de Baz	0.65	0.57	0.44
México	Toluca	3.26	0.80	2.94
Michoacán de Ocampo	Morelia	1.36	0.12	0.14
Morelos	Cuernavaca	0.58	0.09	0.05
Morelos	Jiutepec	1.02	2.15	4.68
Nayarit	Tepic	0.88	0.04	0.00
Nuevo León	Monterrey	2.24	0.42	0.18
Puebla	Puebla	2.55	0.33	0.31

State name	Municipality name	Share of plants	Share of labor	Share of value added
Querétaro	Querétaro	1.46	0.71	6.76
San Luis Potosí	San Luis Potosí	1.56	0.75	0.41
Sinaloa	Culiacán	0.92	0.12	0.02
Sinaloa	Mazatlán	0.65	0.01	0.00
Sonora	Cajeme	0.58	0.05	0.04
Sonora	Hermosillo	0.78	0.41	0.15
Tabasco	Centro	1.19	0.03	0.00
Tamaulipas	Río Bravo	0.71	0.02	0.01
Veracruz	Xalapa	1.09	0.04	0.01
Yucatán	Mérida	1.36	0.20	0.10
	Outside clusters	29.85	30.74	33.35
	Total	100	100	100

Source: WBG staff computations using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Clusters for each industry were found using a machine learning algorithm. The algorithm requires two main parameters—the radius and the minimum points. The radius determines the size of the neighborhood to look for firms in the same industry, and the minimum points parameter determines the minimum number of firms required in the neighborhood to be considered a cluster. The radius was set to 30 km. The minimum points were defined separately for each industry, setting them at the 90th percentile of the distribution of firms across the municipalities that have firms in that industry. Firms on the border of the radius were not considered to belong to the cluster. The Pharmaceuticals and Medical Equipment industry comprises the NAICS codes: 3254 (Pharmaceutical and Medicine Manufacturing), 3391 (Medical Equipment and Supplies Manufacturing), and 334519 (Other Measuring and Controlling Device Manufacturing).

**Table A1.3. Main agroindustry clusters**

State	Municipality	Share of plants	Share of labor	Share of value added
Jalisco	Guadalajara	2.01	4.54	2.70
México	Cuautitlán Izcalli	0.29	3.14	8.45
México	Ecatepec de Morelos	0.88	3.06	3.32
Chihuahua	Chihuahua	0.67	3.05	1.58
Nuevo León	Monterrey	0.54	2.88	1.92
Sinaloa	Mazatlán	0.34	2.47	1.48
Sonora	Hermosillo	0.61	2.30	5.53
Jalisco	Tlaquepaque	0.60	1.78	0.24
Guanajuato	Celaya	0.53	1.72	2.52
Guanajuato	Irapuato	0.44	1.72	10.60
Aguascalientes	Aguascalientes	1.07	1.69	1.85
Nuevo León	Apodaca	0.19	1.67	1.70
Sinaloa	Culiacán	0.77	1.52	1.52

State	Municipality	Share of plants	Share of labor	Share of value added
Durango	Gómez Palacio	0.17	1.47	1.56
Sonora	Navojoa	0.18	1.31	0.94
Jalisco	Zapopan	0.96	1.26	0.94
Guanajuato	León	1.12	0.85	1.10
México	Tlalnepantla de Baz	0.40	0.84	0.29
Yucatán	Mérida	0.50	0.79	0.53
Colima	Manzanillo	0.14	0.78	0.23
México	Nezahualcóyotl	0.81	0.78	0.27
Jalisco	Lagos de Moreno	0.31	0.78	1.38
Chihuahua	Juárez	0.36	0.73	0.88
Sonora	Cajeme	0.39	0.70	0.38
Nuevo León	Gral. Escobedo	0.14	0.67	0.38
Querétaro	Querétaro	0.76	0.66	0.94
San Luis Potosí	San Luis Potosí	0.47	0.66	0.55
Chiapas	Tapachula	0.16	0.53	0.20
Tabasco	Centro	0.43	0.18	0.07
Veracruz de Ignacio de la Llave	Xalapa	0.19	0.14	0.01
Tabasco	Comalcalco	0.17	0.14	0.18
Oaxaca	Heroica Ciudad de Juchitán de Zaragoza	0.81	0.13	0.03
Chiapas	Villaflores	0.51	0.12	0.02
Veracruz de Ignacio de la Llave	Tamalín	0.42	0.12	0.03
Chiapas	Tonalá	0.04	0.11	0.02
Guerrero	Acapulco de Juárez	0.45	0.11	0.02
Chiapas	Tuxtla Gutiérrez	0.31	0.10	0.01
Chiapas	Mapastepec	0.16	0.09	0.04
Quintana Roo	Benito Juárez	0.17	0.08	0.01
Chiapas	Villa Corzo	0.22	0.07	0.07
Campeche	Campeche	0.15	0.07	0.02
Oaxaca	Oaxaca de Juárez	0.30	0.07	0.01
Veracruz de Ignacio de la Llave	Chinampa de Gorostiza	0.22	0.06	0.01
Veracruz de Ignacio de la Llave	Tempoal	0.14	0.06	0.02
Oaxaca	San Juan Bautista Tuxtepec	0.20	0.05	0.01

State	Municipality	Share of plants	Share of labor	Share of value added
Guerrero	Chilapa de Álvarez	0.24	0.05	0.01
Veracruz de Ignacio de la Llave	Perote	0.23	0.05	0.02
Oaxaca	San Pedro Mixtepec -Dto. 22 -	0.28	0.05	0.01
Guerrero	Chilpancingo de los Bravo	0.16	0.04	0.01
Guerrero	Técpan de Galeana	0.20	0.04	0.02
Oaxaca	Villa de Tututepec de Melchor Ocampo	0.29	0.04	0.01
Tabasco	Jalpa de Méndez	0.21	0.04	0.01
Oaxaca	Santiago Pinotepa Nacional	0.27	0.04	0.01
Guerrero	Benito Juárez	0.15	0.04	0.01
Oaxaca	San Pablo Huixtepec	0.22	0.04	0.01
Chiapas	Comitán de Domínguez	0.16	0.04	0.00
Guerrero	Cuajinicuilapa	0.17	0.04	0.02
Veracruz de Ignacio de la Llave	Tierra Blanca	0.14	0.04	0.01
Oaxaca	Loma Bonita	0.15	0.03	0.01
Guerrero	Eduardo Neri	0.18	0.03	0.01
Oaxaca	Villa de Zaachila	0.15	0.03	0.00
Guerrero	Ometepec	0.16	0.03	0.00
Chiapas	Cintalapa	0.16	0.02	0.00
Chiapas	La Concordia	0.15	0.02	0.00
Guerrero	San Marcos	0.18	0.02	0.01
Chiapas	Frontera Comalapa	0.15	0.02	0.00
	In other clusters	29.41	19.16	17.92
	Outside clusters	45.93	34.03	27.40
	Total	100	100	100

Source: WBG staff computations, using data from the 2019 Mexican Economic Census (INEGI 2019).

Note: Clusters for each industry were found using a machine learning algorithm. The algorithm requires two main parameters, the radius and the minimum points. The radius determines the size of the neighborhood in which to look for firms in the same industry, and the minimum points parameter determines the minimum number of firms required in the neighborhood to be considered a cluster. The radius was set to 30km. The minimum points were defined separately for each industry, setting them at the 90th percentile of the distribution of firms across the municipalities that have firms in that industry. Firms on the border of the radius were not considered to belong to the cluster. Agroindustry comprises the NAICS codes: 3115 (Dairy Product Manufacturing), 3116 (Animal Slaughtering and Processing), and 3117 (Seafood Product Preparation and Packaging).

## Appendix 2. Methodology and Mapped Initiatives

The mapping of the entrepreneurship ecosystem of public and non-public programs and initiatives that support the creation, growth, innovation, and internationalization of firms in Mexico, was assessed through two complementary questionnaires with similar questions, but which differed in their scope. The first targeted public programs, while the second questionnaire targeted institutions and organizations such as universities, incubators, accelerators, venture capital funds, industry associations, and other non-public enablers. These surveys collected data on the

services provided by the public program or the non-public enabler, the mechanism of intervention, the expected outcomes, the target beneficiaries, the budget allocation, and other key program features. When an interview was not possible, the information was gathered through on-line information. The tables below present (i) the summary of the public and non-public programs that were mapped, (ii) the list of the public programs that were mapped; and (iii) the list of the non-public programs that were mapped.

**Table A2.1.** Summary of the mapped public and non-public programs that foster firms' creation, growth, innovation, and internationalization

	Public programs				Non-public programs			
	Federal	Jalisco*	Nuevo León**	Chiapas	National	Jalisco	Nuevo León	Chiapas
Responses to questionnaire	33	15	15	13	7	6	10	3
Based on online information	32	18	1	1	7	8	5	5
Total programs mapped	65	33	16	14	14	14	15	8
	128				51			

Note: \*Includes programs from the municipalities of Guadalajara and Zapopan, and from the government of the State of Jalisco.

\*\*Includes programs from the municipality of Monterrey, and from the government of the State of Nuevo León.

**Table A2.2.** Public programs mapped at the federal level, and in the states of Chiapas, Jalisco, and Nuevo León

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
Federal	<i>Programa Emergente de Reactivación Económica UDP-FOCIR</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Metodología MESURA</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Portal de Acceso a Servicios Electrónicos (PASE), MARCia y MARCia chatbot</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Premio IMPI a la Innovación Mexicana</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Red de Mujeres Innovadoras y Propiedad Industrial</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Campaña precio diferencial de tarifas como contribución del IMPI al Plan de Reactivación Económica 2022</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Proyecto intergubernamental de asesorías a personas emprendedoras para el registro de marcas en el IMPI</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Ruta para exportar</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Comercia MX</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Ruedas de negocio</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Exporta MX</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Constitución de Sociedades por Acciones Simplificadas</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Autorización de Uso de Denominación o Razón Social</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Programa de la Industria Manufacturera, Maquiladora y de Servicios de Exportación (IMMEX)</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Programa de Promoción Sectorial (PROSEC)</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Devolución de Impuestos a los Exportadores (Drawback)</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Servicio Nacional de Información de Comercio Exterior</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>MIPYMES MX</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Padrón de Desarrolladoras de Capacidades Empresariales</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Impulso T-MEC</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Programa de Financiamiento a la Mediana Empresa Agroalimentaria y Rural</i>	<i>Secretaría de Economía</i>	Questionnaire

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
Federal	<i>Programa de Financiamiento a la Modernización de Empresas de los Sectores Agroalimentario y Rural</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Telecomunicación PYME</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Programa Fit for Partnership con Alemania</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>SheTrades</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Artesanal MX</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Programa de desarrollo del Ecosistema de Capital Emprendedor</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>DNA en LogistiK</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Estándares de Competencia</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Premio Nacional de Logística</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Leaders in Innovation Fellowships</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Fondo de Coinversión de Capital Semilla</i>	<i>Secretaría de Economía</i>	Questionnaire
Federal	<i>Estímulo Fiscal a la Investigación y Desarrollo de Tecnología</i>	CONACYT	Questionnaire
Municipal	<i>Fideicomiso Fondo Guadalajara de Fomento Empresarial /Crédito Programa Emprende</i>	<i>Gobierno de Guadalajara</i>	Questionnaire
Municipal	<i>Centro Emprendemos Monterrey</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Empleo Temporal Ahora Trabajamos Juntos y Juntas</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Programa Integra PYMES Monterrey</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Emprende ahora Monterrey</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Proyectos Productivos Ahora Emprendemos Juntos</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>MTY Business Nights</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Programa Feria Ahora Emprendemos Juntas y Juntos</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Capacitación empresarial</i>	<i>Gobierno de Monterrey</i>	Questionnaire
Municipal	<i>Reto Zapopan</i>	<i>Gobierno de Zapopan</i>	Questionnaire
State	<i>Asesoría y vinculación en temas de emprendimiento</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Capacítate con ENKO (VISA)</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Crédito a Locatarios y Pequeños Comerciantes</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire



<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
State	<i>Apoyo a empresas para el registro de marca ante el IMPI</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Creación de Tiendas en Líneas en Redes Sociales</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Marketplace Amazon 15 empresas Marca Chiapas</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Subsidio a la distribución</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Workshop en el marco del Foro de Economía Digital</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Programa de Formación Empresarial</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Programa de apoyo a empresas para obtener el código de barras</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Plan de Digitalización MIPyME (KOLAU)</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Tienda Oficial "Consume Chiapas" dentro de Mercado Libre</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Diseño de logo para empresas y etiquetas para productos</i>	<i>Gobierno del Estado de Chiapas</i>	Questionnaire
State	<i>Fomento Jalisciense a la Propiedad Intelectual</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>Fortalecimiento de capital intelectual de empresas jaliscienses</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>Fortalecimiento de invenciones y transferencia de tecnología para IES-CI</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>De la ciencia al mercado</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>Plataforma Abierta de Innovación y Desarrollo de Jalisco</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>FOJAL Emprende</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>FOJAL Avanza</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>FOJAL Consolida</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>FOJAL PyME Crédito</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>FOJAL PyME Plus</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>Financiamiento Verde</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
State	<i>FOJAL PyME Garantías</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>Yo, Mujer FOJAL</i>	<i>Gobierno del Estado de Jalisco</i>	Questionnaire
State	<i>Centro de Atención a PyMES</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
State	<i>Impulso Nuevo León /FOCRECE</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
State	<i>Programa de Asesoría y Capacitación a Pymes</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
State	<i>Hecho en Nuevo León</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
State	<i>Tecnolochicas</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
State	<i>Ferias internacionales</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
State	<i>Cadenas productivas</i>	<i>Gobierno del Estado de Nuevo León</i>	Questionnaire
Municipal	<i>Cuenta con Zapopan</i>	<i>Gobierno de Zapopan</i>	<a href="https://www.zapopan.gob.mx/v3/node/3179">https://www.zapopan.gob.mx/v3/node/3179</a>
Municipal	<i>Laboratorio de Innovación de Zapopan</i>	<i>Gobierno de Zapopan</i>	<a href="https://www.zapopan.gob.mx/linzapopan/">https://www.zapopan.gob.mx/linzapopan/</a>
Federal	<i>Aprendiendo a exportar</i>	<i>Secretaría de Economía</i>	<a href="https://www.snice.gob.mx/cs/avi/snice/yaexporta.html">https://www.snice.gob.mx/cs/avi/snice/yaexporta.html</a>
Municipal	<i>Sinapsis</i>	<i>Gobierno de Zapopan</i>	<a href="https://www.retozapopan.com.mx/sinapsis.php">https://www.retozapopan.com.mx/sinapsis.php</a>
Federal-development bank	<i>Textil, Vestido y Moda</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/sector-textil-vestido-moda.html">https://www.nafin.com/portalnf/content/financiamiento/sector-textil-vestido-moda.html</a>
Federal-development bank	<i>Contratos de Proveedores del Gobierno Federal</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/proveedores-gob-federal.html">https://www.nafin.com/portalnf/content/financiamiento/proveedores-gob-federal.html</a>
Federal-development bank	<i>Impulso Nafin + Estados</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/impulso-nafin-estados.html">https://www.nafin.com/portalnf/content/financiamiento/impulso-nafin-estados.html</a>
Federal-development bank	<i>Micro y Pequeña Empresa Transportista</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/empresa-transportista.html">https://www.nafin.com/portalnf/content/financiamiento/empresa-transportista.html</a>

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
Federal-development bank	<i>Empresas Constructoras</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/empresas-constructoras.html">https://www.nafin.com/portalnf/content/financiamiento/empresas-constructoras.html</a>
Federal-development bank	<i>Dispositivos médicos</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/dispositivos-medicos.html">https://www.nafin.com/portalnf/content/financiamiento/dispositivos-medicos.html</a>
Federal-development bank	<i>Cuero y calzado</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/cuero-calzado.html">https://www.nafin.com/portalnf/content/financiamiento/cuero-calzado.html</a>
Federal-development bank	<i>Financiamiento CSOLAR</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/csolar.html">https://www.nafin.com/portalnf/content/financiamiento/csolar.html</a>
Federal-development bank	<i>Comercio electrónico</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/financiamiento/comercio-electronico.html">https://www.nafin.com/portalnf/content/financiamiento/comercio-electronico.html</a>
Federal-development bank	<i>Desarrollo Empresarial y Asistencia Técnica</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/desarrollo-empresarial-y-asistencia-tecnica/">https://www.nafin.com/portalnf/content/desarrollo-empresarial-y-asistencia-tecnica/</a> ; <a href="https://www.nafintecapacita.com/">https://www.nafintecapacita.com/</a>
Federal-development bank	<i>Fondo de Fondos</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/banca-de-empresas/capital/fondo_fondos.html">https://www.nafin.com/portalnf/content/banca-de-empresas/capital/fondo_fondos.html</a>
Federal-development bank	<i>Garantía Selectiva</i>	NAFIN	<a href="https://www.nafin.com/portalnf/content/acciones-para-apoyar-la-economia/garantia_selectiva.html">https://www.nafin.com/portalnf/content/acciones-para-apoyar-la-economia/garantia_selectiva.html</a>
State	<i>Fondo de Apoyo a Proyectos de Alto Impacto a la Industria Creativa Digital</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://www.jalisco.gob.mx/es/gobierno/organismos/87313">https://www.jalisco.gob.mx/es/gobierno/organismos/87313</a> <a href="https://ciudadcreativadigital.mx/wp-content/uploads/2022/05/Lineamientos-FAPAICD-230322.pdf">https://ciudadcreativadigital.mx/wp-content/uploads/2022/05/Lineamientos-FAPAICD-230322.pdf</a>
Federal	<i>Incubación de Empresas Tecnológicas</i>	<i>Secretaría de Educación Pública /Instituto Politecnico Nacional</i>	<a href="https://www.ipn.mx/diet/incubacion.html">https://www.ipn.mx/diet/incubacion.html</a>
Municipal	<i>Ser Mujer Zapopan</i>	<i>Gobierno de Zapopan</i>	<a href="https://www.hechoenzapopan.mx/sermujer/?fbclid=IwAR2UaJpnxZ2VfFhrTslgp9RnWIHWxSatk">https://www.hechoenzapopan.mx/sermujer/?fbclid=IwAR2UaJpnxZ2VfFhrTslgp9RnWIHWxSatk</a>

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
Municipal	<i>Hecho en Zapopan</i>	<i>Gobierno de Zapopan</i>	<a href="https://www.hechoenzapopan.mx/">https://www.hechoenzapopan.mx/</a>
Federal	<i>Promoción y fomento del desarrollo y la innovación de los sectores industrial, comercial y de servicios</i>	<i>Secretaría de Economía</i>	<a href="https://www.gob.mx/se/acciones-y-programas/programa-para-el-desarrollo-de-la-industria-de-software-prosoft-y-la-innovacion-2016?state=published">https://www.gob.mx/se/acciones-y-programas/programa-para-el-desarrollo-de-la-industria-de-software-prosoft-y-la-innovacion-2016?state=published</a>
Federal	<i>Marca Hecho en México</i>	<i>Secretaría de Economía</i>	<a href="https://www.gob.mx/hechoenmexico#:~:text=La%20Marca%20Hecho%20en%20M%C3%A9xico,ofrecer%20bienes%20y%20servicios%20competitivos.">https://www.gob.mx/hechoenmexico#:~:text=La%20Marca%20Hecho%20en%20M%C3%A9xico,ofrecer%20bienes%20y%20servicios%20competitivos.</a>
State	<i>PROINNJAL - Talento Altamente Especializado: Tecnologías y Artes Audiovisuales CCD</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://www.coecytjal.org.mx/Plataforma/ArchivosApoyo/ROP%20FOCYTJAL%2003-24-22-iii.pdf">https://www.coecytjal.org.mx/Plataforma/ArchivosApoyo/ROP%20FOCYTJAL%2003-24-22-iii.pdf</a>
State	<i>FODECIJAL. Retos Sociales</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://www.coecytjal.org.mx/Plataforma/app/views/2022/FODECIJAL-RS2022/CONVOCATORIA_FODECIJAL_2022%20VF.pdf">https://www.coecytjal.org.mx/Plataforma/app/views/2022/FODECIJAL-RS2022/CONVOCATORIA_FODECIJAL_2022%20VF.pdf</a>
State	<i>Difusión y Divulgación de la Ciencia, la Tecnología y la Innovación (D&amp;D). Fomento de vocaciones científicas y la participación en foros de trasfondo científico-tecnológico</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://www.coecytjal.org.mx/Plataforma/app/index.html#/DYD2022">https://www.coecytjal.org.mx/Plataforma/app/index.html#/DYD2022</a>
Federal-development bank	<i>Turismo PyMEX</i>	BANCOMEXT	<a href="https://www.bancomext.com/pymex/productos/turismo-pymex/">https://www.bancomext.com/pymex/productos/turismo-pymex/</a>
Federal-development bank	<i>Factoraje Internacional</i>	BANCOMEXT	<a href="https://www.bancomext.com/pymex/productos/factoraje-internacional/">https://www.bancomext.com/pymex/productos/factoraje-internacional/</a>
Federal-development bank	<i>PyMEX Proveedoras del Sector Eléctrico-Electrónico</i>	BANCOMEXT	<a href="https://www.bancomext.com/pymex/productos/electrico-electronico/">https://www.bancomext.com/pymex/productos/electrico-electronico/</a>
Federal-development bank	<i>Impulso TMEC</i>	BANCOMEXT	<a href="https://www.bancomext.com/pymex/productos/comercio-exterior-tmec/">https://www.bancomext.com/pymex/productos/comercio-exterior-tmec/</a>
Federal-development bank	<i>PyMEX Proveedoras del Sector Automotriz</i>	BANCOMEXT	<a href="https://www.bancomext.com/pymex/productos/automotriz/">https://www.bancomext.com/pymex/productos/automotriz/</a>

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
Federal-development bank	<i>Cursos en línea. Instituto de Formación Financiera para el Comercio Exterior</i>	BANCOMEXT	<a href="https://www.bancomext.com/pymex/educacion-financiera/cursos/">https://www.bancomext.com/pymex/educacion-financiera/cursos/</a>
Federal-development bank	<i>IMPULSO MIPYME 30 – 50</i>	BANCOMEXT	<a href="https://www.bancomext.com/productos-y-servicios/credito/impulso-mipyme-30-50">https://www.bancomext.com/productos-y-servicios/credito/impulso-mipyme-30-50</a>
Federal-development bank	<i>Exportadores, Sectores Estratégicos</i>	BANCOMEXT	<a href="https://www.bancomext.com/empresas-que-apoyamos/sectores-estrategicos">https://www.bancomext.com/empresas-que-apoyamos/sectores-estrategicos</a>
Federal-development bank	<i>Inversión extranjera</i>	BANCOMEXT	<a href="https://www.bancomext.com/empresas-que-apoyamos/inversion-extranjera">https://www.bancomext.com/empresas-que-apoyamos/inversion-extranjera</a>
Federal-development bank	<i>Empresas que sustituyen importaciones</i>	BANCOMEXT	<a href="https://www.bancomext.com/empresas-que-apoyamos/importadores">https://www.bancomext.com/empresas-que-apoyamos/importadores</a>
State	<i>JALISCO CRECE</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://sedeco.jalisco.gob.mx/temas-economicos/programas-de-apoyo/jalisco-crece">https://sedeco.jalisco.gob.mx/temas-economicos/programas-de-apoyo/jalisco-crece</a>
State	<i>Empresarias de Alto Impacto</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://rumboalaigualdad.jalisco.gob.mx/empresarias-de-alto-impacto-2022">https://rumboalaigualdad.jalisco.gob.mx/empresarias-de-alto-impacto-2022</a>
State	<i>Red de Centros de Innovación</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://redi.jalisco.gob.mx/">https://redi.jalisco.gob.mx/</a>
State	<i>PROINNJAL – Reconversión Digital</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://misprogramas.jalisco.gob.mx/programas/panel/programa/779">https://misprogramas.jalisco.gob.mx/programas/panel/programa/779</a>
State	<i>Programa Impulso a la Ciencia y el Desarrollo Tecnológico</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://misprogramas.jalisco.gob.mx/programas/panel/programa/777#:~:text=Se%20busca%20impulsar%20la%20investigaci%C3%B3n,el%20bienestar%20social%20y%20fortaleciendo">https://misprogramas.jalisco.gob.mx/programas/panel/programa/777#:~:text=Se%20busca%20impulsar%20la%20investigaci%C3%B3n,el%20bienestar%20social%20y%20fortaleciendo</a>
State	<i>Programa de Fortalecimiento de Cultura de Innovación.</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://misprogramas.jalisco.gob.mx/programas/panel/programa/720">https://misprogramas.jalisco.gob.mx/programas/panel/programa/720</a>
State	<i>Premio Estatal de Innovación, Ciencia y Tecnología</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="https://info.jalisco.gob.mx/gobierno/programas-apoyo/modalidad/19060">https://info.jalisco.gob.mx/gobierno/programas-apoyo/modalidad/19060</a>
State	<i>Aprende y Emprende</i>	<i>Gobierno del Estado de Chiapas</i>	<a href="https://ijech.chiapas.gob.mx/convocatorias/aprendeyemprende">https://ijech.chiapas.gob.mx/convocatorias/aprendeyemprende</a>

<b>Level of government</b>	<b>Name of the program</b>	<b>Institution in charge</b>	<b>Source of information</b>
Municipal	<i>Creativa GDL</i>	<i>Gobierno de Guadalajara</i>	<a href="https://creativagdl.com/">https://creativagdl.com/</a> <a href="https://www.instagram.com/creativaguadalajara/?hl=es-la">https://www.instagram.com/creativaguadalajara/?hl=es-la</a>
Federal	<i>Sistema de Apertura Rápida de Empresas (SARE)</i>	<i>Secretaría de Economía</i>	<a href="https://conamer.gob.mx/certificaciones/Certificaciones/?filter=SARE&amp;vallsFilter=1">https://conamer.gob.mx/certificaciones/Certificaciones/?filter=SARE&amp;vallsFilter=1</a>
Federal	<i>Programas Nacionales Estratégicos (PRONACES)</i>	CONACYT	<a href="https://conacyt.mx/pronaces/">https://conacyt.mx/pronaces/</a>
Federal	<i>Sistema de Centros Públicos de Investigación</i>	CONACYT	<a href="https://conacyt.mx/conacyt/areas-del-conacyt/uasr/sistema-de-centros-de-investigacion/">https://conacyt.mx/conacyt/areas-del-conacyt/uasr/sistema-de-centros-de-investigacion/</a>
Federal	<i>Autodiagnóstico Exportador</i>	<i>Secretaría de Economía</i>	<a href="https://appsdesi.economia.gob.mx/autodiagnostico-exportador/">https://appsdesi.economia.gob.mx/autodiagnostico-exportador/</a>
State	<i>PROINNJAL - Desarrollo Tecnológico</i>	<i>Gobierno del Estado de Jalisco</i>	<a href="http://www.coecytjal.org.mx/Plataforma/app/views/2021/PROINNJAL2021/CONVOCATORIA%20PROINNJAL%202021%20VF.pdf">http://www.coecytjal.org.mx/Plataforma/app/views/2021/PROINNJAL2021/CONVOCATORIA%20PROINNJAL%202021%20VF.pdf</a>
State	<i>Premio TECNOS Nuevo León 4.0</i>	<i>Gobierno del Estado de Nuevo León</i>	<a href="http://tecnos.nl.gob.mx/">http://tecnos.nl.gob.mx/</a> <a href="http://retys.nl.gob.mx/servicios/premio-tecnos-nuevo-leon-40">http://retys.nl.gob.mx/servicios/premio-tecnos-nuevo-leon-40</a>
Federal-development bank	<i>Cadenas Productivas</i>	NAFIN	<a href="https://www.nafin.com/portalfn/content/acciones-para-apoyar-la-economia/reactivacion_cadenas.html">https://www.nafin.com/portalfn/content/acciones-para-apoyar-la-economia/reactivacion_cadenas.html</a>
Federal-development bank	<i>Financiamiento a Proveedores del Gobierno Federal</i>	NAFIN	<a href="https://www.nafin.com/portalfn/content/acciones-para-apoyar-la-economia/apoyo_proveedores.html">https://www.nafin.com/portalfn/content/acciones-para-apoyar-la-economia/apoyo_proveedores.html</a>

**Table A2.3.** Non-public programs mapped at the federal level, and in the states of Chiapas, Jalisco, and Nuevo León

Region	Name of the Initiative or Program	Institution/organization	Source of information
National	Academy for Women Entrepreneurs (AWE), México	Fundación México-Estados Unidos para la Ciencia A.C.	Questionnaire
National	Technology Business Accelerator (techBA)	Fundación México-Estados Unidos para la Ciencia A.C.	Questionnaire
National	ProPATENTA	Fundación México-Estados Unidos para la Ciencia A.C.	Questionnaire
National	Desarrollo Regional	Fundación México-Estados Unidos para la Ciencia A.C.	Questionnaire
National	Sistema de Asistencia Tecnológico Empresarial	Fundación México-Estados Unidos para la Ciencia A.C.	Questionnaire
National	Latam Impact Fund	Fondo de Fondos	Questionnaire
National	Fondos de Capital Privado socios de AMEXCAP	AMEXCAP	Questionnaire
Nuevo León	Plataforma INCmty	Tec de Monterrey - INCMTY	Questionnaire
Nuevo León	Skye Ventures	Skye Group	Questionnaire
Nuevo León	Premio Nacional de Ciencia de Datos	CSOFT MTY	Questionnaire
Nuevo León	Enlace de Oportunidades Comerciales	CSOFT MTY	Questionnaire
Nuevo León	My Own Business	CSOFT MTY	Questionnaire
Nuevo León	Venture Café Monterrey	Venture Café Monterrey	Questionnaire
Nuevo León	UNE, Vinculación Universidad-Empresa	Universidad de Monterrey, UDEM	Questionnaire
Nuevo León	Programa Integral de Capacitación para Emprendedores	JOVENES CAINTRA N.L:	Questionnaire
Nuevo León	INIXAR Crowdfunding Platform	INIXAR - Alianza Monetaria SA de CV	Questionnaire
Nuevo León	Heineken Green Challenge	HEINEKEN México	Questionnaire
Jalisco	Oficina de Transferencia de Tecnología del CIATEJ	CIATEJ	Questionnaire
Jalisco	Foro para el desarrollo tecnológico y emprendimiento de dispositivos médicos en América Latina	Pragmatec	Questionnaire
Jalisco	Programa de Innovación en Jalisco PROINNJAL Desarrollo de Proveedores 2021	MATERIALES ILÍMITA S.A.P.I. DE C.V.	Questionnaire
Jalisco	Programa virtual de Impulso a Emprendedores y MiPyME's	MIND México Innovación y Diseño A.C.	Questionnaire
Jalisco	Célula, Talento	Eugenio Galindo Villa Otero y asociados	Questionnaire
Jalisco	Jalisco Talent Land	Talent Network Mx SA de CV	Questionnaire

<b>Region</b>	<b>Name of the Initiative or Program</b>	<b>Institution/organization</b>	<b>Source of information</b>
Chiapas	<i>Modelo de Incubación: Emprender para Desprender</i>	<i>Incubadora de EEVOC EFFORT, A.C.</i>	Questionnaire
Chiapas	Basecamp Chiapas 2022	Watson Institute, Building Health Project	Questionnaire
Chiapas	<i>Marca Chiapas</i>	<i>Consejo Regulador Marca Chiapas</i>	Questionnaire
National	500 Startups Latam	<i>Aceleradora Somos Lucha Fondo de Inversión</i>	Online information
National	<i>Aceleradoras MassChallenge México</i>	MassChallenge México	Online information
National	<i>Fondos de VC de Etapa Avanzada</i>	Angel Ventures México	Online information
National	<i>Fondos Venture Capital de Etapa Semilla</i>	Trebol Capital	Online information
National	<i>Asociación de Emprendedores de México ASEM</i>	ASEM	Online information
National	<i>Fondos de VC de Etapa Avanzada</i>	IGNIA	Online information
National	Corporate Venture Capital	Wayra México	Online information
Nuevo León	<i>Fondos de VC de Etapa Avanzada</i>	Dalus Capital	Online information
Nuevo León	FEMSA Ventures Corporate Venture Capital	FEMSA Ventures	Online information
Nuevo León	Corporate Venture Capital	CEMEX Ventures	Online information
Nuevo León	NEORIS	NEORIS CEMEX	Online information
Nuevo León	Monterrey Digital HUB	Monterrey Digital HUB	Online information
Jalisco	<i>Fondos Venture Capital de Etapa Semilla</i>	Balero	Online information
Jalisco	<i>Fondos Venture Capital de Etapa Semilla</i>	Redwood Ventures	Online information
Jalisco	<i>Inversionistas Ángel</i>	Guadalajara Angel Investor Network	Online information
Jalisco	<i>Guadalajara Connectory por Bosch</i>	Bosch	Online information
Jalisco	<i>Premio Emprendedor COPARMEX Jalisco</i>	COPARMEX Jalisco	Online information
Jalisco	<i>Programa de Aceleración de Startups de Inteligencia Artificial (PASIA)</i>	<i>fAlr LAC Jalisco, Tecnológico de Monterrey en Guadalajara</i>	Online information



<b>Region</b>	<b>Name of the Initiative or Program</b>	<b>Institution/organization</b>	<b>Source of information</b>
Jalisco	<i>Carabela</i>	Angel Ventures Guadalajara	Online information
Jalisco	<i>Poligono Capital</i>	<i>Poligono Capital</i>	Online information
Chiapas	<i>Fondo por el Sureste de México</i>	<i>#GoogleporMexico</i>	Online information
Chiapas	<i>Foro Emprendedor Cacahoatán 2022</i> <i>Foro Emprendedor Tapachula 2021</i>	<i>Foro emprendimiento</i>	Online information
Chiapas	<i>Concurso de Emprendimiento Wortev: CHIAPAS</i>	Wortev Capital	Online information
Chiapas	<i>Incubadora de la Universidad de Ciencias y Artes de Chiapas</i>	UNICACH	Online information
Chiapas	<i>Incubadora de Negocios y Proyectos INCUSUR de la Universidad del Sur (UNISUR)</i>	<i>Universidad del Sur</i>	Online information

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# Mexico

## Entrepreneurship Ecosystem Diagnostic

Entrepreneurship thrives in ecosystems that bring private stakeholders together in a nurturing public policy environment. An impactful entrepreneurship ecosystem not only facilitates the entry of a high number of formal firms, it also fosters high growth, innovative, and globally integrated firms that can create more, and better-quality jobs. Mexico's entrepreneurship ecosystem, however, is characterized by the limited entry of high-quality firms, and by a large share of low productivity firms that have few prospects for upgrading and growth.

The goals of this report are to understand the obstacles that affect Mexico's entrepreneurship ecosystems, and with that knowledge, inform the design of priority policies and programs that can overcome ecosystem obstacles. Mexican policymakers, both at the national and local levels, can influence the entrepreneurship ecosystem directly through policies and programs, and indirectly through the non-public ecosystem "enablers", including business incubators, industry associations, venture capital funds, universities, and multinational companies.

To understand entrepreneurship, this analysis drew on a new World Bank Group framework, multiple global and national data sources, and two surveys that were conducted in Mexico. These surveys covered public programs and institutions, as well as non-public enablers that support entrepreneurship at the national level, and in three states with diverse characteristics (Chiapas, Jalisco, and Nuevo León). This analysis also used the exact locations of firms to identify clusters of impactful entrepreneurship, and it assessed the roles and qualities of public programs, and of the enablers that are helping entrepreneurs to overcome market failures.