PROSPECTIVE ATLAS

2021

TERRITORIAL- INDUSTRIAL ATLAS FOR INVESTMENT ATTRACTION

High-potential industries in Mexico

- Wind energy: wind turbines manufacturing
- Pharmaceuticals
- Aerospace
- Agro-industry (chocolate and vanilla)
- Petrochemical products and their applications

RELACIONES EXTERIORES
SECRETARÍA DE RELACIONES EXTERIORES

UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UN HABITAT
FOR A BETTER URBAN FUTURE

Prospective territorial-industrial atlas for investment attraction.

RELACIONES EXTERIORES
SECRETARÍA DE RELACIONES EXTERIORES

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UN HABITAT FOR A BETTER URBAN FUTURE

Table of contents

1

Introduction

Latin America is currently facing an unprecedented period of economic vulnerability which has been heavily exacerbated by the outbreak of Covid-19. It is estimated that in the next years the region will face a substantial contraction of total GDP (-9.1%), a drastic reduction in employment (more than 44 million people losing their jobs), as well as an important increase in the number of people living in poverty (more than 45 million). In particular, between 2019 and 2020, Mexico's GDP is estimated to have declined by 8.5% with a 3.3% reduction in formal employment levels.

Considering this scenario, the role played by the economy and by the competitiveness of cities are here identified as key elements to induce a process of recovery inside the region. Thus, it is necessary to devise innovative approaches to attract foreign investment that, given the current global restructuring of value chains, allows for the emergence of high value-added industries with ample potential to stimulate higher levels of employment. In this way, economic prosperity could be fully extended to other territorial and societal spheres.

In this context, the United Nations Human Settlements Program (UN-Habitat) and the United Nations Industrial Development Organization (UNIDO) have partnered up with the Government of Mexico (through its Ministry of Foreign Affairs) to jointly formulate a novel approach to attract foreign investment that lays its foundations on urban and regional planning perspectives. This novel approach allows economies of agglomeration to be regarded as fundamental factors to kickstart a steady and sustainable process of economic development that also aims to reduce negative environmental issues as well as generate higher standards of living for the population as a whole. Under this perspective, local territorial advantages stand at the forefront of the country's promotion strategy to induce higher foreign investment; an innovative approach that draws upon recent concepts and ideas derived from the new economic geography.

The development of an Atlas on industrial and territorial perspectives aims to generate a strategic analysis that identifies manufacturing sectors with high potential for future industrial growth on given territories. By following this analysis, it is also possible to recognize the emergence of specific regional corridors inside the country that are highly suitable for the industrial development of strategic sectors, allowing for a new generation of foreign investment that seeks to improve social and economic conditions, generate prosperity and even mitigate negative environmental effects for the population there located.

1.1. Global Value Chains (GVC)

This project lays its foundation in the analysis of global value chains (GVC) to identify strategic sectors in Mexico with high growth potential based on advantages from the country's location, strategic commercial integration and economic performance. The analysis of GVC of strategic sectors allows for the identification of opportunities generated by the global restructuring, the rupture and shrinkage of productive linkages and the regional reorganization post Covid-19.

This approach is complemented by the analysis of GVC at the national scale and the conditions of competitiveness and economic complexity of the selected strategic sectors, considering at the same time elements such as local economic vocations, competitive advantages and agglomeration advantages, and the economic and social impact.

This initiative integrates global and local scales into one industrial development process with a territorial approach, guided by the impact on the achievement of the Sustainable Development Goals (SDGs)

1.2. National Value Chains (NVC)

Mexico's economic activities are divided into three main sectors: primary or agricultural, secondary or industrial sector and tertiary or service sector. These sectors interact with each other constantly, so each has its own supply and demand.

In terms of the specification of the national value chain, these interactions are numerous and complex. Different industries are involved in basic groupings, from which various economic activities are defined. The analysis of the GVCs has identified the following industries of great importance, from which it is possible to generate greater value:

> **1) Wind Energy Industry.** Specifically, the construction industry of the wind turbine tower, which includes steel, cables and paint production.
> **2) Pharmaceutical Industry.** In particular, pharmaceutical preparations that correspond to antiserums and other blood fractions and immunological products.
> **3) Aerospace Industry.** Specifically, aerospace equipment.
> **4) Agro-industry.** Particularly, chocolate and vanilla industries, cultivated using a multiple cropping method.
> **5) Petrochemical Industry.** Specifically, the relationship between petrochemical industry and the other sectors presented above.

These industries are very commercially active. Following the composition of the GVCs, it is possible to find the location of these chains in the national territory (Map 1).

Map 1. Value chains: from global to national level

Source: Created by UNIDO.

The general purpose of locating the NVC within the country is to generate value in these industries so that, being a chain, it maximizes profits and reduces costs, with a cross-cutting perspective of gender equity, sustainability, development and economic growth, in addition to alignment with the SDGs while keeping in mind the prospect of substantial changes caused by the pandemic that we are fighting today.

1.3. An emerging geographic economy

UN-Habitat and UNIDO joined efforts and experience to fine-tune a methodology that, in addition to the industrial performance of the sector, concomitantly considers the economic, social, environmental and urban dimensions of each sector. Because of that, it is possible to identify the characteristics of regions and municipalities that, under certain conditions, could attract investment linked to the global production chain to their territory. The process also proposes the design and promotion of policies that improve conditions in other regions to attract new investments that, otherwise, would not reach them.

Thus, development strategies are moving away from single definitions at the national scale and are instead identifying subregional paths based on the consideration of great heterogeneities within the country. The emergent geographic economy encourages industrial development to reduce regional inequality gaps in a sustainable way, while strengthening the linkages in the value chains in strategic industrial activities.

1.4. High-potential sectors in Mexico

In Mexico, this project has identified five GVC in the following strategic ssectors with promising outlooks:

1. Wind energy: Manufacturing of wind turbines.
2. Pharmaceutical industry.
3. Aerospace.
4. Agro-industry (chocolate-vanilla).
5. Petrochemical products and their applications

Each sector is analyzed at different territorial scales and approached from an industrial territorial perspective that includes the study of more than 45 variables related to social inclusion, environmental sustainability, and urban-regional planning. The territorial analysis made it possible to identify the regions of the country in which these five sectors have the greatest potential for development, given their current conditions of economic performance, ecosystem of actors, and links with pioneering industries.

A strategic result of the project is the design of regional development strategies around prosperity corridors or clusters, which are an effective way to promote social and industrial development at the sub-national scale. These strategies build an economic structure of greater diversity and complexity to generate prosperity, based on the potential of the territory.

The depth of the socioeconomic crisis generated by Covid-19 requires generating a new conversation about the development strategy for Mexico and, eventually, for Latin America. This project offers an innovative territorial and local perspective to create timely proposals for sustainable industrial development to face growth, environmental preservation and social equity challenges in the country and region.

2 Industrial diagnosis of value chains

2.1 Wind Industry: Wind turbines

Wind energy refers to the process of generating electricity using wind or air flows that occur naturally in the atmosphere. Wind turbines are used to capture the kinetic energy of the wind to generate electricity.

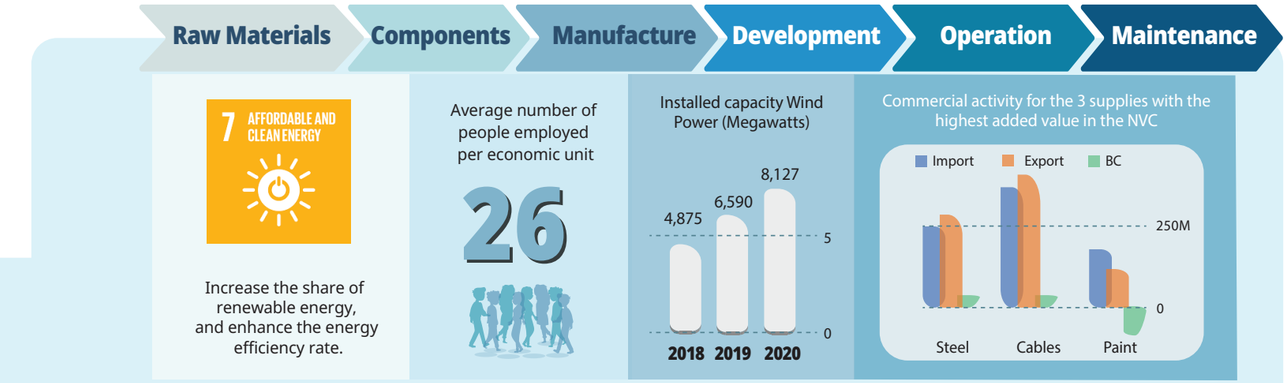
The Value Chain of Wind Turbines consists of several linkages that go from supplying raw materials, the manufacturing and component assembling, logistics services and wind park planning, to energy transmission to the consumers.

The main exporters of wind turbines are Denmark, Germany, the Netherlands, China and Spain (Map 2).

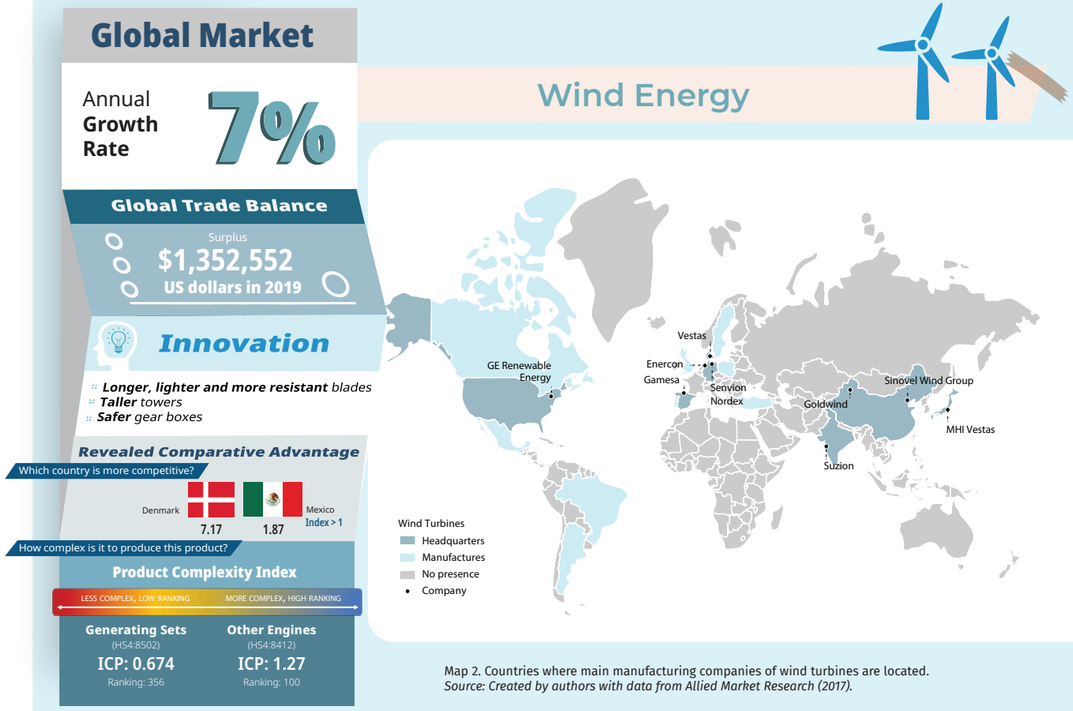
The industry requires technological advances to reduce the cost of wind power production, as well as more effective and safe components: longer and lighter blades, taller towers, safer powertrains and control systems that guarantee performance. These inputs that can be produced nationally.

Mexico has the capacity to produce the necessary inputs for this industry: steel, cables, paint, and lighting systems. These components are essential in the construction of wind towers, but they also allow for a reduction of import costs and an increase in domestic production.

Mexico is at a privileged geographical position to produce what is necessary to satisfy national demand, in addition to supplying products and services to international consumers, particularly to the United States and Latin America.



Lorem ipsum



Map 2. Countries where main manufacturing companies of wind turbines are located.
Source: Created by authors with data from Allied Market Research (2017).

- The states showing a positive trade balance are: **Nuevo León, Chihuahua, San Luis Potosí y Baja California.**
- Top steel-producing states are: **Coahuila, Michoacán, Nuevo León, Guanajuato y Veracruz, with 82% of the domestic market.**

The top partner country from which Mexico imports wind turbine and its components is **China.**

2.2 Pharmaceutical Industry: Pharmaceutical preparations

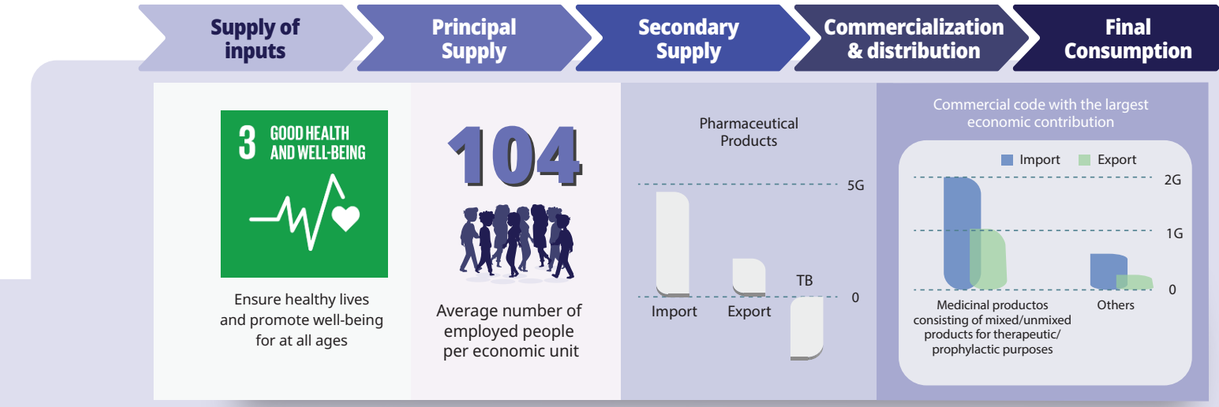
The producers of pharmaceutical preparations manufacture products for the treatment of diseases in humans and animals, which are divided into prescription and over-the-counter drugs.

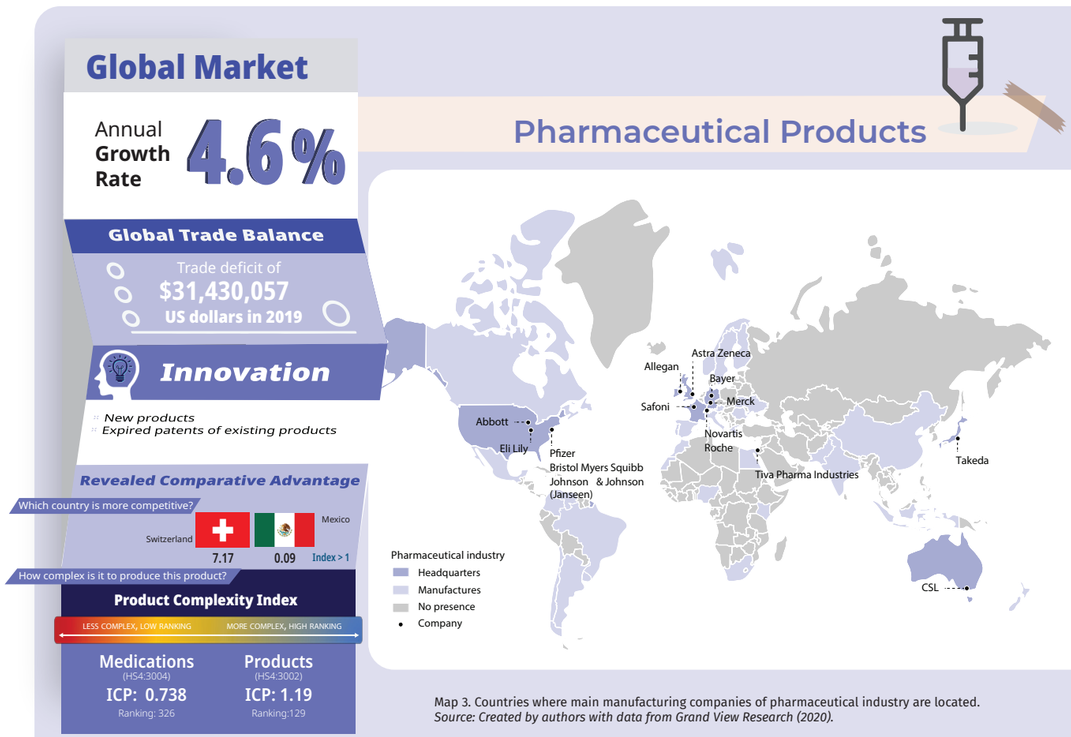
The Value Chain begins with the research and development process followed by the supply of active ingredients, the manufacturing of reliable drugs that meet quality standards, and marketing and distribution.

The main exporting countries are Switzerland, Germany, Ireland, United States and Belgium (Map 3). Research and development of new drugs is fundamentally derived from a continuous process to find more effective pharmaceutical preparations for the treatment of various diseases.

14 of the world's leading pharmaceutical companies operate in Mexico, showing that the country has the capacity to produce pharmaceutical preparations. In addition, there are relevant resources and inputs for the production of active ingredients, critical and in high demand worldwide.

Although there are challenges in how to increase investment focused on research and development in the country, Mexican scientists have the technical capabilities to find cures for the diseases that afflict Mexico and the world.





Pharmaceutical Products

Map 3. Countries where main manufacturing companies of pharmaceutical industry are located.
Source: Created by authors with data from Grand View Research (2020).

- The states showing a positive Trade Balance for Pharmaceutical Preparations (HS 3004.90.99) are: **BC, Jalisco, Estado de México y Morelos.**
- Pharmaceutical Industry represents **1.7 % of national GDP** and **9.8% of manufacturing share in GDP.**

The top partner country from which Mexico imports pharmaceutical products is the **United States.**

2.3 Aerospace Industry: Aeroparts

The Aerospace Industry is made up of companies that produce airplanes, missiles, space vehicles and their parts.

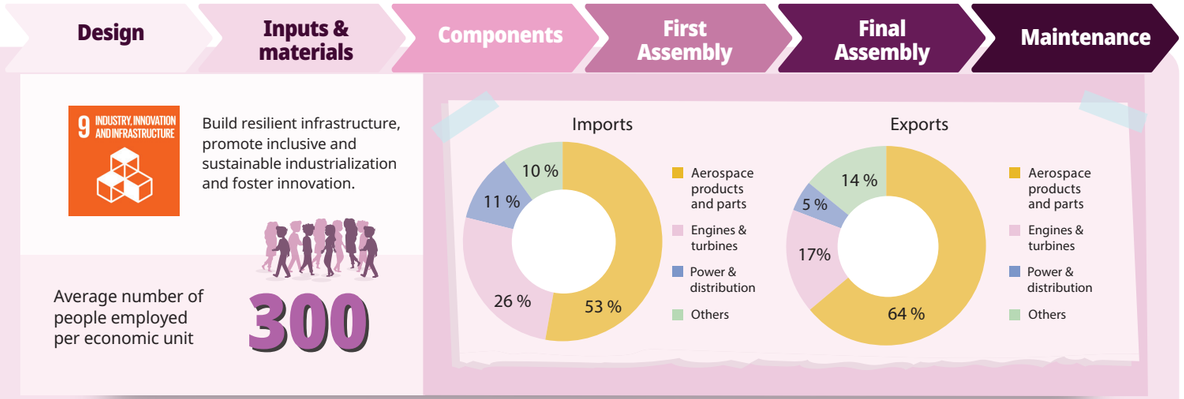
The Value Chain begins with the supply of inputs. The next link is the production of subsystems such as the wings, followed by the assembly of the subsystems and subsequently, the assembly of the aircraft. The final link corresponds to maintenance, repairs, and operation.

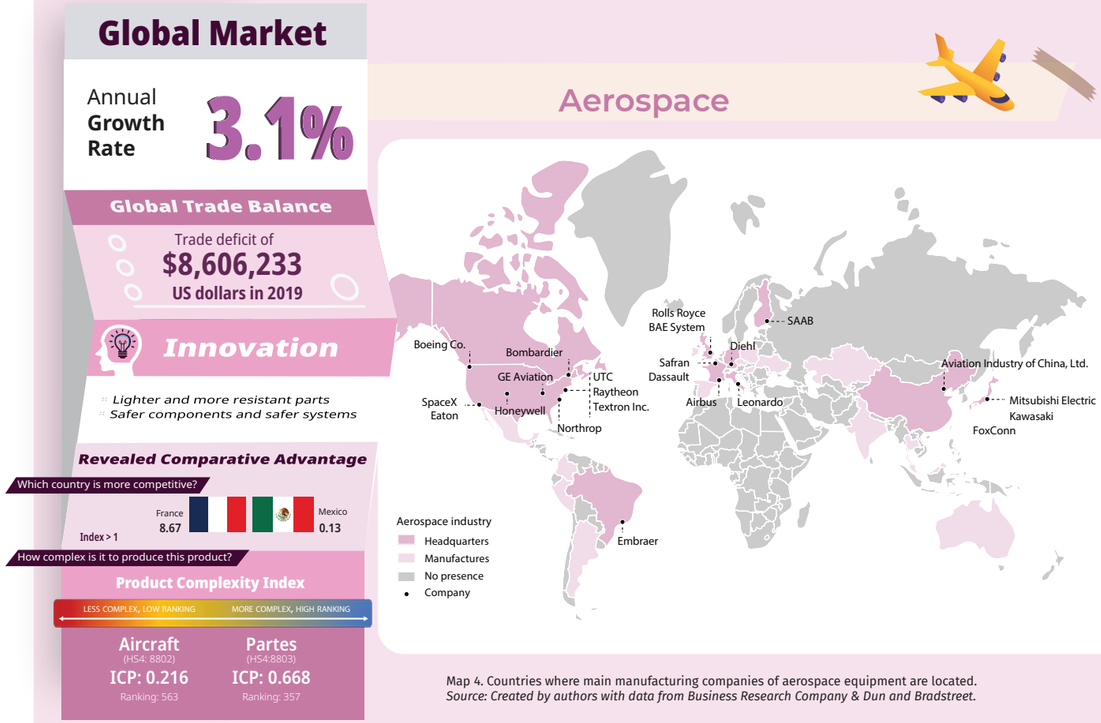
The main exporting countries of Aerospace Equipment are United Kingdom, Germany, France, Singapore, and the United States (Map 4).

Innovation in the aerospace industry seeks to create low-cost parts. At the same time, the parts are required to be lighter and stronger. Mexico has a large participation in the production of inputs for aircraft, helicopters, satellites and engines, both in the production, design and assembly, as a consequence of the high capacity for specialization in productive vocations in mechanics, electronics, and software development.

This allows Mexico to have a large participation within various links of this industry's value chain.

The aspect that makes the country more attractive is the presence and growth of clusters or agglomerates of the aerospace industry where both private and public initiative participate in innovation and research and development centers.





Map 4. Countries where main manufacturing companies of aerospace equipment are located.
Source: Created by authors with data from Business Research Company & Dun and Bradstreet.

- The states showing a positive Trade Balance for Turbojets parts (HS 8411.91.01) are: **Baja California, Sonora y SLP.**
- Mexico **ranks 6th** in exports of aerospace inputs to **the United States of America.**

The top partner country from which Mexico imports aerospace inputs is the **United States.**

2.4 Agro-industry: Vanilla and chocolate

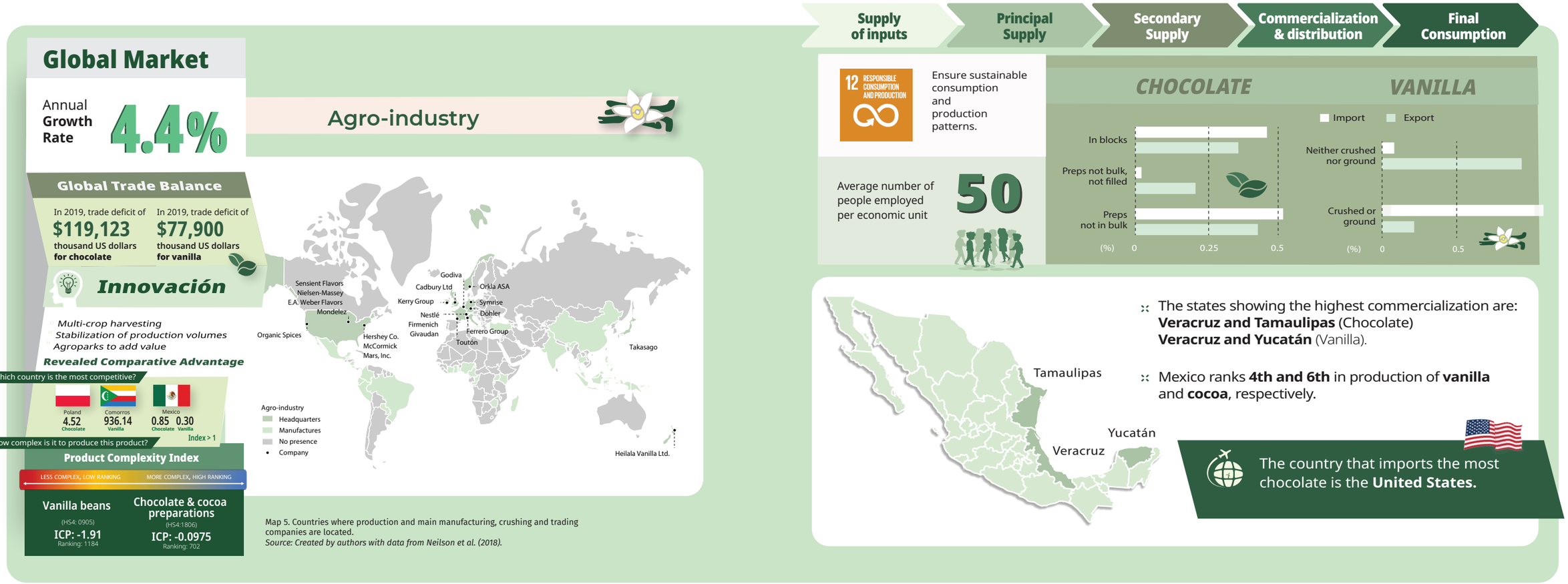
Chocolate and vanilla are significant and traditional products of Mexico, as well as ingredients used in the food industry.

The Value Chain, both for chocolate and vanilla, begins with the growing and harvesting, processing, packaging and distribution to the final consumer.

The main exporters of cocoa and chocolate globally are the Netherlands, Malaysia, Germany, Indonesia, and France. The big vanilla exporters are Madagascar, France, Germany, Indonesia and Papua New Guinea (Map 5).

Innovation consists of investing in agro parks that allow participation in the different linkages along the value chain. Mexico has been internationally recognized as a large producer in the primary sector, which has led to be in a good position within the secondary sector for agribusiness. This is thanks to current agroparks that have excelled in the harvesting, processing, marketing and distribution of these products, nationally and internationally.

In addition, Mexico has experienced growth in agribusiness due to increases in investment in infrastructure and technology in different agricultural areas in the country. The construction and repair of roads, expansion and modernization of ports, new technologies and innovation used in agriculture, as well as an agricultural transformation allow Mexico to diversify and strengthen its agro-industrial supply so Mexican products can reach the whole world.



Map 5. Countries where production and main manufacturing, crushing and trading companies are located.
Source: Created by authors with data from Neilson et al. (2018).

2.5 Petrochemical Industry: Chemical industry

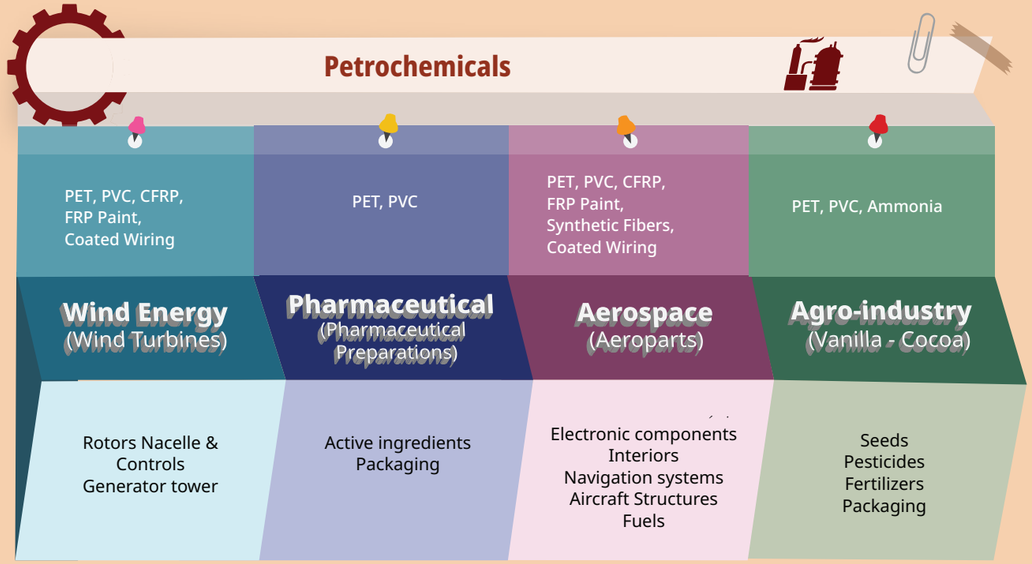
Strategic industries are closely related and offer the possibility of triggering a sustainable industrialization process with high added value. Petrochemicals are one of the supplies that are needed in almost all value chains.

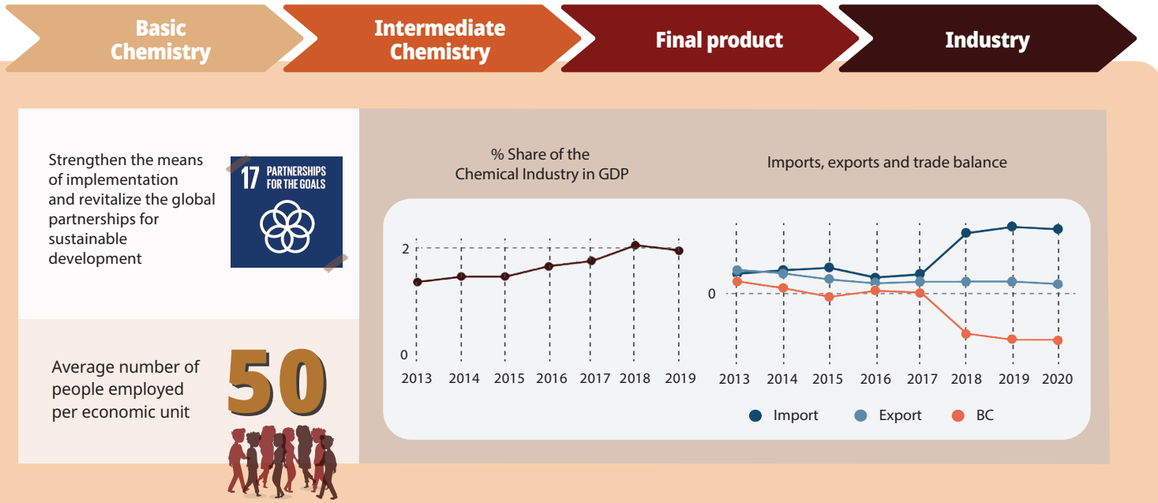
In the case of the Wind and Aerospace industries, they require plastic parts produced with Polyethylene Terephthalate (PET) or Polyvinyl Chloride (PVC), also some parts of the components made with carbon fiber reinforced polyester (CFRP) and Fibreglass Reinforced Polyester (FRP), as well as paint and coated electrical wiring for electrical / electronic systems. Synthetic fibers are used for aircraft interiors and seats.

PET and PVC are widely used by the pharmaceutical industry for packaging of pharmaceutical products due to their versatility. The same happens in the agro-industrial sector, which also uses ammonia derivatives for manufacturing fertilizers.

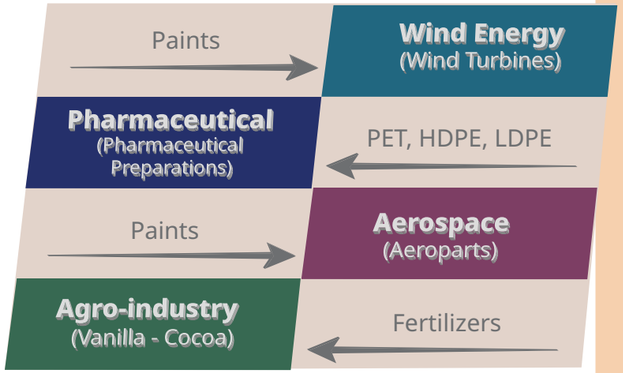
The petrochemical industry is strategic for the economic and social growth and development of Mexico. This industry supplies to more than 40 branches of industrial activities and is part of the demand of goods and services of various industries.

Mexico has the opportunity to increase profitability in the national value chain of petrochemical inputs so that, by being inserted in the value chains of other industries, they can reduce the costs of raw materials and increase the value within the chain.





Mexico has the capacity to produce petrochemical industry inputs needed for other value chains.



2.6 Findings and conclusions from and industrial perspective: the view of UNIDO

Value chains cover aspects such as research and development, production, logistics, marketing and many other services that range from planning to operation and maintenance. It is due to all these processes that value chains play such an important role in the global and national economy.

Foreign trade data, as well as competitiveness indicators, show interdependence between economies in addition to global changes that point to a global restructuring due to COVID-19 and the search for an efficient allocation of productive resources worldwide. These changes suggest that value chains are shortening and reorganizing, betting on regionalization, reshoring and nearshoring.

Mexico's participation in strategic industries has grown in recent years. This Prospective Atlas shows that Mexico's role has been predominantly as an intermediary, but demonstrates its potential to engage in more nearshoring activities and vertical economies to increase domestic production in the export of final and intermediate goods. This will help cement the commitment to the USMCA and other international trade agreements.

The Atlas facilitates exploration of the deepening or expanding activities in the primary, secondary and tertiary sectors, thanks to the specialization and know-how achieved by various regions of the country. In addition, it shows that Mexico has a privileged position that allows greater participation in each of the linkages of the value chains of the analyzed industries.

3 Regionalization of prospective sectors

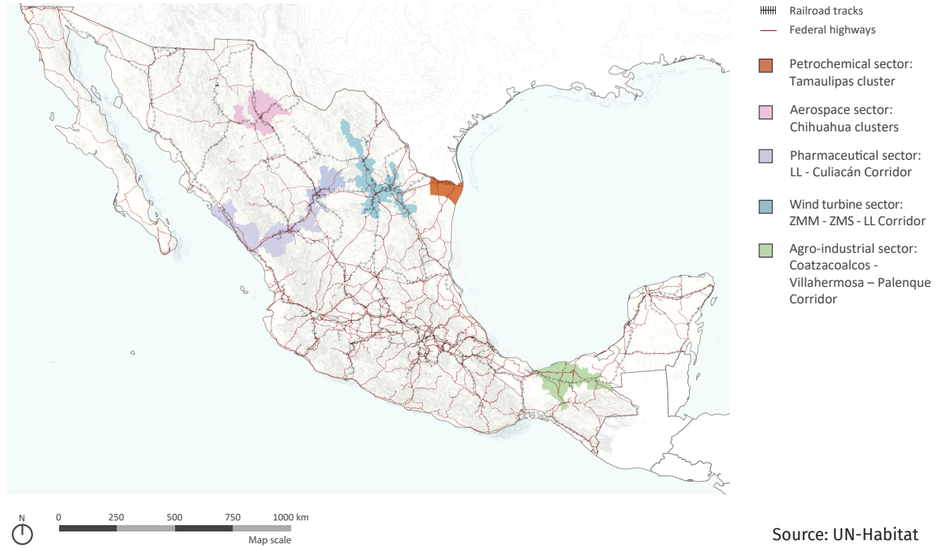
Based on the identification and industrial characterization of the five sectors here selected, a spatial analysis was carried out at the municipal level. Such analysis considers the relationship between industry and territory observed within those sectors as well as the prevailing territorial dynamics. Five corridors (which are highly suitable for the industrial development of aforementioned strategic sector) were thus selected given regional conditions of economic performance, the ecosystem of actors, and existing links between the prospective sectors and the previously established manufacturing capabilities. Map 6 illustrates the national location of these corridors that could potentially kickstart an industrialization process that also generates prosperity and mitigates undesirable environmental effects.

All prosperity corridors were here carefully chosen by following a methodology that draws upon publicly available information. This methodological approach is briefly summarized below:

1. Location of economic activities that belong to each strategic sector
2. Identification of municipal capabilities that are based on the assessment of the labor productivity levels registered by each strategic sector located in those regions between 2014-2019.
3. Identification of opportunities for industrial development that are based on the industrial and sectoral performance of municipalities between 2014-2019
4. Identification of those municipalities with the highest potential to host strategic sectors
5. Planning of territorial corridors based on criteria of municipal interconnectivity and on the existence of subnational inter metropolitan phenomenon.
6. Consideration of inter-municipal interactions of a social and environmental nature (housing, gender, violence).
7. Identification and analysis of the special needs for each sector (proximity to international markets, climate, land, protected natural areas, qualified labor, etc.)

Based on this process, five corridors or territorial clusters were identified, one for each strategic sector (Map 6).

Map 6. Five corridors or territorial clusters, one for each strategic sector



Source: UN-Habitat

3.1. Monterrey-La Laguna corridor: strategic wind turbine sector

2276
economic units located in the corridor are linked to the Wind Turbine Strategic Sector

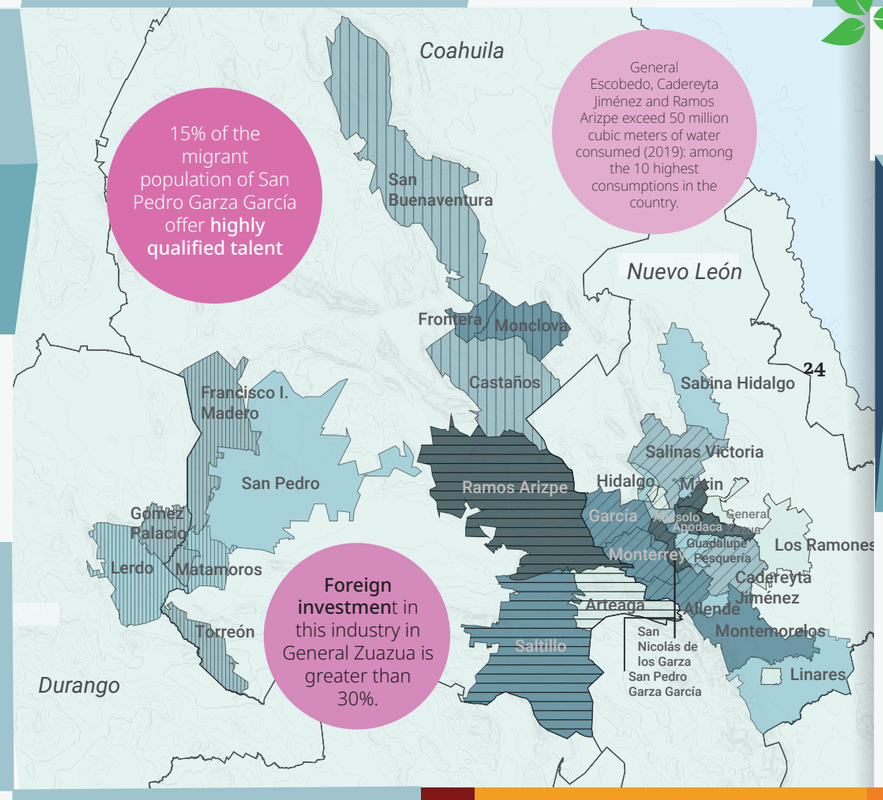
9/25
Nine municipalities are among the **Top 25** productive municipalities of this sector in the country.

Widespread availability of key intermediate inputs with
HIGH
domestic content.

High connectivity with the main marine ports in the Gulf of Mexico and in the Pacific and the main customs points at the northeast border.

3+
The rate of innovation activities at the corridor is three times higher than the national average.

Economic units operating at the corridor generate inputs that are relevant to the **production of wind turbines and other renewable energies**



8
Eight highly-industrialized municipalities *(manufacturing gross value added is higher than 80%).*

Innovation related activities are observed in most stages of the value chain.

High collaboration between universities and manufacturing firms

7.69
10,000
The average number of childcare facilities (per 10, 000 children) is of **7.69** which is higher than the national average.

At the corridor, the rate of female labor participation is **31.02, thus exceeding the national average (20.38%).**

31%

Equal labor force participation *(between males and females)* in the electrical and electronic equipment industries

Challenges

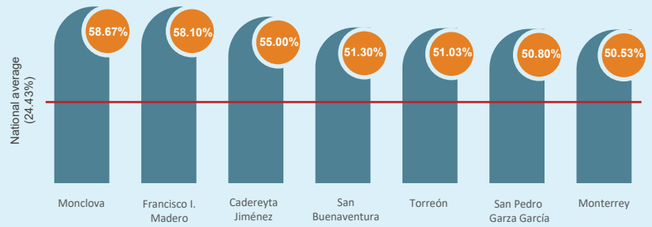
Urban inefficiency: the rate of public transport use is 15 times lower than the national average.

Security: the rate of domestic violence complaints is 6 times higher than the national average.

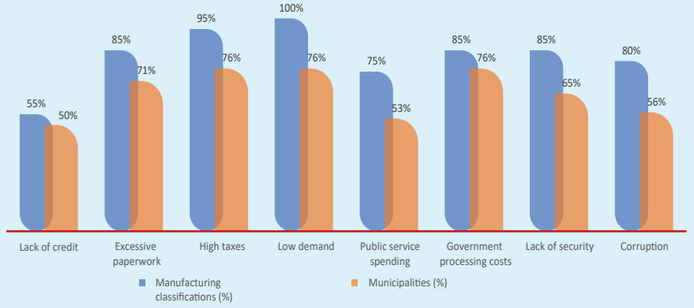
The territorial diagnosis on a national scale suggests development of a new corridor in the northern part of the country, considering factors such as the location of the different economic activities in wind industry and their progress in terms of productivity during 2014-2019.

The Atlas thus proposes the emergence of a new prosperity corridor (which is highly suitable for the industrial development of the Wind Turbine Strategic Sector) in a territorial agglomeration of 38 municipalities that jointly connect the Metropolitan Area of Monterrey (ZMM), the Metropolitan Area of Saltillo (ZMS) and the Metropolitan Area of La Laguna (LL).

Municipalities reporting the highest percentages of employees in manufacturing that completed post-secondary education



Main problems and difficulties faced by economics units reported in the 2019 Economic Census



SYMBOLOGY
- Federal entities
- Monterrey Metropolitan Area
- La Laguna Metropolitan Area
- Saltillo Metropolitan Area
- Monclova Metropolitan Area

Performance of the wind sector
- Very high potential
- High potential
- Medium-good potential
- Low potential

3.2. La Laguna-Culiacán corridor: strategic pharmaceutical sector

389

economic units located in the corridor are linked to the pharmaceutical sector

The rate of innovation at the corridor **120%** is higher in the pharmaceutical sector than the national average.

Presence of leading **PHARMACEUTICAL** firms and of specialized suppliers that are required to meet the needs of the sector.

The corridor offers high connectivity to the main industrial and metropolitan areas in the western and northern part of the country, along with immediate access to the marine port of Mazatlán.

Innovation related activities are observed in most stages of the value chain.

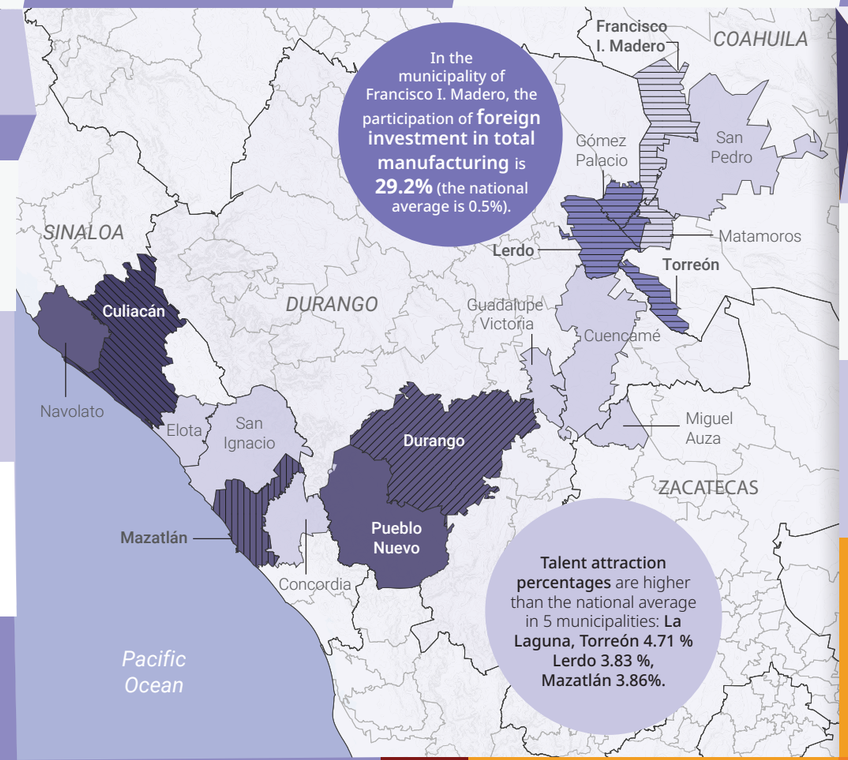
The industry in the corridor reports **higher education** compared to the national average.

Wide availability of **highly specialized research centers** that conduct innovative scientific projects.

The corridor has **1.5 times** as many childcare centers for every 10,000 children as the national average.

In five municipalities within the corridor, the rate of female labor participation is higher than the **national average rate (30%).**

30%



In the municipality of Francisco I. Madero, the participation of **foreign investment in total manufacturing** is **29.2%** (the national average is 0.5%).

Talent attraction **percentages** are higher than the national average in 5 municipalities: **La Laguna, Torreón 4.71 % Lerdo 3.83 %, Mazatlán 3.86%.**

3

3 municipalities within the corridor show **higher labor productivity** in the pharmaceutical sector than t**the national average.**

The highly industrialized ZMLL area generates around **50%** **of the corridor's pharmaceutical gross value added.**

Challenges

High demand for domestic intermediates within the pharmaceutical value chain

Urban inefficiency: the rate of public transport use is **11 times less** than the national average.

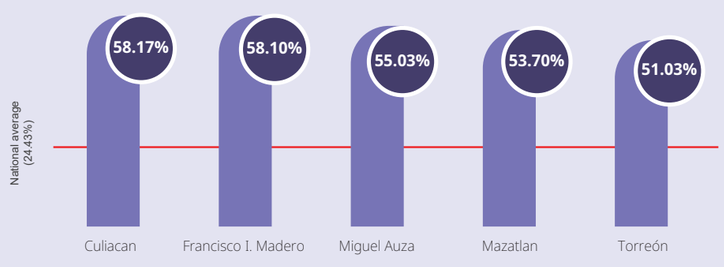
Unsuitable housing: in four municipalities, **60 % of the population** reports insecurity in house ownership.

Insecurity: the rate of domestic violence complaints is **2.5 times higher** than the national average.

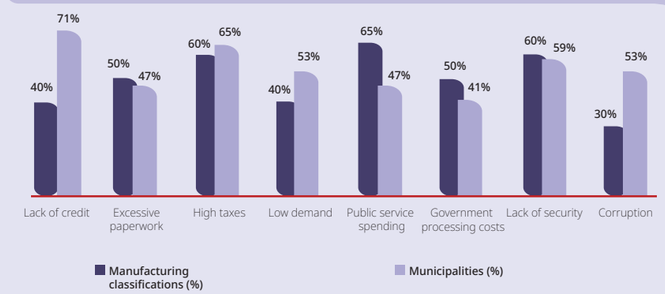
taking into consideration factors such as the location of the different economic activities in wind industry and their productivity during 2014-2019, the territorial diagnosis on a national scale recommends developing a new corridor in the northern part of the country.

This Atlas thus proposes the emergence of a new prosperity corridor (which is highly suitable for the industrial development of the Pharmaceutical strategic sector) in a territorial agglomeration of 17 municipalities that connect the metropolitan areas of La Laguna (ZMLL), Durango and Mazatlán (ZMZN) and Culiacán (ZMCUL).

Municipalities reporting the highest percentages of employees in manufacturing that completed post-secondary education



Main problems and difficulties faced by economics units reported in the 2019 Economic Census



SYMBOLOGY

- Federal entities
- ZM de Durango
- ZM de La Laguna
- ZM de Culiacán
- ZM de Mazatlán

Performance of the pharmaceutical sector

- High potential
- Medium potential
- Low potential

3.3. ZM Chihuahua cluster: strategic aerospace sector

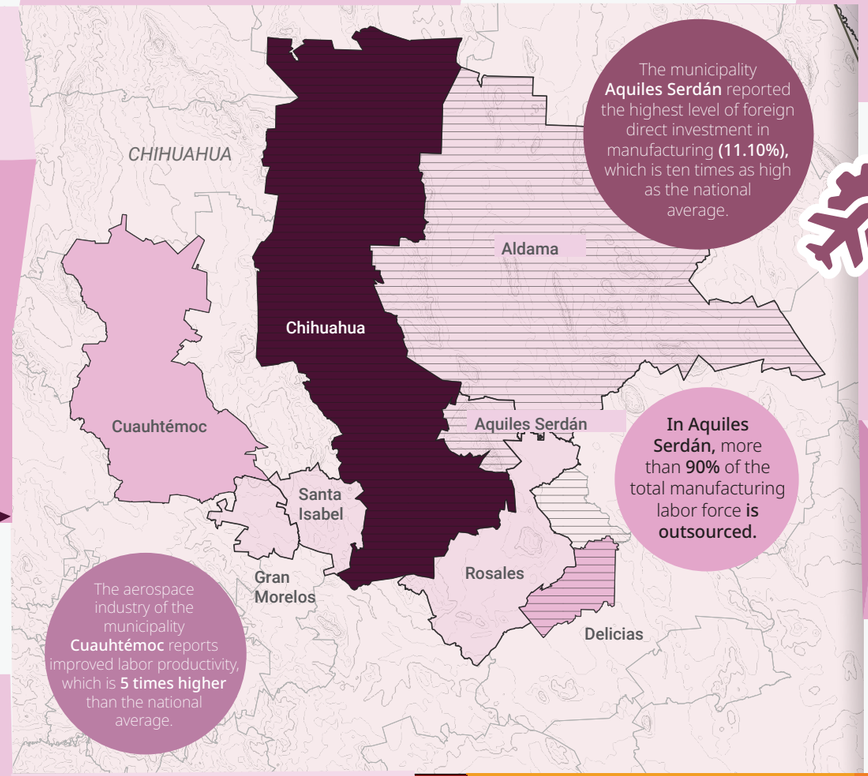
107
economic units in Aerospace Strategic Sector are located in 8 municipalities of de cluster.

The average municipal labor productivity:
1.18
is **higher than than the national average.** ($0.84 million Mexican pesos).

This corridor reports the highest agglomeration of
AEROSPACE FIRMS
in the whole country

Environmental Unsustainability: the municipality of Chihuahua reports the highest water consumption in the corridor.
32 million cubic meters
which is the tenth highest level of consumption in the country.

3+
The corridor is
3 times more innovative
than the national average.



The municipality **Aquiles Serdán** reported the highest level of foreign direct investment in manufacturing **(11.10%),** which is ten times as high as the national average.

In **Aquiles Serdán,** more than **90%** of the total manufacturing labor force **is outsourced.**

The aerospace industry of the municipality **Cuauhtémoc** reports improved labor productivity, which is **5 times higher** than the national average.

Widespread availability of key intermediate inputs **in the aerospace industry.**

Most municipalities in the corridor, except for **Gran Morelos,** exceed the national average rate of workers holding post-secondary education degree in manufacturing.

4
In four municipalities, **manufacturing gross value added is higher than 40%**

Scientific collaborations **between universities and firms** located in the corridor are led by the research center with the highest number of patents registrations in the whole country.

5 out of 8 municipalities exceed the national average of talent attraction (1.42 %)..

The rate of **female labor participation** in the cluster is **34.67%,** which is higher than **national average rate (20.38%).**
35%

Santa Isabel reports
23.42 homicides
10,000 inhabitants
which is the third largest rate in the country.

Challenges

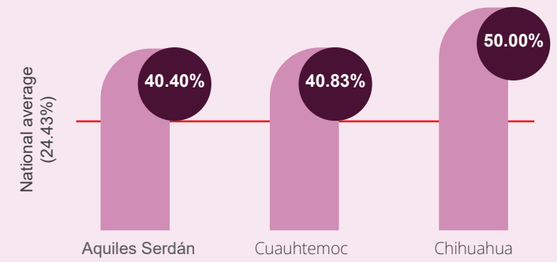
Urban inefficiency: the rate of public transport use is **25 times less** than the national average.

Insecurity: the rate of domestic violence complaints is **4 times higher than** the national average.

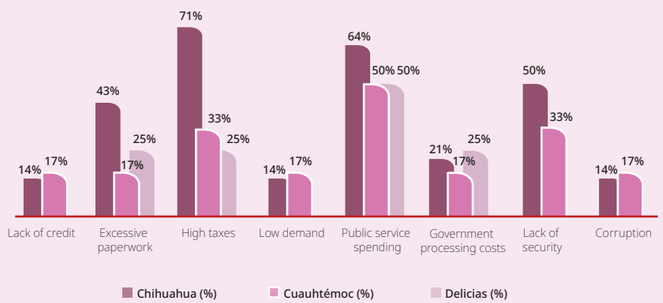
The national scale territorial diagnosis, based on factors such as the location of the different economic acivities and their progress in terms of productivity from 2014-2019, recommends developing a new corridor in the northern part of the country.

This Atlas thus proposes the emergence of a new prosperity corridor (which is highly suitable for the industrial development of the Aerospace strategic sector) in a territorial agglomeration of 8 municipalities that include the metropolitan area of Chihuahua, as well as some other municipalities that are also located in the areas nearby.

Municipalities reporting the highest percentages of employees in manufacturing that completed post-secondary education



Main problems and difficulties faced by economics units reported in the 2019 Economic Census



SYMBOLOGY
- Federal entities

Performance
- High potential
- Low potential

Chihuahua Cluster (Metropolitan area of Chihuahua)
- Aldama
- Aquiles Serdán
- Chihuahua

Municipality Chihuahua
- Cuauhtémoc
- Santa Isabel
- Delicias
- Gran Morelos
- Rosales

3.4. Coatzacoalcos-Palenque corridor: strategic agro-industrial sector

79 **economic units (whose production is linked to the agro-industrial sector)** can be found at the corridor's main urban centers.

1/3 of municipalities within the corridor **1.42** report a higher rate of talent attraction than the **national average (1.42%).**

In 27 municipalities, % of workers (employed in manufacturing) that completed **higher education is higher than national average (24.43%).**

Among these 27, **9 municipalities exceed 50%.**

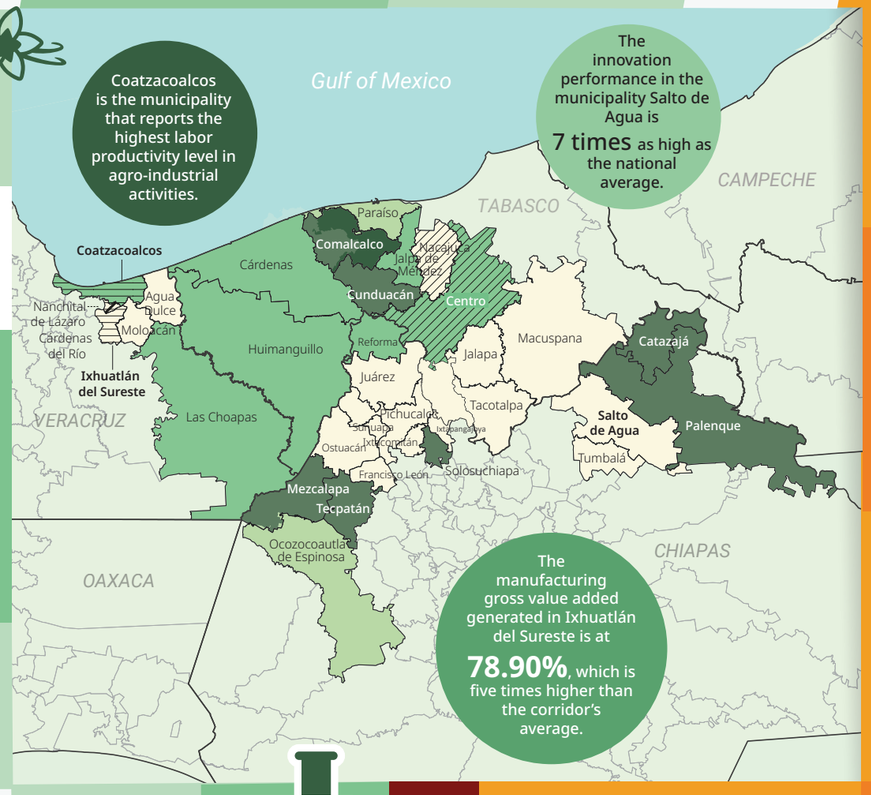
There are firms providing specialized services for the *AGROINDUSTRIAL* sector.

Environmental Unsustainability: the municipality **la ZMVSA, Centro** reports the highest water consumption in the corridor **(with nearly 21 million cubic meters),** thus being the 16th highest level of consumption in the country. Water consumption of the municipality Coatzacoalcos is **20 million cubic meters** (18th highest in the country).

Well-established manufacturing specialization in the processing of cocoa beans and vanilla seeds that does not harm soil and respects natural protected areas.

Ample opportunities to link agro-industrial activities to tourism sector.

The corridor enjoys its strategic location (which includes the point of entry to Mexico's southeast region).



Unsuitable housing: **In half the municipalities** more than 50% of the population report insecurity in home ownership.

Lack of appropriate infrastructure: internet access at home is only available to **less than 11 %** of the total population of the municipalities.

The average number of childcare facilities (per 10, 000 children) in the corridor is **22% less** than the national average.

% of economically active female population is higher than the national average (20.38) in 50% of the corridor's municipalities.

20%

In more than 50% of the corridor's municipalities, **% of economic units** that conduct labor training activities are higher than the national average **5.27 %**

High availability of sugarcane mills.

Challenges

Social vulnerability: more than half of the population of the municipalities Tumbalá and Salto de Agua live under extreme poverty with less than 20% of homes equipped with running water.

Insecurity: Centro and Teapa are ranked among the **top 50 municipalities with the highest number of reports for domestic violence in the whole country.**

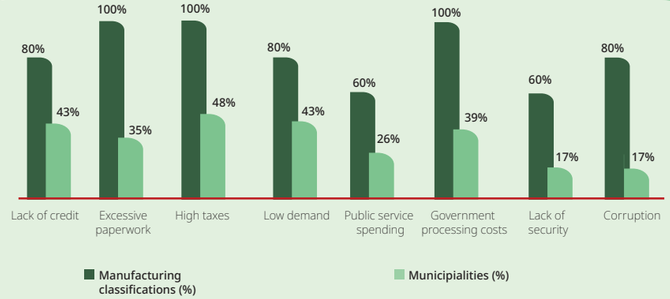
taking into consideration factors such as the location of the different economic activities and their productivity between 2014-2019, the territorial diagnosis on a national scale recommends developing a new corridor in the southeastern part of the country.

This Atlas thus proposes the emergence of a new prosperity corridor (which is highly appropriate for the industrial development of the agro-industrial strategic sector) in a territorial agglomeration of 34 municipalities that connect the metropolitan areas of Coatzacoalcos (CTZ), the one of Villahermosa (ZMVSA), as well as the city of Palenque.

Municipalities reporting the highest percentages of employees in manufacturing that completed post-secondary education

Class elaboration of edible vegetable oils and fats is among those that hire most workers with this education level

Main problems and difficulties faced by economics units reported in the 2019 Economic Census



SYMBOLOGY

Federal entities

Performance at the agro-industrial sector

High potential · Medium potential · Low potential

ZMV · ZMC

3.5. Tamaulipas cluster: strategic petrochemical sector

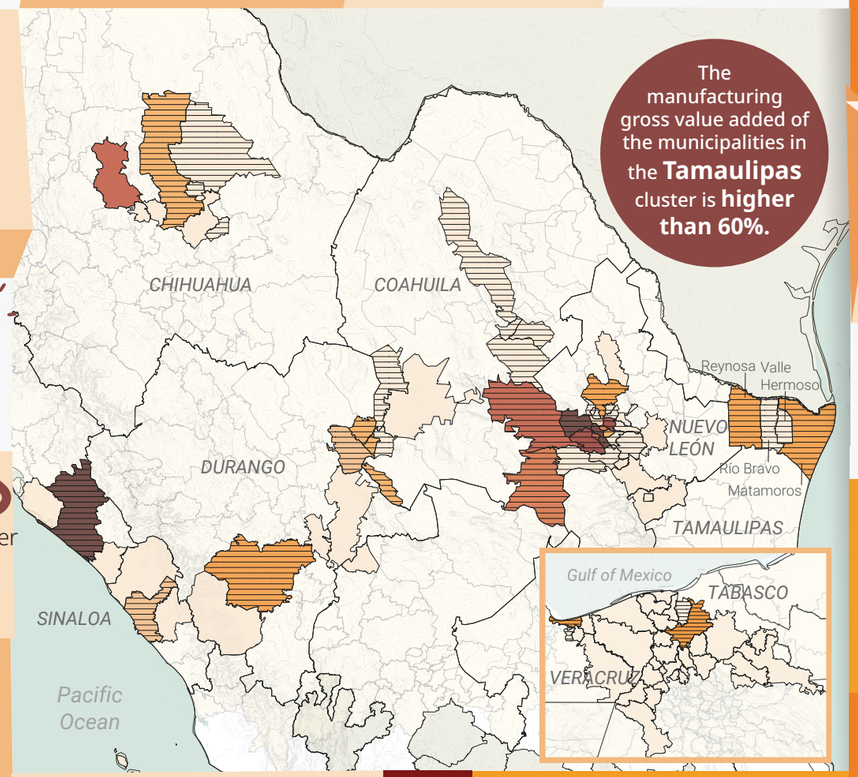
926

economic units (whose production is linked to the petrochemical sector) can be found within the indicated municipalities.

1 / 25 **At least 1 municipality within each corridor ranks at the top 25** municipalities showing highest labor productivity level at the petrochemical sector.

2 selected municipalities rank among the **the top 40** municipalities with **the highest level of foreign direct investment.**

Well-established industrial capabilities are observed in all the municipalities of the Tamaulipas cluster.



The manufacturing gross value added of the municipalities in the **Tamaulipas** cluster is **higher than 60%.**

In the municipality Reynosa (part of the Tamaulipas cluster), the yearly water consumption by manufacturing firms is **more than 25 million cubic meters (the 15th highest in the country).**

120

economic units (whose industrial activity is linked to the petrochemical sector) are located at the **Tamaulipas cluster**

High potential to perform **innovation related activities** in the field of **lean manufacturing**

At the Tamaulipas cluster, there are ample opportunities to induce higher productive linkages between petrochemical firms and the other economic units.

Manufacturing gross value added is higher than 50% in half of the selected municipalities.

The % of Matamoros (part of the Tamaulipas cluster) **is at**

60.48 %

The % of economically active female population is higher than the **national average (20 %)** in all the municipalities in the petrochemical sector.

20%

Challengees

Urban inefficiency: the rate of public transport use is **21 times less** than the national average.

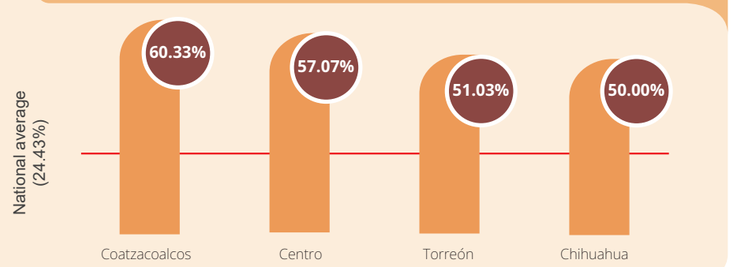
On average in the selected municipalities, **the portion of the population living in extreme poverty** is 1/10 of the national average.

Unsuitable housing: in the municipality Valle Hermoso (Tamulipas cluster), **more than 50 % of the population** reports insecurity in home ownership.

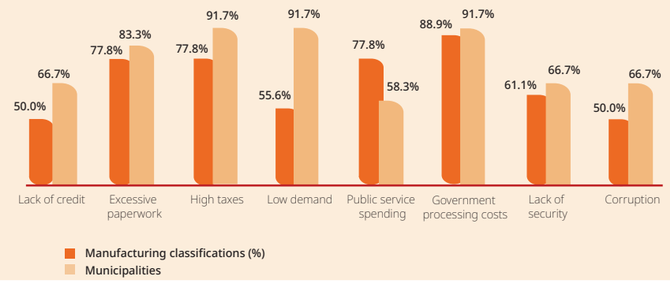
The petrochemical value chain is proposed as a strategic sector because its output is highly relevant for the productive processes of the other four strategic sectors presented in this atlas. The analysis conducted is not only aimed at identifying a new prosperity corridor for the industrial development of the petrochemical sector, but also at determining industrial and territorial elements necessary for economic diversification in each of the previously examined corridors. The territorial value chain analysis of the petrochemical sector thus examines the existence of backward and forward linkages as well as their presence in the municipalities of the prosperity corridors.

This Atlas thus proposes incentivizing petrochemical production in 12 municipalities that belong to the industrial corridors here considered: 2 at the ZMM-ZMS-LL corridor,1 at the LL-Culiacán, 2 other municipalities that jointly belong to the previously mentioned corridors (i.e. they are both part of the ZMM-ZMS-LL corridor as well as that of LL-Culiacán) , 1 municipality at the Chihuahua cluster, 2 more at the CTZ-VSA-PAL cluster, and 4 municipalities located on a specialized corridor focused on petrochemical activities.

Municipalities reporting the highest percentages of employees in manufacturing that completed post-secondary education



Main problems and difficulties faced by economics units reported in the 2019 Economic Census



SYMBOLOGY

- Federal entities
- Metropolitan zones
- Municipalities within corridors

Performance of the petrochemical sector

- Well-constructed
- Consolidated
- High potential
- Medium potential
- Moderate
- Moderate - low
- Low
- Regressed

3.6 Findings and conclusions from a territorial perspective: the view of UN-Habitat

From a territorial perspective, this Atlas indicates that the industrial growth of strategic sectors could be initiated by relying on the different set of economic activities that are already in place and that have been established by highly consolidated industries and services for the Mexican economy. For instance, the automotive and electronic industry are tightly linked to the manufacturing of wind turbines and of aerospace equipment, while the pharmaceutical and agro-industrial sectors are also heavily dependent on the fabrication of machinery and equipment.

Foreign and domestic firms interested in investing at the wind turbine sector at the northern part of Mexico will benefit from a well-established industrial ecosystem that offers wide availability of highly skilled personnel, the presence of well ranked universities conducting scientific projects with other manufacturing firms, as well as from the existence of economic units that provide specialized services for this sector. Strong competitive advantages are particularly observed at the Monterrey-Saltillo- La Laguna corridor given their important concentration of skills, knowledge and experience, which is further confirmed by the fact that the innovation rate in those municipalities is three times higher than the corresponding national average. In addition, the vast majority of municipalities belonging to this corridor (specially the metropolitan areas located therein) register high percentages of highly specialized immigrants (the percentage for the municipality of San Pedro Garza Garcia is as high as 15%). Nonetheless, this corridor also faces a number of socioeconomic challenges that include the improvement of housing and transport mobility issues as well as the devising of specific policy measure to cope with water shortages inside the region.

Regarding the pharmaceutical strategic sector, it is worth noting that ten out of the top 20 manufacturing activities belonging to this value chain demand a high number of domestic intermediates on their respective productive processes. Thus, supporting this strategic sector could also imply the achievement of higher levels domestic content of aggregate exports. The La Laguna-Culiacán corridor also features important competitive advantages in terms of their availability of human capital and of specialized personnel, in light of their above than average rates of workers holding higher education degrees and of continuing training of recruits. The dynamism observed in those rates could be further enhanced through an adequate provision of urban services, as well by the implementation of proper fiscal incentives that aim to reduce the high expenditures on water, electricity and lands lines that are paid by local industries. Guaranteeing an appropriate installation of manufacturing activity in this corridor also entails accounting for the improvement of the motorized and non-motorized public transportation used by the population located therein.

Achieving higher industrial growth within the aerospace sector also represents an important opportunity to induce higher economic activity in other less specialized regions of the Mexican territory. This is the case in the municipalities of Salvador Escalante (in the state of Michoacán) and Taxco (in the state of Guerrero) that could potentially participate at the aerospace equipment value chain through an increasing specialization on the production of copper. The advantageous territorial location of the Chihuahua cluster stands as the predominant factor to attract foreign direct investment related to the aerospace sector in this region. Nevertheless, to fully exploit the potential industrial growth observed on this territory it is necessary to enhance housing and labor conditions (so that there are no major differences across the municipalities in the corridor), further strengthen the observed agglomeration of high skilled labor, as well as address pressing issues related to increasing water stress and low rates of public transport use.

Opportunities for economic diversification are present in the agro-industrial sector as the production generated by vanilla and chocolate manufacturing could be utilized as intermediates for a number of industries including food and beverages, pharmaceutical as well as cosmetics. Furthermore, activities related to agroturistic services can also be linked to those from the industrial processing of vanilla and chocolate. Even though the Coatzacoalcos-Villahermosa-Palenque offers territorial strengths in terms of low industrial water consumption and low water stress, this region also faces significant difficulties regarding low levels of foreign direct investment, low training of personnel and low rates of access to public services.

The observed high demand of specialized labor generated by the economic units linked to the petrochemical industry represents a good opportunity to foster increasing scientific collaboration between these firms and universities and research institutions. While the Tamaulipas cluster features wide availability of highly skilled labor, it nonetheless encounters a number of socioeconomic challenges incluiding the improvement of working and living conditions for the population in the region and the pressing need to ensure an adequate access to urban services.

In this context, by jointly taking into consideration industrial and territorial perspectives, this Atlas stands as a thorough assessment that aims to provide policy makers with the necessary tools to kickstart socioeconomic development using an inclusive and sustainable approach that also allows for a fast economic recovery, given the crisis triggered by the outbreak of COVID-19. Through detailed territorial ordering and exhaustive industrial urban planning this Atlas also stands as a novel alternative tool that seeks to promote a better future for the Latin American region by highlighting relevant factors (such as gender equality, environmental sustainability, fair urban development) when pursuing any given industrialization process.

4

General conclusions

A new national strategy that aims to attract foreign investment to initiate a sustainable industrialization process (given the current restructuring of the global economy triggered by the outbreak of COVID-19) demands an innovative approach that takes into account sectoral economic performance as well as other relevant factors such as environmental sustainability, social inclusion and even the existing urban-regional structures inside the country.

The proposal formulated by the Government of Mexico (in collaboration with UNIDO and UN-Habitat) is then related to the kickstarting of an inclusive and sustainable industrialization process that takes into consideration the performance of global and domestic value chains in given strategic sectors. This approach is further complemented with new perspectives on economic geography where factor endowments and territorial advantages within the country stand as the main strength to attract more firms and induce higher levels of foreign investment and of human capital in industrial activities with high growth potential.

In this context, this approach not only allows for an identification of those productive stages in value chains where Mexico has the highest potential to increase its industrial participation, but also it permits the recognition of specific regions that possess competitive advantages and thus are most suitable for the attraction of foreign investment and for the development of new industrial activities.

The results presented by this Atlas prioritize the industrial development of five strategic sectors on five regional corridors. As whole, these findings constitute an attempt to set the foundations for a novel industrial policy (as well as new strategy for the attraction of foreign investment) that aims to ignite a more inclusive and sustainable process of economic development for Mexico.

PROSPECTIVE ATLAS

TERRITORIAL- INDUSTRIAL ATLAS FOR INVESTMENT ATTRACTION

RELACIONES EXTERIORES
SECRETARÍA DE RELACIONES EXTERIORES

UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UN HABITAT
FOR A BETTER URBAN FUTURE