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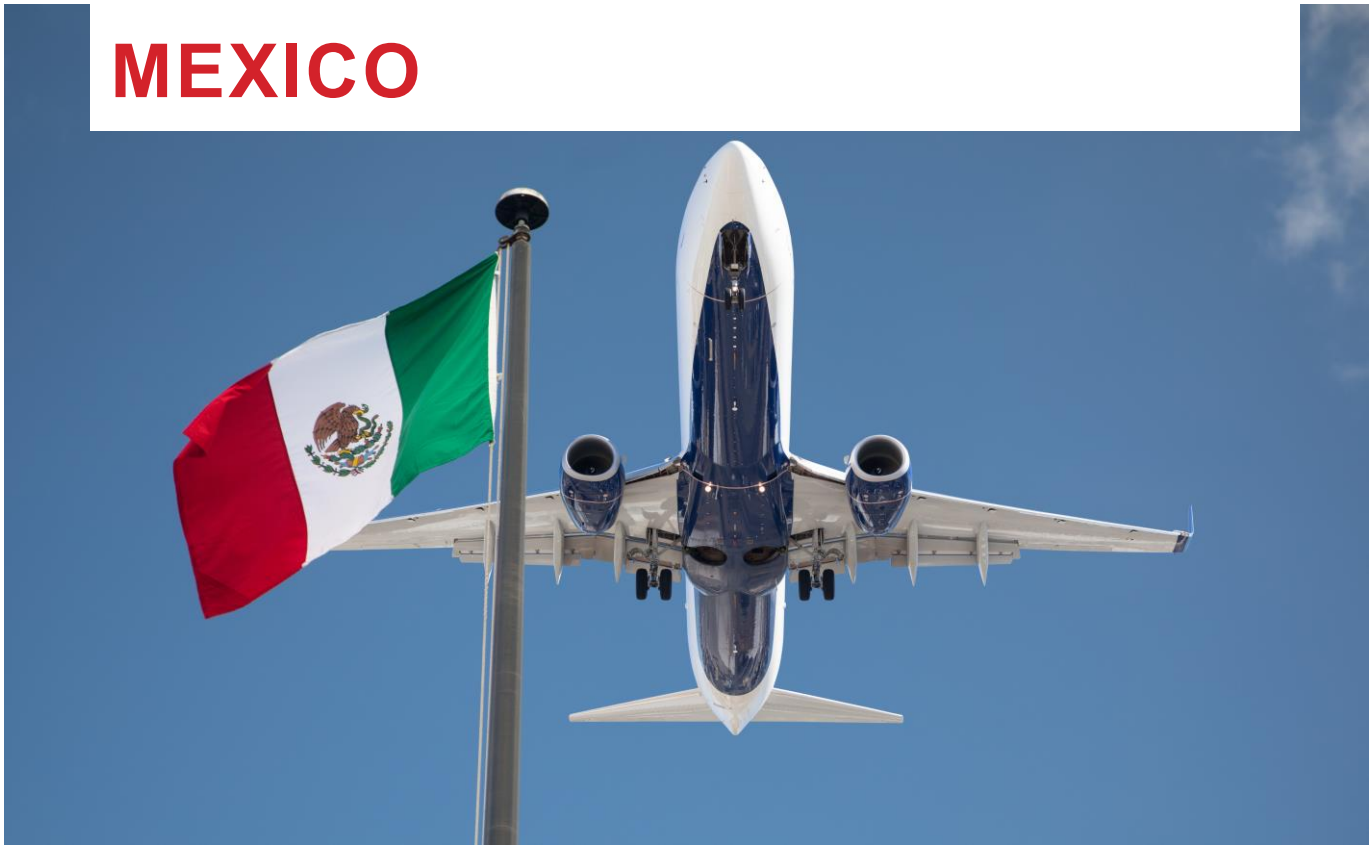
AN OVERVIEW OF BUSINESS OPPORTUNITIES FOR SWISS COMPANIES IN THE AEROSPACE INDUSTRY IN MEXICO



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1. Foreword

The Aerospace Industry in Mexico overall offers business opportunities to Swiss firms in manufacturing, services, education, training, and R&D. Due to the breadth and depth that each requires, this Report specifically addresses Equipment Manufacturing.

Aerospace Equipment Manufacturing is an exciting and extremely dynamic industry, which, though heavily adversely impacted in recent years, is coming out for a post-pandemic world with resilience and facing requirements to become more efficient and environmentally friendly, and even innovate to make newer vehicles. Mexico has had remarkable growth in this industry, notably in the past decade, successfully integrating with competitive global value chains in North America.

Based on rigorous and extensive analysis of public data, including details available on small- and medium-sized enterprises, this Report presents a complete overview of the markets that can be served and the opportunities in them identified for Swiss firms. These are either to export from Switzerland and/or to produce locally in Mexico, assessing for that purpose comparative advantages that duly inform, with evidence, the strategic business decisions of these firms.

In Mexico, the Swiss Business Hub in Mexico City and the Swiss-Mexican Chamber of Commerce & Industry, with offices in Mexico City, Querétaro, and Monterrey, can support Swiss businesses in their market entry in this sector.

We look forward to this Report effectively supporting and catalyzing business projects in Aerospace Manufacturing in Mexico for Swiss firms.

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2. Executive Summary

This Report focuses on the business opportunities for Swiss firms in Aerospace Equipment Manufacturing in Mexico, based on economic analysis of trade and production public data in Mexico and Switzerland, even in the United States (US). Target markets to serve are those of output products and/or input products and have developed predominantly in four major clusters in the states of Baja California, Chihuahua, Queretaro, and Sonora. In the case of outputs, inputs can be either owned, or from third parties and processed in their Maquila operations (i.e. those that add value by using inputs owned by third parties). Both markets have expanded pre-pandemic significantly, and both their products have become notably more diversified and technologically complex. Small and medium-sized firms (SME) integrate themselves in value chains with many already established major global aerospace companies.

The market for output products has grown pre-pandemic almost 60% from 2013 to 2018, in US dollar terms to USD$1,900 M and margins are north of 30%; outputs are mostly exported and include products such as commercial aircraft and turbines. In turn, the market for inputs increased its size in that period by nearly 40% to USD$438 M; inputs are largely imported and include products such as landing gears, helixes, turboprops, and aluminum castings and profiles. Post-pandemic recovery insight and heavily related to the US, in a global industry with challenges and opportunities that represent business value, such as sustainable energy sources; aircraft redesign; operational and financial airline optimization; continuous refinement of capital expenditures in Original Equipment Manufacturers (OEM) aircraft; and new vehicles.

Said firms can decide whether to export from Switzerland and/or to produce locally in Mexico, deciding how to proceed with their own timeline for the strategic mix of such operations. Mexico provides a clear geographical location edge vis-à-vis Switzerland because it borders in North America with the United States, which is the country's main export market. Specifically, this means that Aerospace firms exporting from Mexico can be closer to said market; in other words, Mexico facilitates the so-called "nearshoring" whereby firms operate geographically closer to their main markets in the global supply chains. Also, and as this Report shows, Mexico offers potential cost advantages, allowing for larger margins, for firms based in the host country (i.e. Mexico) as compared with similar Swiss ones producing at home, specifically in labor and personnel, as well as in materials and goods and services.

One opportunity for Swiss firms is expanding the star export from Switzerland to Mexico in other parts for gas turbines. Another is using excess penetration in the US import market for both countries as a proxy for relative competitiveness: Swiss firms could expand exports to Mexico in Aircraft, and Other Guided Missile and Space Vehicle Parts; conversely, they may consider producing in Mexico, and thus exporting indirectly to the US, Aircraft Engines and Parts, and Other Aircraft Parts and Equipment.

Interested Swiss firms may consider for their strategic decisions and business plans, based on the evidence and arguments presented in this Report, ten inter-related elements herein listed. There are paths and certainly the space and multiple alternative avenues to new and/or increased business by Swiss firms in Aerospace Equipment Manufacturing in Mexico.

3. Market overview

The Aerospace Industry in Mexico offers opportunities to Swiss firms in manufacturing, services, education, training, and R&D. This report focuses on those either to produce locally and/or export to Mexico in Equipment Manufacturing, which is export-oriented, is organized essentially in four clusters in the states of Baja California, Chihuahua, Queretaro and Sonora, and where smaller firms (SME) are integrated into value chains with many already established major global aerospace companies.

3.1. ECONOMIC ACTIVITIES OF THE OVERALL AEROSPACE INDUSTRY IN MEXICO

The Aerospace Industry in Mexico can overall be essentially described as the supply chains of each of two main economic activities, one in manufacturing and the other in services, as classified in the country under the North American Industrial

Classification System version 2018 (NAICS 2018) [1]. Naturally, each of these activities, which will be detailed below, is supported by human, physical, and institutional infrastructure.

Manufacturing

The most important of those activities in the Mexican economy is Aerospace Equipment Manufacturing (NAICS 2018 codes 33641/336410), under Transport Equipment Manufacturing. The Mexican description is the manufacturing and reconstruction of aerospace equipment, such as internal combustion engines, turbines, and transmissions, for aircraft. The latest tri-national comparable description in English from the United States (hereafter referred interchangeably also as "U.S." or "US") is as follows (NAICS 2022): "33641 Aerospace Product and Parts Manufacturing: This industry comprises establishments primarily engaged in one or more of the following: (1) manufacturing complete aircraft, missiles, or space vehicles; (2) manufacturing aerospace engines, propulsion units, auxiliary equipment, or parts; (3) developing and making prototypes of aerospace products; (4) aircraft conversion (i.e., major modifications to systems); and (5) complete aircraft or propulsion systems overhaul and rebuilding (i.e., periodic restoration of aircraft to original design specifications)."

This activity roughly corresponds to Manufacture of Air and Spacecraft and Related Machinery (code 3030/303000) under Manufacture of Other Transport Equipment, of the General Classification of Economic Activities in force since 2008 (Nomenclature générale des activités économiques, NOGA, 2008), which is the Swiss version of the European classification of economic activities, and which is currently employed in Switzerland[2].

Services

The other activity referred above is designated as Other Services related to Air Transportation (NAICS 2018, code 488190). This includes various services, among them, inspection and testing of aircraft and repairs and maintenance of aircraft. Here too, the latest tri-national comparable description in English from the United States is as follows (NAICS 2022): "488190 Other Support Activities for Air Transportation: This industry comprises establishments primarily engaged in providing specialized services for air transportation (except air traffic control and other airport operations). Illustrative Examples: Aircraft maintenance and repair services (except factory conversions, overhauls, rebuilding), Aircraft passenger screening security services, Aircraft testing services." Thus, this activity as classified in North America includes part of, but is not limited to, the so-called "Maintenance, Repair, and Overhaul Services" (MRO) in the aerospace industry worldwide.

This second activity is thus broader in Mexico, but under the Swiss nomenclature fully includes Repair and Maintenance of Aircraft and Spacecraft (NOGA 2008, code 331600), under Repair and Installation of Machinery and Equipment, and will also comprise other services that could be classified in Switzerland, for instance, under Other Service Activities Incidental to Air Transportation (NOGA 2008, code 52.23.19).

Education, Training, and R&D

In addition to manufacturing and services defined above, there are also potential opportunities for technical education, human resource training, and services related to supporting research and development (R&D) activities, many in established centers, all in the aerospace industry in Mexico.

3.2. OVERVIEW OF THE AEROSPACE INDUSTRY IN MEXICO

For the purposes of this Report, Swiss firms or enterprises can take part in three ways in the afore-mentioned supply chains of the Aerospace Industry in Mexico: 1) production in Mexico; 2) export to Mexico from Switzerland; and 3) a combination of production in Mexico and export to the latter from Switzerland. Of course, which ways to follow and the timing for each will certainly depend on the strategy and competitiveness of each interested Swiss firm in expanding its Mexican-related business; for instance, such a firm may decide to export first from Switzerland and later establish productive operations in Mexico, and gradually increasing their size and scope. Mexico provides a clear geographical location edge vis-à-vis Switzerland because it borders in North America with the United States, which is the country's main export market. Specifically, this means that Aerospace firms exporting from Mexico can be closer to said market; in other words, Mexico facilitates the so-called "nearshoring" whereby firms operate geographically closer to their main markets in the global supply chains.

Aerospace industry activities have mostly developed globally taking advantage of economies of agglomeration of firms and resources in geographically identifiable areas or regions. Mexico is not the exception, and its aerospace industry has expanded mostly in Central, Western and Northern Regions of the Country. The current major aerospace industry clusters are located primarily in the three Northern border states of Baja California, Sonora, and Chihuahua, and also developing

[1] A NAICS revision for 2022 (NAICS 2022) is scheduled to go into effect this year in Canada and the United States, and in Mexico in 2023.
[2] Switzerland may feature a new nomenclature in 2025.

in Nuevo Leon; and in the so-called "Bajio" (in Central Mexico), comprising mostly of the state of Queretaro, and still to a lesser extent, of the neighboring state of Guanajuato.

Those clusters, small and large, have evolved due to skilled human resources, technology/R&D centers, economies of networking, and business culture, all advanced over the years and partly -but also critically- fostered by the automotive industry supply chain capabilities, and certainly by the trilateral United States-Mexico-Canada Agreement (USMCA) and its forerunner, the North American Free Trade Agreement (NAFTA), as well as a web of other free trade agreements implemented by Mexico with dozens of economies worldwide. The aerospace industry is highly integrated with the North American region; for that reason, joining the supply chains in Mexico is also a means to export indirectly to its two northern neighbors: the United States and Canada.

Mexico has a Mexican Federation of the Aerospace Industry (FEMIA, for its acronym in Spanish), www.femia.com.mx, a private non-profit association with over 100 listed members[3], involved in manufacturing, MRO, design & engineering, among other activities.

Specifically, manufacturing firms include Original Equipment Manufacturers (OEM) as well as all their suppliers arranged along the so-called “tiers” (or levels), i.e. subsequent hierarchically-structured links in the supply chain pyramid of value creation. Depending on the source, 3 or 4 subordinate tiers can be defined for the aerospace industry, in addition to related supporting activities. For instance [4], Tier 4, at the bottom of the said pyramid, may include raw materials, castings, forgings, extrusions, and standard hardware; then Tier 3 produces with Tier 4 outputs make-to-print parts and components; with the latter, Tier 2 subsequently manufactures parts and subassemblies; using the previous tier's products, Tier 1 integrates systems and major structures, from which, at the top of the manufacturing pyramid, the OEM produces the aerospace final product for the customers. Usually, suppliers across tiers must be duly certified to be allowed to join and trade within the value chain. tiers.

According to the long FEMIA list, among the top global aerospace companies, the following already have well-established operations in Mexico: Boeing, Airbus, Bombardier, Honeywell, Safran, and Thales. The first three-plus Textron Aviation and Gulfstream are among the leading OEM operating in the country. Other notable global companies in Mexico are General Electric (GE), Bell, Siemens, and Dassault Systemes.

As for MRO, business is markedly more widely spread in the Mexican geography than manufacturing, with notable presence also in such states as Mexico City and the State of Mexico, in the country’s center; Coahuila and Tamaulipas, in the Northeast; and Campeche and Tabasco, in the Southeast. Among the established firms are Asesa MRO, Marposs, and Mexicana MRO Services. Moreover, OEM also provides MRO services in Mexico (as elsewhere), like Airbus, Honeywell, and Safran.

Given its extent and relevance, this Report will focus hereafter only on manufacturing, except where so noted.

3.3. AEROSPACE EQUIPMENT MANUFACTURING

The most trustworthy, comprehensive, and detailed Mexican statistical information on economic activities is regularly published by the National Institute of Statistics and Geography of Mexico (INEGI, for its acronym after its name in Spanish). In addition to National Accounts generated by said Institute, this Report will present results from the also INEGI-produced five-yearly Economic Censuses ("Censos Economicos”, in Spanish). By far the richest information in breadth and depth is provided by these Censuses[5]; the latest two took place in 2014, collecting data for the year 2013 (which will be identified hereafter as "EC 2014"), and in 2019, tallying data for the year 2018 (hence thereafter "EC 2019"). The statistical unit of analysis of the Censuses is the "establishment", which is the local productive unit, that may (or may not) be part of a firm or even in turn of a group of firms or enterprises. Values are converted into United States Dollars (thus, values in X million USD will be henceforth denoted as “USD$ X M”) using exchange rates originally published by Mexico’s Central Bank, Banco de Mexico (also known as “Banxico”) [6].

Specifically, the target activities for the aerospace industry here can be jointly designated as Aerospace Equipment Manufacturing (NAICS 2018, codes 33641/336410); however, the corresponding name in the official NAICS classification

[3] https://femiamx.com/#!/-miembros/
[4] Source: Spreen, Wesley (2020), *The Aerospace Business. Management and Technology*, Routledge, New York.
[5] INEGI also produces the Annual Survey of the Manufacturing Industry (EAIM, for its acronym in Spanish). However, the results of this Survey do not necessarily match, or provide as much useful detail, as the Economic Censuses.
[6] The United States Dollar (USD$) – Mexican Peso exchange rate used in this Report is Banxico’s daily rate but averaged for each indicated year. Specifically, the FIX rate, which is widely used at payment or settlement date (48 business hours after determination date) of transactions. The average daily peso per US Dollar rate for 2013 was 12.767464 and for 2018 was 19.238029. Source data are available at: https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?sector=6&accion=consultarCuadro&idCuadro=CF102&locale=es

in Spanish can be more properly translated into English as "Aerospace Equipment Production"[7]. Henceforth, both names will be used interchangeably in this Report to refer to the same group of industrial activities.

The majority of establishments in 2013 as well as in 2018 were based in the states or clusters of Baja California, which experienced a sharp expansion, Chihuahua, Queretaro, and Sonora. Further, information from the Economic Censuses is also available for Small- and Medium-sized Enterprises (or "SME"), defined for this Report to use such data as establishments (not necessarily firms) with up to 250 employees in Mexico. The majority of those SME, excluding details for Chihuahua (because of data restrictions), were located in 2018 in Baja California, and Sonora.

Table 1: Aerospace Equipment Manufacturing – All Establishments by cluster in Mexico

State/ Cluster	Number 2013	Number 2018	Share of Total 2013	Share of Total 2018
Baja California	18	33	19.1%	26.0%
Chihuahua	22	27	23.4%	21.3%
Queretaro	14	18	14.9%	14.2%
Sonora	24	34	25.5%	26.8%
Aggregate	**78**	**112**	**83.0%**	**88.2%**
National	**94**	**127**	**100.0%**	**100.0%**

Source: NAICS 336410, EC 2014 and EC 2019, INEGI.

Table 2: Aerospace Equipment Manufacturing - SME Establishments by cluster in Mexico

State/ Cluster	Number 2013	Number 2018	Share of Total 2013	Share of Total 2018
Baja California	n. av.	21	n. av.	25.9%
Chihuahua	n. av.	n. av.	n. av.	n. av.
Queretaro	n. av.	11	n. av.	13.6%
Sonora	n. av.	26	n. av.	32.1%
Aggregate	**n. av.**	**58**	**n. av.**	**71.6%**
National	**66**	**81**	**100.0%**	**100.0%**

SME: Establishments with up to 250 employees. All: Establishments of all sizes.
n. av.: Breakdown not available due to information confidentiality requirements.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI.

The market of interest is that of the economic activities of aerospace equipment manufacturing in Mexico. As will be further explained below, said market -and its evolution in time- can describe either: 1) from an *output producer perspective*, for Swiss firms wanting to sell in the *market of outputs* of the aerospace equipment manufacturer located in Mexico; or 2) from a *supplier perspective*, for Swiss firms willing to participate in the *market of input suppliers* for the same industry.

4. Market size and growth: output product perspective

Business opportunities for Swiss firms have been identified for those wanting to sell in the market of outputs of Aerospace Equipment Manufacturing in Mexico. This market increased nearly 60% since 2013 to USD$1,900 M in 2018 by revenues, mostly Maquila, yielded margins above 30%, and where sales with own inputs (or non-Maquila) are predominantly exports, mostly from Chihuahua, with increased diversity and technological complexity, that include products such as commercial aircraft and turbines.

This perspective involves the following market size indicators in this Report: 1) total revenues; 2) net sales with own inputs; 3) gross total production; 4) gross value added.

[7] The original literal description in Spanish in NAICS 2018 is "Fabricacion de equipo aeroespacial". However, "fabricacion" is more accurately translated into English as "production" (and certainly not "fabrication"), in the manufacturing industry.

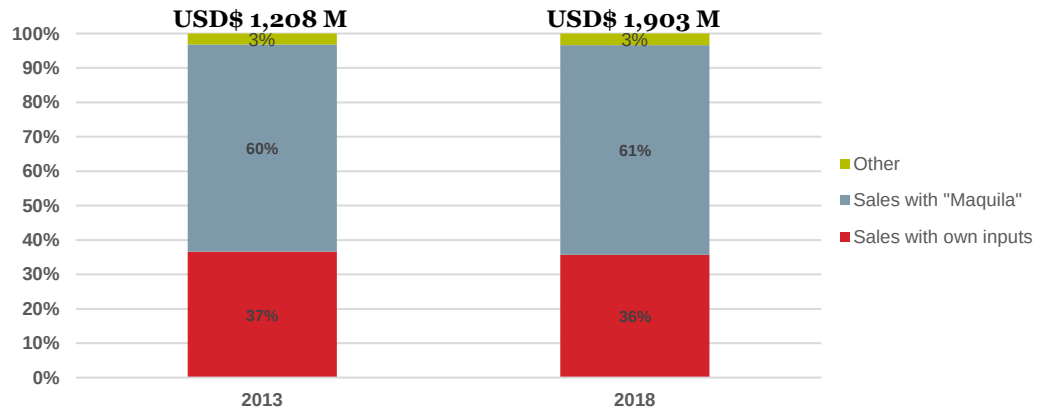
4.1. TOTAL REVENUES

The variable Total Revenues in the Economic Censuses includes all receipts by an establishment from its activities, such as sales of products, resales, services rendered (e.g. professional and real estate leasing), among other income revenue sources. Thus, the market value in Mexico of all Aerospace Equipment Manufacturing establishments reached USD$1,208 M in 2013, and increased 57.5% (or USD$695 M) to USD$1,903 M in 2018; this means an average annual growth rate (hereafter "AAGR") of 9.52% for each of those five years (or USD$139 M per annum).

The structure or breakdown of revenues remained unchanged from 2013 to 2018. Most significantly, 97% of Total Revenues in both years came from product sales, which are divided into two important distinctive types: one representing 60-61% of Total Revenues that come from "Sales with own inputs", where sold products are manufactured by an establishment with inputs (i.e. mostly raw materials and intermediate goods) that are wholly owned by the same; and the other, representing 36-37% of those revenues that come from "Sales with Maquila", where said inputs are instead owned by other establishments. In the afore-mentioned Censuses, sales revenues are attributed only to the manufacturing establishments which own the inputs that are processed or transformed into saleable outputs, regardless of whether said inputs were transformed by that same establishment (i.e. the first type) or -in a "Maquila" arrangement- by a different one (i.e. the second type).

While in the aggregate such arrangements even out and the overall economic size stays unaffected, it does matter because the market for Aerospace Equipment Manufacturing in Mexico can be characterized as mostly Maquila operations between industrial establishments. As in other industries, and given the same essential productive capabilities in them, establishments take part in manufacturing aerospace equipment in both Maquila and non-Maquila arrangements.

Chart 1: Aerospace Equipment Manufacturing - Total Revenues and Breakdown



Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

As for the major afore-mentioned clusters, the most significant increase in Total Revenues between 2013 and 2018 was in Queretaro.

Table 3: Aerospace Equipment Manufacturing - Total Revenues by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018
Baja California	276	404	22.9%	21.2%	7.87%
Chihuahua	504	709	41.7%	37.3%	7.08%
Queretaro	167	480	13.8%	25.2%	23.49%
Sonora	203	204	16.8%	10.7%	0.14%
Aggregate	**1,150**	**1,797**	**95.2%**	**94.4%**	**9.34%**
National	**1,208**	**1,903**	**100.0%**	**100.0%**	**9.52%**

AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

SME had Total Revenues of more than USD$ 4.1 M per establishment in 2018, up from USD$ 3.8 M in 2013. Overall in Mexico, establishments managed an AAGR of 3.12% in that period, almost double the comparable rate for the SME.

Table 4: Aerospace Equipment Manufacturing - Total Revenues by establishment in Mexico

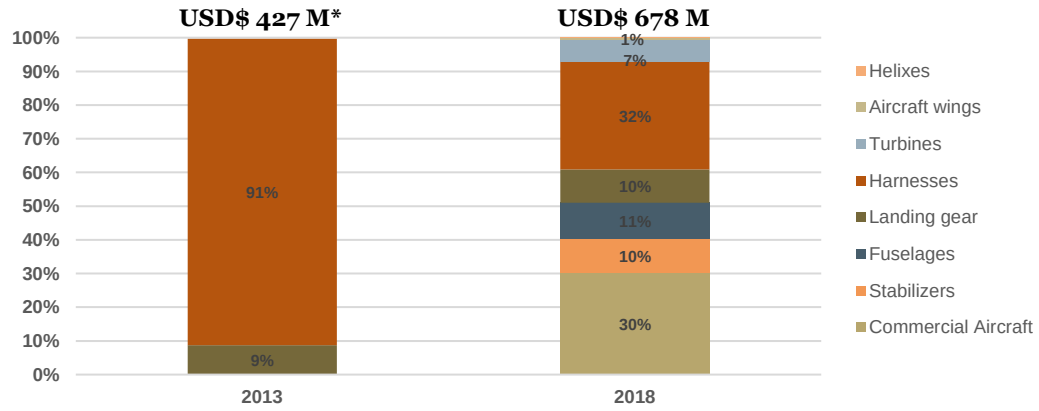
Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	252	335	20.9%	17.6%	5.85%	3.821	4.138	1.61%
All	**94**	**127**	**1,208**	**1,903**	**100.0%**	**100.0%**	**9.52%**	**12.851**	**14.984**	**3.12%**

AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

4.2. NET SALES WITH OWN INPUTS

Revenue of "Sales with own inputs" can be *net* of discounts, returns, reimbursements, and the like, thus obtaining the "Net Sales with own inputs". The respective Censuses data on the latter are revealing as to the top products sold and their value breakdown. Worth highlighting is that significantly more products were sold in 2018 compared with 2013 (mostly harnesses), including commercial aircraft as such; the latter even represented 30% of the total of sales of USD$ 678 M in the more recent year.

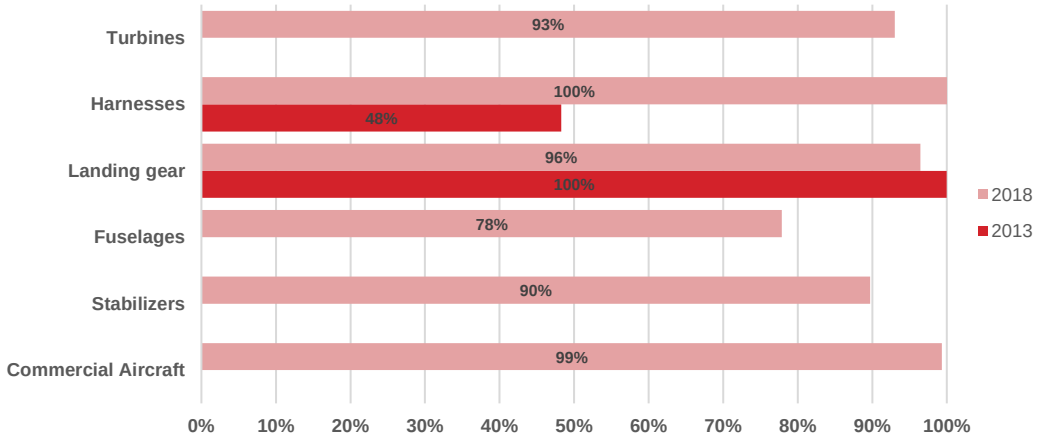
Chart 2: Aerospace Equipment Manufacturing - Net sales with own inputs and Breakdown



* Note: 2013 does not include USD$ 15 M of unreported, as well as reported but negligible, products.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Those products were mainly exported, especially in 2018. Thus, any Swiss firm interested in joining the market of these outputs could do so provided it invests in one or more *local* establishments in the country.

Chart 3: Aerospace Equipment Manufacturing - Shares exported of Net sales with own inputs*



* Note: Given limited data availability in the latest Censuses, a small part of the firms, representing about 3% of Sales with own inputs, were wholly excluded from reporting for 2013 from both Net sales with own inputs and exports. Likewise, exports by firms responsible for less than 3% of Net sales with inputs in value terms were not reported in 2018, and thus are not reflected in the numerators of the shares. In both cases, such information constraints have negligible impacts on the analysis presented.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI.

Net sales with own inputs originated mostly in the Chihuahua cluster, with Queretaro in a distant place; however, the latter shows considerable growth from 2013 to 2018 (AAGR of 27.34%). Moreover, Baja California and Sonora started to appear.

Table 5: Aerospace Equipment Manufacturing - Net sales with own inputs by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018
Baja California	0	41	0.0%	6.0%	n.a.
Chihuahua	389	440	87.9%	64.9%	2.52%
Queretaro	53	178	12.0%	26.2%	27.34%
Sonora	0	2	0.0%	0.3%	n.a.
Aggregate	**442**	**660**	**99.9%**	**97.4%**	**8.37%**
National	**442**	**678**	**100.0%**	**100.0%**	**8.93%**

n.a.: Not applicable. AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Those sales were driven essentially by larger establishments, at the expense of SME, likely because of scale advantages. Overall, in 2018 Net sales with their inputs grew to more than USD$ 5.3 M per unit, still an AAGR of 2.57%; at the same time, SME managed to sell more than USD$ 0.55 M that year.

Table 6: Aerospace Equipment Manufacturing - Net sales with own inputs by establishment in Mexico

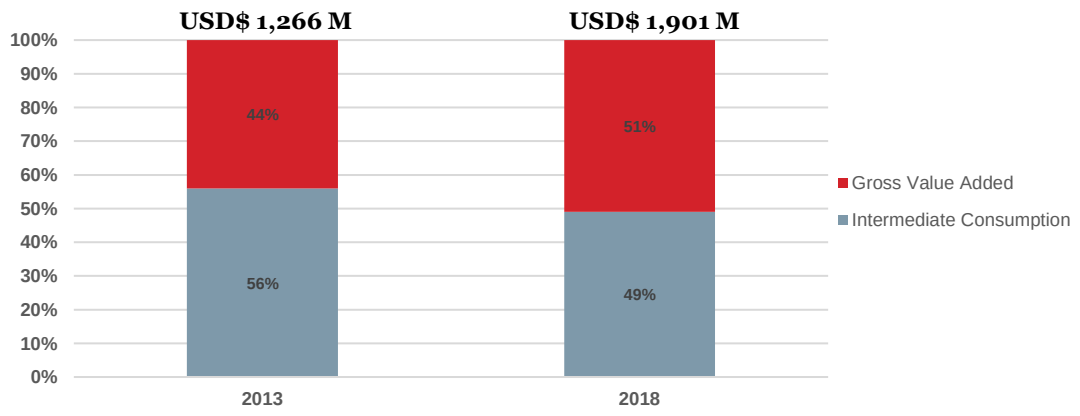
Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	50	45	11.2%	6.6%	-1.93%	0.752	0.555	-5.87%
All	**94**	**127**	**442**	**678**	**100.0%**	**100.0%**	**8.93%**	**4.705**	**5.341**	**2.57%**

AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

4.3. GROSS TOTAL PRODUCTION

Further, "Total Revenues" are a near proxy for the reported overall Gross Total Production values published in the two Censuses referenced above. This is useful, as the respective published data allow for breaking down such value as the sum of "Intermediate Consumption" plus "Gross Value Added". It is worth noting that from 2013 to 2018 Gross Value Added expanded seven percentage points at the expense of Intermediate Consumption, an equivalent of around USD$ 410M. The straightforward implication is that Aerospace Equipment Manufacturing became a more attractive and competitive business and so managed to add more value *locally* in Mexico.

Chart 4: Aerospace Equipment Manufacturing – Gross Total Production and Breakdown



Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Noticeably, the four main clusters explained almost all Gross Total Production, especially Chihuahua. However, Queretaro experienced the most impressive jump with an AAGR of 23.32% between 2013 and 2018.

Table 7: Aerospace Equipment Manufacturing – Gross Total Production by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018
Baja California	276	404	21.8%	21.2%	7.89%
Chihuahua	561	710	44.4%	37.4%	4.82%
Queretaro	167	477	13.2%	25.1%	23.32%
Sonora	203	204	16.0%	10.7%	0.14%
Aggregate	**1,208**	**1,796**	**95.4%**	**94.5%**	**8.25%**
National	**1,266**	**1,901**	**100.0%**	**100.0%**	**8.47%**

AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

As with Total Revenues, SME had Gross Total Production of more than USD$ 4.1 M per establishment in 2018, up from USD$ 3.8 M in 2013. Overall in Mexico, establishments managed an AAGR of 2.14% in that period, one and a half the comparable rate for the SME.

Table 7: Aerospace Equipment Manufacturing – Gross Total Production by establishment in Mexico

Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	252	332	19.9%	17.5%	5.66%	3.822	4.102	1.42%
All	**94**	**127**	**1,266**	**1,901**	**100.0%**	**100.0%**	**8.47%**	**13.467**	**14.968**	**2.14%**

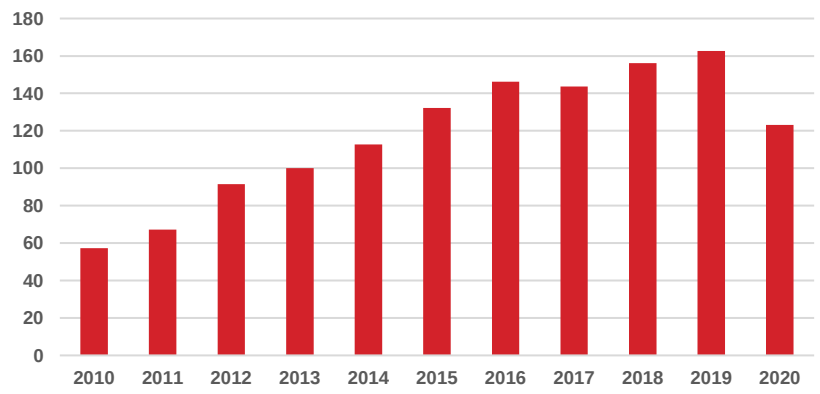
AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

4.4. GROSS VALUE ADDED AND MARGINS

This measure for the output market of the aerospace manufacturing equipment located in Mexico, when duly broken down as will be explained below, allows interested Swiss firms in the said market to gauge the profitability or returns from such manufacturing undertaken in Mexico.

As a starting point, it can be recalled that in national accounting, Gross Value Added can be obtained as Gross Domestic Product (GDP) less the result of taxes net of subsidies on products. Such outcome can be expressed with an index based on the year value of 2013=100 for constant Mexican pesos of Gross Value Added. Since 2010, such indicator shows how the market took off until roughly 2015; then, after somewhat plateauing, it started a new upswing in 2018 and 2019. As expected, the pandemic in 2020 caused a contraction.

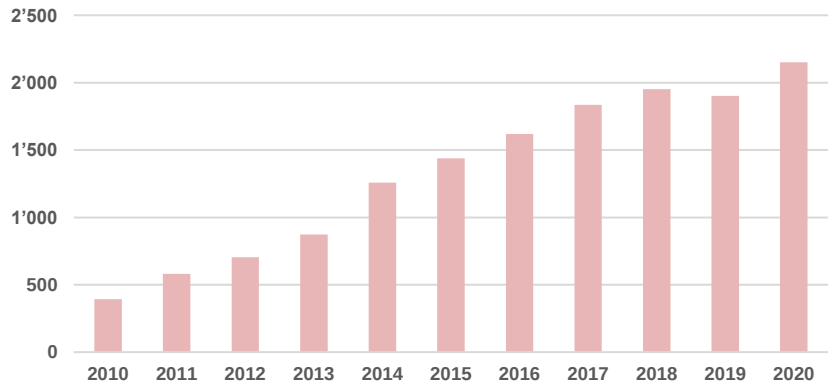
Chart 5: Aerospace Equipment Manufacturing – Real Gross Value Added (Index 2013 = 100)



Source: NAICS 3364, National Accounts, GDP, original series in Mexican pesos at 2013 prices, INEGI.

Moreover, such growth has been made possible by considerable foreign direct investment (FDI) over the years, At the end of 2020, cumulative flows since 2010 were approaching USD$ 2,200 M (despite a hiccup in 2019 and later the pandemic), according to official data published by the Mexican Secretariat of the Economy.

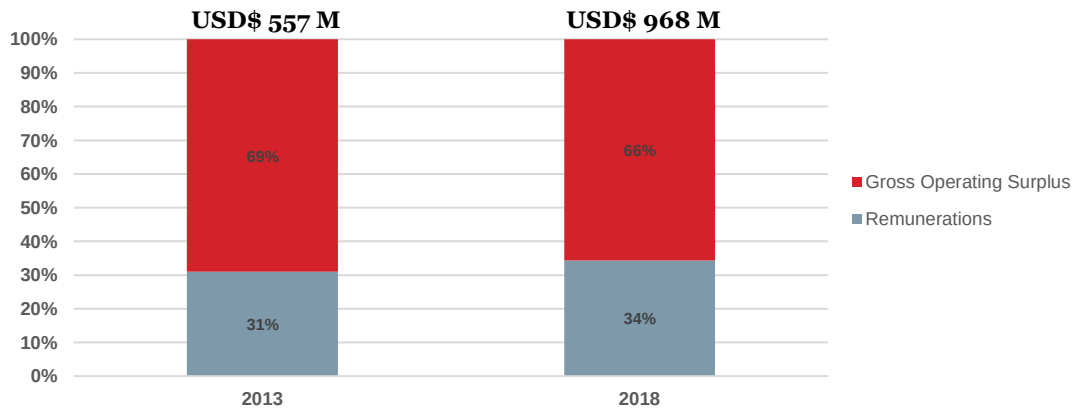
Chart 6: Aerospace Equipment Manufacturing – Cumulative FDI flows since 2010 (USD$ M)



Source: FDI: Foreign Direct Investment. NAICS 3364, Government of Mexico, Secretariat of the Economy. https://www.gob.mx/cms/uploads/attachment/file/687530/Aeroespacial_2021-3T.pdf .

According to the Economic Censuses, Gross Value Added increased from USD$ 557 M in 2013 to USD$ 968 M in 2018. This means an expansion of nearly 74% and an AAGR of almost 11.7% for those five years. Now, Gross Value Added can be broken down following the "income approach", i.e. distinguishing between remunerations of personnel or compensation to employees (henceforth "Remunerations"), on the one hand, and Gross Operating Surplus, on the other. The latter still represented two-thirds of the total in 2018, but the need to attract and retain more skilled labor is starting to be reflected in an increase of three percentage points in the share of Remunerations from 2013 to 2018.

Chart 7: Aerospace Equipment Manufacturing – Gross Value Added and Breakdown



Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

The four main clusters had almost all the value-added in 2013 and 2018, but with different trends. Baja California, more so Chihuahua, and especially Queretaro, experienced impressive growth rates; on the other hand, Sonora's value declined.

Table 8: Aerospace Equipment Manufacturing – Gross Value Added by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018
Baja California	160	239	28.6%	24.7%	8.43%
Chihuahua	108	263	19.4%	27.2%	19.48%
Queretaro	77	267	13.9%	27.6%	28.11%
Sonora	187	157	33.5%	16.2%	-3.41%
Aggregate	**532**	**927**	**95.4%**	**95.7%**	**11.74%**

National	**557**	**968**	**100.0%**	**100.0%**	**11.68%**

AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Each SME obtained in 2018 almost USD$ 2.4 M of Gross Value Added. Overall, establishments achieved an AAGR between 2013 and 2018 of almost five times that of SME, as the large ones managed to capitalize their scales to extract value.

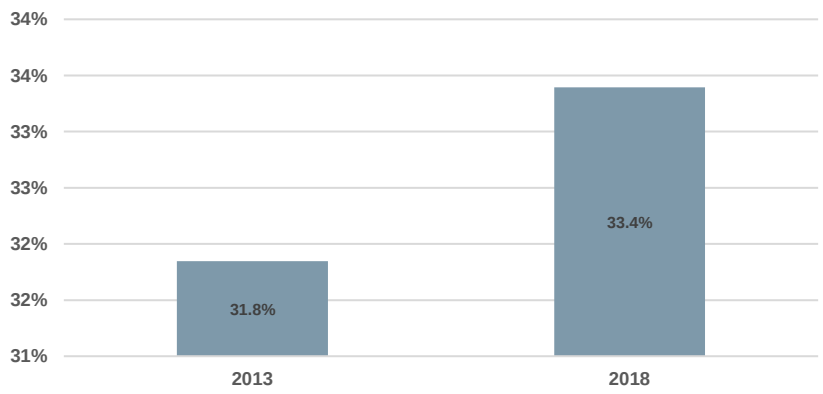
Table 9: Aerospace Equipment Manufacturing – Gross Value Added by establishment in Mexico

Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	149	193	26.7%	19.9%	5.31%	2.259	2.383	1.08%
All	**94**	**127**	**557**	**968**	**100.0%**	**100.0%**	**11.68%**	**5.930**	**7.625**	**5.16%**

AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

The Gross Operating Surplus, in effect a Gross Operating Margin, represents an absolute measure of profitability; it increased from USD$ 385 M to USD$ 635 M, up to USD$ 250 M, which is around 65% from 2013 to 2018, thus implying an AAGR of nearly 10.6% over that period. Moreover, as a percentage of Total Revenues, such measure grew from 31.8% to 33.4% in dollar terms.

Chart 8: Aerospace Equipment Manufacturing – Gross Operating Margin on Total Revenues



Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

By state, all four major clusters had very healthy Margins on Total Revenues, all above 20% both in 2013 and 2018. In Sonora, they declined between those years, but from over 80% to nearly 50%, even above Queretaro, which essentially doubled in that period to 46%.

Table 10: Aerospace Equipment Manufacturing – Margins by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Margins on Total Revenues 2013	Margins on Total Revenues 2018
Baja California	56	86	14.6%	13.6%	8.96%	20.4%	21.4%
Chihuahua	108	206	28.0%	32.5%	13.92%	21.4%	29.1%
Queretaro	39	221	10.2%	34.8%	41.19%	23.6%	46.0%
Sonora	169	101	43.9%	15.8%	-9.84%	83.2%	49.3%
Aggregate	**372**	**615**	**96.8%**	**96.7%**	**10.55%**	**32.4%**	**34.2%**
National	**385**	**635**	**100.0%**	**100.0%**	**10.56%**	**31.8%**	**33.4%**

AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Margins of individual large establishments grew at the expense of those of SME between 2013 and 2018. While the margin per establishment of SME declined in that period, they were more than USD$ 1.6 M in the more recent year.

Table 11: Aerospace Equipment Manufacturing – Margins by establishment in Mexico

Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	123	131	31.9%	20.6%	1.27%	1.862	1.616	-2.79%
All	**94**	**127**	**385**	**635**	**100.0%**	**100.0%**	**10.56%**	**4.092**	**5.004**	**4.10%**

AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

5. Market size and growth: input supplier perspective

There are also business opportunities for Swiss firms willing to participate in the market of input expenditures for Aerospace Equipment Manufacturing in Mexico. Said market was worth USD$438 M in 2018, having grown 40% since 2013, of mostly imported inputs and mostly in Chihuahua, which has also experienced increased diversity and technological complexity; they are large switches, but also inputs such as landing gears, helixes, turboprops, and aluminum castings and profiles.

This other perspective involves the following market size indicators in this Report: 1) intermediate consumption; and 2) input expenditures.

5.1. INTERMEDIATE CONSUMPTION

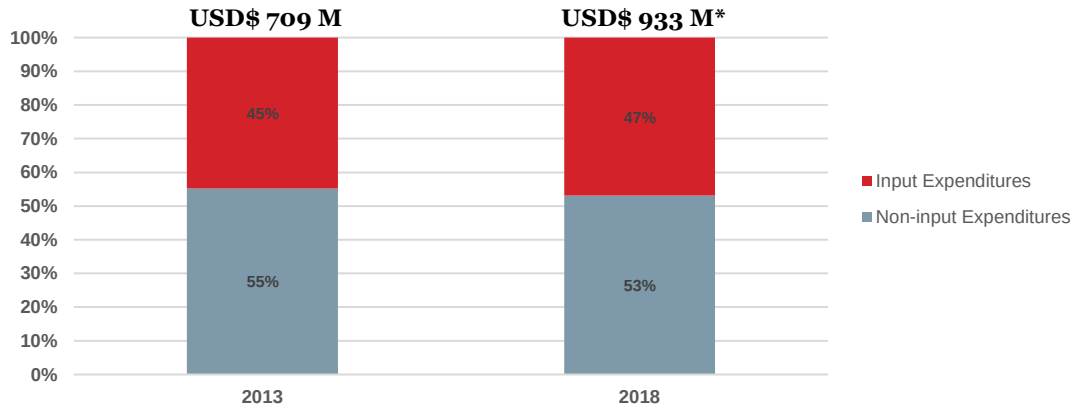
As in "Total Revenues" (again, a proxy for Gross Total Production), the Economic Censuses also report "Total Expenditures" of Aerospace Equipment Manufacturing establishments, the latter being, in turn, a proxy for Intermediate Consumption for the two last Censuses, which in effect represents the overall supplier market for that activity. That market grew USD$ 226 M, from USD$ 709 M in 2013 to USD$ 935 M in 2018, up almost 32%, or an AAGR of 5.7% per annum.

For analytical purposes, this Report divides Intermediate Consumption into two groups: first, reporting all output production inputs as defined above, or Input Expenditures; and second, all Non-input Expenditures[8]. The former can be best described, for Swiss interested firms, as a measure for the market for input suppliers for Aerospace Equipment Manufacturing in Mexico.

The structure or breakdown of Intermediate Consumption changed about 2 percentage points from 2013 to 2018, in favor of Input Expenditures. This means that such market for input suppliers increased by nearly 27% between 2013 and 2018, or USD$105 M, implying an AAGR of 4.9% (i.e. each year in dollar terms over that period).

[8] Non-input expenditures include the following: utilities and fuel; lubricants; office supplies, stationery, and consumables; personnel services; professional services; advertising; packaging; repairs, parts and maintenance; freight; water provision; furniture; telecommunications; and other costs related to services and goods consumed.

Chart 9: Aerospace Equipment Manufacturing – Intermediate Consumption and Breakdown



* Note: 2018 does not include USD$ 2 M of expenditures related to resales.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Intermediate Consumption was especially dynamic in the clusters of Queretaro and Sonora between 2013 and 2018, but also significantly in Baja California. Chihuahua's indicator fell in that period, albeit from the highest level of all main four states, and staying close to USD$ 450 M in purchases.

Table 12: Aerospace Equipment Manufacturing – Intermediate Consumption by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018
Baja California	117	165	16.5%	17.7%	7.14%
Chihuahua	453	447	64.0%	48.0%	-0.27%
Queretaro	90	210	12.7%	22.5%	18.50%
Sonora	16	47	2.3%	5.1%	24.05%
Aggregate	**676**	**869**	**95.4%**	**93.2%**	**5.16%**
National	**709**	**933**	**100.0%**	**100.0%**	**5.65%**

AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

In the aforementioned period, SME became relatively more intensive *buyers* than the rest of the establishments, as they increased their average intermediate consumption purchases from almost USD$1.6 M to over $1.7 M; however, larger units still represented over 85% of the market by value.

Table 13: Aerospace Equipment Manufacturing – Intermediate Consumption by establishment in Mexico

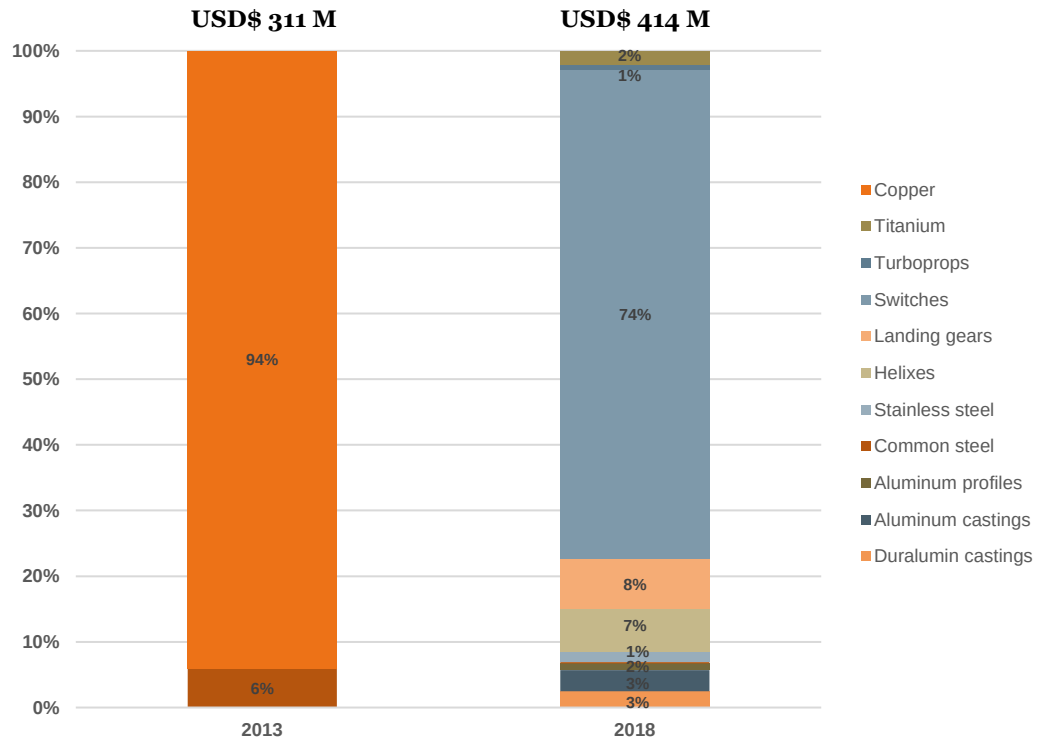
Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	103	139	14.6%	14.9%	6.17%	1.563	1.718	1.91%
All	**94**	**127**	**709**	**933**	**100.0%**	**100.0%**	**5.65%**	**7.537**	**7.343**	**-0.52%**

AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

5.2. INPUT EXPENDITURES

As for input expenditures, the value of purchases increased significantly, over a third from 2013 to 2018. Worth highlighting is the radical change in the composition of those inputs. While in 2013 it was overwhelmingly raw metals, almost all copper, by 2018 it was far more economically and technologically complex; indeed, in that year switches alone represented a market valued north of USD$300 M. Other sophisticated inputs came up in the purchases list, such as landing gears, turboprops, and helixes. Moreover, the buying mix changed to noticeably displace copper and common steel for stainless steel and titanium and said mix now introduced aluminum castings and profiles, as well as Duralumin castings.

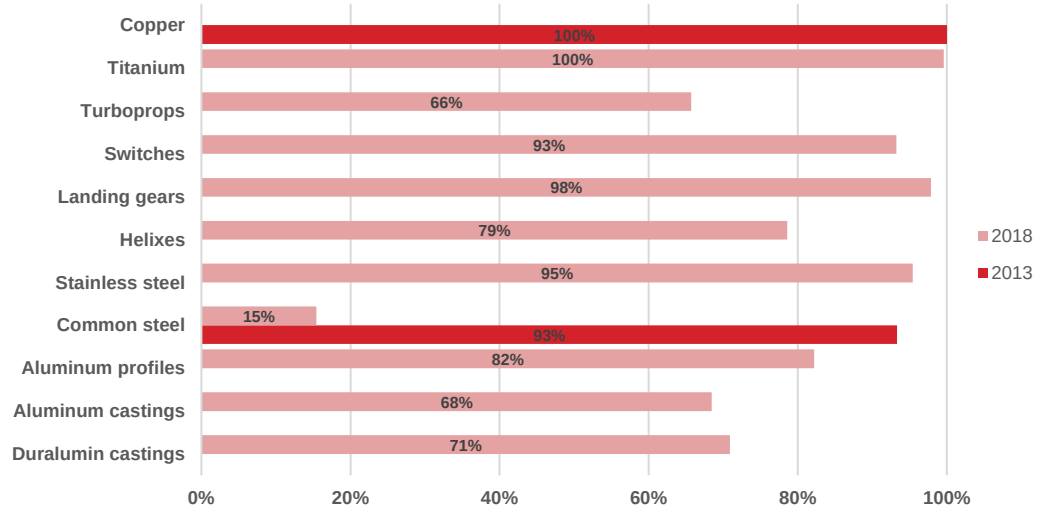
Chart 10: Aerospace Equipment Manufacturing – Input Expenditures and Breakdown*



* Note: 2013 does not include almost USD$ 7 M of unreported, as well as reported but negligible, inputs. Likewise, for 2018 for an amount of nearly USD$ 25 M.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

Except for common steel in 2018, all other inputs in both 2013 and 2018 were mostly imported, clearly pointing to opportunities for Swiss firms to either export them to Mexico and/or supply them to the value chains with local production in the host country.

Chart 11: Aerospace Equipment Manufacturing - Shares imported of Input Expenditures*



* Note: Given limited data availability in the latest Censuses, a small part of the firms, representing about 1% of Input Expenditures, were wholly excluded from reporting for 2013 from both Input Expenditures and imports. Likewise, imports by firms responsible for less than 3% of Input Expenditures in value terms were not reported in 2018 and thus are not reflected in the numerators of the shares. From reported inputs, those included in the list in the graph add up to 99.2% of expenditures in 2013 and 97.2% in 2018. In both cases, such information constraints and exclusions have negligible impacts on the analysis presented.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI.

The main buyer of those inputs in both years referred above was the Chihuahua cluster, representing by itself a market of more than USD$ 300 M, followed by Queretaro's cluster, which grew to nearly USD$100 M in that period. Moreover, Sonora and more considerably so Baja California became purchasers.

Table 14: Aerospace Equipment Manufacturing – Input Expenditures by cluster in Mexico

State/ Cluster	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018
Baja California	2	19	0.5%	4.3%	63.65%
Chihuahua	294	312	92.4%	71.3%	1.25%
Queretaro	22	99	7.0%	22.6%	34.89%
Sonora	0	1	0.0%	0.2%	n.a.
Aggregate	**317**	**431**	**99.9%**	**98.4%**	**6.33%**
National	**318**	**438**	**100.0%**	**100.0%**	**6.67%**

n.a.: Not applicable. AAGR: Average Annual Growth Rate.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

The majority of the purchasers in value were large; all establishments procured on average around USD$3.4 M annually of those inputs.

Table 15: Aerospace Equipment Manufacturing - Input Expenditures by establishment in Mexico

Type of Establishment	Number 2013	Number 2018	Value 2013 (USD$ M)	Value 2018 (USD$ M)	Share of Total 2013	Share of Total 2018	AAGR 2013-2018	Value per establishment 2013 (USD$ M)	Value per establishment 2018 (USD$ M)	AAGR Value per establishment 2013-2018 (USD$ M)
SME	66	81	22	28	6.9%	6.4%	5.18%	0.332	0.349	0.95%
All	**94**	**127**	**318**	**438**	**100.0%**	**100.0%**	**6.67%**	**3.378**	**3.452**	**0.44%**

AAGR: Average Annual Growth Rate. SME: Establishments with up to 250 employees. All: Establishments of all sizes.
Source: NAICS 336410, EC 2014 and EC 2019, INEGI; Banxico.

6. Potential cost advantages of locally producing in Mexico

For those Swiss firms choosing to set up productive establishments in Mexico, either to sell output and/or inputs, available information on transport as well as non-automotive equipment manufacturing point to potential cost advantages compared with producing and exporting from Switzerland. Specifically local production in Mexico, even for SME, offers USD-assessed lower costs in labor and personnel, as well as in materials, goods, and services, allowing for much larger margins.

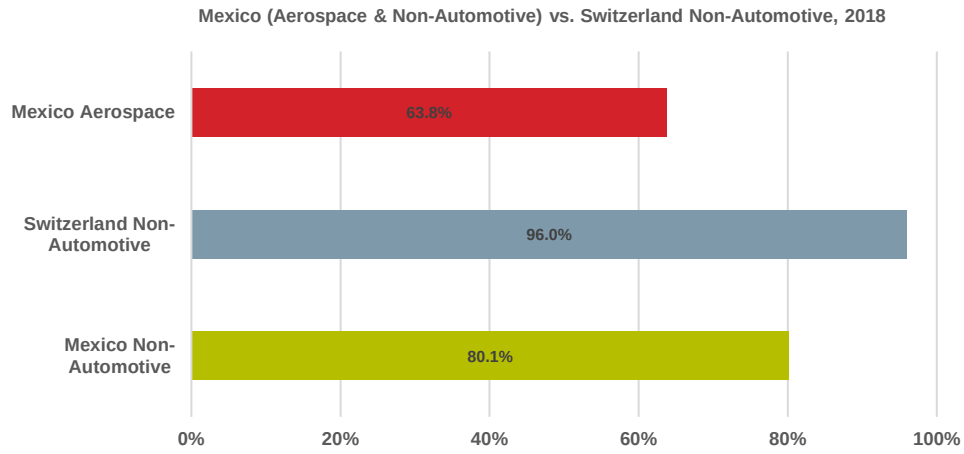
6.1. TRANSPORT EQUIPMENT MANUFACTURING SME IN MEXICO AND SWITZERLAND

In addition to the Economic Censuses information for Mexico presented above, there are also useful publicly-available data published by various Federal authorities of Switzerland, which can be processed to compare cost structures between Mexican and Swiss firms, and so derive potential advantages in that regard to produce in the host country. The comparisons, as shown below, can only be made with Swiss firms in Non-Automotive Transport Equipment Manufacturing (i.e. NOGA 2008, code 30), which besides aerospace also includes mostly railway and shipping manufacturing. This analysis is for the year 2018, the latest suitable for comparison between both countries, and it is expressed in U.S. dollar terms.

Also, it is important to note that the SME definition employed before in this Report for Mexico -establishments with up to 250 employees, serves for appropriate comparison with Switzerland's Federal (functional) classification of SME's (Klein- und Mittlere Unternehmen, KMU) as those enterprises (rather than local establishments) having up to 249 employees.

As a start, the prevalence of SME in Swiss Non-Automotive Transport Equipment Manufacturing was very high in 2018: 96%, compared with Mexico's share of 80%. Specifically, Aerospace had a still lower share of nearly 64% of all establishments.

Chart 12: Transport Equipment Manufacturing - Shares of SME of All business units*



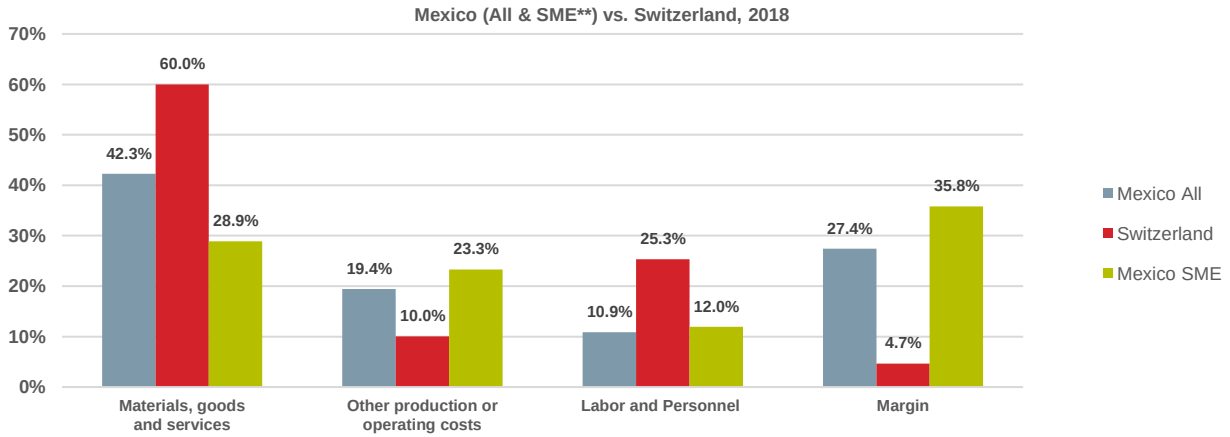
* Note: A "business unit" is defined here as a local establishment in Mexico and a firm or enterprise in Switzerland. Small- and Medium-sized Enterprises (or "SME") are defined here as such establishments with up to 250 employees in Mexico, for appropriate comparison with Switzerland's Federal (functional) classification of SME's (Klein- und Mittlere Unternehmen, KMU) as those enterprises having up to 249 employees. "All" indicates that all establishments are included in Mexico and all enterprises in Switzerland, of any sizes and numbers.
Source: Aerospace, NAICS 2018 code 3364, and Non-Automotive Transport Equipment as the sum of NAICS 2018 codes 3364, 3365 (Railway), 3366 (Ships/Boats) and 3369 (Other), EC 2019, INEGI, for Mexico; and (1) Marktwirtschaftliche Unternehmen nach Wirtschaftsabteilungen und Grössenklasse, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), Statistik der Unternehmensstruktur-STATENT, Bundesamt für Statistik (BFS), and (2) Porträt del Schweizer KMU, 2011-2019, STATENT, BFS, for Switzerland.

6.2. MEXICO VS. SWITZERLAND, NON-AUTOMOTIVE TRANSPORT EQUIPMENT MANUFACTURING

Focusing only on Non-Automotive Transport Equipment Manufacturing, Mexican establishments, either SME or of all sizes, achieved on average in 2018 higher margins on revenues -almost 36% and 27%, respectively - than their (all-sized) Swiss counterparts, with less than 5%. Swiss firms were more efficient in various production and operating costs, with about half of the share of said costs of all Expenditure items considered, than those of the Mexican establishments. However, two other items stand out as margin-dragging for the Swiss. Specifically, first, labor and personnel costs for the Swiss firms are more than double the share of the Mexican establishments, which highlights the labor cost advantage for Mexico can offer in these activities while keeping competitiveness for exports. And second, materials, goods, and services procured were at least 50% more expensive for the Swiss firms, as a share of said Expenditure items, than the Mexican establishments.

In Mexico, SME were only slightly less competitive than the average any-sized establishment, in the shares of both various production and operating costs and labor and personnel costs. Moreover, it is safe to conclude that Mexican SME managed to be more efficient than the larger establishments in sourcing materials, goods, and services, hence the higher margin on revenues.

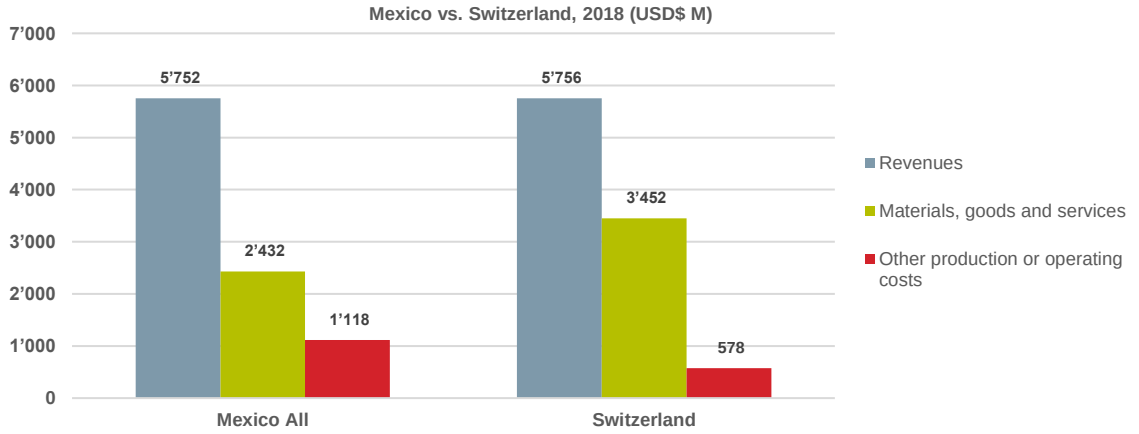
Chart 13: Non-Automotive Transport Equipment Manufacturing - Shares of Major Expenditure Items and Margin on Revenues*



* Note: Non-financial expenditures and revenues only; also excludes depreciation and amortization and taxes, as well as other accessory expenditures and revenues. Margin is the result of subtracting all those expenditures from all the revenues considered.
** Note: A "business unit" is defined here as a local establishment in Mexico and a firm or enterprise in Switzerland. Small- and Medium-sized Enterprises (or "SME") are defined here as such establishments with up to 250 employees in Mexico, for appropriate comparison with Switzerland's Federal (functional) classification of SME's (Klein- und Mittlere Unternehmen, KMU) as those enterprises having up to 249 employees. "All" indicates that all establishments are included in Mexico and all enterprises in Switzerland, of any size..
Source: Non-Automotive Transport Equipment as the sum of NAICS 2018 codes 3364 (Aerospace), 3365 (Railway), 3366 (Ships/Boats) and 3369 (Other), EC 2019, INEGI, for Mexico; and (1) Marktwirtschaftliche Unternehmen nach Wirtschaftsabteilungen und Grössenklasse, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), Statistik der Unternehmensstruktur-STATENT, Bundesamt für Statistik (BFS), (2) Porträt del Schweizer KMU, 2011-2019, STATENT, BFS, and (3) Struktur von Bilanz und Erfolgsrechnung (nach Gewinnverteilung), 2018 und 2019, nicht hochgerechnet, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), 2018, Buchhaltungsergebnisse schweizerischer Unternehmen, Geschäftsjahre 2018–2019, Wertschöpfungsstatistik (WS), BFS, for Switzerland.

Interestingly, revenues in Non-Automotive Transport Equipment Manufacturing were estimated to be essentially equal in value size in 2018 for Mexico and Switzerland, both at around USD$ 5,750 M. However, because the Swiss market sizes for materials, goods, and services procured, and for various production and operating costs, are both higher than the Mexican values, the result is a margin (i.e. revenues minus expenditures) over USD$ 475 M superior in Mexico.

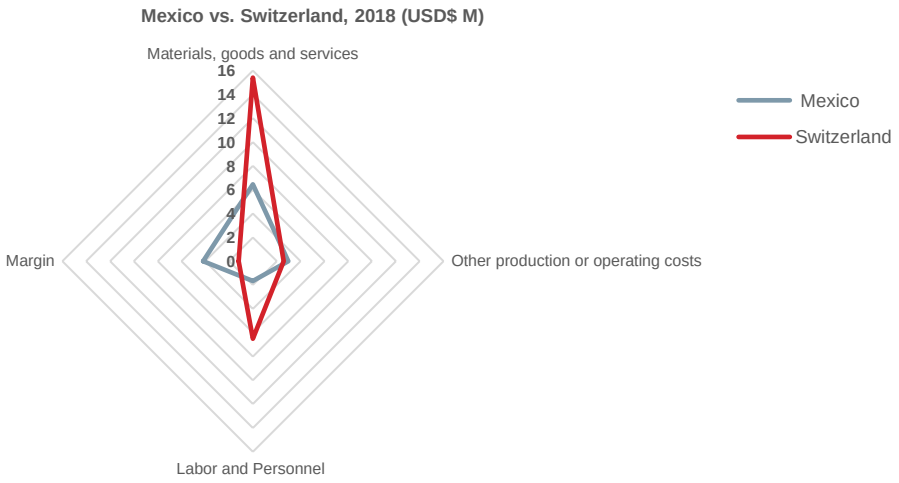
Chart 14: Non-Automotive Transport Equipment Manufacturing – Market Sizes for Products (Revenues) and Inputs (Expenditures)*



* Note: Non-financial expenditures and revenues only; also excludes depreciation and amortization and taxes, as well as other accessory expenditures and revenues. All establishments are included in Mexico and all enterprises in Switzerland, of any size.
Source: Non-Automotive Transport Equipment as the sum of NAICS 2018 codes 3364 (Aerospace), 3365 (Railway), 3366 (Ships/Boats) and 3369 (Other), EC 2019, INEGI, for Mexico; and (1) Marktwirtschaftliche Unternehmen nach Wirtschaftsabteilungen und Grössenklasse, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), Statistik der Unternehmensstruktur-STATENT, Bundesamt für Statistik (BFS), (2) Porträt del Schweizer KMU, 2011-2019, STATENT, BFS, and (3) Struktur von Bilanz und Erfolgsrechnung (nach Gewinnverteilung), 2018 und 2019, nicht hochgerechnet, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), 2018, Buchhaltungsergebnisse schweizerischer Unternehmen, Geschäftsjahre 2018–2019, Wertschöpfungsstatistik (WS), BFS, for Switzerland. Exchange Rates obtained as the 2018 calculated average daily FIX rates from Banxico for Mexico (at 19.238029 Mexican peso per USD), and the 2018 published yearly rate from the Swiss National Bank (SNB) for Switzerland (at 0.97804 CHF per USD).

The differences explained above can also be expressed as results in USD per "business unit" (i.e. all establishments in Mexico and all enterprises in Switzerland, of any size). The relatively higher efficiency in various production and operating costs that Swiss enterprises achieve over their Mexican counterparts is not on average that significant in dollar terms, notably because of the disadvantages in materials, goods, and services procured and in labor and personnel costs.

Chart 15: Non-Automotive Transport Equipment Manufacturing – Comparison by Major Expenditure Item and Margin per business unit*

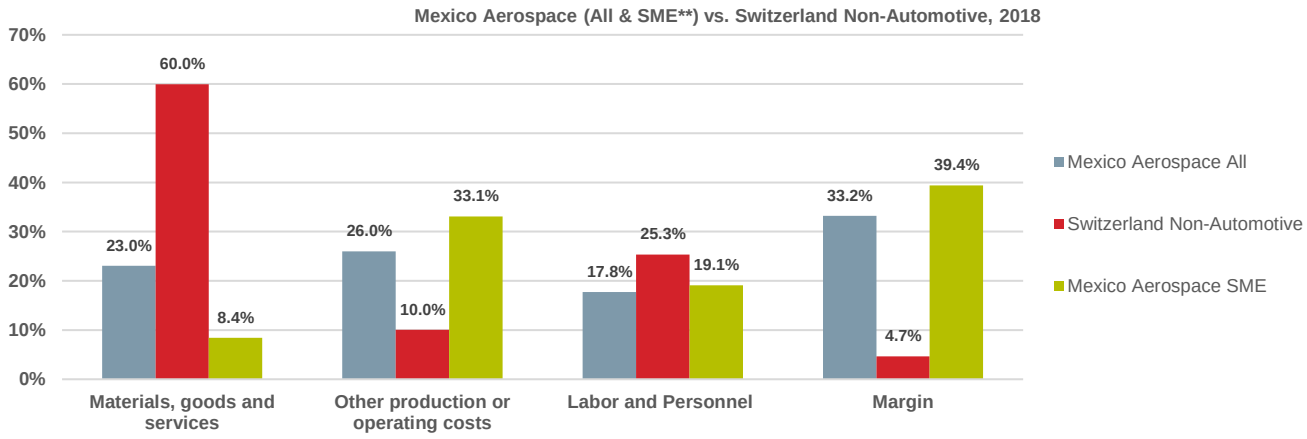


* Note: Non-financial expenditures and revenues only; also excludes depreciation and amortization and taxes, as well as other accessory expenditures and revenues. Margin is the result of subtracting all those expenditures from all the revenues considered. A "business unit" is defined here as a local establishment in Mexico and a firm or enterprise in Switzerland; all establishments are included in Mexico and all enterprises in Switzerland, of any size.
Source: Non-Automotive Transport Equipment as the sum of NAICS 2018 codes 3364 (Aerospace), 3365 (Railway), 3366 (Ships/Boats) and 3369 (Other), EC 2019, INEGI, for Mexico; and (1) Marktwirtschaftliche Unternehmen nach Wirtschaftsabteilungen und Grössenklasse, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), Statistik der Unternehmensstruktur-STATENT, Bundesamt für Statistik (BFS), (2) Porträt del Schweizer KMU, 2011-2019, STATENT, BFS, and (3) Struktur von Bilanz und Erfolgsrechnung (nach Gewinnverteilung), 2018 und 2019, nicht hochgerechnet, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), 2018, Buchhaltungsergebnisse schweizerischer Unternehmen, Geschäftsjahre 2018–2019, Wertschöpfungsstatistik (WS), BFS, for Switzerland. Exchange Rates obtained as the 2018 calculated average daily FIX rates from Banxico for Mexico (at 19.238029 Mexican peso per USD), and the 2018 published yearly rate from the Swiss National Bank (SNB) for Switzerland (at 0.97804 CHF per USD).

6.3. MEXICO AEROSPACE VS. SWITZERLAND NON-AUTOMOTIVE, TRANSPORT EQUIPMENT MANUFACTURING

A similar analysis as the one presented before can be done to compare Mexico Aerospace establishments with Swiss all-sized enterprises in Non-Automotive Transport Equipment Manufacturing. The core conclusions are the same in that Mexican all-sized and SME-only establishments are still relatively more competitive than the Swiss enterprises in labor and personnel costs and various production and operating costs; however, the advantage in the former is smaller, possibly revealing activities that are more demanding of highly skilled and expensive labor in Mexico. In contrast, the disadvantage in materials, goods, and services comes out as markedly higher than the obtained in the previous analysis. As a result, margins on revenues are even higher in this one, with 33% for all-seized and 39%, for SME establishments, respectively, in Mexico.

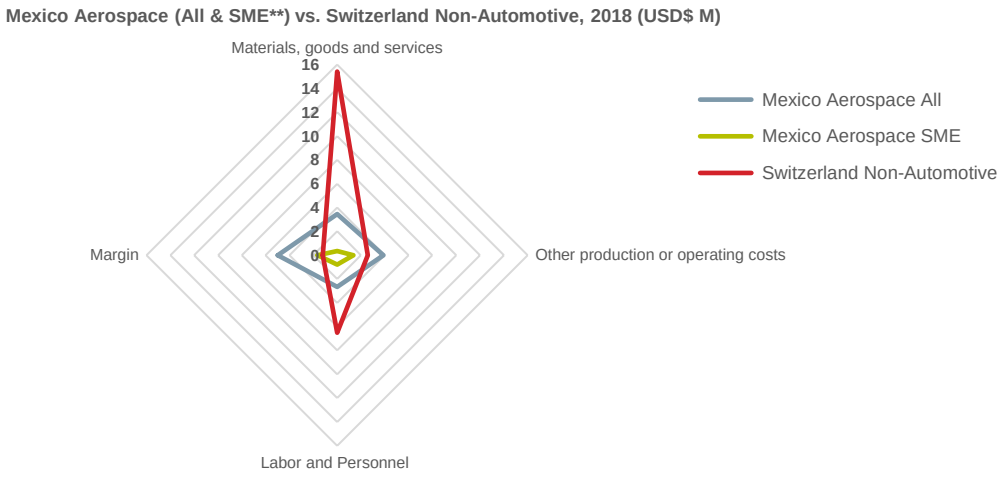
Chart 16: Transport Equipment Manufacturing - Shares of Major Expenditure Items and Margin on Revenues*



* Note: Non-financial expenditures and revenues only; also excludes depreciation and amortization and taxes, as well as other accessory expenditures and revenues. Margin is the result of subtracting all those expenditures from all the revenues considered.
** Note: Small- and Medium-sized Enterprises (or "SME") are defined here as establishments with up to 250 employees in Mexico, for appropriate comparison with Switzerland's Federal (functional) classification of SME's (Klein- und Mittlere Unternehmen, KMU) as those enterprises having up to 249 employees. "All" indicates that all establishments are included in Mexico and all enterprises in Switzerland, of any size.
Source: Aerospace, NAICS 2018 code 3364, EC 2019, INEGI, for Mexico; and (1) Marktwirtschaftliche Unternehmen nach Wirtschaftsabteilungen und Grössenklasse, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), Statistik der Unternehmensstruktur-STATENT, Bundesamt für Statistik (BFS), (2) Porträt del Schweizer KMU, 2011-2019, STATENT, BFS, and (3) Struktur von Bilanz und Erfolgsrechnung (nach Gewinnverteilung), 2018 und 2019, nicht hochgerechnet, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), 2018, Buchhaltungsergebnisse schweizerischer Unternehmen, Geschäftsjahre 2018–2019, Wertschöpfungsstatistik (WS), BFS, for Switzerland.

In value on average per business unit, all-sized Mexican establishments in Aerospace, despite being less efficient than their Swiss Non-Automotive Manufacturing counterparts in various production and operating costs, manage higher dollar margins individually, thanks to lower labor and personnel costs and those of materials, goods, and services. As for SME establishments in Aerospace in Mexico, while they spend fewer dollar costs in all three expenditure categories referenced before, on the other hand, they also receive a lower dollar margin amount each. Interestingly, said amount is only slightly above the average value for a Swiss all-sized enterprise in Non-Automotive Manufacturing.

Chart 17: Transport Equipment Manufacturing – Comparison by Major Expenditure Item and Margin per business unit*



* Note: Non-financial expenditures and revenues only; also excludes depreciation and amortization and taxes, as well as other accessory expenditures and revenues. Margin is the result of subtracting all those expenditures from all the revenues considered.
** Note: A "business unit" is defined here as a local establishment in Mexico and a firm or enterprise in Switzerland. Small- and Medium-sized Enterprises (or "SME") are defined here as such establishments with up to 250 employees in Mexico, for appropriate comparison with Switzerland's Federal (functional) classification of SME's (Klein- und Mittlere Unternehmen, KMU) as those enterprises having up to 249 employees. "All" indicates that all establishments are included in Mexico and all enterprises in Switzerland, of any size.
Source: Aerospace, NAICS 2018 code 3364, EC 2019, INEGI, for Mexico; and (1) Marktwirtschaftliche Unternehmen nach Wirtschaftsabteilungen und Grössenklasse, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), Statistik der Unternehmensstruktur-STATENT, Bundesamt für Statistik (BFS), (2) Porträt del Schweizer KMU, 2011-2019, STATENT, BFS, and (3) Struktur von Bilanz und Erfolgsrechnung (nach Gewinnverteilung), 2018 und 2019, nicht hochgerechnet, NOGA 2008 code 30 (Sonstiger Fahrzeugbau), 2018, Buchhaltungsergebnisse schweizerischer Unternehmen, Geschäftsjahre 2018–2019, Wertschöpfungsstatistik (WS), BFS, for Switzerland. Exchange Rates obtained as the 2018 calculated average daily FIX rates from Banxico for Mexico (at 19.238029 Mexican peso per USD), and the 2018 published yearly rate from the Swiss National Bank (SNB) for Switzerland (at 0.97804 CHF per USD).

7. Foreign trade complementarity

One opportunity is expanding the star export from Switzerland to Mexico in other parts for gas turbines. Another is using excess penetration in the US import market for both countries as a proxy for relative competitiveness: Swiss firms could expand exports to Mexico in Aircraft, and Other Guided Missile and Space Vehicle Parts; conversely, they may consider producing in Mexico, and thus exporting indirectly to the US, Aircraft Engines and Parts, and Other Aircraft Parts and Equipment.

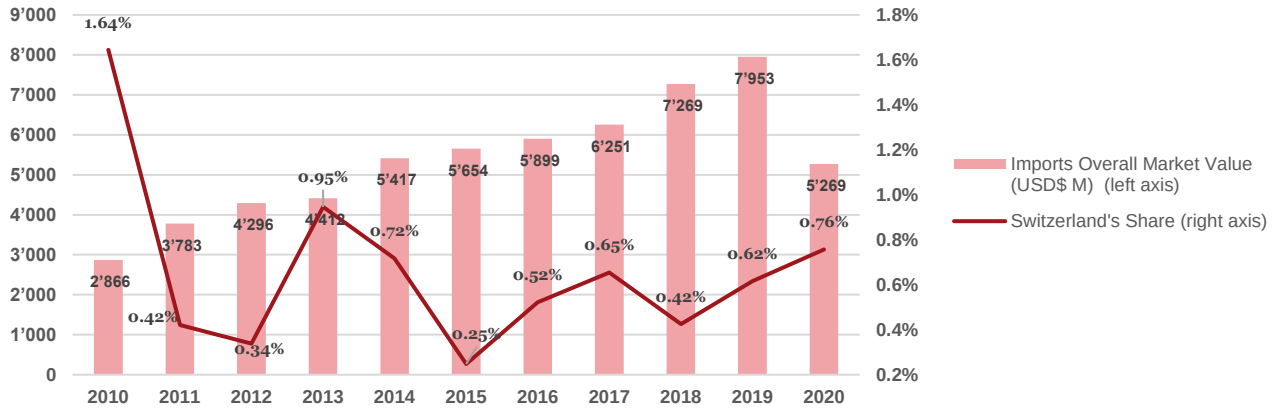
7.1. STRENGTHENING MEXICO'S IMPORTS FROM SWITZERLAND

For the purposes of this Report, "strengthening imports" means assessing opportunities to expand penetration of products exported from Switzerland that are already reasonably positioned in Mexico's Aerospace import market (see below for this market scope).

Mexico's Secretariat of the Economy (SE) offers a very useful tool to explore the country's foreign trade by tariff code: Sistema de Informacion Arancelaria Via Internet (SIAVI)[9]. An analysis with data obtained from that source of the imports by Mexico related to Aerospace (i.e. not exclusively to the Aerospace manufacturing industry) points to two important facts. On the one hand, such market by value in US dollars was growing every single year since at least 2011 up until 2019, before the pandemic. In the latter year, that market value was already worth more than USD$ 7,950 M. On the other hand, Switzerland's share of the import market, while mostly increasing since 2016 when it hit a low, has nevertheless been below 1% since 2011.

[9] http://www.economia-snci.gob.mx/siavi5/fraccion.php which is now being replaced with Sistema Nacional de Informacion de Comercio Exterior (SNICE) https://www.snice.gob.mx/cs/avi/snice/informacionarancelaria.html

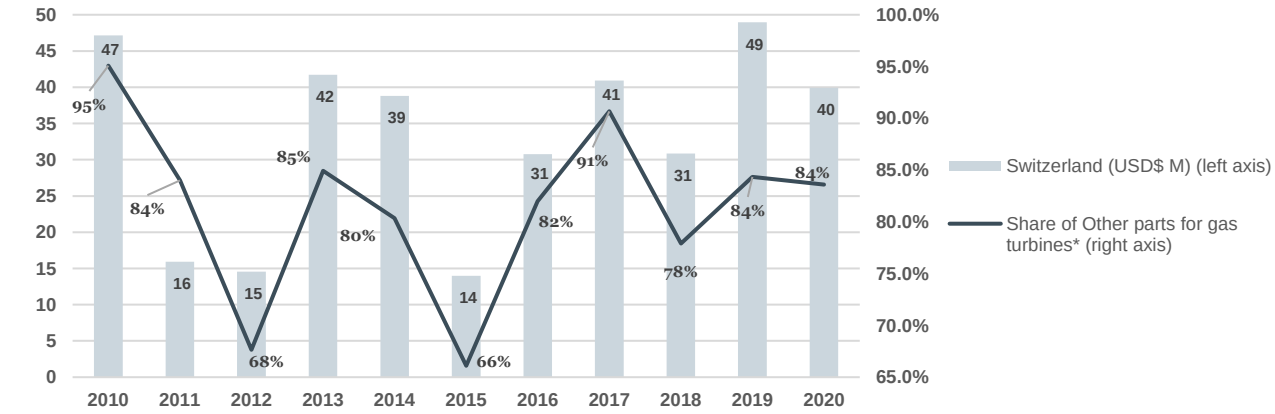
Chart 18: Aerospace Imports by Mexico Market Value and Switzerland's Share



Source: SIAVI, SE.

A third fact is that Switzerland's share is predominantly explained by a single tariff item, namely that of "Other parts for gas turbines" (Harmonized System, HS, code 84119999)[10].

Chart 19: Aerospace Imports by Mexico from Switzerland and Share of Other parts for gas turbines*

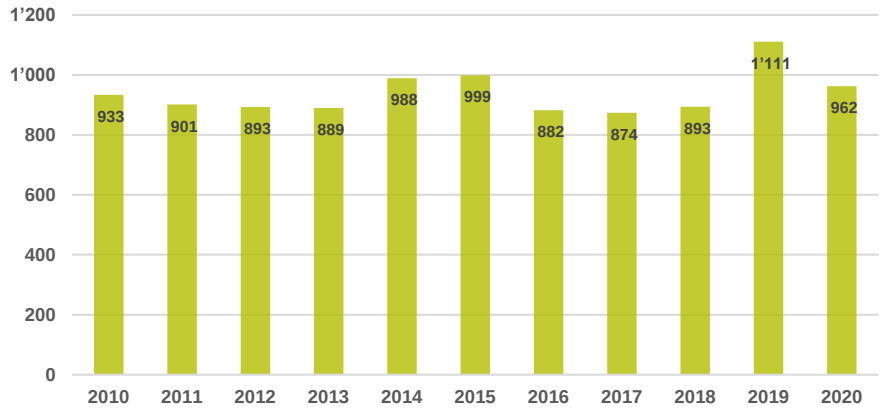


* Harmonized System, code 84119999
Source: SIAVI, SE.

This star product by Switzerland has had a considerable market value in Mexico since 2010, at between about USD$875 M and over USD$1,110 M. Still, the Swiss share in 2019 was 3.72%, or nearly USD$41.3 M, already the highest level attained since 2011.

[10] "Other parts for gas turbines" classified under HS code 84119999 for Mexico are those that comply with all of the following: 1) are not parts of turbojets or turbopropellers; 2) are not cast-iron parts, not advanced beyond cleaning, and machined only de removal of fins, gates, sprues, and risers or to permit location in finishing machinery; and 3) are not parts of nonaircraft gas turbines.

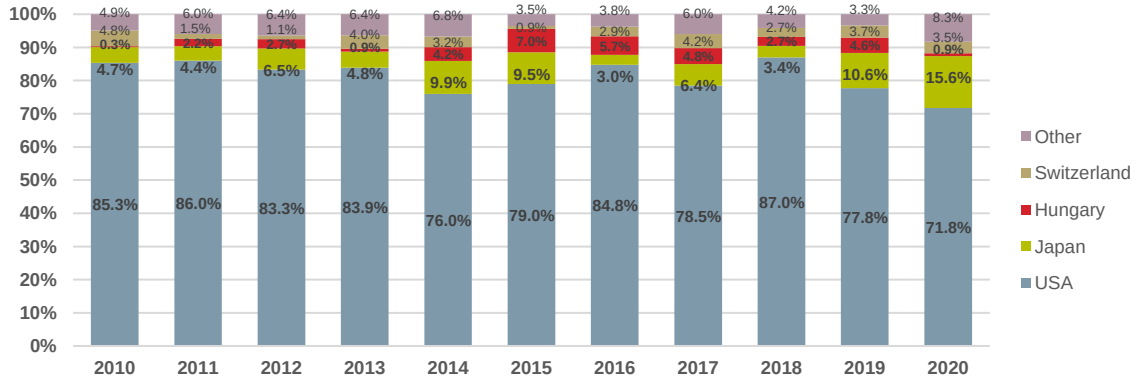
Chart 20: Aerospace Imports by Mexico: Market value of Imports of Other parts for gas turbines* (USD$ M)



* Harmonized System, code 84119999
Source: SIAVI, SE.

Thus, strengthening Swiss Aerospace imports to Mexico implies expanding the market share of said item, but facing fierce competition to increase the share *and* to sustain any gains over time. The United States is by far the major exporter to Mexico of such product category, followed by Japan. The experience in past years demonstrates that it is possible to expand market share: for instance, Hungary went from a similar share as Switzerland in 2018 of 2.7% and managed to surpass the latter the following year with 4.6%; Japan went from 3.4% in 2018, to 10.6% in 2019 and 15.6% in 2020; and even Switzerland was able to raise penetration three times since 2010 (from 1.1% in 2012 to 4.0% in 2013, from 0.9% in 2015 to 2.9% in 2016 and 4.2% in 2017, and from 2.7% in 2018 to the above-mentioned 3.7% in 2019). All these named countries have seen their shares slip; notably, the United States lost over 9 percentage points pre-pandemic, just from 2018 to 2019.

Chart 21: Aerospace Imports by Mexico: Share of Imports of Other parts for gas turbines* by selected countries



* Harmonized System, code 84119999
Source: SIAVI, SE.

7.2. DIVERSIFYING MEXICO'S IMPORTS FROM SWITZERLAND

Taking into account other HS import codes with Swiss exports in 2019 above USD$1.5 M and/or with a Switzerland share of the respective import value of more than 0.1% that same year, two more possibilities come out. One is HS code 98060006 or Merchandise for the assembly or manufacture of aircraft or aero parts when the companies have the Certificate of Approval for Production issued by the Ministry of Communications and Transportation. This was the top import Aerospace item for that year in Mexico, with a share of 34% (of a whole value of close to USD$ 8,000 M), at a total value of almost USD$ 2,700 M; however, Switzerland only exported nearly USD$ 3.4 M (share of 0.12%). The other is HS code 98060005 Merchandise intended for the repair or maintenance of aircraft or aircraft parts, in itself a market of over USD$1,500 M, where Switzerland only sold USD$2.7 M (share of 0.18%) in the afore-mentioned year.

Besides the three Aerospace HS codes described above, an import value of roughly USD$2,600 M in 2019 remains marginally or completely untapped by Switzerland, with exports to Mexico in the aggregate of only USD$ 1.6 M.

All these other HS import codes indicate blatant potential -in various degrees- to diversify Aerospace exports from Switzerland to Mexico. For instance, and most significantly, HS code 84119101 Parts of turbo-jets or turbo-propellers

(turboprops), is an import item market valued in 2019 at over USD$1,650 M, where Swiss products barely reached just USD$1.2 M in sales that year.

A view that complements the one presented above uses Switzerland's penetration in the Aerospace manufacturing market of the United States as a reasonable proxy for a Swiss firm's exports competitiveness to expand sales also to Mexico. Specifically, there are Swiss Aerospace products that are being successfully exported to the United States where Mexico is bare -if at all participating. This serves as an indication that Swiss firms also have the potential to export to Mexico.

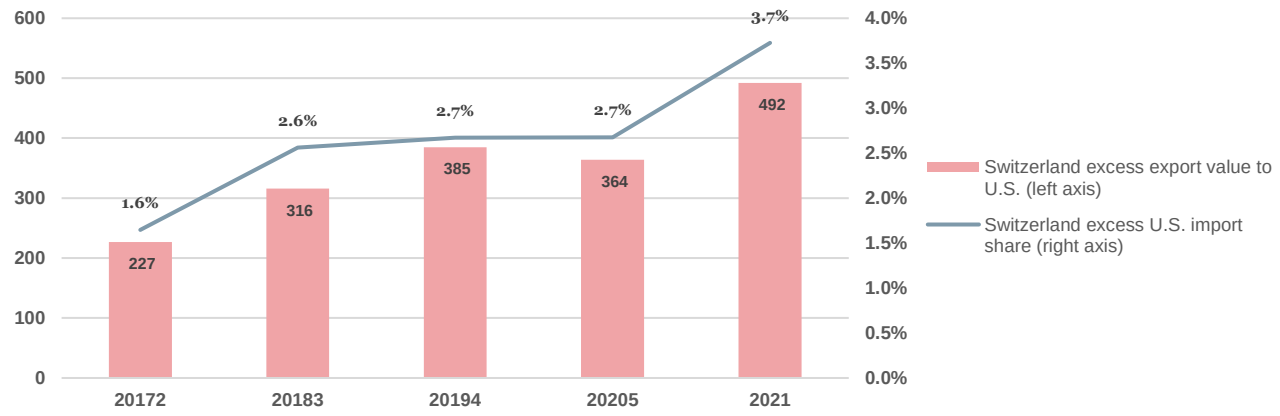
For that purpose, it is possible to use the CIF General Import USD Value published on U.S. Trade Online by the U.S. Census Bureau, where said imports are classified by NAICS code and exporting country The analysis here covers fully the last pre-pandemic three years and two of the pandemic years, i.e. from 2017 to 2021. Also, the U.S. NAICS version has the advantage that, unlike Mexico, Aerospace Products and Parts Manufacturing (codes 3364/33641) is further broken down into more detailed six codes. One of these codes, 336414 Guided Missile and Space Vehicle Manufacturing can be excluded at the outset because neither Mexico nor Switzerland have exported to the U.S. in any one year in that period[11].

Modified criteria as above can be used, meaning to rate U.S. NAICS 33641 codes for U.S. imports where: 1) Swiss or Mexican annual exports in that period were above USD$1.5 M; and/or 2) any of those country's import values into the U.S. reached a share of at least 0.4% in that year. With such criteria, code 336415 Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing, can also be excluded, as neither Swiss nor Mexican exports satisfy any of them in the said analysis period.

Thus, the result is that Swiss exports have had a relative advantage over the Mexican in competing in the respective U.S. import market for two codes, as detailed in the following paragraphs.

336411 Aircraft Manufacturing: Establishments primarily engaged in one or more of the following: (1) manufacturing or assembling complete aircraft; (2) developing and making aircraft prototypes; (3) aircraft conversion (i.e., major modifications to systems); and (4) complete aircraft overhaul and rebuilding (i.e., periodic restoration of aircraft to original design specifications). For this market, Switzerland's relative advantage has grown concerning Mexico to nearly USD$ 500 M or 3.7 percentage points in 2021. Activities[12] include Aircraft conversions (i.e., major modifications to the system), Aircraft manufacturing, Aircraft overhauling, Aircraft rebuilding (i.e., restoration to original design specifications), Autogiros manufacturing, Blimps (i.e., aircraft) manufacturing, Developing, and producing prototypes for aircraft, Gliders (i.e., aircraft) manufacturing, Hang gliders manufacturing, Helicopters manufacturing, Target drones, aircraft, manufacturing, Ultralight aircraft manufacturing, and Unmanned and robotic aircraft manufacturing.

Chart 22: Aerospace Manufacturing Exports to the U.S., Aircraft* - Excess export value (USD$ M) and import share of Switzerland over Mexico



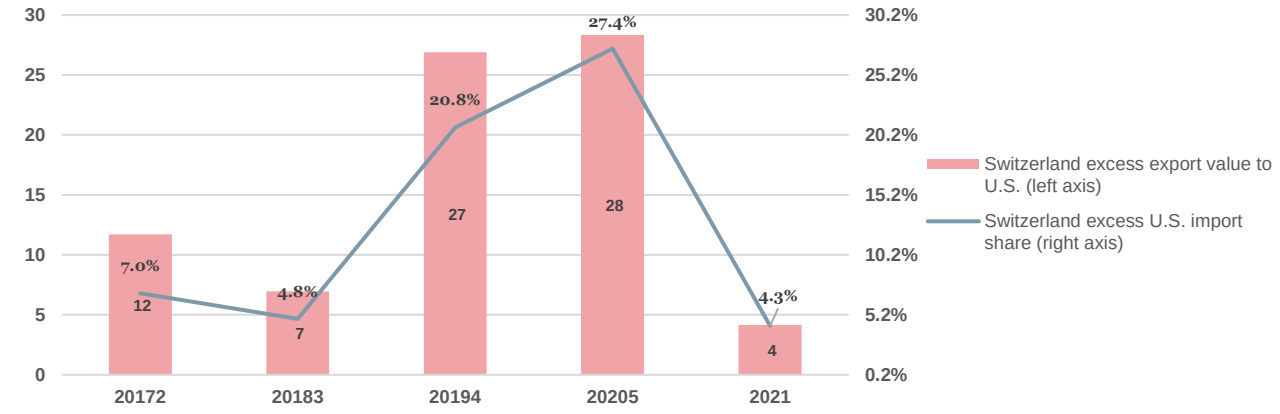
* Aircraft Manufacturing, U.S. NAICS 2022, code 336411.
Source: CIF General Import USD Value, U.S. Trade Online, U.S. Census Bureau

336419 Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing: Establishments primarily engaged in (1) manufacturing guided missile and space vehicle parts and auxiliary equipment (except guided missile and space vehicle propulsion units and propulsion unit parts) and/or (2) developing and making prototypes of guided missile and space vehicle parts and auxiliary equipment. Switzerland's relative advantage concerning Mexico is modest in value compared with the previous code, though it represents over 4.3 percentage points in 2021, down

[11] The U.S. Census also reports a seventh code, 33641X *Civilian Aircraft, Engines, Equipment, And Parts*, but the trade status of code 336414 also applies to 33641X: neither Mexico nor Switzerland have exported under it during 2017-2021.
[12] In this chapter, these activities -and their products- are each code's corresponding index entries as listed in the NAICS 2022 respective search at https://www.census.gov/naics/.

from over 27 points in 2020 and almost 21 points the year before. Activities include: Airframe assemblies for guided missiles manufacturing, Developing and producing prototypes for guided missile and space vehicle components, Guided-missile and space vehicle parts (except engines) manufacturing, and Space capsules manufacturing.

Chart 23: Aerospace Manufacturing Exports to the U.S., Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment* - Excess export value (USD$ M) and import share of Switzerland over Mexico



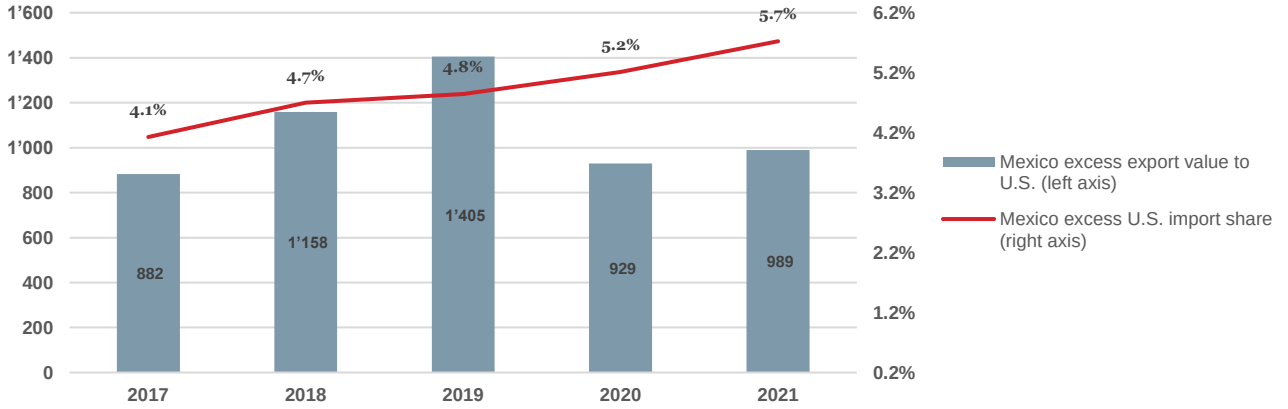
* Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing, U.S. NAICS 2022, code 336419.
Source: CIF General Import USD Value, U.S. Trade Online, U.S. Census Bureau

7.3. STRENGTHENING MEXICO'S EXPORTS TO THE U.S. WITH SWISS LOCAL MEXICAN PRODUCTION

Conversely, Swiss firms have also the potential to expand exports to the U.S. but indirectly, namely by producing in the Aerospace Manufacturing Industry based in Mexico, which reveals a comparative advantage vis-à-vis the same Switzerland-based industry. Using the same sources, data, and criteria as in the previous section, the result is that Mexican exports have had an edge over the Swiss in two U.S. NAICS 2022 codes that will be explained below.

336412 Aircraft Engine and Engine Parts Manufacturing: Establishments primarily engaged in one or more of the following: (1) manufacturing aircraft engines and engine parts; (2) developing and making prototypes of aircraft engines and engine parts; (3) aircraft propulsion system conversion (i.e., major modifications to systems); and (4) aircraft propulsion systems overhaul and rebuilding (i.e., periodic restoration of aircraft propulsion system to original design specifications). For this market, Mexico's comparative advantage over Switzerland's has been considerable in value (between USD$ 880 M and USD$ 1,400 M), and in share terms, it has increased every year to reach 5.7 percentage points in 2021. Activities include Aircraft engine and engine parts (except carburetors, pistons, piston rings, valves) manufacturing, Aircraft engine overhauling, Aircraft engine rebuilding, Aircraft turbines manufacturing, Developing and producing prototypes for aircraft engines and engine parts, Engines and engine parts, aircraft (except carburetors, pistons, piston rings, valves), manufacturing, Gas turbines, aircraft, manufacturing, Gasoline engine parts (except carburetors, pistons, piston rings, valves), aircraft, manufacturing, Gasoline engines, aircraft, manufacturing, Internal combustion engines, aircraft, manufacturing, Jet propulsion and internal combustion engines and parts, aircraft, manufacturing, and Rocket engines, aircraft, manufacturing.

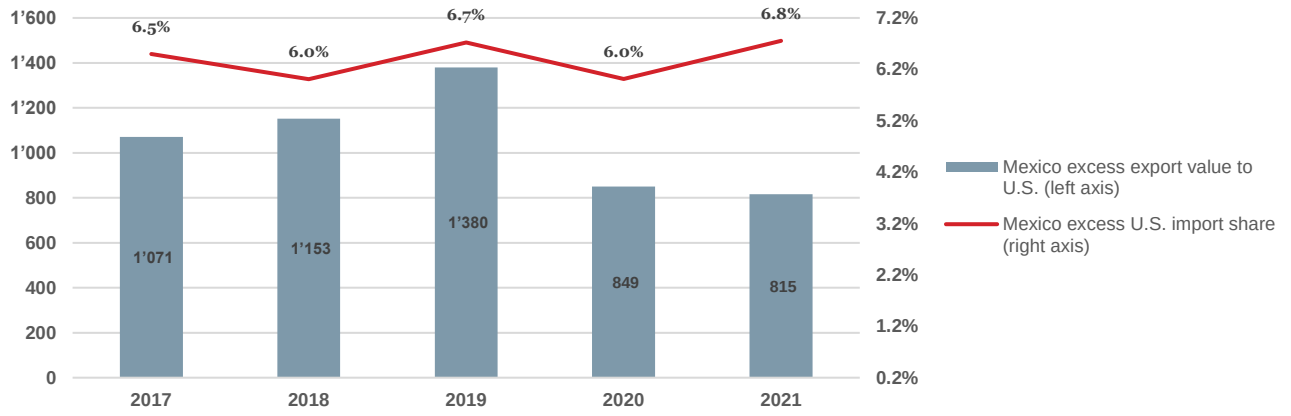
Chart 24: Aerospace Manufacturing Exports to the U.S., Aircraft Engine and Engine Parts Manufacturing* - Excess export value (USD$ M) and import share of Mexico over Switzerland



* Aircraft Engine and Engine Parts Manufacturing, U.S. NAICS 2022, code 336412.
Source: CIF General Import USD Value, U.S. Trade Online, U.S. Census Bureau

336413 Other Aircraft Parts and Auxiliary Equipment Manufacturing: Establishments primarily engaged in (1) manufacturing aircraft parts or auxiliary equipment (except engines and aircraft fluid power subassemblies) and/or (2) developing and making prototypes of aircraft parts and auxiliary equipment. Auxiliary equipment includes such items as crop dusting apparatus, armament racks, inflight refueling equipment, and external fuel tanks. Mexico's comparative advantage over Switzerland's has been considerable in value, but in share terms, it has been fairly stable, between 6 and 7 percentage points. Activities include: Aircraft assemblies, subassemblies, and parts (except engines) manufacturing, Aircraft auxiliary parts (e.g., crop dusting, external fuel tanks, inflight refueling equipment) manufacturing, Aircraft brakes manufacturing, Aircraft control surface assemblies manufacturing, Aircraft fuselage wing tail, and similar assemblies manufacturing, Aircraft propellers and parts manufacturing, Aircraft wheels manufacturing, Airframe assemblies (except for guided missiles) manufacturing, Developing and producing prototypes for aircraft parts (except engines) and auxiliary equipment, Joints, universal, aircraft, manufacturing, Targets, trailer type, aircraft, manufacturing, Tow targets, aircraft, manufacturing, and Universal joints, aircraft, manufacturing

Chart 25: Aerospace Manufacturing Exports to the U.S., Other Aircraft Parts and Auxiliary Equipment Manufacturing* - Excess export value (USD$ M) and import share of Mexico over Switzerland



* Other Aircraft Parts and Auxiliary Equipment Manufacturing, U.S. NAICS 2022, code 336413.
Source: CIF General Import USD Value, U.S. Trade Online, U.S. Census Bureau

8. Short- and long-term Aerospace Manufacturing Industry outlooks for Mexico

A preliminary assessment of supply and demand US-linked indicators shows recovery is underway for the Aerospace Industry in Mexico, both in a long-term overview and a short-term window. Also, recent literature point to at least five challenges and opportunities in the post-pandemic environment for that industry: sustainable energy sources; aircraft redesign; operational and financial airline optimization; continuous refinement of capital expenditures in OEM aircraft; and new vehicles.

8.1. LONG TERM OVERVIEW

It is, admittedly, a difficult and imperfect task to forecast where the Aerospace Manufacturing Industry is heading, especially amid various country-specific post-pandemic definitions, uncertain upcoming virus variants, and challenging geopolitical events. However, careful data analysis can point to trends reasonably useful for business planning (if always subject to timely revision).

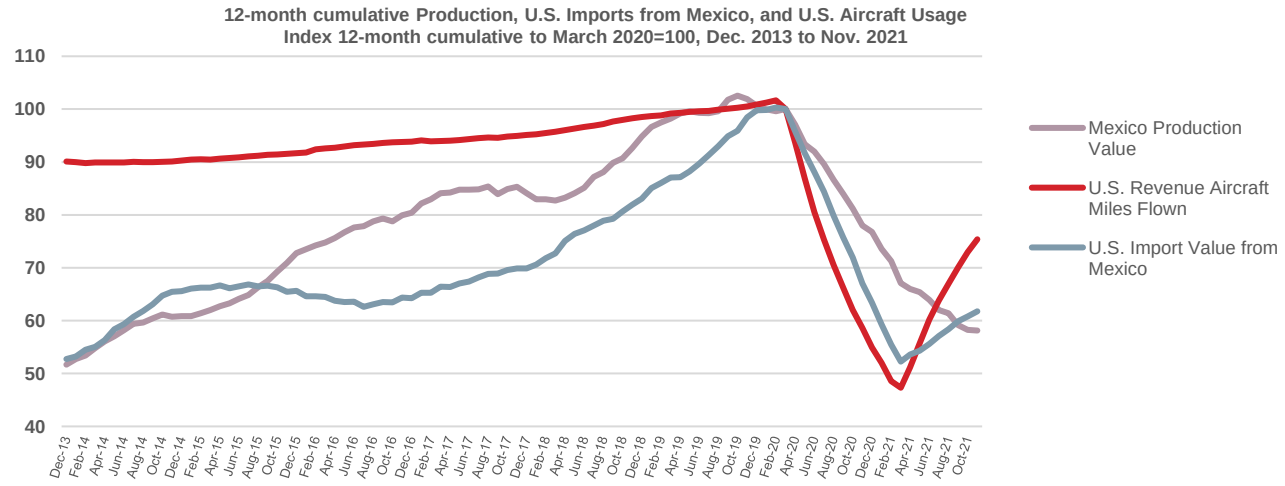
For that purpose, it is of course necessary to first identify an indicator of the demand driver for the Aerospace Manufacturing Industry based in Mexico. Being the latter heavily dependent on the U.S. market, aircraft usage in this economy becomes a significant proxy for such demand. As is well known, one such usage measure is Revenues Aircraft Miles Flown, published consistently each month by the U.S. Bureau of Transportation Statistics. On the supply side, the peso production value of Mexican Aerospace Manufacturing establishments and the dollar import value of such industrial products from Mexico into the U.S. serve as indicators, published monthly by INEGI and by the U.S. Census Bureau, respectively. However, businesses usually react not to short-term variations of market conditions, but rather to more

discernible patterns of market behavior; thus, it is reasonable to assume that, for example, a 12-month cumulative measure of all three indicators referenced above can better capture economic signals between supply and demand.

March 2020, when widespread lockdowns and restrictions were imposed because of COVID-19, marked a major drop in the airline industry worldwide, including all American domestic and international operations (especially passenger transportation). Such watershed point in time can serve as the base month for an index that can reflect a smoother behavior. A long-term overview to better appreciate said signals requires many years; in this case, this Report is using 12-month periods starting in December 2013 (which is also the calendar 2013 cumulative total), up until the latest available.

As can be derived from such analysis (and aside from, for instance, a more rigorous econometric one), aircraft usage has indeed apparently exerted a pull to the Mexican Aerospace Manufacturing Industry, and translated in production and hence exports to the U.S. Such pull was upwards at least from 2013 until March 2020, when it turned heavily downwards. The good news is that the 12-month cumulative fall stopped in March 2021, when aircraft usage reversed course onwards and has been increasing ever since, a trend that has been mirrored so far, albeit more moderately, by Aerospace Industry imports by the U.S. from Mexico. Given that Mexico's value production indicator only slowed its downfall and may likely start to turn upwards in December 2021 or early 2022, such imports increase may have so far included much of Mexican product inventories that remained previously unsold. Still, the long-term overview suggests that -ceteris paribus- the market outlooks may actually improve.

Chart 26: Aerospace Equipment Manufacturing - Indicators of supply and demand for Mexico, long-term overview

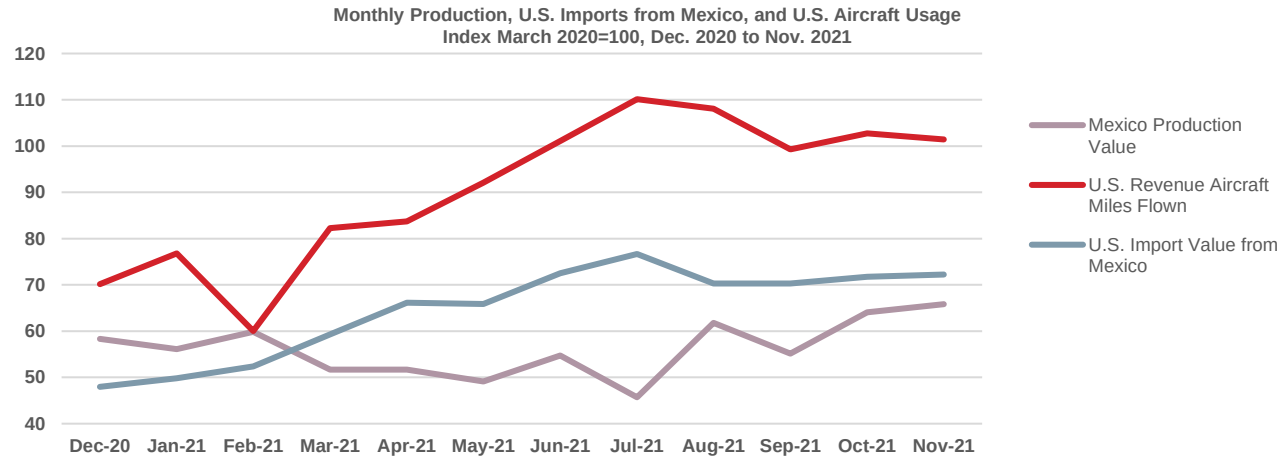


Source: NAICS 2018 336410, current peso Production Value, EMIM (2020 Version), INEGI, for Mexico; and 1) Revenue Aircraft Miles Flown, U.S Air Carrier Traffic Statistics (excludes all-cargo services and includes both domestic and international), T-100 Market and Segment, U.S. Bureau of Transportation Statistics, and 2) NAICS 33641 Aerospace Products & Parts, CIF General Import USD Value, U.S. Trade Online, U.S. Census Bureau, for the U.S.

8.2. SHORT TERM WINDOW

As indicated above, a short-term view of the market will show significant volatility. But even a window of the latest 12 *monthly* data points, this time setting the base index for the same three afore-mentioned indicators as their respective value for March 2020, confirms that indeed a market improvement is likely, ceteris paribus. Aircraft usage has returned and even surpassed that month's level (though admittedly still below pre-pandemic usage), which has been reflected in U.S. Aerospace Industry imports from Mexico and, already, in Mexican local industry production sales, whose indicator shows that they have been catching up (probably also because of inventory depletion of unsold products, in addition to the demand signals).

Chart 27: Aerospace Equipment Manufacturing - Indicators of supply and demand for Mexico, latest 12-month window



Source: NAICS 2018 336410, current peso Production Value, EMIM (2020 Version), INEGI, for Mexico; and 1) Revenue Aircraft Miles Flown, U.S Air Carrier Traffic Statistics (excludes all-cargo services and includes both domestic and international), T-100 Market and Segment, U.S. Bureau of Transportation Statistics, and 2) NAICS 33641 Aerospace Products & Parts, CIF General Import USD Value, U.S. Trade Online, U.S. Census Bureau, for the U.S.

8.3. MAIN INDUSTRY CHALLENGES AND OPPORTUNITIES

Among the ideas currently put forward regarding the aerospace industry challenges and opportunities in the post-pandemic environment, and which undoubtedly will also shape the future of the Mexican industry and the participation of Swiss firms, at least the following five equally relevant stand out[13]:

1. Sustainable energy sources. Reduction of emissions, to become carbon neutral, by replacing older aircraft with the latest-generation aircraft, able to use affordable sustainable aviation fuels (e.g. hydrogen) or in any case alternative power sources, and which will be likely mandated in the foreseeable future by governmental regulations.

2. Aircraft redesign. Development of technological innovations in aircraft (especially in engines and airframes) to improve their performance, such as in gas turbines, redesigned aerodynamics, and lightweight structures, mostly to increase range. Worth highlighting is also the increased use of composite materials in the airframes, reducing the employment of metals, and so enhancing fuel efficiency and flight range.

3. Operational and financial airline optimization. Increased use of aircraft with alternate seat configurations (e.g. single-aisle with a long-range) to enable the optimization of different airlines' s fleets, networks, and flight services structures. As a result of the pandemic, airlines are accelerating the replacement process of aircraft, especially of the largest planes, and redefining their business models. For instance, there will be expanded use of narrow-body planes capable of longer ranges, and long-haul flights, including many of those relatively inexpensive, are likely to become more prevalent.

4. Continuous refinement of capital expenditures in OEM aircraft. Furthering of discussions between OEM and aircraft customers to thoroughly and timely revise aircraft requirements (e.g. pay-load range potential, minimum service-life, among others), to enhance intertemporal efficiency in capital expenditure planning for product development, with minimal later disinvestment.

5. New vehicles. Development and introduction of novel aircraft that will also serve nascent markets (e.g. vertical take-off and landing electric vehicles).

[13] Source: Taneja, Nawal K. (2021*), Airlines in a Post-Pandemic World. Preparing for Constant Turbulence Ahead*, Routledge, New York NY; and Bilotkach, Volodymyr (2021), *The Economics of Airlines*, Second Edition, Agenda Publishing, Newcastle upon Tyne, England UK.

9. Conclusion / Call-for-Action

There are identifiable business opportunities for Swiss firms in the Aerospace Industry in Mexico, specifically in Equipment Manufacturing, where four major clusters have developed significantly. The associated markets have grown considerably, become larger, more diversified, and technologically complex, with a post-pandemic recovery insight and heavily related to the US.

To move forward, interested Swiss firms may consider for their strategic decisions and business plans based on the evidence and arguments presented previously in this Report, at least the following ten inter-related elements:

1. **Which target markets to serve: output and/or input products in the aerospace manufacturing supply chains in Mexico, mostly export-oriented, and in the former case whether inputs will be owned and/or from third parties and processed in own Maquila operations.**

2. **How to serve the target markets: either by exporting from Switzerland and/or producing locally in Mexico and how to proceed with a timeline for the strategic mix of such operations.**

3. **What is the appropriate scale required in each case to serve those markets, which also means if a consortium or joint ventures are more convenient (e.g. with other Swiss or European firms).**

4. **Which exports to Mexico are best to expand from Switzerland, in light of the Swiss presence and potential in the Mexican import market.**

5. **Which exports to Mexico are best to expand from Switzerland, given revealed superior Swiss competitiveness in penetrating the US import market.**

6. **What to best produce locally in Mexico rather than export from Switzerland, and so capitalize the host country's higher advantages, such as a geographical location next to the US, lower labor costs, and smaller sourcing costs of materials and goods and services.**

7. **Which exports to the US best to expand, but now indirectly rather than shipping them from Switzerland, by producing them more competitively locally in Mexico and so obtain larger margins.**

8. **Where is it most convenient to locate in Mexico (e.g. how close to one or more clusters) to competitively serve the target markets?**

9. **Which current commercial relationships (e.g. global firms located in Europe, clients in the US, FEMIA, and other contacts in Mexico) can you leverage to better plan to expand business in Mexico.**

10. **With whom to further a network to develop competitive supply chain linkages in the planned business operations in Mexico, and how can related case studies (on both successes and failures) enlighten the way forward.**

Thus, there are paths and certainly the space and multiple alternative avenues to new and/or increased business by Swiss firms in Aerospace Equipment Manufacturing in Mexico.

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