

Being prepared for the next Mexican automotive boom

Perspectives for
OEMs and suppliers



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- A. Automotive vehicle production in Mexico is growing by 9% annually and develops into premium vehicles production



Mexican automotive industry is growing and changing – Entry of premium products results in new requirements for the value chain

Overview on Mexican light vehicle production

Looking at the past



8.4%
Past production annual growth

Over the last 5 years, Mexico's light vehicle production has been on a **remarkable growth track** driven by **exports to USA – CAGR since 2010 was 8.4%**

Looking into the future



9%
Future production annual growth

Growth will continue with expected 41% more capacity by 2020 to supply **existing and new export markets – Above average increase** of exports to markets **outside NAFTA**



4 to 10%
Growth of premium segment from 2015 to 2020

Entry of new brands like Audi, BMW and Infiniti is shifting product mix from 4% to 10% share of premium vehicles

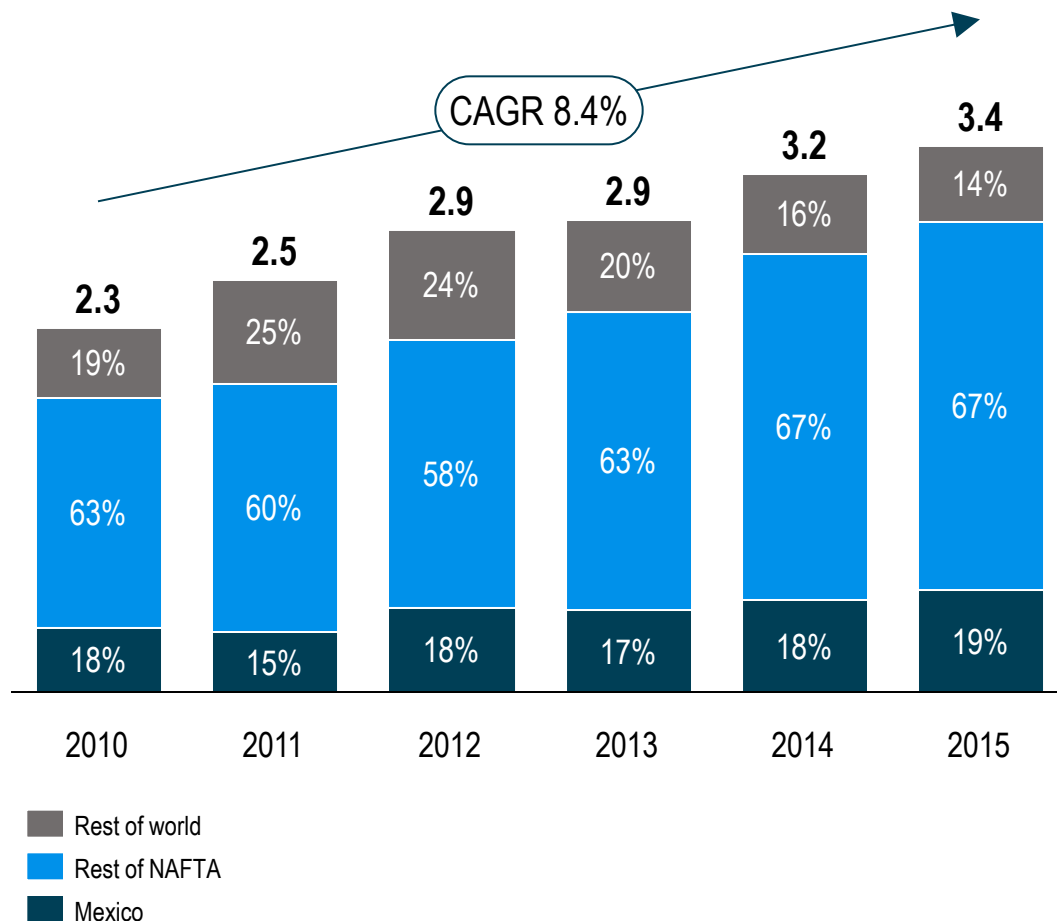


>\$17 bn
OEM investments

New OEMs from developed countries are beginning to enter Mexico – Together with incumbent OEMs, more than USD 17 bn investments are expected

In the last five years Mexico's vehicle production has been on a remarkable growth track driven by exports to USA

Light vehicle production in Mexico and sales destination [m units]



Drivers



Maturity of past exporting destinations

Main exports destinations are mature markets reaching saturation level



Conquest of new markets

Mexico has been expanding its export markets with rapid increase to new markets

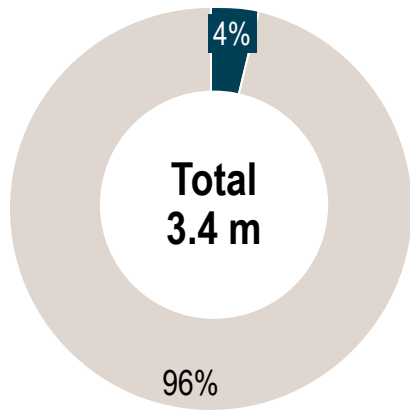


Shift to Asia

In the 2010-15 term, Mexico's LV exports to Asia grew ~250% whereas exports to Latin America grew by ~20%

2015 vehicle production mix was characterized by non-premium mass-market products which are comparably low in complexity

Light vehicle production by brand and segment in 2015 ['000 units]

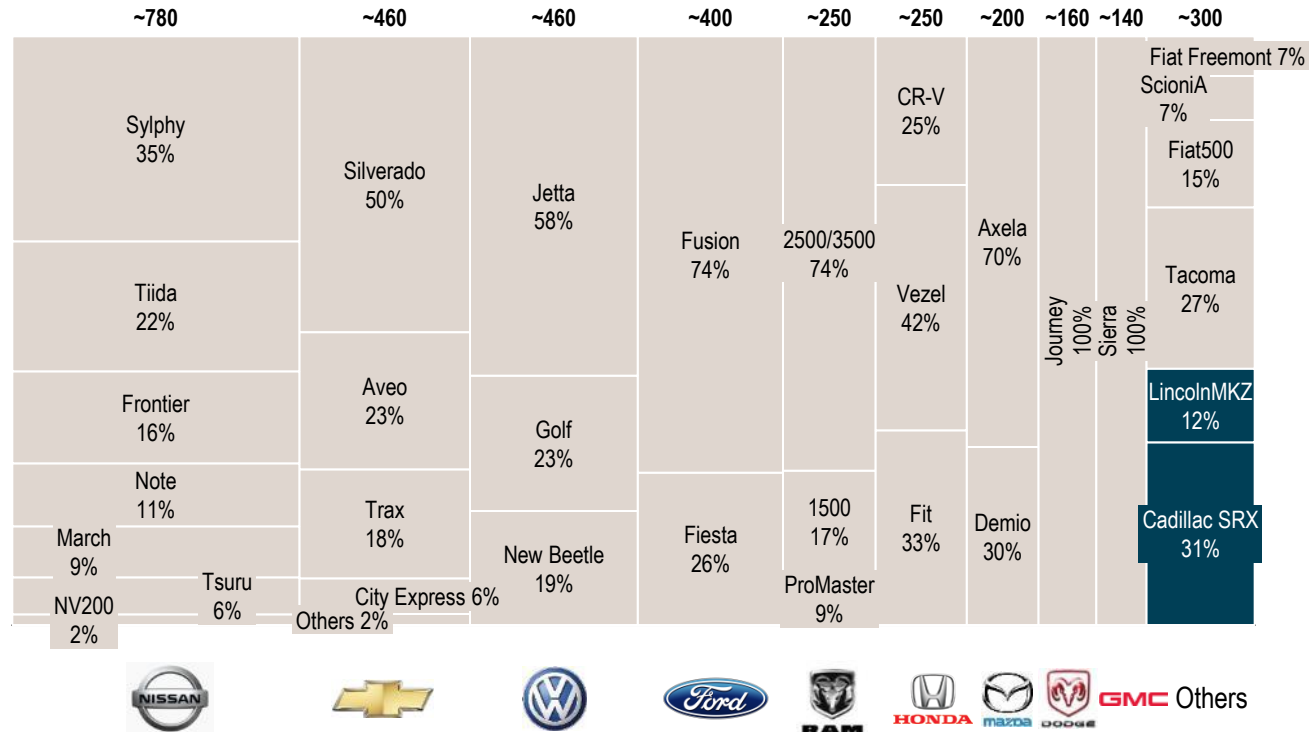


Premium

Premium brand vehicles such as Mercedes, BMW, Audi etc.

Non-premium






























Non premium large production brands such as VW, Ford, GM, Fiat, Nissan etc.



> Premium models currently present are only Cadillac SRX and Lincoln, with 122,000 units production which will run out in 2015 and 2019

Mexico combines favorable trade agreements and regulations with adequate infrastructure and a cost competitive labor force

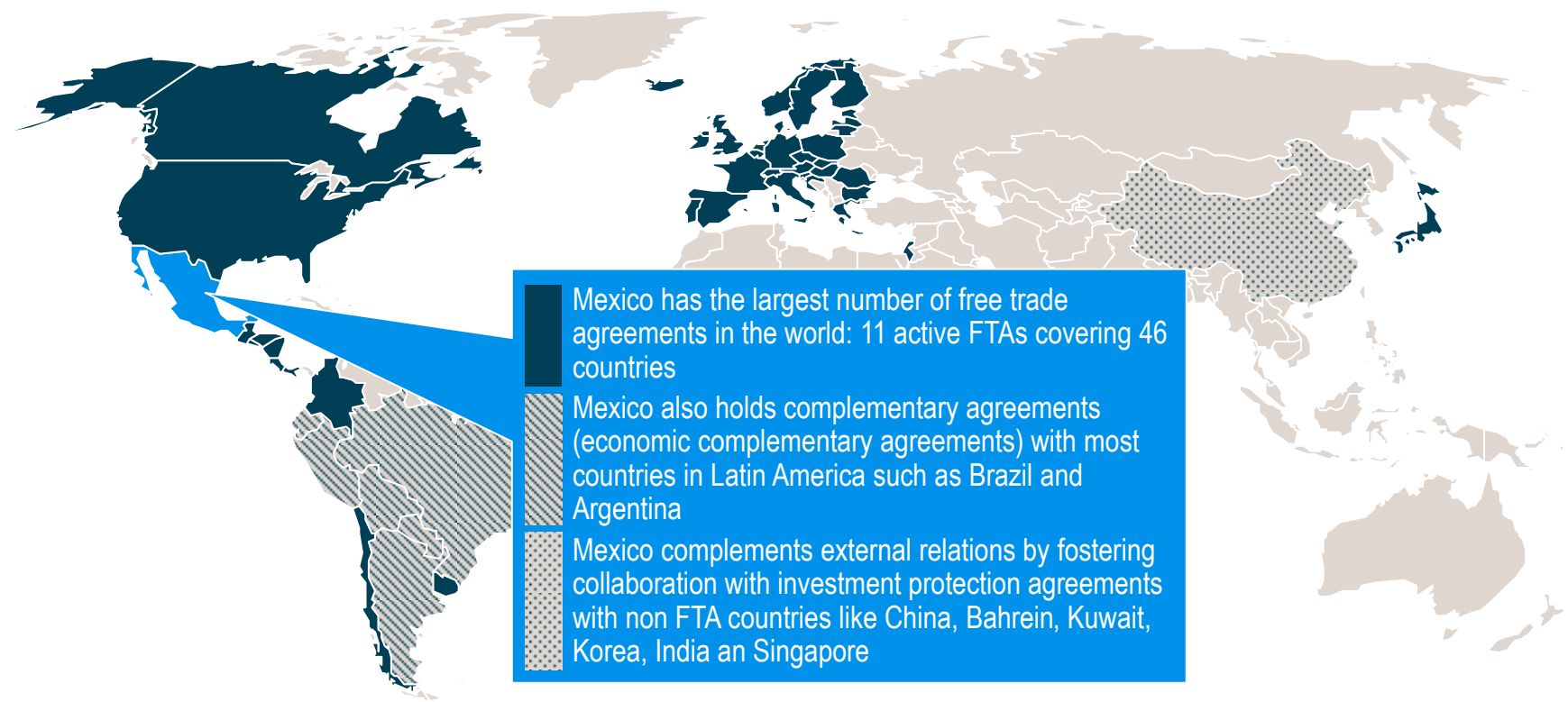
Mexico location advantages compared to global automotive hot spots

Theme	 Mexico	Emerging market examples		Developed market examples		
		 Brazil	 China	 Europe	 USA	
 Infrastructure and logistics conditions	<ul style="list-style-type: none"> > Established automotive industrial parks > Proximity to USA and South America > Wide rail and highway accessibility along with over 150 international harbors (on both Atlantic and Pacific) and airports 					
 Business climate	<ul style="list-style-type: none"> > Stable currency exchange rate through the last decade and inflation under control > Reliable credit rating grades from global rating agencies 					
 Regulatory environment	<ul style="list-style-type: none"> > Investment protection laws > Advantageous regulatory conditions for trading > Over 10 free trade agreements covering more than 45 countries 					
 Cost-competitive workforce	<ul style="list-style-type: none"> > Cost competitive workforce at all levels > Lower wages if compared to other LatAm economies 					

● High ○ Low

Mexico's government continuously lowered the boundaries to export – Today, 11 free trade agreements cover over 45 countries

Major free trade agreements between Mexico and other countries

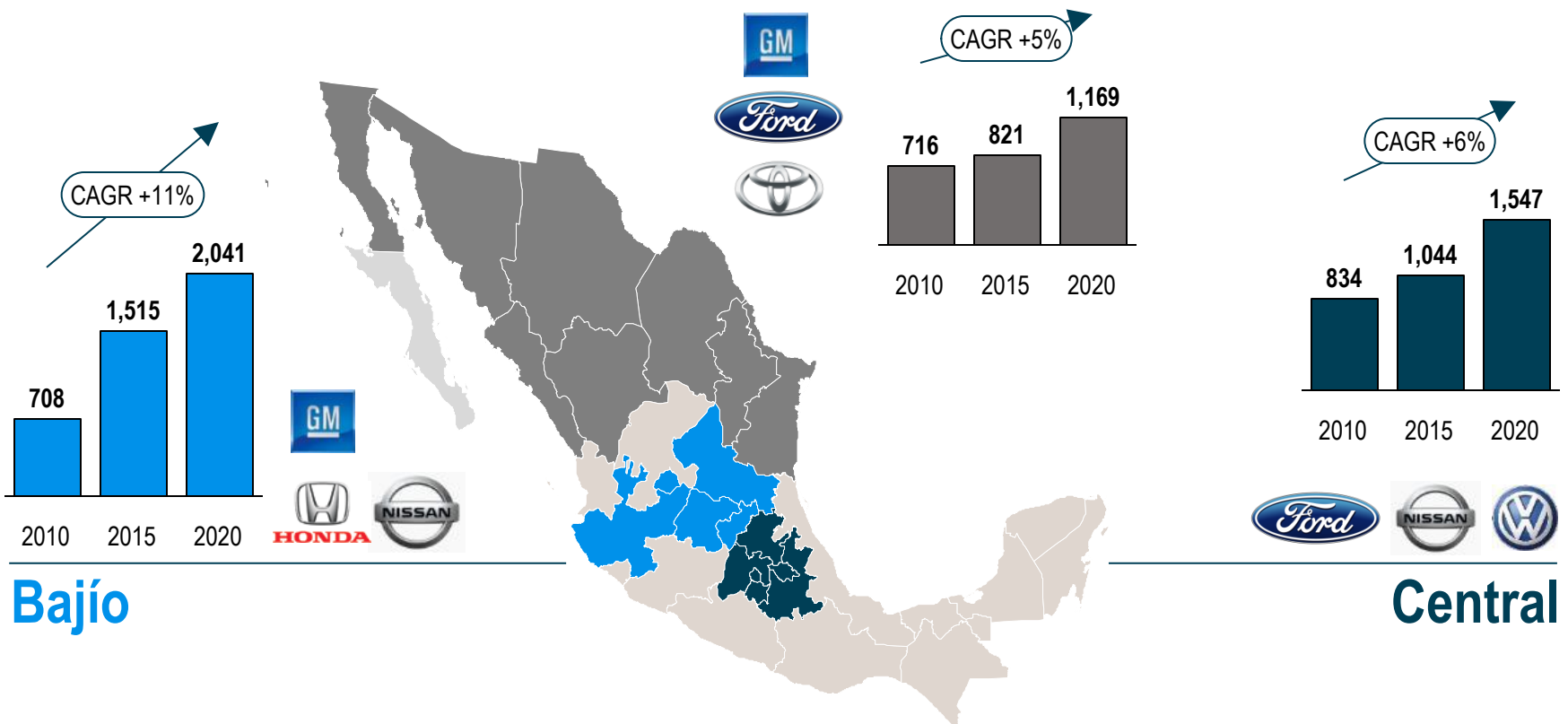


Free Trade Agreements (FTA) Economic cooperation agreements and/or restricted trade agreements Economic cooperation agreements and/or restricted trade agreements

Of the three major automotive clusters in Mexico, Bajío is the largest and fastest growing

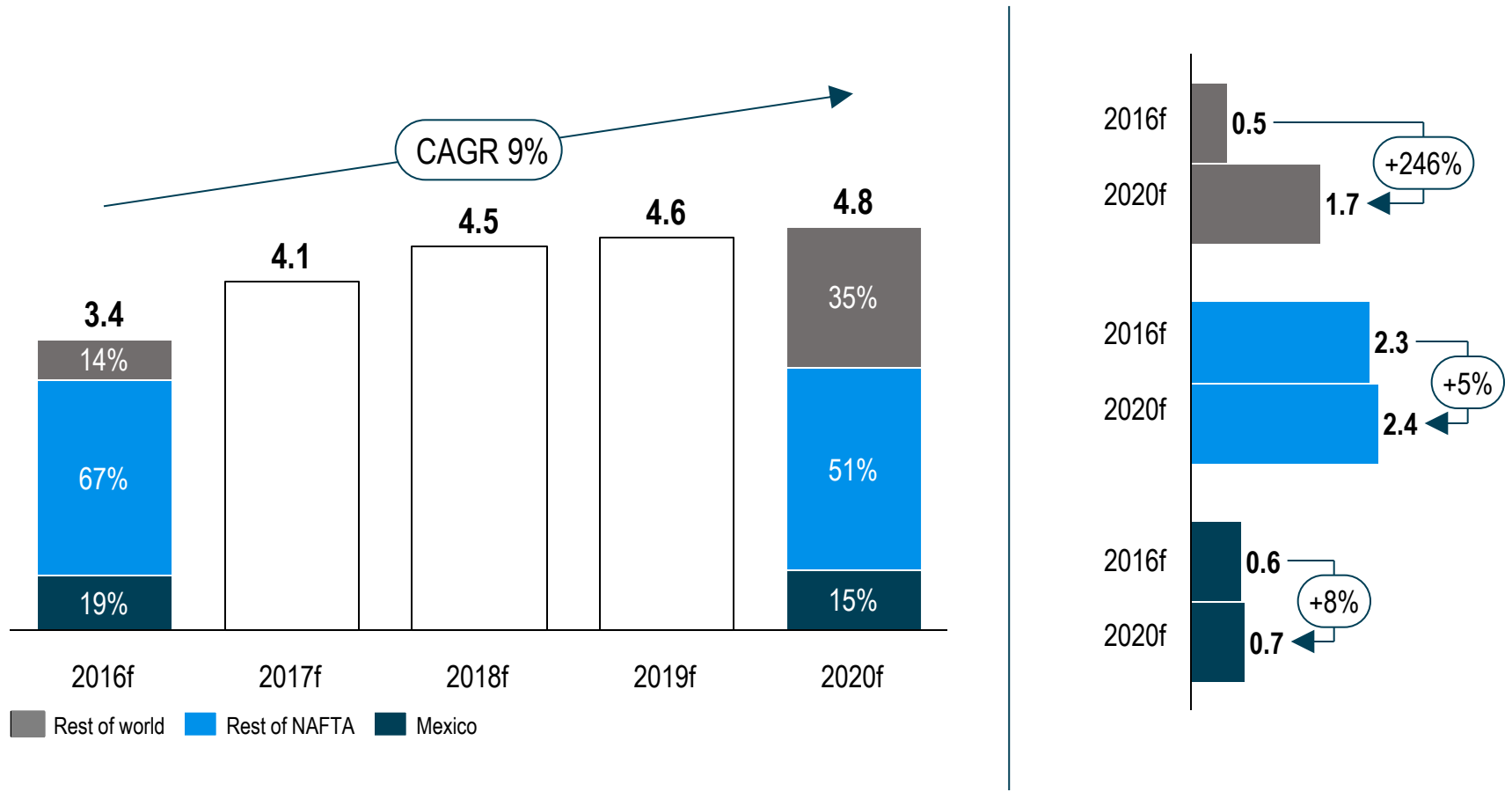
Mexico's major automotive clusters

Vehicle production capacity ['000 units] and example OEMs



Future production expects 9% CAGR until 2020 – Demand driver is exports to outside NAFTA

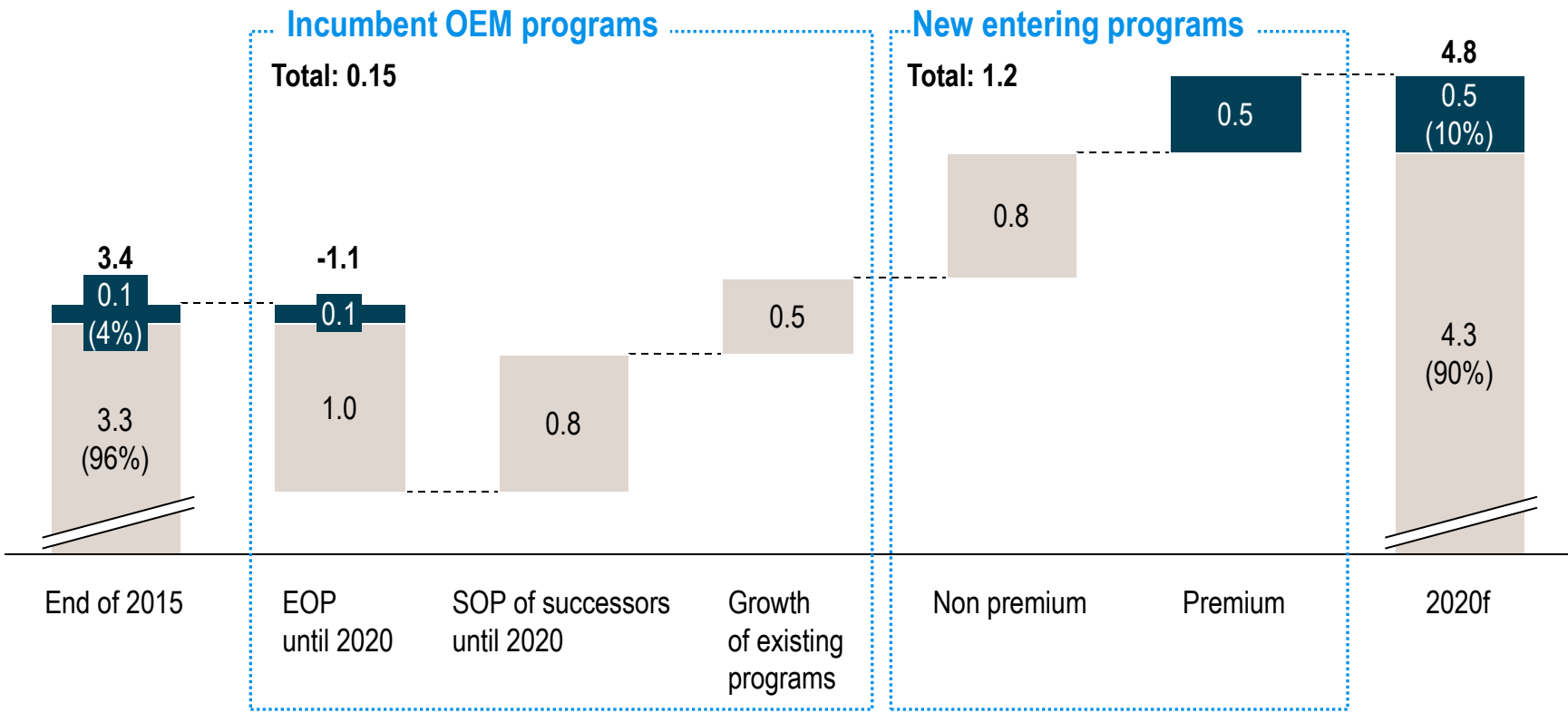
Future destinations of Mexican light vehicles production [m units]¹⁾



1) Estimate based on Roland Berger analysis

Entry of new brands like Audi, BMW and Infiniti will shift share of premium vehicles from 4% to 10%

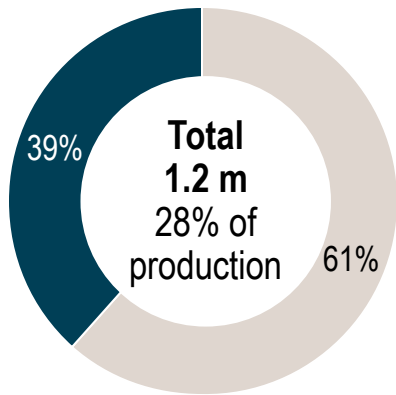
Change in production mix of light vehicles from 2015 to 2020 [m units]



- Premium Premium brand vehicles such as Mercedes, BMW, Audi etc.
- Non Premium Non premium large production brands such as VW, Ford, GM, Fiat, Nissan etc.

Out of the 1.2 m additional new entering programs until 2020, 39% are expected to be premium segment

Production of new entering programs by brand and segment in 2020 ['000 units]

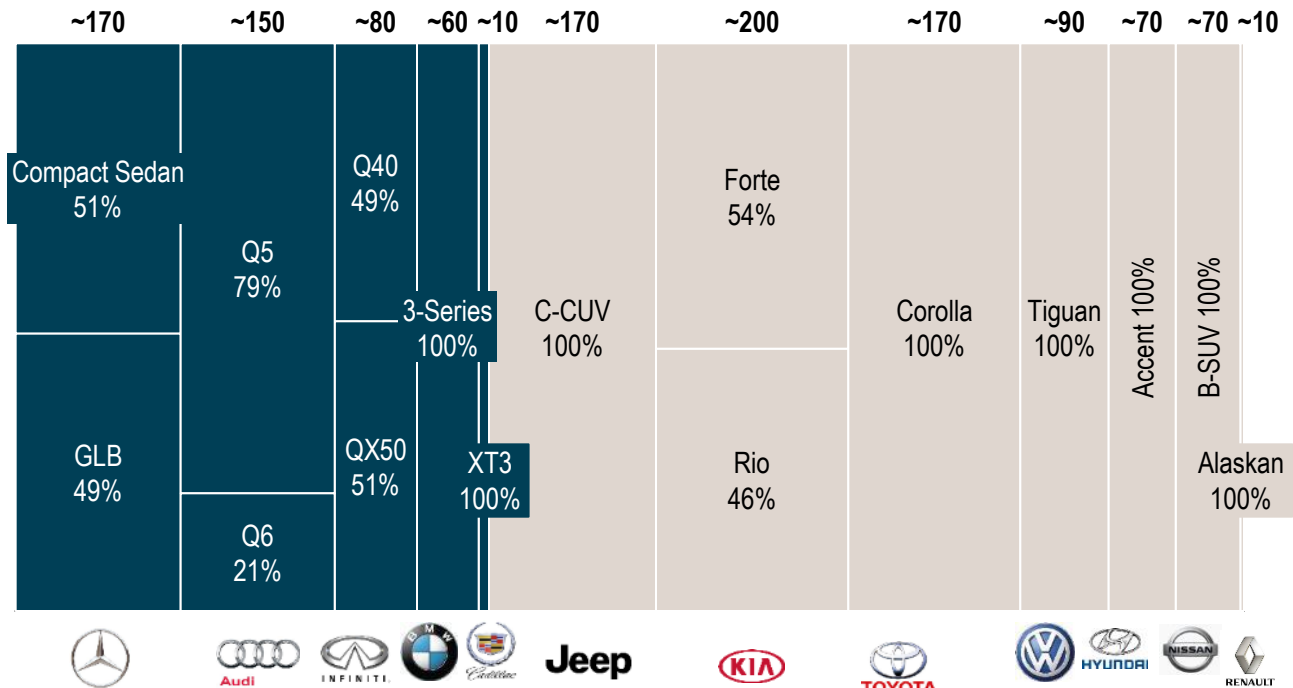


Premium

Premium brand vehicles such as Mercedes, BMW, Audi etc.

Non premium

Non premium large production brands such as VW, Ford, GM, Fiat, Nissan etc.



- > Premium brands (ex. Audi) are building plants in Mexico to export mainly to the United States, Europe and South America
- > Audi, Mercedes, BMW and Infiniti relocate their production from developed countries to Mexico

The product mix change happens due to new entrants – Established foreign OEMs invest at least USD 6 bn

New entrants main announced investments in the 2016-2020 term (selection)



	Brand	Location (city or state)	SOP	Production model	Added capacity ['000 units]	Investments [bn USD]
1	ACURA	Celaya	2017	Expansion of Honda's plant	40	N/A
2	Audi	Puebla	2016	Export vehicles in a new plant	150	2.3
3	BMW	Hidalgo or San Luis Potosi	2019	New plant under negotiation	100	1.5
4	HYUNDAI	Nuevo León	2017	Probably expansion of Kia's plant	80	N/A
5	Jeep	Toluca	2016	Probably expansion of FCA's plant	200	N/A
6	KIA	Nuevo Leon	2016	New plant with whole new supply park	300	1.0
7	INFINITI	Aguascalientes	2017	JV MBB/Nissan – Expansion of Nissan's plant	300	1.2
Total:					1,170	>6.0

OEMs already present in Mexico are planning to invest at least USD 11.1 bn in large production sites during 2016-2020

Existing OEMs main announced investments in the 2016-2020 term (selection)



	Brand	Location (city or state)	Type of investment	SOP	Added capacity ['000 units]	Investments [bn USD]
1	 DAIMLER	Aguascalientes	New	2017	230	1.4
2		Salamanca	Expansion	2016	~90	N/A
3		Guanajuato	New	2019	200	1.0
4		San Luis Potosi, Mexico City	New/expansion	2018	500	5.0
5		Coahuila	N/A	Announced	N/A	1.2
6		Guanajuato	N/A	Announced	N/A	5.0
Total:					>520	>11.1

- B. Growth of automotive parts production lags behind vehicle production – Gap closed through imports of parts



Mexican auto suppliers are strong in some aspects but not ready for growing demand or changing product mix

Overview on Mexican automotive parts industry

Looking at the past



>80%
Foreign companies

Mexico has a very **well established Tier 1 supplier base**, out of which more than **80% are large global companies**



~65%
Dependency on imports

Suppliers lack technological know-how and certain **product offerings** like body, powertrain and chassis rely heavily on **imports** of auto parts to meet the gap in supply – With current **devaluation of the Mexican peso** imports paid in dollars are getting more expensive



\$46 bn
Technology gap

Product and process supply base offerings **vary regionally**, with high concentration of **suppliers in the north** and **lack of critical products in some regions** – Production process gaps account to USD 46 bn

Looking into the future



OEM **9%** vs. Suppliers **1%**
CAGR

Production is expected to **grow at different rates** for vehicles and auto parts (**9% vs 1% CAGR 2016-2020**), creating a growing **demand-supply gap** which offers a domestic **auto-parts investment opportunity of USD 25 bn in 2020**

The Mexican auto parts industry is well established, but falls behind on the Tier 2/3 level

Strengths and weaknesses of Mexican auto parts industry

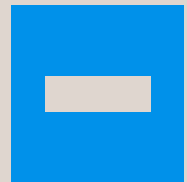


Strengths

- > **Experienced and cost-competitive labor force** in auto parts industry **at all levels**: operators, managers and directors
- > **Established Tier 1 park**, connected to foreign capital with **flexible production systems and client oriented** (> 80% of the companies are from abroad)
- > **Favorable regulatory environment** – Tax incentives for manufacturing for exports

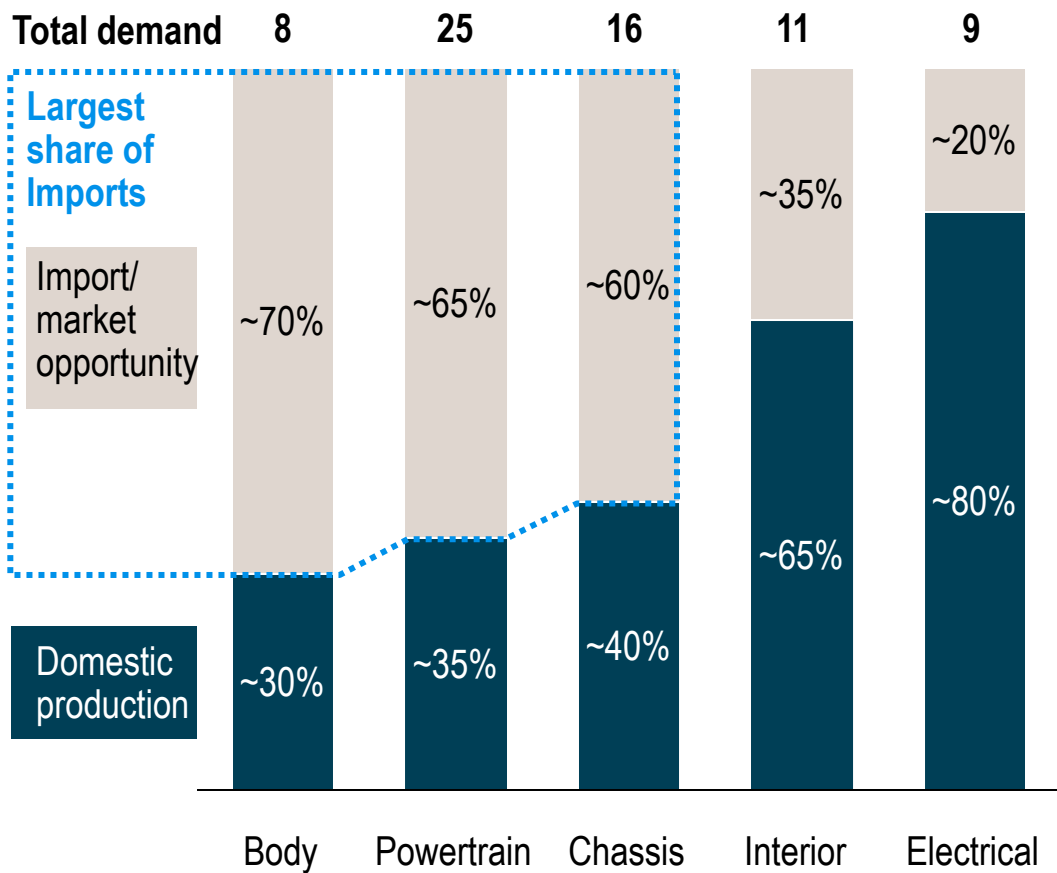
- > **High competition** for workers at **technical and operator** levels
- > **Low application** of international **quality standards** due to **obsolete technology** and **low innovation** and technological development at Tier 2/3 level
- > **Reduced** number of **solid production chains** with **well integrated clusters** – **Absence of proper Tier 2** supply base drives up **imports by Tier 1** companies

Weaknesses



Significant gaps exist in product offerings especially in body, powertrain and chassis which are being met by imports

Local production vs. imports of parts by system in 2013¹⁾ [USD bn]



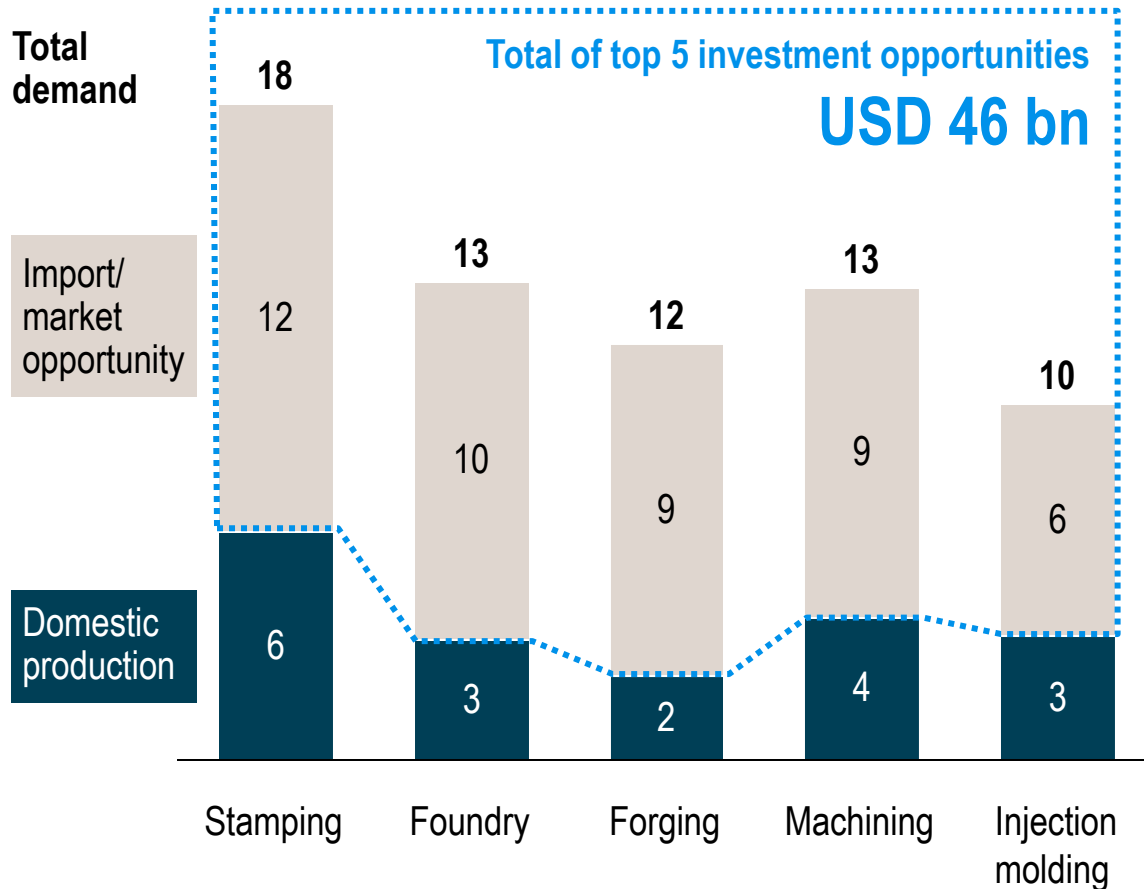
- > Tier 1 suppliers use Mexico as a base for exports and choose product portfolio accordingly
- > Reliance on imports increases inventory handling costs
- > Imports face logistics bottlenecks risks and hamper just in time production methods
- > Local production is heavily centered around plastics and E/E competence centers in the North of Mexico

1) Local market demand: Estimated share and market value [USD bn]

Source: AMIA, ProMexico; Roland Berger

Product gaps result from unexplored technology base and leave opportunities for investment in advanced production processes

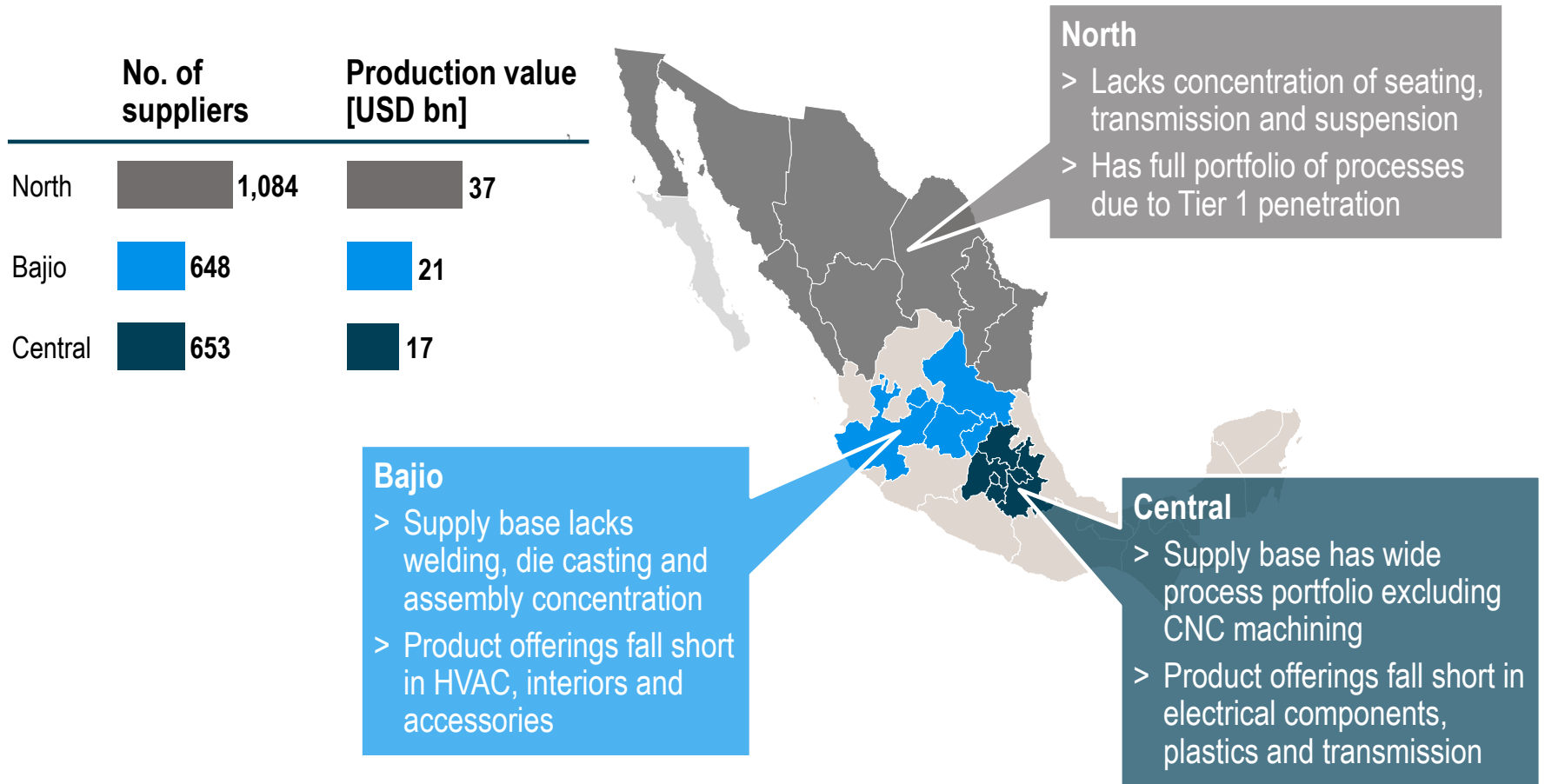
Top 5 auto parts production processes in 2013 [USD bn]



- > Local Mexican suppliers lack expertise, many of them do not have ISO certification
- > Besides the top 5 production processes mentioned on the left, there is **shortage on following technologies:**
 - Aluminum die casting
 - Hot forming
 - Laser cutting
 - Fasteners
 - High gloss painted parts
 - Etc.

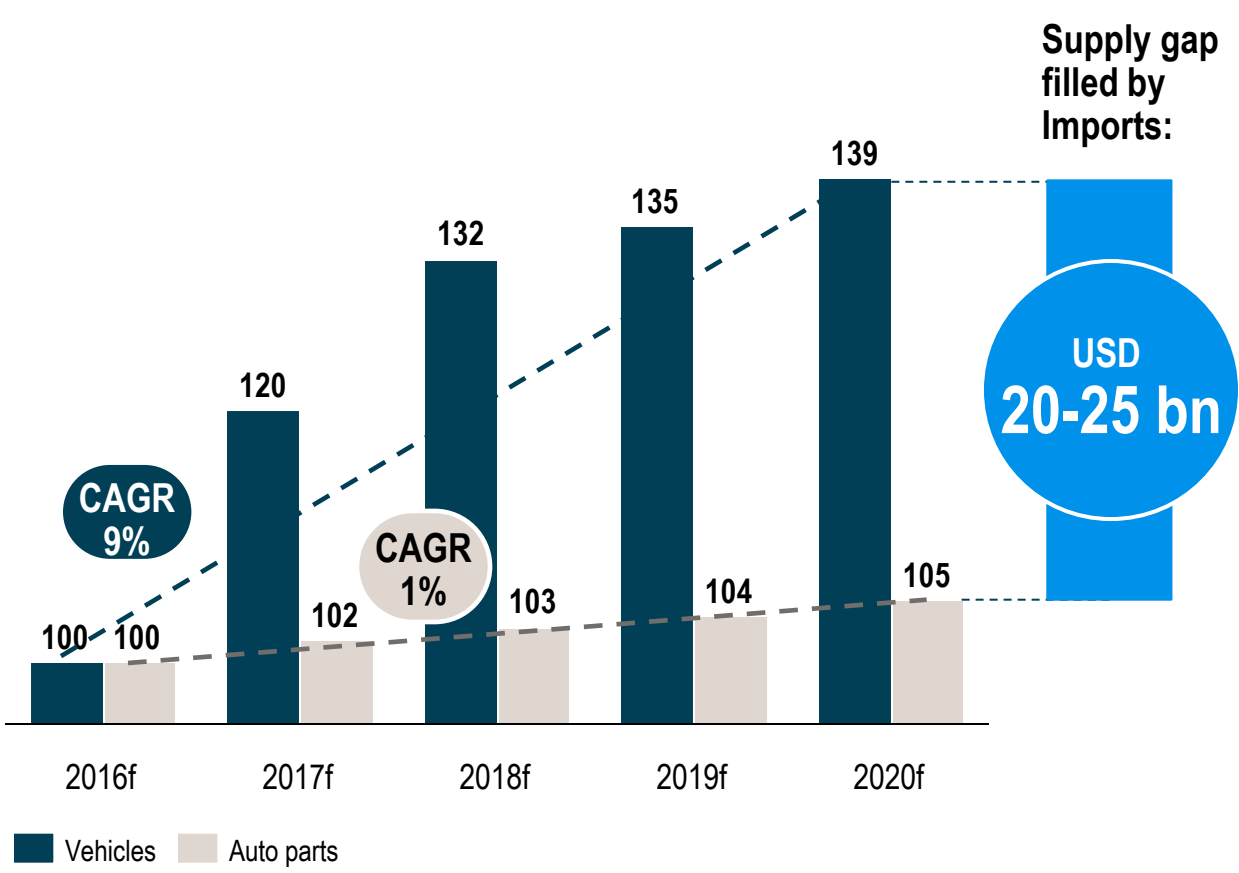
Regional coverage of supply base varies across 3 clusters – Bajío and Central being under-represented vs. North

Regional variations of supply base in 2013 (examples)



Vehicle production growth with 9% CAGR but auto parts 1% only – Domestic auto-parts production opportunity of USD 20-25 bn

Indexed growth of light vehicles vs. auto-parts production [2016 = 100]



- > Vehicle production set to increase to ~4.8 million units by 2020 due to investments
- > Auto parts industry is still recovering from 2008-2009 downfall and growth is much slower
- > The mismatch in growth creates a significant demand gap
- > Increase in imports is currently imminent to cover for this gap in the supply chain – Expensive due to devaluation of Mexican peso
- > **There is a significant opportunity for domestic auto-parts production up for grabs**

Note: Compared growths are vehicle units [#] vs. auto parts production value [USD]
Source: IHS, INA, Roland Berger

C. Automotive industry is not prepared for the changes – Especially, high-tech manufacturing capabilities are missing



The changing product mix and exports environment questions OEMs and suppliers ability to adapt to the new automotive Mexico

Qualitative analysis of Mexico's readiness for automotive challenges







		Current development level ¹⁾	Fit for production mix		Analysis
			Non premium	Premium	
OEM base	Assembly capabilities	Low High 	✓	✓	Global OEMs and Tier 1 companies are adept at bringing assembly technology with them
	Advanced manufacturing processes		✓	✗	More than 70% of process requirement is already imported, which is not fit for premium product mix
Supplier base	Tier 1 presence		✓	✓	Mexico has a well established Tier 1 supply base formed by large global players
	Tier 1 product coverage		(✓)	✗	Changing product mix calls for a different set of supplier parts which would need to be setup
	Tier 2/3 presence		✗	✗	Tier 2/3 base focusing on high tech capabilities and international background is largely missing
	Manufacturing technology		(✓)	✗	Suppliers lack high tech. manufacturing standards and require major financial and technological support

1) Comparable level to production in developed country ✓ Fulfilled to a good extent ✗ Not fully fulfilled








The automotive supply chain faces specific issues as a whole to adapt to the changes

Issues affecting the Mexican automotive industry in the wake of change

OEMs

-  Difficulty in local sourcing of parts that matches requirements
-  Production/supply demand competition from new entrants
-  Supply base not to grow at same pace as vehicle production
-  SOP/launch management on suppliers' side
-  Labor cost increase in the long term
-  Shortage of logistics capacity

Tier 1

-  Gaps in product offering and process
-  Sub-optimal footprint, white spots in certain regions
-  Lack of technological capability and rising quality standards
-  SOP/launch management
-  Insufficient Tier 2/3 base
-  Labor cost increase in the long term
-  Shortage of logistics capacity

Tier 2 and 3

-  Gaps in product offering and process
-  Sub-optimal footprint, white spots in certain regions
-  Lack of technological capability and rising quality standards
-  SOP/launch management
-  Hard access to capital
-  Reduced options to deal with risk
-  Labor cost increase in the long term
-  Shortage of logistics capacity

Go to chapters D and E to read how to deal with these issues

- D. OEMs need to react and develop their suppliers to secure seamless supply in the future









OEMs need to focus on developing an integrated and localized supply base to reduce imports and avoid potential supply gap

OEM perspective: Securing seamless supply in the future

Issues

OEMs agenda

	Difficulty in local sourcing of parts that matches requirements	Raising production becomes non competitive with dependence on imports under free trade agreements compliance for local content share in exports
	Production/supply demand competition from new entrants	Increase in number of OEMs will increase demand for Tier 1 and Tier 2/3 supply and drive up costs
	Supply base not to grow at same pace as vehicle production	Production of vehicles is expected to grow at 9% CAGR and auto parts at 1%, creating a supply gap
	SOP/launch management on suppliers' side	Due to lack in in experience with local teams launch management often fails
	Labor cost increase in the long term	Densification of OEMs and suppliers causes labor costs to increase due to further increasing competition for talent
	Shortage of logistics capacity	Inbound and outbound logistics capacity is too limited to meet automotive sector growing demand



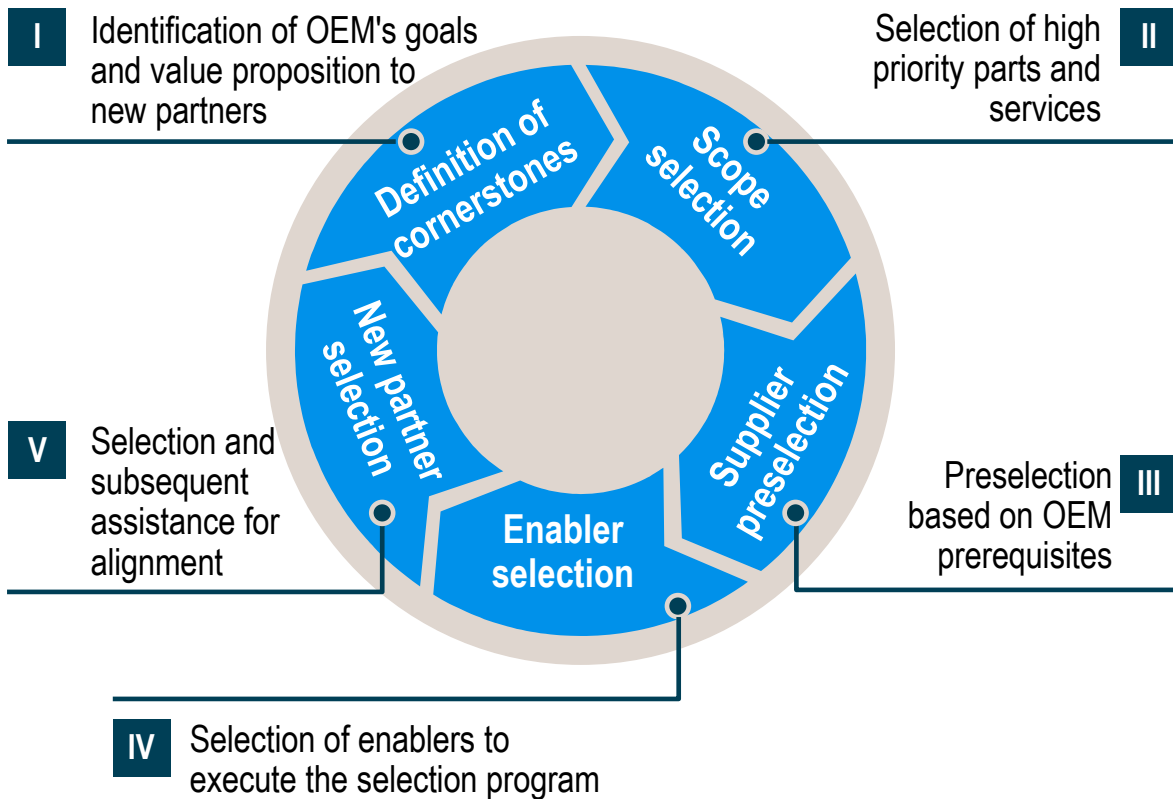
Develop localized supply base and strategic partners for critical parts

Support suppliers with building up launch expertise

Accommodate future costs in decisions

Building an integrated supply chain requires partnering with the right suppliers and providing subsequent alignment support

Methodology for identifying and establishing supply partners



Support activities

- > Technical workshops to facilitate integration and technology transfer
- > Visits to OEM and suppliers for synergizing functioning and communication
- > Workshops to integrate quality culture and value system between partners
- > Assistance programs for financing, quality certification and logistics for new partners

The definition of cornerstones is based on the cross evaluation of the OEM goals and value proposition to potential new suppliers

I Definition of cornerstones

OEMs goals

- > Establishing end to end supply base in Mexico
- > Creation of a dynamic just-in-time/lean value chain to mitigate logistic risks
- > Ensure sustainable supply of auto parts
- > Leveraging penetration in the supply-base for creation of sustainable financial results

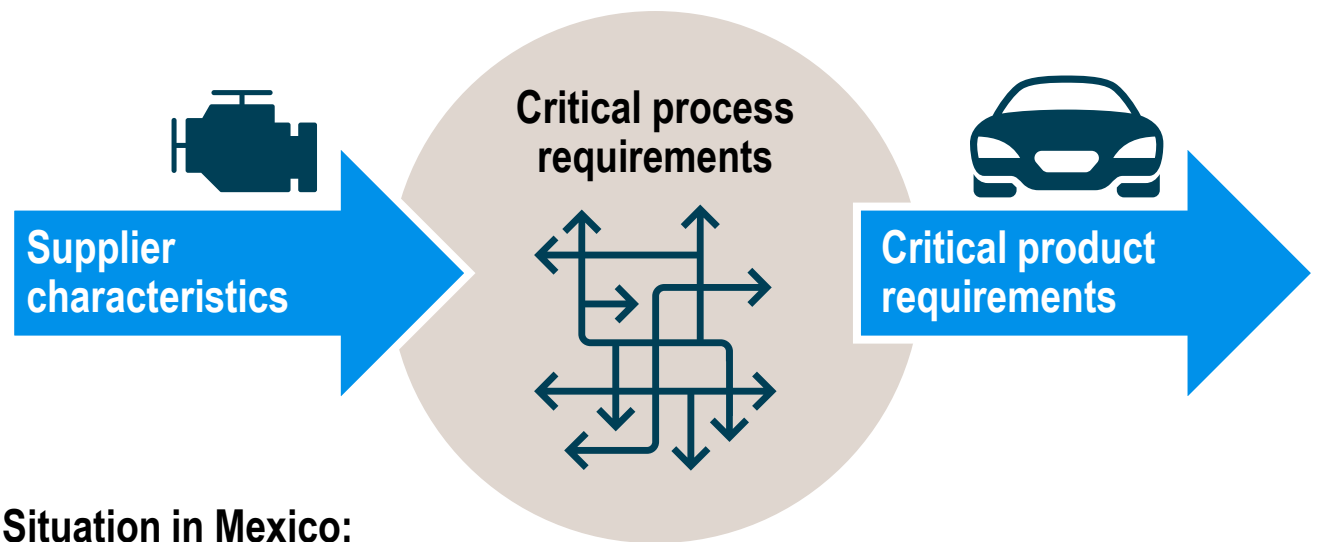


Value proposition to potential new suppliers

- > Opportunity for market entry and expansion in Mexico
- > Support for further internationalization and export opportunities
- > Increased sales revenues and export channels
- > Long-term perspective of growing Mexican production demand
- > Preferential partnership for new developments in Mexico and abroad

The selection of high priority parts and services aims to identify critical suppliers, products and processes in the supply chain

II Scope selection: Key product, process and supplier requirements



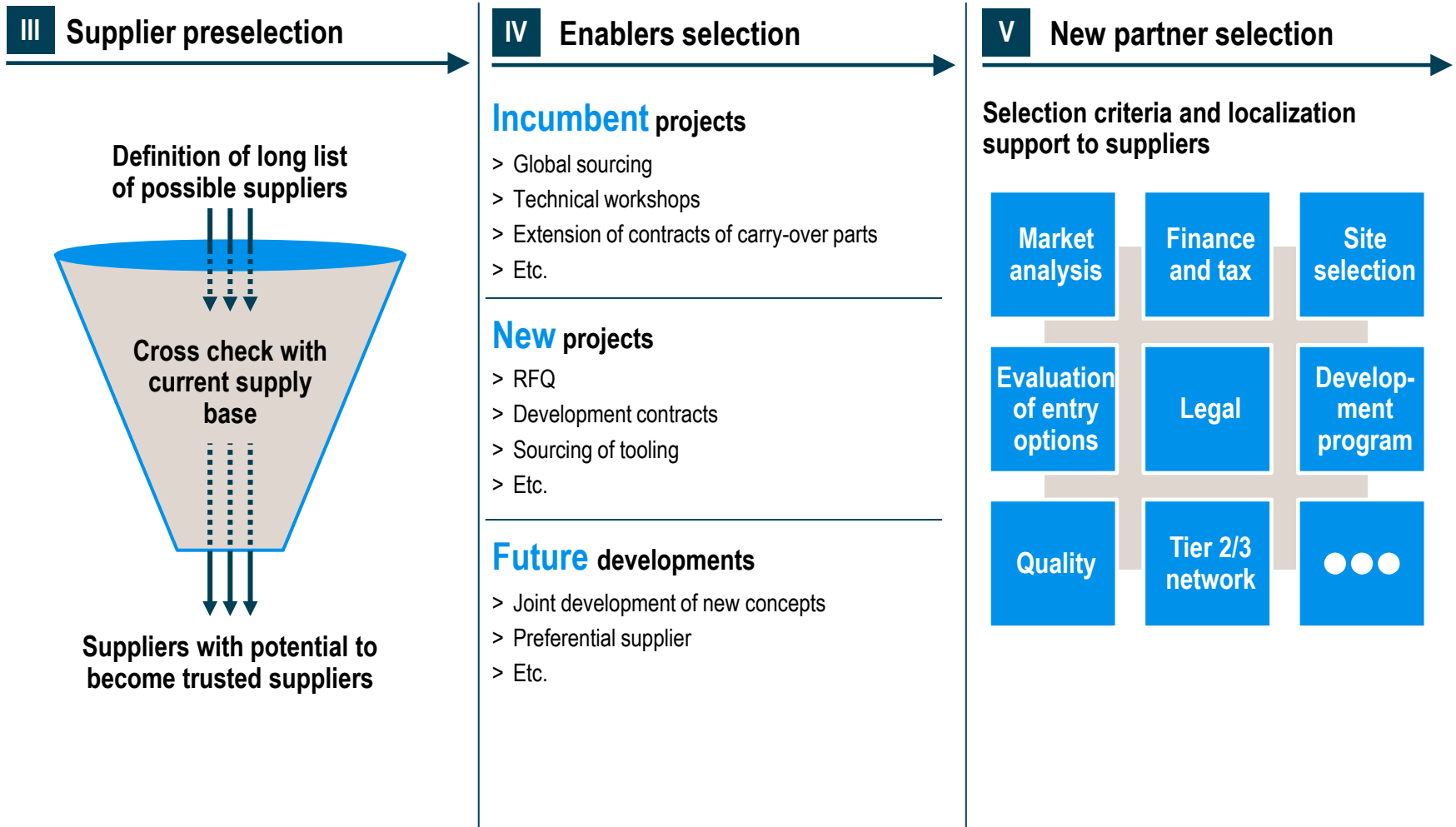
Results

- > Identification of critical suppliers, products and process along the supply chain
- > Selected products and processes discussed with relevant stakeholders (purchasing, quality, logistics, finance, engineering, R & D,...)
- > Necessary documentation for the selection of high priority products and processes made available

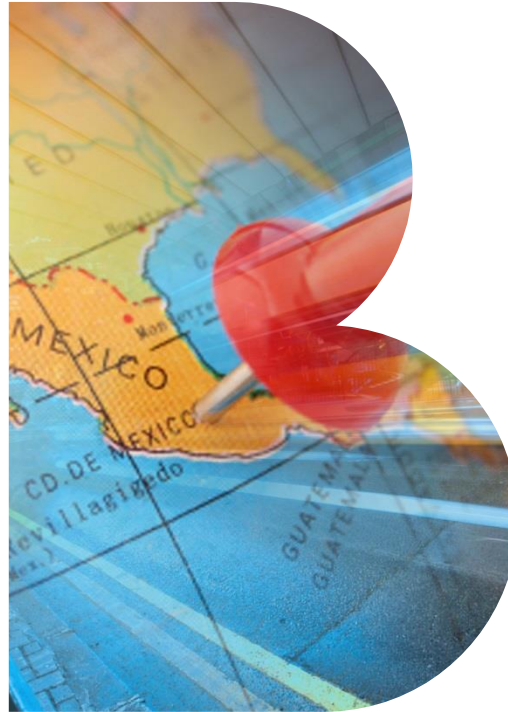
Situation in Mexico:

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> > Technical proficiency to handle new product mix for premium OEMs > Logistics and quality control autonomy > Adaptive to emerging market conditions | <ul style="list-style-type: none"> > Over 70% of process needs are imported > USD 31 bn opportunity exists in stamping, foundry and forging alone > Other opportunities include surface finishing and mechanical assembly | <ul style="list-style-type: none"> > Body, powertrain and chassis parts need localization in production > Steels, fiber glass, tubing and ceramics show investment opportunity |
|---|---|--|

The selection of suppliers and partners considers the suitability of each according to OEM pre-determined requirements



- E. Suppliers' landscape shows growth opportunities – Invest in product offerings gaps at the right location in Mexico



Major challenges faced by suppliers come from gap in products offering and sub-optimal production footprint

Supplier perspective: Growth opportunities and implementation issues

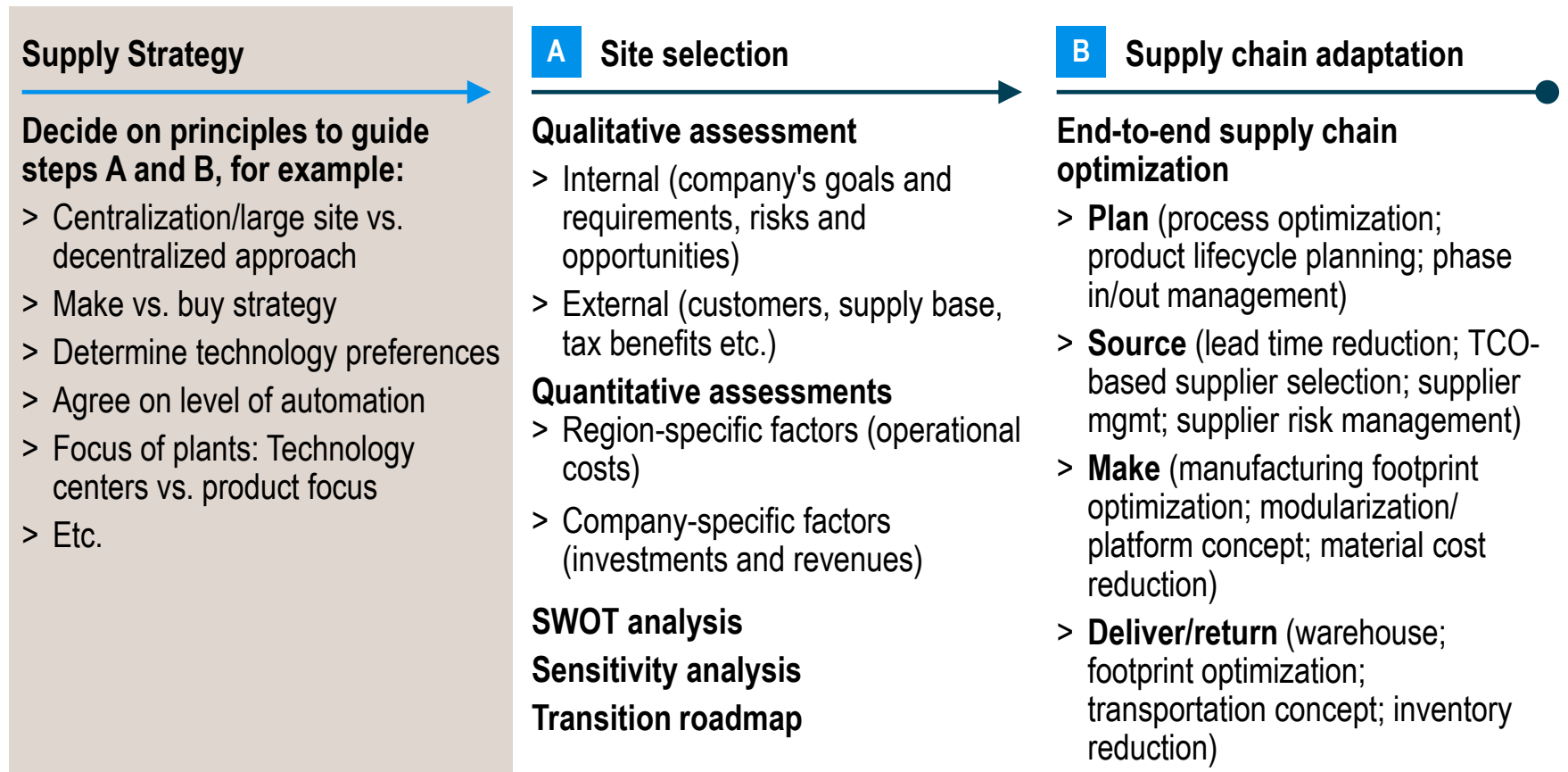
Issues

Suppliers agenda

	Issues	Suppliers agenda
All tiers	 Gaps in product offering and process The gaps must be filled with imports, and thus raise cost as production model aims exports	Explore new product offerings
	 Sub-optimal footprint, white spots in certain regions Lack of product specialized suppliers at some regions, ability to supply premium is questioned	Invest in optimal footprint & the right locations in Mexico 
	 Lack of techn. capability and rising quality standards Whereas Tier 2/3 do not have access to high tech, Tier 1 would need to import at premium level	Partner and obtain technology/ Import know how
	 Labor cost increase in the long term Densification of OEMs and suppliers entering Mexico might incur in labor costs increases	Accommodate future costs in decisions
	 Shortage of logistics capacity Inbound and outbound logistics capacity is too limited to meet automotive sector growing demand	Develop dedicated launch expertise
Tier 1	 SOP/launch management Due to lack in in experience with local teams launch management often fails	Invest and support Tier 2/3 build up
	 Insufficient Tier 2/3 base Body, powertrain and chassis rely heavily on imports to meet demand – Invest opportunity	Aggregate with local suppliers
Tier 2/3	 Hard access to capital Being small players, local suppliers have a lower hand in negotiations	Diversify product portfolio
	 Reduced options to deal with risk Tier 2/3 have less options to deal with direct impact from reduced demands of OEMs	

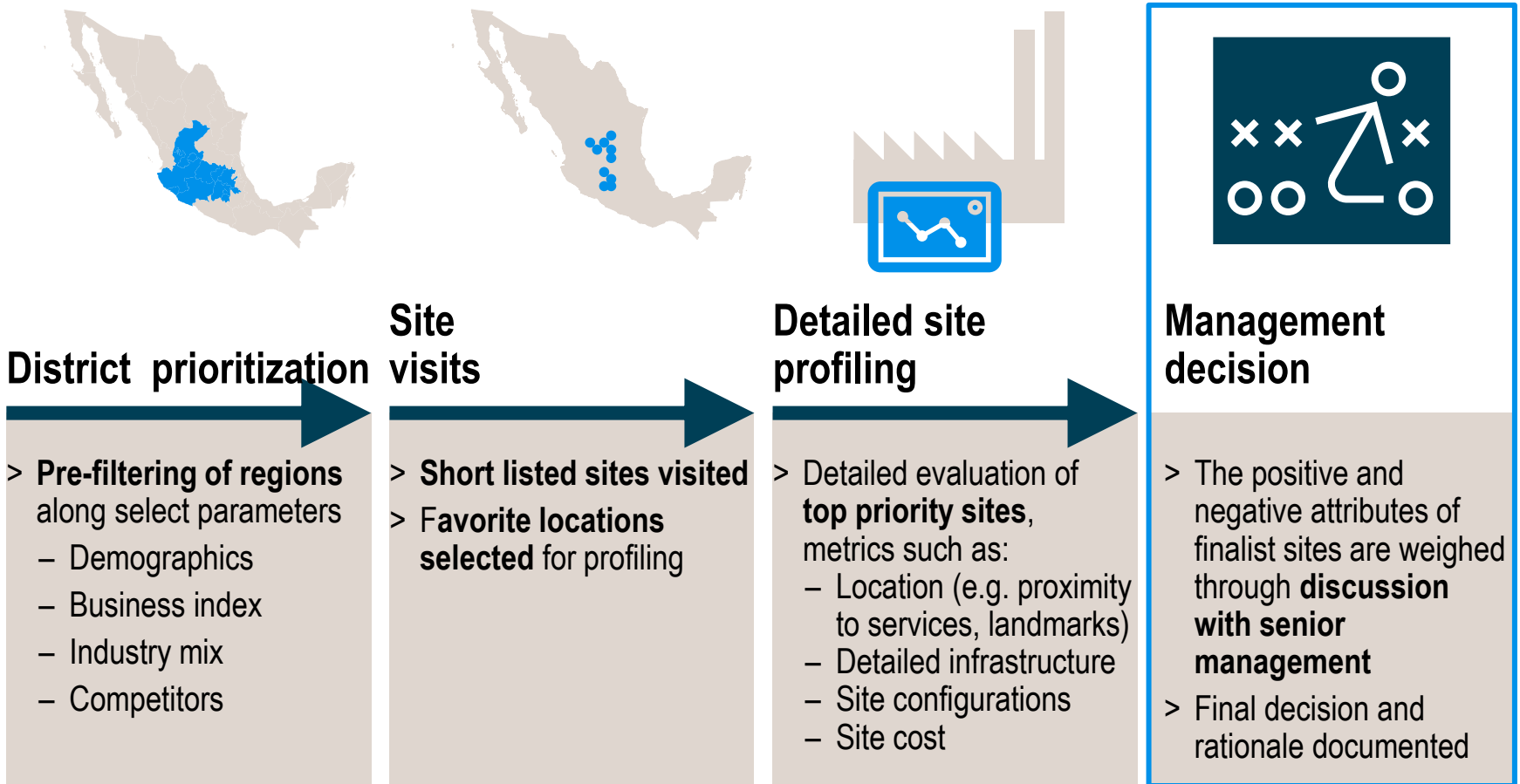
Roland Berger has a proven approach for footprint optimization – From the definition of strategy to supply chain adaptation

Roland Berger manufacturing footprint optimization and site selection approach



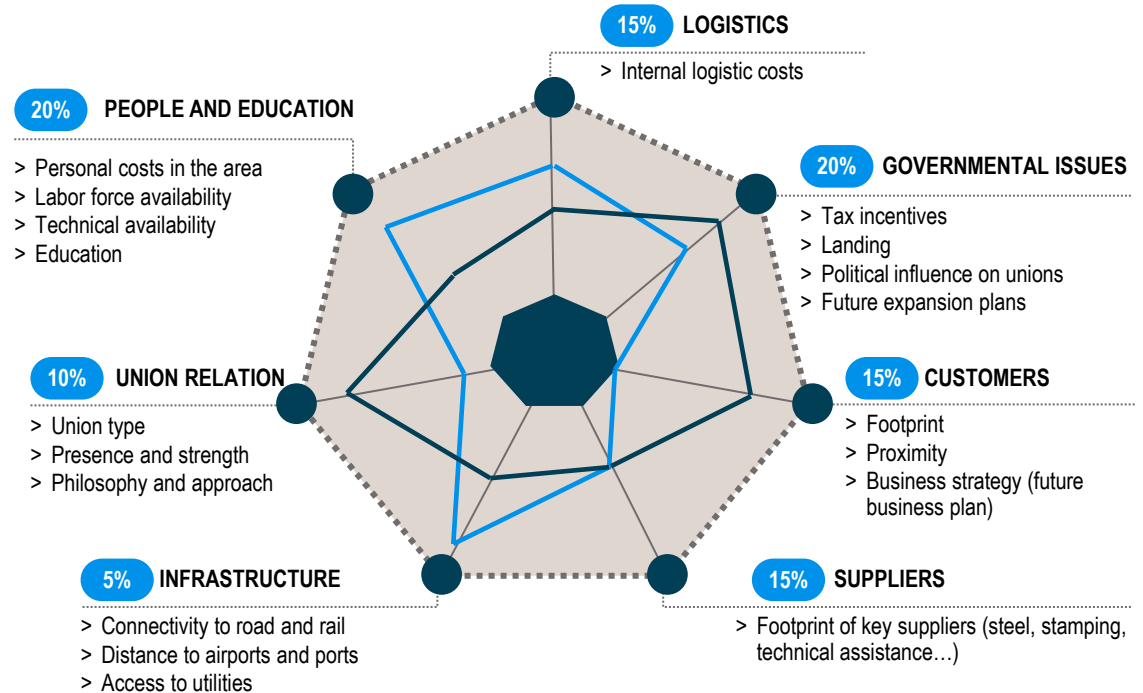
In order to find an optimal location a four step approach can be applied

A Site selection (top-down approach)



The site selection process uses distinct evaluation criteria

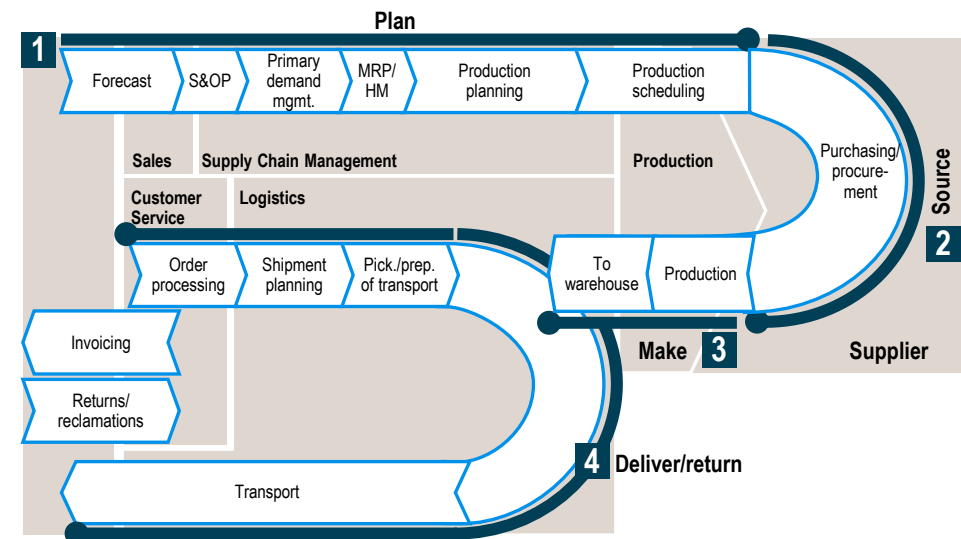
A Site selection and evaluation criteria (illustrative)



— Municipality 1
 — Municipality 2
 Risk zone
 Scoring weights

The footprint strategy shall also integrate a supply chain configuration to map end-to-end optimization opportunities

B Supply chain adaptation: Roland Berger framework



- | | | | |
|--|---|---|---|
| <p>1 Plan</p> <ul style="list-style-type: none"> > S&OP process optimization > Product lifecycle planning > Phase In/Out management | <p>2 Source</p> <ul style="list-style-type: none"> > Lead time reduction > TCO-based supplier selection > Supplier mgmt > Supplier risk management | <p>3 Make</p> <ul style="list-style-type: none"> > Manufacturing footprint optimization > Modularization/ Platform concept > Material cost reduction | <p>4 Deliver/return</p> <ul style="list-style-type: none"> > Warehouse footprint optimization > Transportation concept > Inventory reduction |
|--|---|---|---|

- > RB conducts end-to-end supply chain optimization incorporating changes through footprint optimization
- > Most strategic supply chain decisions include usage of tools to aid planning of:
 - Make vs. buy
 - Insource vs. outsource
 - Dependence map of strategic points
 - Just in time supply chain requirements
 - ..Etc.

F. References, further readings and your contacts at Roland Berger



We have sound project experience in Mexico, South America and globally for both automotive OEMs and suppliers

Our project experience in Mexico and South America (selection)

OEMs



Suppliers



Content of selected projects

- > **Mexico market assessment and growth strategy** for a global truck & bus manufacturer
- > **Definition of growth strategy Mexico** for an European mass market OEM based on the Brazilian product portfolio
- > **Vender due diligence** for an exclusive distributor/dealer for Mexico to be bought by the OEM
- > Development of a **growth strategy for an automotive supplier** in LatAm with focus in Mexico
- > **Perform detailed competitive positioning analysis** and recommend specific negotiating positions for a Mexican automotive supplier
- > **Market study** on latest developments in Intelligent Transportation Systems (ITS) in Mexico

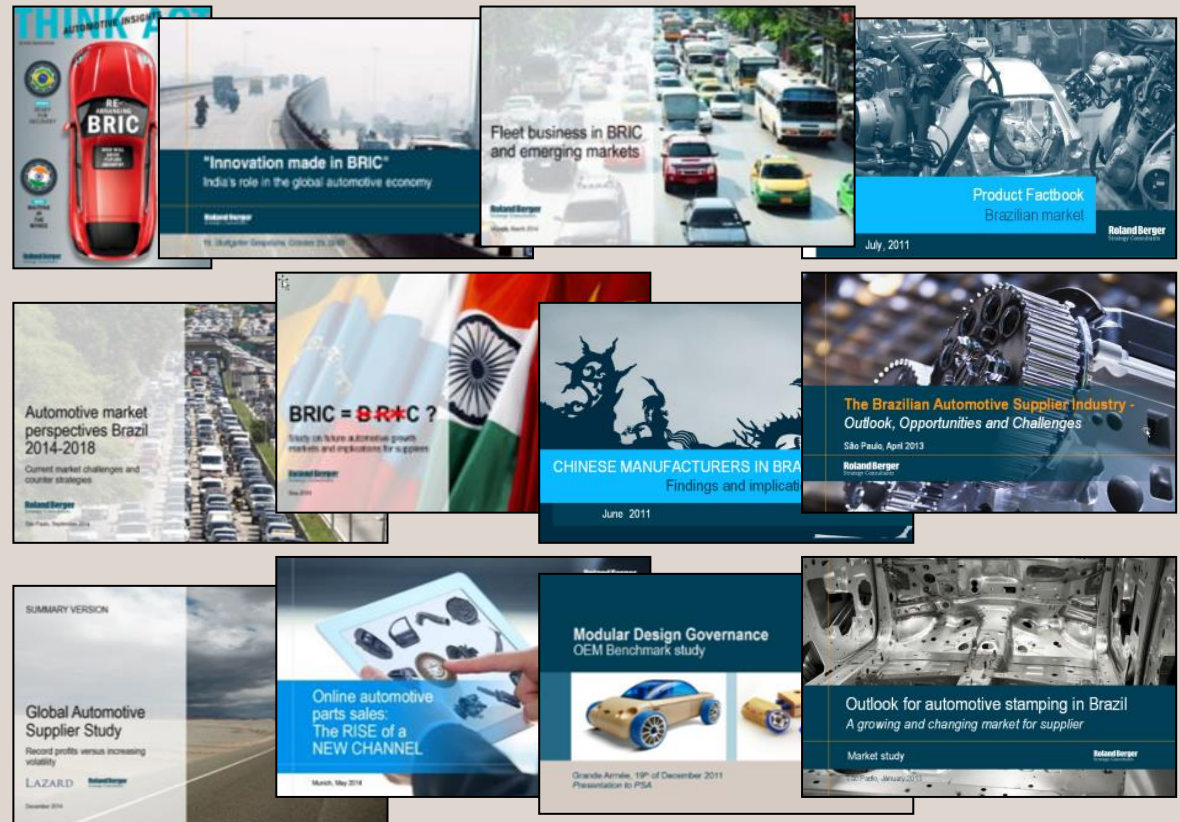
We are thought leaders globally and with profound market know-how, documented in high-quality publications

Thought leadership – Automotive (selection)

Future of mobility




BRIC & suppliers




Our expertise and thought leadership are showcased through frequent publications on hot topics in operations

Thought leadership – Operations strategy (selection)


THINK: act management book



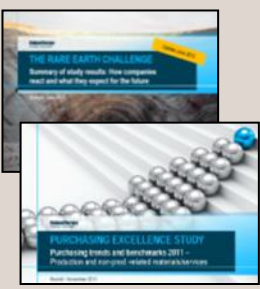
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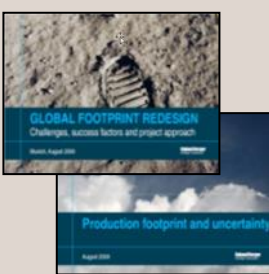
COO insights




Procurement studies




Manufacturing studies



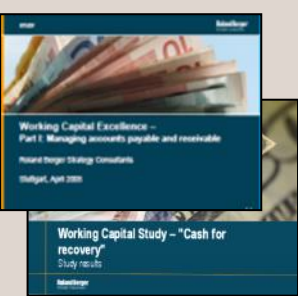
SCM studies



R&D studies



Working capital studies



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