



Productive linkages in the Mexican automotive industry: supply chain, tariffs, and competitiveness; context, challenges, and expectations

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Abstract

This article analyzes production linkages in Mexico's automotive industry amid U.S.-imposed tariffs. These tariffs create operational, financial, and technological pressures that prompt a reevaluation of business collaboration models and supply chain organization.

The section on the domestic automotive industry highlights its role as an economic engine and a strategic exporter, emphasizing Mexico's position as the world's fourth-largest light-vehicle producer. The article then examines production linkages—the network of horizontal and vertical relationships among automakers, suppliers, and regional clusters—that sustain competitiveness amid an adverse international environment.

The text explores the supply chain concept and context, noting that tariffs have reduced exports to the U.S., prompting market diversification toward Canada, Brazil, and Colombia. It also examines the current state of technological and production integration within the automotive ecosystem, where the transition to electromobility and digitalization presents both opportunities and challenges.

An analysis of strengths and vulnerabilities identifies advantages such as installed capacity and export experience, alongside weaknesses related to dependence on the U.S. market and pressure on local suppliers. Finally, the article outlines key challenges, including the need to diversify markets, adapt technology, comply with USMCA rules of origin, and consolidate business cooperation frameworks.

Keywords: Production linkages, automotive industry, business networks, supply chain, competitiveness

Introduction

The Mexican automotive industry is globally recognized for its significant manufacturing capacity, technological integration, and strategic role within global value chains. Its production ecosystem comprises a complex network of assembly plants, auto parts suppliers, transporters, and logistics providers operating under international standards of efficiency and competitiveness.

Against this backdrop, the recent imposition of tariffs by the U.S. government on vehicles, parts, and components manufactured in Mexico poses a critical challenge with structural implications for the supply chain. These tariffs create operational, financial, and even technological pressures that necessitate a rethinking of collaboration models and business organizational structures.

Faced with this landscape, the Mexican automotive industry requires strategies to strengthen its production integration in the face of trade tensions and regulatory pressures. It is essential to identify key nodes, supply chain vulnerabilities, and resilience capabilities to maintain the country's competitiveness in the automotive sector.

Methodology

This study is qualitative, exploratory, and documentary in nature, based on an analysis of academic literature, institutional reports, and official sources. This approach makes it possible to understand the current situation of the Mexican automotive industry regarding U.S. tariffs, identify strengths and vulnerabilities within the supply chain, and outline expectations concerning the sector's productive and technological integration.

General Objective

To analyze the productive integration of the automotive industry in Mexico in the context of tariffs imposed by the United States, identifying their impact on the supply chain as well as the strengths, vulnerabilities, challenges, and outlook of the national automotive ecosystem, to understand business cooperation dynamics and the technological and market adaptation strategies that enable the sector to sustain its international competitiveness.

Theoretical Framework

The Mexican automotive industry: national overview, production structure, and strategic contributions to development.

The potential of the Mexican automotive industry is of such significance that it represents the country's second-most important economic sector, serving as a cornerstone of its modernization and globalization strategy. This industry operates in a prime geographic location—adjacent to the U.S. consumer market—within an environment characterized by economic deregulation, an experienced workforce, the transfer of proven technology, and substantial production infrastructure (Vicencio, 2007).

Over the last decade, the performance of the Mexican automotive industry has been outstanding, according to both official and private sources. These sources highlight growth in auto-part exports and the production of light and heavy vehicles, driven by the participation of long-established domestic and foreign companies, as well as the entry of

Asian vehicle manufacturers and distributors—particularly from China, starting in 2017 and accelerating significantly over the past two years (AMDA, 2023/2024).

The automotive industry in Mexico is considered a driver of competitiveness in the regions where it has established operations. Among other outcomes, this has resulted in more highly skilled jobs—with wages 30% higher than those in the service sector—and enhanced human capital development (Rosales, 2023). On average, compensation in Mexico's automotive manufacturing sector is 2.1 times higher than in the rest of the manufacturing industry (INEGI, 2013) ^[26].

In 2023, the Mexican automotive industry demonstrated significant progress for the national economy; for instance, it ranked first as a generator of foreign currency, the world's leading exporter of heavy-duty trucks, and the top supplier of vehicles and auto parts to the United States. 4th largest global exporter of heavy vehicles; 4th largest global producer of auto parts; 5th largest producer of heavy cargo vehicles; 6th largest producer of heavy passenger vehicles; 6th largest global exporter of light vehicles; top exporter in Latin America; 7th largest global producer of light vehicles; 12th largest domestic market globally; and 2.1 million jobs generated by the industry value chain (AMDA, 2024).

According to the Mexican Association of Automotive Distributors (AMDA, 2023), the primary destinations for Mexican light vehicle exports were the United States (2,554,551 vehicles, representing 77.4% of total Mexican exports), Canada (264,885 vehicles, representing 8%), and Germany (164,032 vehicles, representing 5%). These three countries account for 90.4% of national exports. The remaining 9.3% is distributed among countries such as Brazil, Colombia, Puerto Rico, Saudi Arabia, the United Kingdom, Japan, and Chile.

Productive articulation: A management and organizational school of thought for competitiveness, innovation, and business cooperation

Zárate and Molina (2017) note that the concept of productive articulation refers to the interrelationships between an economy's various sectors; the nature of the links between high-performing productive and commercial activities determines the dynamic effects on the economic agents involved in those tasks and on the associated information flows. Productive articulation ensures that foreign trade generates feedback effects within economic structures, rather than benefiting only those companies most active in global value chains (Aroche *et al.*, 2022) ^[3].

In this regard, the ability to remain in the market depends not only on a company's internal resources but also on the modes of communication, relationship-building, and exchange established with other enterprises or institutions within the productive system in which they operate. Thus, their capabilities and competencies can be enhanced by combining and complementing those of other firms and institutions (Dini, 2007) ^[9].

Productive articulation offers a pathway to building competitive advantages through cooperation frameworks; within these, key players from both the private and public sectors mature and gain awareness of the pivotal roles they must play—driving the development of companies and nations at the local and territorial levels, while maintaining an outward-looking perspective. (Gómez, 2012).

In the late 1980s, a school of thought emerged that broke away from traditional organizational frameworks and

introduced new paradigms regarding internal processes, manufacturing, commercial relations, and interactions with the environment—encompassing customers, key competitors, and suppliers alike. Notable figures include Alfred Sloan, whose divisional model at General Motors represented an organizational innovation that balanced divisional autonomy with corporate strategic coherence; Taiichi Ohno, whose Toyota Production System (Just-in-Time) aimed to produce only what was necessary, at the precise moment and in the required quantity; and Prahalad and Hamel, whose theory of core competencies posited that a company's competitive advantage depends not merely on its products or markets, but on the fundamental capabilities that enable it to generate value sustainably.

Meanwhile, Michael Porter's competitive strategy provided a theoretical framework explaining how companies can achieve and sustain a competitive advantage within their sector through three fundamental approaches: cost leadership, differentiation, and focus. Shigeo Shingo, with his *Poka-Yoke* system (quality control at the source), described a set of error-prevention mechanisms or devices designed to avoid human error in production processes. Finally, Klaus Schwab—through his model incorporating digitalization, IoT, and AI in automotive manufacturing—proposed principles such as total connectivity, applied artificial intelligence, flexible automation, digital integration, and continuous innovation, thereby transforming the mission and vision of the automotive sector. According to Torres (2023), these ideas focus on strengthening business capabilities and driving the productive transformation of sectors, regions, and the business climate, while engaging with governments, the private sector, and international organizations to fulfill this mission.

Taking into account the aforementioned theories, models, and proposed systems, productive articulation seeks to enhance the competitiveness of small and medium-sized enterprises (SMEs) by implementing—through organizational forms of productive integration such as business networks—a strategic approach that enables them to achieve significant results in two areas of strategic importance for policy design: the promotion of innovation and access to more demanding markets (ECLAC, 2007).

In light of the above, and according to Dini (2010) ^[10], business networks—as a form of productive articulation—represent collective actions driven by companies and organizations with the aim of forging enduring alliances with a medium- to long-term horizon. The author notes that there are various types of networks based on their position within the production chain; the two generally accepted definitions are:

- a. Horizontal Cooperation: a form of collaboration established between independent companies that manufacture the same product and voluntarily decide to interact to achieve a common goal that they could not attain by acting in isolation. A current example of horizontal cooperation in the Mexican automotive industry is the alliance between the National Auto Parts Industry (INA) and the National Automotive Industry Cluster Network (REDCAM); they signed an agreement to coordinate the auto parts and cluster agenda leading up to 2026 ^[25]. This collaboration links independent companies producing similar components; by joining forces, they strengthen their competitiveness

in the context of the USMCA (T-MEC), nearshoring, and the transition to electromobility.

- b. Vertical Cooperation: a form of collaboration established between independent companies belonging to adjacent links in the value chain of a specific product (energymagazine.mx/2026). Regarding vertical cooperation, the author describes it as a form of collaboration within organizational networks where companies at different levels of the production chain interact to achieve common goals. In Mexico's automotive industry, vertical cooperation refers to collaboration among companies operating at different stages of the value chain—such as automakers, Tier 1 and Tier 2 suppliers, universities, and government bodies. A clear example is the Coahuila Automotive Cluster (CIAC), where General Motors, local suppliers, academic institutions, and state authorities work together to strengthen innovation, productivity, and competitiveness.

Supply chain: a strategic tool for sourcing raw materials, inputs, and industrial materials in production management

A supply chain consists of all parties involved—directly or indirectly—in satisfying a customer's needs and expectations. The supply chain encompasses not only manufacturers and suppliers but also transporters, warehouse operators, sellers, and even the customers themselves (Manrique *et al.*, 2019). It is a network of facilities and distribution channels designed to procure and transform materials into intermediate and finished products, and to distribute those finished products to consumers (Gómez *et al.*, 2018).

As the name implies, the supply chain is a sequence of links (processes) primarily aimed at competitively satisfying the end customer; each link produces or processes a part of the

product, thereby adding value to the overall process. The supply chain is also understood as the set of facilities and distribution channels involved in procuring raw materials, transforming them into finished products, and distributing them to the customer (Hernández *et al.*, 2012) ^[17].

López *et al.* (2023) state that companies rely on external suppliers—such as distribution channels—for their supplies. In this context, supply chains comprise the various actors participating—directly or indirectly—in the process ranging from raw material acquisition to transport, storage, and final delivery to the consumer, utilizing network structures to provide intermediate or final products (Peña & García, 2019; Zhang, He, & Tian, 2022). The chain's degree of concentration determines the extent to which companies depend on specific suppliers or stakeholders, who are ultimately responsible for business continuity (Cagri *et al.*, 2023) ^[7]. In this revolution of digital services, the demand for the acquisition of vehicles of different ranges has also changed (Kota *et al.*, 2022) ^[22].

The strategic context of the supply chain in the Mexican automotive industry

The automotive industry is characterized by a complex supply chain typically divided into levels, or "Tiers." These tiers are defined by their proximity to the vehicle manufacturing plant (OEM). Tier 1 suppliers are direct suppliers to the OEMs, while Tier 2 suppliers supply the Tier 1s. The term OEM (Original Equipment Manufacturer) refers to a company that designs and manufactures products under its own brand, even though it often does not produce every component itself; instead, it integrates systems or parts developed by a network of suppliers classified as Tier 1, Tier 2, and Tier 3.

Table/Examples of vehicle manufacturers (OEMs) in Mexico

OEM	Plant location	Models produced	Key features
General Motors	Silao (Guanajuato), Ramos Arizpe (Coahuila), San Luis Potosí, Toluca (Edomex)	Chevrolet Silverado, GMC Sierra, Chevrolet Blazer, Equinox	It is the OEM with the highest production volume in Mexico; it exports primarily to the U.S.
Ford	Hermosillo (Sonora), Cuautitlán (Edomex), Chihuahua (motores)	Bronco Sport, Maverick, Mustang Mach-E	A pioneer in electromobility in Mexico; strong presence in the Bajío region and the north of the country.
Toyota	Tijuana (Baja California), Apaseo el Grande (Guanajuato)	Tacoma, Hilux	Specializing in pickup trucks; production capacity of nearly 300,000 units per year.

Prepared by the authors based on sources such as Noticias de Autos en México. (March 4, 2025). Car brands and models manufactured in Mexico in 2025 ^[21].

Mexico has a growing number of local suppliers at different levels. The formation of the auto parts industry rests on a classification into levels or Tiers. In principle, the first level of Tier 1 suppliers manufactured components; The second Tier 2 level produced some simple parts that were integrated into the Tier 1 level, and the third Tier 3 level provided raw materials to the Tier 2 level. This production model remained until the adoption of the Just-in-Time system: this system promotes the delivery of merchandise directly from the auto parts suppliers to the manufacturer, and significantly reduces the accumulation of inventories.

The growing degree of specialization registered by global value chains encourages the integration of the automotive sector installed in Mexico. Now Tier 1 suppliers are now able to design, integrate, sub-assemble and deliver systems

in steering and air conditioning modules, among others to be incorporated or mounted in vehicles. Tier 2 suppliers produce or design systems that are standardized, while Tier 3 companies manufacture specific components (García, 2019).

A Tier 1 supplier directly supplies products, systems, or complete assemblies to an OEM. These suppliers have high quality requirements, certifications such as ISO 9001: 2015, and direct participation in design, engineering, and regulatory compliance. An example in the automotive industry is Bosch, which manufactures brake systems and sensors. The Tier 2 supplier supplies components or smaller parts to the Tier 1. The Tier 2 supplier does not interact directly with the OEMs, but they are key to guaranteeing final quality. Some Tiers are certified under ISO or NOM standards, such as NOM-017 (EPP) or NOM-019 (safety

committees). Some examples of Tier 2 are manufacturers of chips, connectors, or sensors and producers of industrial plastics, foams, technical textiles, etc. For its part, a Tier 3 supplier provides raw materials or basic processes: metals, resins, packaging, solvents, cables, cardboard, etc. Tier 3 suppliers are the starting point of the entire chain. As an example, the Acerinox industry provides stainless steel for electronic or automotive parts, and suppliers of copper,

lithium, polymers, etc., which are used for cables, batteries, or packaging (Fábrica visual, 2025).

Logistics experts point out that the number of suppliers involved can reach thousands, which complicates management and increases dependence on inter-company collaboration. Managing relationships with suppliers, negotiating contracts and quality control are crucial aspects (Export logistics, 2024) ^[12].

Table/Example of suppliers in Mexico

Supplier level	Company example	Type of manufactured components	Key characteristics
Tier 1	Bosch México	Complete systems ABS brakes Automotive electronics, fuel injection	Direct suppliers to vehicle manufacturers (OEMs); they deliver modules and systems ready for assembly.
Tier 2	Nemak (Monterrey)	Aluminum components: Cylinder heads Engine blocks Structural parts	Supply parts to Tier 1 suppliers; specialized in industrial materials and processes.
Tier 3	Steels Corsa (Querétaro)	Raw materials Rolled steel Basic metal parts	Supply basic inputs and materials to Tier 2; less direct interaction with automakers.

Original table compiled based on sources such as Bosch, Nemak, Aceros Corsa, AMIA, and the Secretariat of Economy.

This diagram illustrates the production structure of the Mexican automotive industry, where each tier of supplier fulfills a specific role within the value chain, ensuring competitiveness and efficiency across regional clusters.

In 2021, the automotive sector comprised approximately 600 Tier 1 suppliers—companies that manufacture complete modules and systems—and 900 Tier 2 suppliers, which produce parts and components for those modules and systems. Key products from this supply base include wiring harnesses, cables, stamped parts, and accessories for vehicle bodies, seats, transmissions (and transmission parts), braking mechanisms, internal combustion engines, lighting and signaling equipment, air conditioning units, axles, airbags, and seatbelts (Zozaya, 2021).

Currently, Mexico's automotive supply chain is undergoing a structural reconfiguration driven by tariffs imposed by the United States—reaching up to 25% on light vehicles and auto parts—which has reduced Mexico's competitiveness in its primary export market (Secretaría de Economía, 2026). This situation has led to a contraction in exports to the U.S., with a 3.6% drop in the first half of 2026, marking two consecutive years of decline (AMIA, 2026).

Faced with this scenario, Mexican automakers have adopted a market diversification strategy, increasing shipments to Canada (+32,000 units), Brazil (+16,000), and Colombia (+5,200) in an effort to offset losses in the U.S. market (INA, 2026). However, the rising cost of automotive-grade steel and aluminum—even with partial tariff reductions—has driven up production costs and placed additional pressure on local suppliers, who face heightened demands regarding certification and technological adaptation to meet USMCA rules of origin (Horizonte Aduanal, 2026) ^[18]. In short, the Mexican automotive supply chain is undergoing a process of strategic adaptation in which tariffs act as catalysts for new dynamics of cooperation and diversification, aimed at sustaining the industry's international competitiveness.

The international commercial context of the automotive industry: global market dynamics, value chains, and export competitiveness

According to Sharon Oster, Castañeda, and Moriles (2018), “a company's competitiveness is its ability to produce goods

meeting specific quality standards while utilizing its resources more efficiently than similar companies elsewhere in the world over a given period.” Thus, business competitiveness can be understood as a company's capacity to offer a product or service that meets or exceeds customer expectations through the more efficient management of its resources relative to other firms in the same sector.

International competitiveness can be defined as a company's ability to achieve superior performance compared to its competitors in foreign markets, thereby preserving the conditions that sustain its current and future returns (Peña-Vinces and Triguero Sánchez, 2011). While it is true that companies—not countries—compete in international markets, the structural characteristics of a national economy, or of a specific country's industry, exert a strong influence on corporate performance.

Given this, it is useful to define competitiveness at the microeconomic level. According to Porter, competitiveness depends on four factors, integrated into the following framework:

1. Firm strategy: how companies structure and organize themselves to compete against commercial rivals.
2. Demand conditions: the size of the local market and its purchasing power.
3. Logistics and supporting industries: the presence of high-quality, globally competitive suppliers.
4. Factor conditions: infrastructure, the quality of communication and transport networks, and the education and skill level of the workforce (Guzmán, 1993) ^[16].

The automotive industry in Mexico is considered a driver of competitiveness in the regions where it has established operations. This has resulted in—among other outcomes—more highly skilled jobs paying 30% more than those in the service sector (Rosales, AMDA, 2023), as well as enhanced human capital development. On average, compensation in Mexico's automotive manufacturing sector is 2.1 times higher than in the rest of the manufacturing industry (INEGI Monthly Manufacturing Industry Survey, 2013) ^[26].

The entry of Asian companies into the domestic automotive market has turned Mexico into a strategic hub for vehicle distribution, sales, and exports, as well as for the establishment of assembly plants in various cities—particularly in central and northern states. This strategic

importance stems from the competitive advantages offered by the country's geographic proximity to the United States, a major consumer of vehicles. Furthermore, over the past twenty years, logistics and supply chains have achieved significant efficiencies—such as cost reductions—driven by process digitalization, labor availability, transportation infrastructure, and the creation of clusters and collaborative networks among automotive companies of varying sizes and specializations.

Following recent trade-related decisions by the U.S. government (2025), the global economy has shifted toward a new path of regional integration. This shift was triggered by unexpected U.S. tax policies targeting various global productive sectors—including the automotive industry—by imposing differential tariffs on vehicles, parts, and key components manufactured outside U.S. territory as a measure to protect its domestic industry. Faced with this situation, the global automotive industry—and the Mexican sector in particular (comprising foreign companies established in Mexico that operate in coordination with local and national auto-part and component manufacturers)—is confronting new rules. These regulations necessitate a rethinking of strategies and negotiation mechanisms, not only regarding vehicle production and sales but also concerning the pursuit of new markets and medium-term economic scenarios.

According to Ibarra *et al.* (2025) ^[21], the phenomenon of nearshoring has gained global prominence since 2018, with Mexico emerging as one of the primary beneficiaries—particularly within the automotive sector. This trend began to take hold following the onset of the trade war between the

United States and China that same year. As a result of U.S. tariffs on Chinese products, many companies sought alternatives closer to their main consumer markets; this positioned Mexico as a strategic choice due to its geographic proximity, existing trade agreements—such as NAFTA (later the USMCA)—and its well-established automotive industry.

The imposition of tariffs threatens regional integration and the efficient manufacturing of light and heavy vehicles—as well as industry components—which, according to international indicators, have met quality standards and maintained competitive costs; this jeopardizes the stability and growth of the automotive industry in both Mexico and North America. Such protectionist policies dismantle years of collaborative production integration, creating unnecessary trade barriers between the two nations to the detriment of both consumers and businesses.

Technological and production integration of the Mexican automotive ecosystem: current status, innovation dynamics, and industrial competitiveness

The automotive industry comprises two sectors: vehicle manufacturing (OEMs) and auto parts. Regarding segmentation by product line, the global vehicle manufacturing industry generally divides motor vehicle production into two segments: light vehicles and heavy vehicles.

Descriptive table of production sectors in the Mexican automotive industry

Productive sector	Definition	Example in Mexico	Key characteristics
Terminal sector (OEM)	Manufacturers producing complete vehicles for the domestic and international markets.	Volkswagen (Puebla), Nissan (Aguascalientes), BMW (San Luis Potosí)	They assemble finished vehicles. High foreign direct investment. Exports to the U.S., Europe, and Asia. They generate specialized jobs and coordinate the supply chain.
Auto parts sector	Companies that manufacture components, systems, and parts integrated into vehicles produced by OEMs.	Rassini (brakes and suspension systems) Metalsa (metal structures, chassis) Valeo Mexico (electrical and electronic systems)	They supply modules and components to OEMs. This includes Tier 1, Tier 2, and Tier 3 suppliers. High level of technological specialization. – They generate production linkages and regional employment.

Compiled in-house using data from Rassini, Metalsa, Valeo Mexico, AMIA, and the Secretariat of Economy.

Terminal Sector

In the Mexican industry, vehicle classification distinguishes between light vehicles, heavy vehicles, and buses. Light vehicles are categorized into passenger cars—motor vehicles used for transporting passengers, provided they have no more than eight seats, including the driver's—and light commercial vehicles. The latter are motor vehicles used to transport goods and people; this category includes pickup trucks, SUVs, minivans, and panel vans. Heavy vehicles are those used for transporting goods and weigh more than 7 tons. Buses are vehicles used to transport more than eight passengers and have a capacity exceeding 7 tons. Internationally, vehicles are classified into two groups: passenger cars and commercial vehicles (which include light commercial vehicles, heavy trucks, and buses) (García, 2019).

The Mexican Automotive Industry Association (AMIA) reports that in 2020 ^[20], there were 26 light vehicle and

engine manufacturing plants representing 15 vehicle brands, located across 14 states: Sonora (Ford), Chihuahua (Ford), Coahuila (Stellantis, GM), Nuevo León (Kia), San Luis Potosí (GM, BMW), Baja California Norte (Toyota), Aguascalientes (Nissan 1, Nissan 2), Guanajuato (GM, Honda, Ford, Hyundai, Toyota, VW), Puebla (Audi, VW), Veracruz (BRIC), Jalisco (Honda), Hidalgo (JAC), State of Mexico (Ford, GM, Stellantis), and Morelos (Nissan) (AMIA, 2020).

By 2024, the number of light vehicle assembly plants had reached 22, distributed across 10 states: Puebla, San Luis Potosí, Sonora, State of Mexico, Coahuila, Guanajuato, Hidalgo, Nuevo León, Aguascalientes, and Baja California Norte. ...in addition to 10 plants dedicated to automotive engine production across six states—Aguascalientes, Chihuahua, Coahuila, Guanajuato, Jalisco, and the State of Mexico—and seven transmission manufacturing plants across five states: Coahuila, Guanajuato, Jalisco, Nuevo León, and San Luis Potosí (AMIA, 2024).

Auto Parts Sector

Of the approximately 15,000 parts that make up a car, an automaker designs and produces only a few; the majority are supplied by direct suppliers. Likewise, direct suppliers may outsource their activities, sourcing components from sub-suppliers, and so on. "Auto parts" refers to the individual piece or assembly of pieces involved in the assembly of an automobile that are also sold separately (Gómez *et al.*, 2018).

The auto parts sector comprises companies that supply inputs—primarily to the automotive assembly industry and, to a lesser extent, replacement parts to businesses and individuals responsible for the maintenance and repair of used cars (Huerta *et al.*, 2017) ^[19]. Initially, auto parts manufacturing was integrated into the vehicle production process itself; engines and innovations were attributed to the finished-vehicle manufacturers, as cars were built one piece at a time—though collaboration did exist (for instance, Peugeot used Daimler engines and Bugatti designs). Once mass production began, specialization in auto parts became necessary; although this branch did not initially receive

much recognition, companies like Dunlop—and later Michelin—were already active in the tire segment (Huerta *et al.*, 2020) ^[20].

According to the National Auto Parts Industry (INA), regional auto parts production in Mexico—including engines and transmissions—is distributed as follows: the northern border states of Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, and Tamaulipas account for 53.2% of production, while the Bajío region states—Guanajuato, Querétaro, San Luis Potosí, Aguascalientes, and Jalisco—account for 28.1% (INA, 2023) ^[23]. Similarly, according to this organization, the state of Coahuila ranked first in 2021 with 16.9% of production—including engines and transmissions—followed by Chihuahua (12.3%), Nuevo León (11.2%), Guanajuato (11.0%), and Querétaro (6.6%). Of the auto parts produced in Mexico, 76% are exported to the United States, 2% to Canada, 1% to Brazil, and 4% to other countries.

Descriptive table on regional auto parts production in Mexico

Region	% of national production	Examples of specialization	Key characteristics
Frontera norte (Baja California, Sonora, Chihuahua, Coahuila, Nuevo León, Tamaulipas)	53.2%	Engines Transmissions, Electrical components	High industrial concentration; Strong integration with the U.S.; Binational clusters.
Región Bajío (Guanajuato, Querétaro, San Luis Potosí, Aguascalientes, Jalisco)	28.1%	Metal auto parts, Suspension systems, Electronics	Recent expansion; Attraction of foreign investment; Specialization in electromobility.

Prepared by the authors based on data from the National Auto Parts Industry (INA). Annual report on auto parts production and exports in Mexico (2023) ^[23].

The remaining 18.7% of regional auto parts production in Mexico is distributed as follows: 10% is located in Central Mexico (State of Mexico, Mexico City, Hidalgo, Tlaxcala, Morelos); 4% in the Western region (Michoacán, Colima, Nayarit); and 4.7% in the South-Southeast region (Puebla, Oaxaca, Veracruz, Chiapas, Yucatán) (INA, 2023).

Supply Chain Strengths and Vulnerabilities: Organizational Resilience, Strategic Risks, and Competitive Capabilities

Over recent decades, the manufacturing industry—and the automotive sector in particular—has built a robust, global supply chain capable of delivering necessary parts to any location worldwide promptly. According to the 2023 ^[24] report *Complex Manufacturing Supply Chain Risk* by Willis Towers Watson (WTW), the primary risks facing this sector include:

Climate change and environmental risks, such as increasing pressure to reduce emissions, the impact of extreme weather events, and issues surrounding natural resource usage.

Geopolitical risks. As a highly globalized industry, it is significantly affected by geopolitical factors. Beyond armed conflicts, there is concern regarding the imposition of tariffs in certain countries intended to penalize foreign companies.

Economic risks. Volatility—which complicates medium- and long-term planning—along with rising prices and wages, is viewed as significant risk factors.

Supply shortages and disruptions. The impact of recent events—such as the pandemic-induced technology supply crisis (microchips)—means that risks associated with component shortages, supplier production constraints, and material scarcity remain significant concerns.

Cyber risks. 85% of surveyed companies indicated that exposure to cyber risks resulting from increasing digitalization has a medium-to-high impact on manufacturing supply chains, while regulatory and public pressures to move toward a sustainable industry are becoming increasingly prominent. 89% of surveyed companies stated that sustainability is a key objective for their supply chains.

A notable strength is the resilience of the automotive industry's supply chain. It is evident that the world is becoming increasingly interconnected and globalized, and effective supply chain management has become critical to the success and sustainability of companies, particularly within the automotive sector. Geopolitical and geoeconomic uncertainty, the decoupling of the US and China, unexpected regulatory changes, and the rapid evolution of disruptive technologies have created a series of challenges that test the industry's ability to maintain smooth, efficient operations (Solistica, 2023). In this context, organizational resilience is understood as a company's capacity to absorb and adapt to the changes, challenges, and crises that may affect its operations.

Expectations Stemming from International Economic Policies

Global economic integration has also generated trade tensions that manifest through protectionist measures, such as the imposition of tariffs. Tariff barriers are the taxes (tariffs) that importers and exporters must pay at customs points upon the entry and exit of goods (Sarquis, 2002). Various authors note that the impact of tariffs is felt at different levels of the supply chain; one such impact is increased costs and a loss of efficiency. Another is the alteration of the supply chain structure, as the application of tariffs necessitates evaluating new suppliers, establishing strategic alliances, or relocating part of production.

Furthermore, as prices rise, consumers opt for local products over imports, thereby altering consumption patterns and market dynamics (NRHoy, 2025).

Arciniega (2024)^[2] draws attention to other perspectives that view the situation more optimistically, identifying crises as a realignment of global capitalism. These viewpoints see *nearshoring*, for instance, as both an opportunity and a challenge with specific, limited objectives—such as reintegrating the country into the supply chain by linking local Tier 2 and Tier 3 automotive companies to the network.

Quiroz *et al.* (2025) describe how the global automotive industry is facing a series of risks that could disrupt and once again restructure trade and supply chains for key sector participants: China, the European Union, Canada, and Mexico. Specifically, domestic production faces heightened challenges amidst a complex tariff landscape involving the U.S., pointing primarily toward a more extensive renegotiation of the USMCA scheduled for July 2026. The current situation marks a turning point for the country's highly integrated production chains—spanning light and heavy vehicles as well as auto parts. It is estimated that the implementation of these policies would result in reduced economic growth for the domestic automotive industry, impacting it by 4.7% and 21.7% of GDP.

Supply Chain Challenges in the Automotive Industry

Given the structural changes occurring in the global automotive industry and the intense competition resulting from the entry of new players into the sector, the primary challenge facing the Mexican automotive industry is strengthening the local supply chain. This could be achieved by designing diversification strategies that incentivize supplier development, enabling suppliers to participate in processes currently characterized by a heavy reliance on parts and components manufactured abroad and imported in large volumes.

Challenges

One supply chain challenge is reducing reliance on Asian auto-part production; increased government support—such as tax incentives and financial programs—would enable small Mexican Tier 1 and Tier 2 companies to become more competitive.

Measures to strengthen the automotive sector's production linkages and supply chain

The United States is an unstable trading partner, and the trade agreement has currently failed to uphold the automotive accords that previously enabled a competitive market between the two nations for years. In response to *faits accomplis*—such as the imposition of tariffs—diversification into new segments (like battery and semiconductor manufacturing) and the pursuit of new markets (such as Brazil and China) will be key to consolidating Mexico's strategic position.

Another relevant and urgent step, in light of recent events, is integrating small and medium-sized enterprises (SMEs) into supply chains by addressing their specific needs—such as access to financing for technology acquisition, obtaining essential certifications, and ongoing training.

Meanwhile, tripartite collaboration among industry, academia, and government has driven significant progress in

strengthening the automotive industry, particularly by aligning technical and university education with the "Plan México" initiative. One example of this is the curriculum update carried out jointly by the National Association of Universities and Higher Education Institutions (ANUIES), the National Auto Parts Industry (INA), and the Secretariat of Public Education (SEP), aimed at training specialists who can effectively enter the automotive industry workforce.

Conclusions

Mexico is strategically positioned to lead the processes of industrial and commercial reconfiguration. The trade model established over three decades ago is no longer serving the needs of the Mexican economy or the automotive industry—particularly its supply chain. As a major exporter of vehicles and auto parts, Mexico has been affected by structural shifts in the global economy and their impact on the global automotive industry. The sector faces significant challenges, including structural changes such as the energy transition and sustainability, geoeconomic reconfiguration, digitalization and connectivity, corporate mergers and strategic alliances, China's global leadership in the automotive industry, and the need for a supply chain resilient enough to adapt to constant, disruptive changes.

Given this scenario and its strategic position, Mexico—a key player—faces immense pressure on its supply chain due to its continued heavy trade dependence on the United States. While the relocation of companies to Mexican territory has yielded advantages stemming from US-China tensions, the transition to electric vehicles has also exposed the country's lack of technological capabilities for manufacturing high-tech components.

Key findings highlight the strategic nature of Mexico's vehicle export relationship with the United States, revealing a promising trade balance but also a high-risk dependency. The new business model—characterized by tariff measures implemented by the current US administration—demonstrates that, from a strategic standpoint, Mexico must seek to diversify by finding new markets and partners with whom it can establish more reciprocal and long-term stable agreements.

To underscore this point, Mexico and its productive sector must devise entrepreneurial strategies to tackle the logistical, regulatory, and technological challenges facing the automotive industry and its key partner, the supply chain. At the same time, the pursuit of regional cooperation with trading partners in South America warrants serious yet decisive analysis, with a view to strengthening existing trade agreements. China has already taken the first step by collaborating with certain South American nations.

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