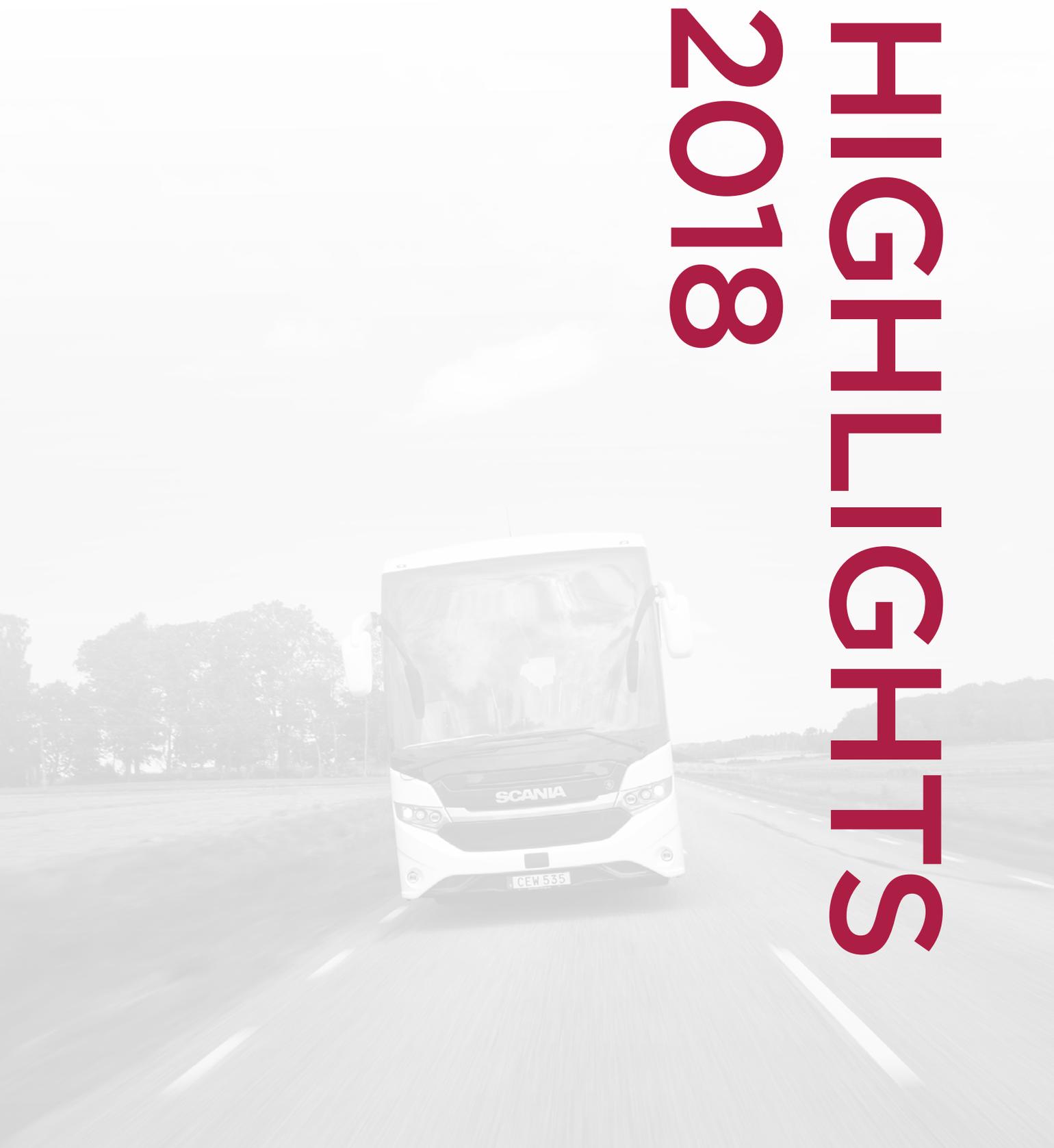


MEXICO

AUTOMOTIVE REVIEW



HIGHLIGHTS 2018

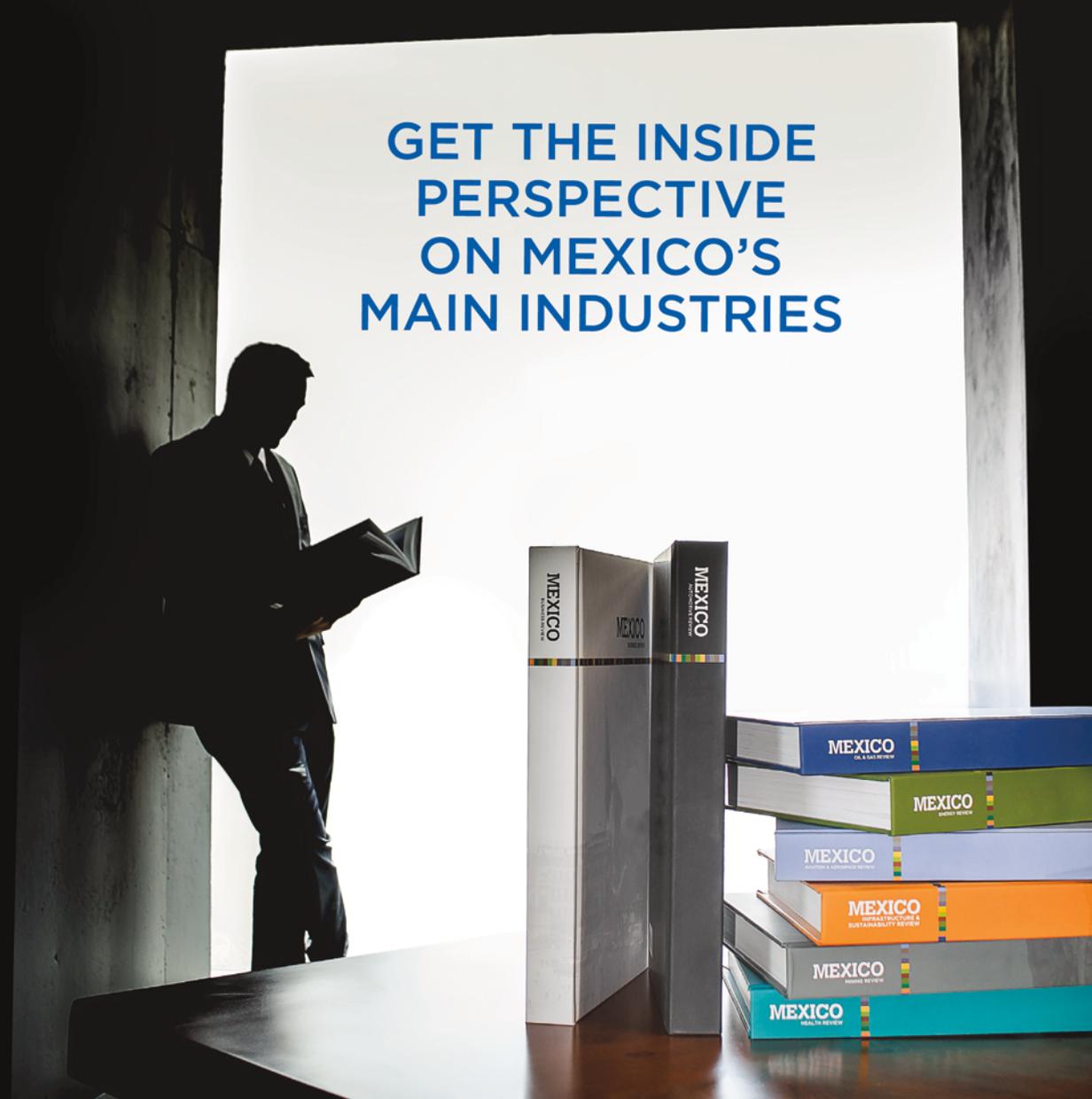


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MEXICO

AUTOMOTIVE REVIEW

2018

The automotive industry remains a cornerstone for the Mexican economy, contributing 3.5 percent of national GDP and 20.2 percent of manufacturing GDP. Investment flows continue to arrive unabated and the country has strengthened its position as the world's seventh-largest light-vehicle manufacturer and the third-largest light-vehicle exporter. However, changes in global demand and the threat of a redefined trade relationship with the US, its main commercial partner, have clouded the country's prospects.

Domestically, two years of record-breaking sales and seven years of uninterrupted growth are now showing signs of wear with results decelerating. Contracting sales in an already extremely competitive market have forced companies to come up with new strategies to retain their position in the market.

During these challenging times, Mexico Automotive Review provides insight into companies' views regarding Mexico's position as an automotive manufacturing destination. Throughout its 14 chapters, success stories are highlighted from companies that maintain strong growth despite market obstacles, while other players share their concerns regarding the main areas of improvement. 2018 is also a transition year for the federal government and in this edition, Mexico Automotive Review includes a special feature on Andrés Manuel López Obrador, his projected plans for the automotive industry in Mexico and the thoughts of key leaders at the dawn of a new political era.

WITH CHANGE AT ITS DOORSTEP, THE INDUSTRY WILL EVOLVE OR FALTER

Mexico is entering a period that will impact both its position as a production powerhouse and its domestic market development. Industry leaders say this is a natural process but even so, the country must prepare to evolve if it is going to cater to a new market ruled by different demands and possibly new trade standards

The Mexican automotive industry enjoyed undisrupted growth in light-vehicle production, exports and sales in the domestic market from 2010 to 2016. However, 2017 was a breaking point. Starting in the second half of the year, sales began declining, reaching a total of 1.53 million units. Compared to 2016, this represented a reduction of 4.6 percent. In Mexico Automotive Review 2017, Guillermo Prieto, Chairman of AMDA, said that the one plausible scenario for the industry was to end the year with a 6 percent growth rate. The most pessimistic expectation was for sales to plunge 17 percent compared to 2016. The 4.6 percent decrease fell in-between and it still represented growth of 13.2 percent compared to 2015.

In terms of production and exports, however, the country continued to deliver stronger results, with a total of 3.93 million units manufactured and 3.25 million units exported by the end of the year. This represented an increase of 13.5 percent in production and 17.5 percent in exports. Volumes are still expected to increment in the coming years as automakers such as Audi, Mercedes-Benz, INFINITI and Kia continue to ramp up their operations while others such as BMW and Toyota bring new operations to the country. Nevertheless, changes in global demand are also expected to decelerate Mexico's rise as an automotive powerhouse.

PERIOD OF STABILIZATION

Until 2016, industry experts expected the market to reach the 2 million-unit mark in terms of domestic sales by 2020. However, the downturn in sales has colored the picture significantly, moving the 2 million mark further down the line. Although not as exciting as growing at double-digit rates year-on-year, industry leaders still see a strong market in Mexico and urge other players to not see this as a catastrophic turn of events. "Domestic sales are not falling, they are just decelerating. Moreover, Mexico is not the only market going through this process," says Gerardo San Román, Head of Latin America at JATO Dynamics.

The US, Mexico's main export market and the second-largest automotive market in the world, saw a 1.7 percent contraction in its domestic sales by the end of 2017, going from 17.55 million units in 2016 to 17.25 million units the following year. Interest rates for vehicle financing are

rising, as are gas prices and after years of continued growth, the US market is also stabilizing. Guido Vildoza, Senior Manager, Americas Light Vehicle Sales Forecasting of IHS Markit, expects the US will end up at yearly sales of 16.5 million units in due course.

"Mexico has the potential to reach yearly sales of 2 million units but not in the short term," says San Román. To understand this, two factors must be considered in Mexico's domestic development. First, in an effort to boost vehicle sales as much as possible, the financing market implemented an aggressive strategy to spur new-vehicle purchases. In 2010, only 49.8 percent of all light-vehicle sales were financed. By the end of 2017, that number had risen to 71.1 percent.

Although this is not a bad sign and it is in fact a key factor in ensuring continued growth in the industry, banks achieved this by elongating financing plans to the point where now clients can find loans of up to 72 months. "By enabling this, companies are extending repurchase terms and disrupting the sales cycle," says San Román. "We are finally noticing the effects of this strategy; the market cannot sustain such growth levels indefinitely and that is completely natural."

The second factor is the fallout from Mexico's presidential elections. The market's sales decline continued into 2018. As of July 2018, the market had seen 14 straight months of negative results. Between January and July 2018, the market sold 795,011 units, which compared to the 865,161 units from 2017 represents a contraction of 8.1 percent. Many industry participants attribute the negative results of the first half of 2018 partly to the elections on July 1. Due to the uncertainty caused by the campaign of now President-elect Andrés Manuel López Obrador, some customers put their purchases on hold until getting more clarity regarding the future of the country.

"Dealership visits have fallen in the past few months," Carlos López de Nava, Director General of Grupo Alden, said prior to the election. "To boost confidence among potential buyers, some brands are offering their clients unemployment insurance to protect them for a few months should they lose their jobs because of the elections."

Consumer confidence also was shaken during the first half of 2018 and inflation rates were on an uphill climb since January 2017, reaching a peak in December 2017 of 6.77 percent. However, the country's economic situation has somewhat stabilized, returning inflation to 4.81 percent as of July 2018.

The market expects stronger results now that the election is over and some even suggest stronger results compared to 2017 due to the low numbers registered during the second half of that year. "The ideal scenario would be to stop further drops in demand and reach approximately 1.48 million by 2018 and an equilibrium point of 1.5 million units by the end of 2019," says Guillermo Rosales, Director General of AMDA.

A NEW MARKET REALITY

In terms of production, Mexico was expected to surpass the 5-million-unit mark once all new OEM investments arrived to the country and started production. This would take the country from its current position as the seventh-largest light-vehicle producer to sixth, overtaking India. However, Vildoza, expects the country will not move past production of 4.1 million units due to the changes that some companies have made in their production plans.

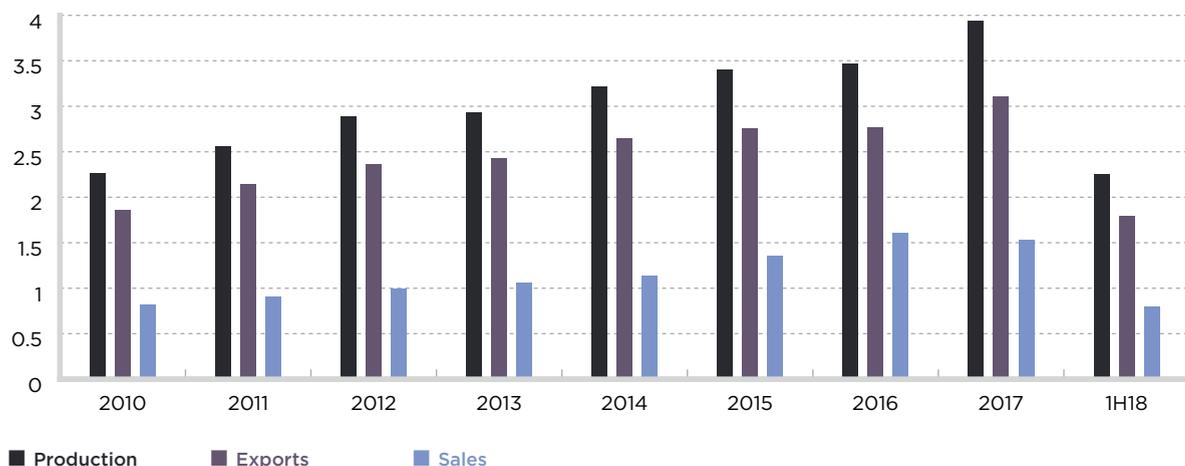
In December 2017, Ford announced that it would move its production of Fusion out of Hermosillo, Sonora, to China by 2020, which according to Vildoza represents approximately 400,000 units. Meanwhile, FCA disclosed in January 2018 that its production of RAM would move out of its plant in Saltillo, Coahuila, to Michigan after CEO Sergio Marchionne said it was an error to move RAM production to Mexico. The company will spend US\$1 billion on the move and Vildoza says that makes another 200,000 units that will no longer be manufactured in Mexico.

These moves are not the only concerns. Traditionally, Mexico has been a compact-car oriented production hub, which was fine as long as demand supported these units. But consumer preferences are changing and the world is becoming a light-truck intensive market. The US, Mexico's main export market, is now favoring larger models that are not normally produced in Mexico. The shift in environmental policies in the US after it abandoned the Paris Agreement and announced a revision of the emissions-standard goals applied by the Environmental Protection Agency during President Barack Obama's administration are contributing factors.

"Mexico will have to compete against the rest of the world to maintain its share in a relatively flat market," says Vildoza. Its capability to do so, however, will depend on how willing companies are to shift their existing platforms in Mexico. Some manufacturers, such as Honda and FCA, already manufacture larger models in the country. Toyota, on the other hand, shifted its production plans for Guanajuato to produce Tacoma pickups instead of the previously scheduled Corolla. But not all companies are responding in an equal fashion. "Ford, for example, canceled its manufacturing investment in San Luis Potosi because it saw there was no point in producing 400,000 passenger cars if the US would not take them," says Vildoza.

It will take some time before the market stabilizes to its true levels but there are already signs of deceleration in the manufacturing market. Between January and July 2018, production numbers reached 2.25 million units, which were only 0.1 percent above the results from the same period in 2017. Exports, however, remain strong with an increase of 8.1 percent between January and July 2018 compared to 2017, even without Nissan's export numbers, which the company stopped reporting in April 2018.

LIGHT-VEHICLE PRODUCTION, EXPORTS AND SALES (million units)



Source: AMIA



SUCCESSFUL RESULTS, POSITIVE OUTLOOK

ILDEFONSO GUAJARDO
Minister of Economy

Q: As the Peña Nieto administration comes to an end, what message would you give to current and potential investors in the Mexican automotive industry?

A: In recent years, Mexico's automotive industry has reached record levels for light-vehicle production and exports. Between 2013 and 2017, production achieved growth of 36 percent and exports of 38 percent. In 2017, the automotive industry, including light and heavy-vehicle production as well as auto parts, represented 3.5 percent of the national GDP and 20.2 percent of the manufacturing GDP. Meanwhile, automotive exports amounted to 32.4 percent of total manufacturing exports and 28.9 percent of the total national exports, with an approximate value of US\$118.2 billion. This allowed Mexico to become one of the main automotive hubs in the global market in 2017, ranking seventh in terms of production and third in exports.

Our expectations for Mexico's automotive industry remain positive and our forecasts show that by 2020, light-vehicle production could reach 5 million units per year. Furthermore, we expect the country will maintain a strong performance in auto part and component production. My message for investors would be to remain confident about the Mexican automotive sector. Investing in the national industry will continue yielding positive results but it is imperative that both industry and investors adapt to the complex global environment.

Q: What are the main areas of opportunity that need to be addressed in Mexico to improve the local supply chain?

A: Even though the automotive industry had an exemplary performance during this administration, there are still areas of opportunity to be addressed to increase the country's competitiveness and strengthen Mexico's position as one of the main investment destinations, especially with the emerging trends in auto manufacturing.

The latest investments arriving to the country for vehicle assembly, including companies such as BMW, INFINITI, Daimler, Kia and Toyota will increase demand expectations on auto part production. Despite many of the largest auto part companies from North America and Europe having already set up shop in Mexico, there is still an opportunity to attract investment from Tier 1 Asian enterprises. Furthermore, Mexico needs to grow its supplier base at the second and third levels of the value chain, prioritizing providers of raw materials and tooling components. It is necessary to develop the supply chain by type of process, boosting growth of all kinds of suppliers, while promoting quality certifications and specialization among all players. Another strategic move to strengthen and diversify the automotive supply chain would be to reduce the existing gaps between the industry's human capital requirements and what is offered by technical and professional academic institutions.

Q: What conditions must be met for the automotive industry to remain a pillar in Mexico's economy?

A: For the industry to remain a pillar of the Mexican economy, global markets must remain open. In addition, the country must strengthen the capabilities of its local industry, including infrastructure development and human capital availability based on the profiles the industry demands. In order to do so, appropriate human capital development must be a priority, especially to adjust their skills to meet Industry 4.0 productive trends. At the same time, innovation is essential to escalate the industry toward higher value-added activities.

Q: How far along is Mexico in its journey toward being an advanced manufacturing and engineering destination?

A: R&D centers in Mexico are now specialized in research and testing projects with global reach, virtual design, project management, prototyping and emission analyses, as well as design and engineering of automotive components, systems and subsystems. Promotion of these types of activities will lead Mexico to a more relevant position as an automotive design and production hub capable of catering to the latest technological developments and adhering to the strictest environmental regulations.

Ildefonso Guajardo was appointed Minister of Economy on Dec. 1, 2012. Originally from Monterrey, Guajardo has also served as President of the Economic Commission and Coordinator of Business Relations during Enrique Peña Nieto's presidential bid

'LIGHT' STRATEGY EMPOWERS INDUSTRY

ROGELIO GARZA

Deputy Minister of Industry and Commerce



Q: What is the Ministry of Economy doing to incentivize the development of Mexican suppliers?

A: Since large companies have the resources to grow and insert themselves into the production chain, our main focus has been on SMEs. We launched the ProAuto program as a way to support companies to become part of the automotive production chain. However, this administration implemented a “precise-shot” strategy to give priority to companies that focused on areas of opportunity for the country. We no longer hold massive events hoping to find one or two suppliers to develop. Instead, we go directly to OEMs and large Tier 1 suppliers and ask them to identify potential local suppliers. With this list of candidates, we pinpoint what companies need to improve to become part of the production chain, whether it is certifications, equipment or production volume, and we work with Bancomext or CONACYT to support them. We have already approached FCA, GM, Bosch and Continental with this strategy and suppliers know they will get a contract once they finish with their improvement process.

Q: What has been the biggest success of the current administration regarding the automotive industry?

A: Our biggest success has been defining the areas where we need to invest thus attracting more investment to the country. Mexico received significant investment in the automotive sector in past years but during this administration, many companies arrived to the country knowing they would find the right conditions to grow their investment. Our “light” industrial policy has been key to helping the industry without interfering in matters where we should not participate. We have built strong relationships with academic institutions to develop capable talent, we have spurred innovation and fostered an environment for R&D and engineering capabilities and we have laid the foundations for strong collaboration between companies, thus leading to successful clusters in the north and in the Bajío region.

Q: How much did the government advance toward its goal of incrementing R&D expenditure to 1 percent of GDP?

A: We are currently at 0.9 percent, which is certainly not in line with what we are trying to achieve as an industrial

country. We started our participation in the industry as a low-cost manufacturer and gradually advanced to high-value operations. The next step for the country is to attract new investment focused on design, R&D and engineering, moving to the top tier of the manufacturing chain. Our goal is to design more cars and more auto parts locally and have more prototyping and testing centers but to do that, we need to invest in our talent and in supporting companies to engage in R&D activities.

We cannot neglect traditional manufacturing activities since they are a solid source of employment. However, we can gradually evolve to participate in higher-value and high-tech production. Moreover, it is far easier to retain foreign projects when the company has its design operations in Mexico rather than just component production.

Q: How is the Ministry of Economy supporting providers in the shift toward electrification?

A: As a country, we are fully committed to the Paris Agreement and our strategy to reduce polluting emissions. This involves not only manufacturing operations but also carbon emissions from the national vehicle park. The future is electric for the automotive sector and within our “precision-shot” strategy, we have opened a specific division for suppliers wanting to participate in the electrification trend. Soon, Mexico will start manufacturing electric light-vehicle models and that will force us to move ahead with supplier development strategies for these types of components.

Electrification will bring new business opportunities as demand for these vehicles grows and we must take advantage of our position as manufacturers to make the best of this new trend. As a government, we must be agile enough to support this transformation and integrate more suppliers to the production chain.

Rogelio Garza is the Deputy Minister of Industry and Commerce at the Ministry of Economy. Previously, he was Deputy Director General of International Trade Negotiations and Subdirector of Negotiations in the Automotive and Electronics Sectors



INTERESTING TIMES AHEAD

EDUARDO SOLÍS

Executive President of AMIA

Q: What should the industry prioritize to ensure continued growth?

A: One priority should be to strengthen the domestic market. We need a healthy domestic market to keep boosting the industry and so far, 2018 has seen a deceleration in sales of almost 10 percent. Just like Chile and Argentina, what we need is to sell 20 new vehicles per 1,000 inhabitants and today, that rate is at 13 vehicles per 1,000 inhabitants. Controlling used-vehicle imports from the US is also critical because it has been one of the main contributors for domestic sales growth. Even though this has not been an excellent year, for the past three years domestic sales have thrived thanks to strict controls at the border and a strong financing strategy.

The Mexican industry must advance its position in the value chain. We must also bet on local engineering by investing more in R&D activities. Today, we are the industry that demands the most resources from CONACYT.

Q: What would you say to investors to assure them about Mexico's position in the global automotive industry?

A: Mexico is ranked fourth in light-vehicle exports and we are tied with South Korea in sixth place in light-vehicle production. The country has demonstrated its capabilities as a competitive automotive hub and now our goal is to define the best way to face the current trade challenges including the possibility of new tariffs that could be implemented by the US on vehicle imports, similar to those the country slapped on steel and aluminum following Section 232 investigations on national security. These are interesting times and particularly now, many changes are coming. Whatever we can tell investors today could change in the following months and they must be aware of that. Nevertheless, we are optimistic about the future.

The Mexican Association for the Automotive Industry (AMIA) is a civil association formed in 1951 with the goal of representing the interests of vehicle manufacturers established in Mexico

Q: What diversification opportunities will the CPTPP agreement create for the Mexican industry?

A: We must recognize the real opportunities that this agreement will create for the automotive sector. Our biggest commercial relationship with the existing CPTPP members is with Canada and Japan at the moment and we already have a pre-existing agreement with the latter. Australia or Malaysia could present interesting opportunities but we are talking about countries with markets of between 1 million or 1.5 million units where we have no presence. Whatever sales we can generate will not solve our dependence on the US market. It is interesting to open new markets but these will not be substantial, at least in vehicle production.

Q: How can Mexico bolster its local supply-chain and grow its global production presence?

A: Mexico has a strong and capable Tier 1 supplier network, with practically 95 percent of all companies in the world already present in the country. However, at a Tier 2 level, 85 percent of the needs of Tier 1 suppliers can only be met through imports. Machining, forging, foundry, plastic injection, stamping, molds and tooling are among the gaps that the national industry must fill. Therefore, to strengthen the local supply chain and grow our competitiveness as an automotive hub, we must promote investment from Tier 2 companies and support growth of local family-owned companies and SMEs.

Q: What are your overall expectations for production and export results?

A: It is difficult to make a forecast given the complicated global scenario we are facing. As of June 2018, US President Donald Trump was still threatening to close the border and slap tariffs on vehicle imports from Canada and Mexico. We are on the brink of a pointless trade war that clouds whatever prediction we might make. If no Section 232 measure is implemented, we still see a possibility to reach production of 5 million light vehicles by 2020 and exports of over 4 million units. So far, we are producing over 4.1 million vehicles yearly, both light and heavy, and exporting over 3.3 million.

LEVELING THE FIELD FOR QUALITY SPARE PARTS

ÓSCAR ALBIN

Executive President of INA



Q: What is INA's role in making sure quality components have an even playing field to compete against cheap, low-quality imports?

A: Considering the country is more price sensitive than the US or Canada, many users prefer to keep their vehicles, trucks and buses on the road by using low-quality parts even if it is only for short periods and puts the vehicle at high risk of breaking down. INA is pushing for quality norms in Mexico that regulate the entrance of cheap, low-quality products into the Mexican aftermarket. As an association that represents Mexico's auto parts companies, INA works with the Ministry of Economy's General Directorate of Norms to develop these standards.

Several norms to regulate vehicle security standards and emissions have already been introduced. Norms on brake pad quality are in place and we are working on a new norm for vehicle dampers. These norms will ensure imported auto parts meet basic standards and will act as a nontariff barrier against the sale of low-quality spare parts. We cannot produce norms for every component family in the Mexican aftermarket, so our main focus is on critical parts that impact passenger and pedestrian safety.

Q: What aftermarket segments and components have the most pressing regulatory needs?

A: INA works toward the development of regulations that focus on important products for the aftermarket. In collaboration with the Ministry of Economy, we have developed voluntary technical norms or NMXs on filters and brakes that we expect will soon become an official and compulsory norm or NOM. The next norms will focus on dampers and tie rod ends and eventually vehicle lighting systems.

Q: How can stricter emission regulations in Mexico impact the local aftermarket?

A: These norms have a positive effect because vehicles will have to be thoroughly repaired in a timely manner to be allowed on the road. Using the wrong spark plug or a bad catalytic converter will prevent these vehicles from passing inspections. This process will boost sales of ignition, exhaust and injection system components in the Mexican aftermarket.

Q: How might the downturn in sales of new vehicles that started in 2H17 impact the Mexican aftermarket?

A: Changes in light-vehicle sales normally impact the aftermarket after three years. During their first three years of use, vehicles demand simple maintenance such as change of oil and regular components such as filters and perhaps brake pads. Repairs also generally take place in dealerships that use original equipment parts. After this and when vehicles lose their warranty, users start taking their vehicles to independent shops and use components from independent brands. At the moment, the vehicles going through this transition are those that were sold in 2015, which was a good year in terms of sales and thus will generate large revenues for the aftermarket. Since 2016 was a record year with sales of 1.6 million units, 2019 will also be a great year for independent brands and workshops in the Mexican aftermarket.

Q: How important is the development of e-commerce for the Mexican aftermarket?

A: For a domestic market with sales of approximately 1.5 million vehicles per year, Mexico has a huge variety of brands, models and vehicle versions. Knowing what spare part is necessary for each vehicle plays a key role in the aftersales market and access to digital catalogues is essential for consumers.

Q: What do Mexican auto parts manufacturers need to do to supply more cost-competitive components to OEMs?

A: There is no such thing as a bad automotive supplier since companies without the necessary standards rarely survive for more than two years. Good Mexican auto parts companies wanting to become excellent suppliers need to make constant reinvestments. All players must remain updated in areas of quality and cost, which means they cannot allow themselves not to invest in new equipment. Any company wanting to remain afloat needs to deliver enhanced productivity at lower costs.

The National Auto Parts Industry (INA) is an association that represents auto parts manufacturers. It promotes the growth and development of its member-companies in the original equipment and aftermarket segments



DRIVING SIX YEARS OF AUTOMOTIVE GROWTH

MIGUEL MÁRQUEZ MÁRQUEZ

Governor of the State of Guanajuato

Q: What would you consider the highlights of your administration regarding new investment?

A: In terms of foreign direct investment, we had projected a total of US\$5 billion by the end of the administration but we will close our six-year period with almost US\$13 billion in new projects. Consequently, we have had a great impact on the state's unemployment rate, driving it down to 3.5 percent, which is barely above the national average of 3.1 percent. Guanajuato has recently been among the main states regarding job creation and by the end of the administration, we will have generated 300,000 new positions. Only in 2017, 62,000 new jobs were created, leading to an average of 50,000 new positions per year.

Q: How have you helped Guanajuato become a pinnacle of the automotive industry in Mexico?

A: Human capital has been key for the development of Guanajuato. We are now the leading state in terms of training and in the opening of academic slots due to the industry's talent demand. At the same time, educational institutions are gradually adapting their programs based on what companies require and our offering of robotics, nanotechnology, aeronautics and pharma engineers has increased considerably.

We have also worked extensively to ensure new investments have strong support. We wanted to close the administration with seven new industrial parks and the end result was 27 and an additional offering of 2,000ha of available space. We are growing beyond the traditional industrial corridor, offering companies new areas in the north and south of the state where there is more available talent looking for job opportunities.

Q: How is Guanajuato helping SMEs to adopt digitalization and technology into their processes?

A: In 2017, Guanajuato was the first state in the world to declare a year focused on innovation. We collaborated with UNESCO

to diagnose how the state was doing regarding technology and what we want to achieve by 2040. This initiative went beyond the industry and included cultural, sports, agricultural and other elements that could help Guanajuato reach the concept of Industry and Company 4.0. We also organized the Innovation Forum, which was one of the most important technology events in Latin America, and we established the basis for this to be an annual event in Guanajuato.

We want the state to be committed to the idea of Industry 4.0. Today, we have eight innovation parks, supported by a strong network of universities and research institutions. Moreover, Guanajuato is third for patent registrations nationally according to the Mexican Institute of Industrial Property and first in GDP generation due to patent registrations according to UNESCO. We went from zero innovation in the state to leading our nation's committee to the World Educational Robot Contest with nine students from Guanajuato out of the 15 that traveled to Shanghai to compete.

Q: How are you ensuring continuity in Guanajuato's investment promotion strategies?

A: Investment promotion is not only dependent on state policies and all investment projects are approved by a citizen's council. That being said, Guanajuato offers legal certainty above anything else. According to the National Institute for the Consumer, we are among the Top 3 states for contract fulfillment. As a result, companies know that whatever contracts they sign with this administration will stand once the new government arrives. We also offer certainty based on the development plan we have structured for 2040, which helps investors understand where the country will be in the next couple of decades. Lastly, according to INEGI's last census, Guanajuato appears to be the region with least corruption in the country thus providing transparency in every process a company must follow with the government.

We expect all these factors will offer certainty for investment to continue arriving to Guanajuato after we leave office. We have 100 pending projects to bring new investment to the state, 70 percent of them oriented to the automotive industry.

Miguel Márquez Márquez is a Mexican politician affiliated with the PAN party. He has been Governor of Guanajuato since 2012. Previously, Márquez was mayor of the Purísima del Rincón municipality

ENSURE COMPETITIVENESS THROUGH TECHNOLOGY IMPLEMENTATION

FIDEL OTAKE

President of CLAUGTO



Q: How has supplier integration evolved in Guanajuato and how is CLAUGTO supporting this process?

A: Integration into local supply chains has advanced. OEMs have a time frame of five years to establish their local supplier networks and that has given us enough time to grow the participation of local companies. Many Tier 2 businesses are expected to set up shop in Guanajuato by the end of 2018 and our focus at the moment is to support SMEs that want to participate more actively in global supply chains.

We are organizing several events to promote supplier integration in Guanajuato and in our neighboring states. We have also developed a system to evaluate the level of maturity of local suppliers, coupling that with trainings and coaching programs during the year to connect the needs of OEMs and Tier 1 companies with the available capabilities in the local supply chain.

Q: What impact will Toyota's upcoming operations have on the state?

A: Toyota's operations will bring a new wave of investment to the state. We expect the company will start operations by the end of 2019 and many new Tier 1 companies will accompany the OEM to support its operations. Companies in Guanajuato are already strengthening their own operations to prepare for when Toyota arrives but newcomers will have to set up shop quickly to be ready when the company starts ramping up its operations.

Q: How has CLAUGTO addressed the challenge of security concerns in Guanajuato?

A: Security has become a key topic for our human resources committee. This became such an issue for companies in the state that we had to create a subcommittee focused on asset protection. We are exchanging information and analyzing the state's situation along with the government, as well as the state and municipal police forces to determine the best strategy going forward.

Q: What impact are you expecting from the current trade uncertainty between Mexico and the US?

A: Our productivity and competitiveness will help us face whatever challenges we might face. As long as companies remain strong and focused on their operations, we will not be fazed by external tariffs. To this day, many plants in Guanajuato have been recognized by their global headquarters thanks to their productivity levels and that puts Mexico in a good position within the global industry. Our focus now should be on technology integration, both in product and manufacturing processes. Within the cluster, we also have a committee focused on technology and innovation. Product-engineering directors and manufacturing leaders gather periodically to create synergies with research institutions to accelerate technology-development processes. Our role in this is to help the private sector connect with the government to ask for funds and resources for technology development, as well as helping companies access new technologies.

Q: How is CLAUGTO helping companies embrace the Industry 4.0 trend?

A: Industry 4.0 will shape the future of the sector. This is a global trend and if we want to remain competitive, the only way is to implement technologies that ensure traceability, efficiency and data management. In 2018, we are launching the 4.0 Smart Industry program with several industrial institutions to help local suppliers become part of this revolution.

Q: How is the cluster incentivizing investment related to R&D and engineering activities?

A: To incentivize this, we can work with local research centers so they focus their operations on the needs of the industry. In this way, companies know their design operations will be supported by a local player. To that end, we are working with the state government to create an R&D center focused exclusively on supporting the automotive sector.

The Guanajuato Automotive Cluster (CLAUGTO) was officially presented in 2012 as a civil association made up of six committees focused on preserving and promoting the development of the automotive industry in the state



MEXICO AUTOMOTIVE *summit* 2019

**SHERATON MARIA ISABEL,
MEXICO CITY,
SEPTEMBER 11, 2019**

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Hosted in Mexico City, Mexico Automotive Summit brings together the premier national and international players driving the transformation of Mexico's automotive industry including the interviewees featured in Mexico Automotive Review. This one-day summit features constructive debate on key topics, combined with targeted networking opportunities, and elaborates emerging business prospects.

The topics to be discussed include Mexico's growth challenges, technology and innovation strategies and both public and private perspectives on achieving success. Ranging from the manufacturing opportunities for both OEMs and auto parts suppliers, the challenges in the optimization of the supply chain, to the uncovering of real-estate and logistics solutions, Mexico Automotive Summit will garner detailed insights direct from the industry's primary stakeholders.

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Mexico Automotive Summit will also mark the launch of Mexico Automotive Review 2018, the most relevant and comprehensive overview of the Mexican automotive industry, based on face-to-face interviews with more than 180 business and political leaders who are shaping the industry's development. Mexico Automotive Review 2018 is destined to serve as an essential decision-making tool at this time of growth and opportunity and will be gifted to all attendants of Mexico Automotive Summit.



“ Forums like this give the chance to discuss the trends of the segment, the trends for the industry for the future, to hear different opinions, to share experiences. It is really a top event.”

Enrique Enrich, Managing Director of Scania Mexico



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GOING AGAINST THE TIDE

MIGUEL BARBEYTO

President of Mazda de México

Q: How is Mazda innovating to differentiate itself from other brands and attract new customers?

A: Mazda is more interested in maintaining its market share than in higher sales volumes. Even though the market contracted in 2017 and continues to decelerate in 2018, we have protected our 3.5 percent market share. By offering quality vehicles and covering all steps in the sales process we can ensure client satisfaction. It is crucial that clients are treated well when they arrive to dealerships, that they receive follow-up from salespeople and that they are presented with the various options to purchase vehicles either through cash or credit. Our whole business is oriented toward our clients and they need to know all the advantages that Mazda offers in terms of service, guarantee, spare parts and service. Since we consider our distribution partners as clients as well, we make sure they are in the best condition to service the end consumer. Our aftersales collaborators must be able to welcome clients, tell them when their vehicles will be ready for pickup and follow up when necessary. Spare parts managers must keep tight control of stock, warranty managers must offer a solution that matches the client's situation and technicians must repair Mazda vehicles well and at the drop of a hat.

Q: Each brand has a unique perspective regarding electrification. What is Mazda's vision on the car of the future?

A: As part of its commitment to society and the planet, Mazda strives to reduce its emissions and to improve vehicle performance. We adopted the well-to-wheel strategy to assess how much a vehicle pollutes from the moment it is produced to the moment it is discarded. EVs and hybrids may pollute less than fuel-powered vehicles when driven but are more harmful in the big picture because their batteries are highly polluting when they are discarded.

Mazda still believes in the internal combustion engine and we are investing in technology to boost engine efficiency. In 2012, Mazda launched its SKYACTIV technology, which included new engines, chassis structures, gearboxes and body frames. This platform helped us increase fuel efficiency and curb emissions without compromising our vehicles' performance. In 2017, we delivered the SKYACTIV-X engine. Despite its two-liter configuration, this new engine performs as a 2.5-liter and offers the advantages of both gasoline and diesel, thus further reducing emissions while increasing efficiency and performance.

Q: What impact does demand for Mazda vehicles abroad have on Mazda's assembly operations in Salamanca?

A: In terms of production, 140,000 units came out of Mazda's Salamanca assembly line in 2017. Though this plant has the capacity to ramp up production to 250,000 units a year, growth in production will largely depend on demand in foreign markets. Demand for Mazda vehicles in the US flatlined in the first two months of 2018 but experienced slight growth in March. On the other hand, the European and Canadian markets have grown, so we expect Salamanca to keep ramping its operations. This facility is Mazda's first manufacturing location outside of Japan and it is already functioning at optimal levels just four years after its inauguration.

Q: What opportunities exist for Mazda to grow its local content sourcing?

A: Both foreign and local suppliers have developed well in the Bajío so the opportunity is there. Having a local sourcing strategy will always prove advantageous due to the logistic advantages this offers and there are still opportunities for more local companies to integrate into our supply chain. Quality, short response times and support are areas of opportunity for new companies to compete against players with more experience in the market. The industry is becoming increasingly demanding and suppliers must have enough experience to not compromise OEM production or force companies into a recall. Mazda is open to growing its local supplier base. That being said, in terms of product costs, having a local or a foreign provider makes little difference considering that most components are priced in dollars.

Mazda de México is the local subsidiary of Japan-based Mazda Motor Corporation. The company has manufacturing operations in Mexico in Salamanca, Guanajuato, where the Mazda2 and Mazda3 models are produced

BUSINESS STRATEGIES THAT BEAT THE TIDE

LEANDRO RADOMILE

Managing Director of MAN Truck & Bus México



Q: What does Volkswagen's new partnership with Navistar imply for MAN's operations in Mexico?

A: Having a partner with significant presence in North America such as Navistar is a key step toward Volkswagen Truck & Bus becoming the main global producer of heavy vehicles. Volkswagen was on the lookout for the best collaboration alternatives and it created a joint venture with Navistar to pursue two objectives: to promote joint technical development and to improve purchasing operations. The final goal of this interaction is having a company that looks for new synergies, growth opportunities and better purchasing options. Each of the 12 brands that comprise the Volkswagen Group will keep its own identity, however. There is a common force behind them that enables the group to remain competitive, but each one is unique in the eyes of the client. Volkswagen Truck & Bus is no exception and regardless of our partnership with Navistar, the company will hold on to its market position and continue competing. Similarly, we will keep working and defending our own brand's characteristics in Mexico.

Q: Production and sales of heavy vehicles faced a tough year in 2017. How has MAN Truck & Bus performed?

A: 2017 may turn out to be the best year in terms of sales for MAN Truck & Bus. The heavy vehicle sector registered a 5.2 percent drop in 2017. The most significant drop was in the truck segment while the bus market remained firm. However, MAN Truck & Bus saw an increase in sales volume of 22 percent compared to the numbers of 2016. If we divide our growth by segment, MAN will reach 48 percent growth in the truck sector and 7 percent in the bus sector.

Q: What level of growth is MAN Truck & Bus expecting in 2018?

A: There is plenty of uncertainty for 2018 because of the NAFTA renegotiations and the effect of presidential elections in Mexico. We understand NAFTA is a 25-year-old treaty that needs to be modernized. There will be a revision but we understand that trade between Mexico and the US in the heavy vehicle sector will not be strongly affected. Mexico is the greatest exporter of articulated trucks in the world and 90 percent of these exports are directed to the US. Also, 50 percent of the parts for these vehicles are manufactured in the US.

If we keep our sales volume steady, it will be a positive year. I am not overly worried about the drop in sales in 2017 because the industry's slowdown was foreseeable. I expect the year to finish with sales falling 3-5 percent, mainly because of the good results the industry enjoyed in 2016. The last two months of that year resulted in record-breaking numbers because of advance purchases attributable to uncertainty with President Trump's discourse. Over 5,500 units were sold only in December. To put results in perspective, a 5 percent drop in 2017 would still mean growth of between 8 and 10 percent compared to 2015, which was a more stable year.

Q: What new products and technologies is MAN Truck & Bus bringing to the table?

A: We launched our highest number of new products for the decade in 2017. We released the new Delivery vehicle family comprising six new models that required a US\$350 million investment from our headquarters. This line includes a prototype of the first 100-percent electric light truck developed by Volkswagen. This truck is already being tested and we expect it to be mass produced by 2020. The company is also introducing products equipped with technology that meets Euro VI emissions requirements.

In the bus segment, we launched the Volkswagen 14.190 SCD bus. Approximately 50 percent of Mexico's buses are Class 7, weighing between 12 and 15 tons, including semi-forward-control (SCD) buses that account for sales of between 3,500 and 4,000 units a year. The 14.190 SCD is our bet in this segment and it was a model specifically designed for the Mexican market. MAN is introducing the latest diesel, electric and natural gas technology in the heavy vehicles sector. Diesel motors will never die off, they will co-exist with new technologies. We will launch a new natural gas Constellation unit with a Euro VI engine that the company previously tested in Brazil.

MAN Truck & Bus is a subsidiary of the Volkswagen Group. Headquartered in Germany, the company focuses on the production of buses and both light and heavy trucks. In Mexico, the company manages Volkswagen and MAN brands

A GLOBAL EFFORT

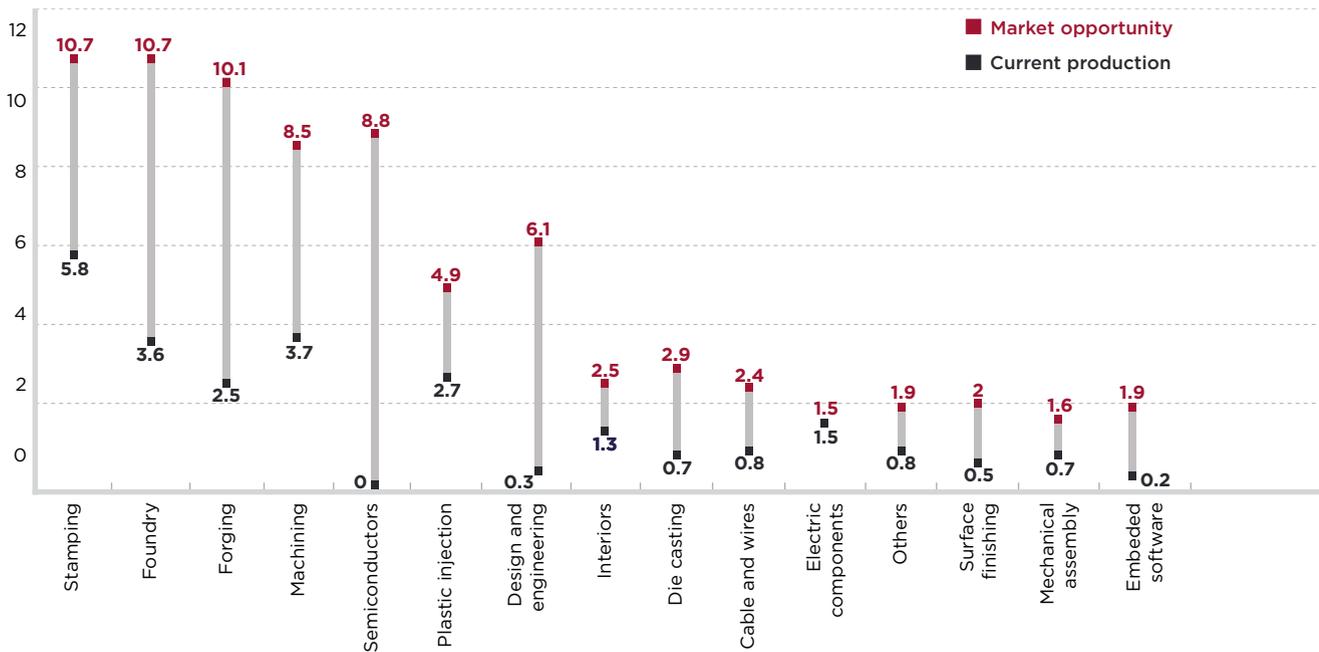
Mexico has attracted investment from all over the world in the auto parts sector, mainly from Tier 1 and Tier 2 companies looking to support OEM operations, leading to an industry worth US\$87.7 billion by the end of 2017.

However, there is still opportunity for the country to develop its global supply chain, mainly in the lower tiers of production. Areas such as raw-material supply and electronic-component assembly, as well as die and mold manufacturing and maintenance remain areas of opportunity where more local and international companies can grow.

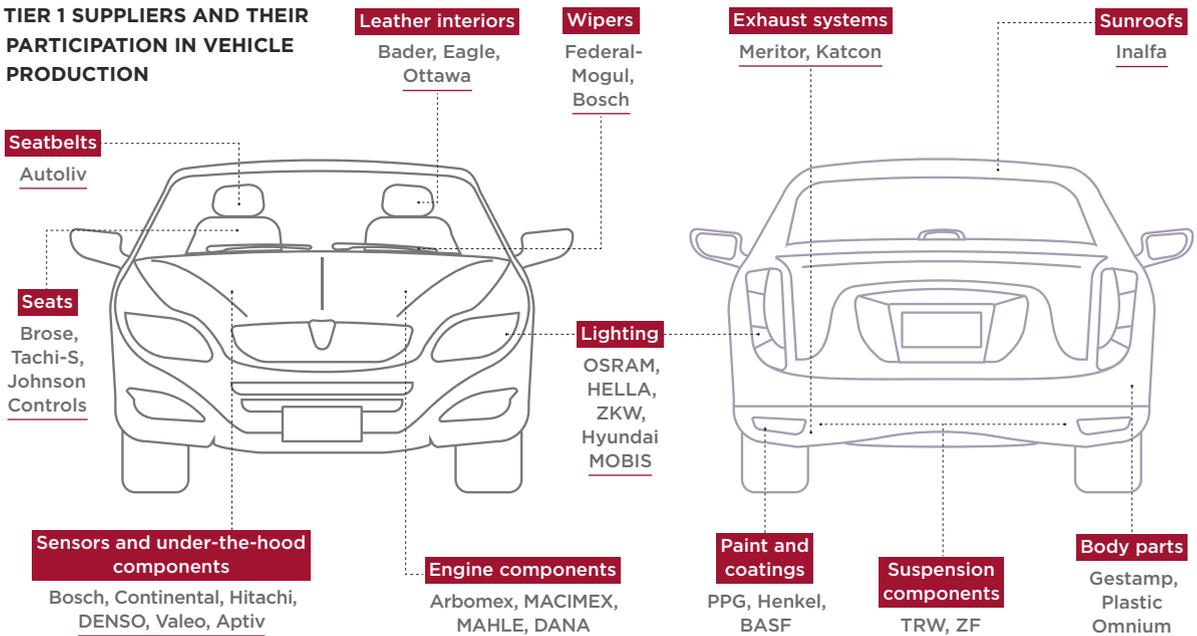
TOP GLOBAL SUPPLIERS BY SALES

3	Magna	Canada
7	Hyundai MOBIS	Korea
9	Valeo	France
10	Faurecia	France
16	Yangfeng Automotive Trim Systems	China
21	Aptiv	Ireland
23	Samvardhana Motherson Group	India
24	Autoliv	Sweden
26	Plastic Omnium	France
28	Gestamp	Spain

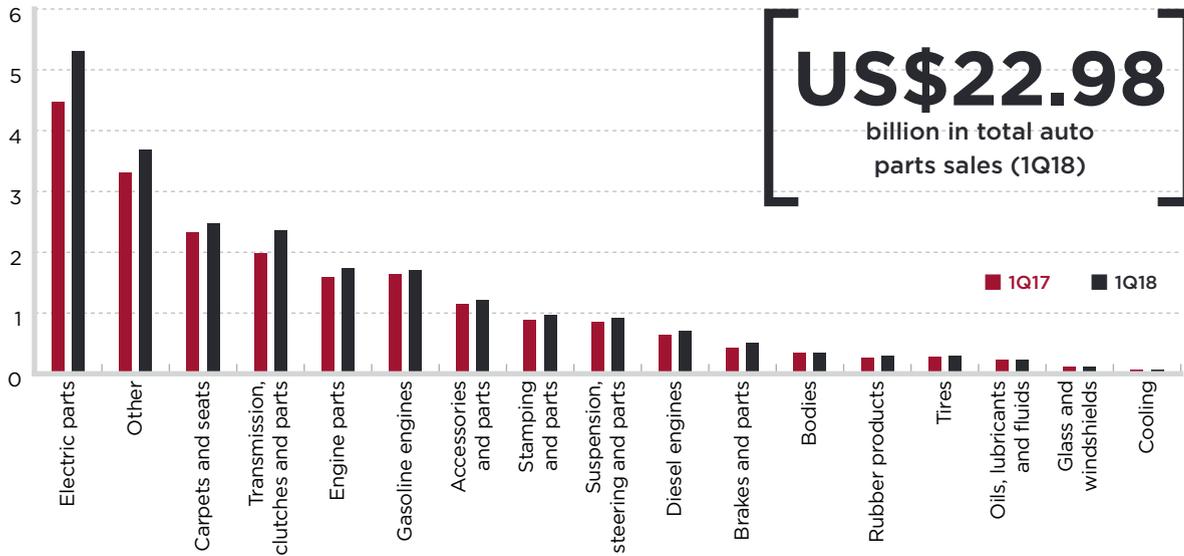
MARKET VALUE AND INVESTMENT OPPORTUNITIES IN MEXICO'S SUPPLY CHAIN (US\$ billion)



TIER 1 SUPPLIERS AND THEIR PARTICIPATION IN VEHICLE PRODUCTION

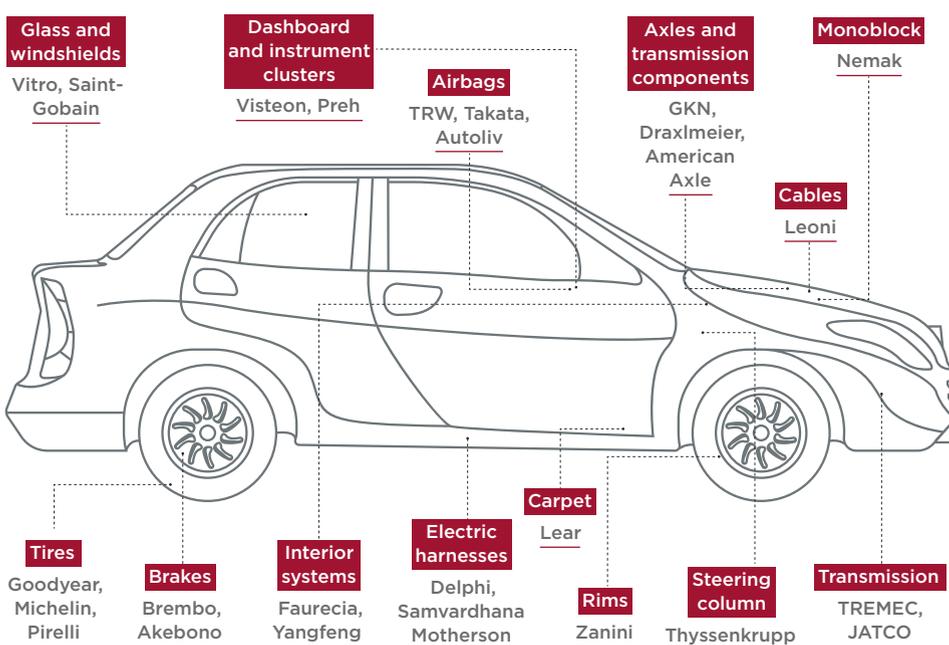
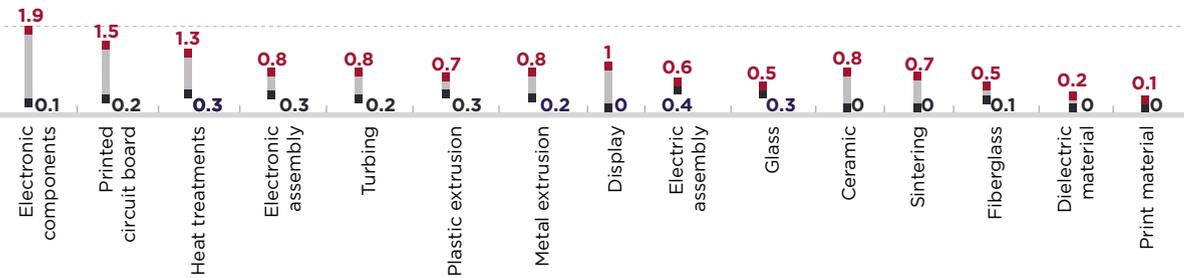
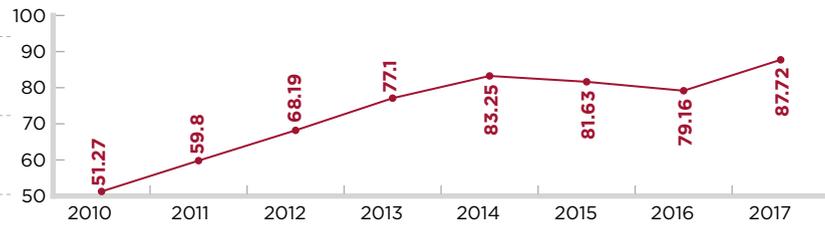


AUTO PARTS PRODUCTION (Jan-Mar)



1.5%
participation of the auto parts sector in national GDP

YEARLY AUTO PARTS PRODUCTION (US\$ billion)



HOW POSITIVE IS YOUR COMPANY ABOUT INVESTING IN MEXICO?*



- 62.4% Very positive
- 25.5% Positive
- 0% Not positive
- 7.3% No answer
- 4.8% N/A

Source: INA, Automotive News 2017, ProMéxico, INEGI 2014

*Mexico Automotive Review 2018 interviewee survey



AN OPEN MIND KEY FOR BUSINESS SURVIVAL

MARIO RODRÍGUEZ

CEO of Arbomex

Q: What advantages can foreign investors gain from local players with design and engineering operations?

A: Besides being a more profitable country in terms of costs, one of Mexico's biggest advantages is the continuous training of technicians and engineers focused on advanced technology, coupled with the establishment of engineering and design centers from local and foreign companies. Mexico is advancing toward a more technological participation in the automotive production chain thanks to the support of private companies, universities such as ITESM and IPN, as well as government R&D centers.

Q: How has Arbomex grown its collaboration with universities and R&D centers?

A: We are in the middle of an ambitious project to develop an iron camshaft which could compete with steel in automotive internal-combustion engine applications. We named this material *Acehierro* and our camshafts derived from it will lead to lower production costs, thus giving us an opportunity to grow our market share. We established a collaboration agreement with IPN in August 2017 that assigns us Ph.D. graduates in the topic of metallurgy. They have oriented us in our material development process and now we are testing our components at IPN's laboratories.

Q: As a leading Mexican Tier 1 player, what advice would you give to new local players?

A: The biggest challenge for companies is to gain clients' trust. In our case, being the camshafts manufacturers of choice, we deliver added value in terms of quality, cost, technology and timely deliveries. Local players must be ready to demonstrate that they can offer an added value to their clients. At the same time, companies must be open and creative enough to showcase their products and technology in other industries besides automotive. We work with the

highest quality standards in the manufacturing sector, which can be applied to many different industries.

Q: What strategies does Arbomex have regarding diversification?

A: Internal combustion technology is not only applicable to the automotive industry. Many products such as lawnmowers and tractors also use the same systems. We are trying to attack this niche and we are showcasing our products and technology with the same level of quality and highest standard of performance that we deliver to other industries. As an example, we are already collaborating with Kawasaki Motors Manufacturing Corporation.

As an automotive supplier, the main advantage we can offer to clients in these new segments is our experience in quality and repeatability in our production process. Our cost structure has already been depurated to the minimum and our parts-per-million scrap generation is minimal, thus giving us an edge over any competitor in the market. We also have the advantage of being vertically integrated with foundry, machining and sub-assembly operations, which allows us to control the entire manufacturing process of our components from casting to machining.

Q: What are Arbomex's growth expectations and what are your plans regarding inorganic growth in other regions?

A: We expect a good year in 2018. We are in the middle of a renovation tied with our strategic development plan set at the end of 2016. First, we are working on implementing a new foundry, which will bring more productivity, quality and cost competitiveness to our operations. We are working on ensuring repeatability throughout our entire process with the use of Industry 4.0 solutions. In terms of expansion to other regions, we are evaluating the Asian market. China is rapidly evolving, companies are making strategic decisions and the country is becoming the strongest economy on the planet. Meanwhile, India is also growing its presence in the global market. The US will always remain an important client for Mexico due to its proximity but we do not want to miss out on the opportunity to become suppliers for two of the strongest economies in the world.

Arbomex is a Mexican company that specializes in production of powertrain and chassis components, including camshafts, crankshafts, casted parts and precision machining parts. It mainly exports to North America and Europe

INVESTMENT, COLLABORATION FOR ONGOING INNOVATION

FRANK HEZEL

Vice President of BASF's Coatings Division in Mexico, Central America and Caribbean



Q: How is BASF ensuring a healthy innovation strategy to remain a leader in its business segment?

A: We want to challenge our own product portfolio to ensure increased sustainability and we strive for our innovations to be accelerators in the market. This is a clear strategy that represents an investment of €1.5 billion (US\$1.7 billion) annually in research activities. In 2016, 47 percent of our solutions had a positive sustainability impact and that figure grew to 56 percent in 2017. Our expectation is to keep transforming our portfolio, which in turn will also help us boost our accelerator rate, which now comprises 13,000 products in all industrial sectors we cover.

The company's long-term success, however, requires an alignment of our creative spirit with the market's actual needs. We have driven innovators in the company but it is not always easy to be disruptive without compromising the actual implementation of the solution due to an extremely high investment. Sometimes, instead of disruption you have to strive for gradual modifications. This is a constant struggle but we have an optimistic view because otherwise, we could not bring change to the industry.

Q: The company continues with a strong inorganic growth strategy exemplified by its recent acquisitions. How is that strategy impacting the coatings division?

A: Although BASF has strong technical capabilities, at times we have to evaluate if it is best to innovate by ourselves or if there is a company in the market that has something unique and that could add value to BASF's portfolio.

Q: In which technologies does BASF see the biggest opportunity to drive innovation and contribute to lightweighting and electrification in the automotive sector?

A: BASF has set ambitious objectives to remain ahead of all other chemical companies worldwide. As the market leader, we are one of the few companies that can support the automotive industry's ongoing innovation efforts. We are passionate about surface protection. Whatever technology goes into electric or lightweight components must be protected by paint. Our solutions must also ensure appropriate energy management to help the car heat or

cool, especially when there is no internal combustion engine to heat the system. Sound must also be controlled more efficiently to ensure the comfortable operation of a vehicle, as well as lighting to ensure optimal energy consumption.

Color, too, will maintain a high level of importance, considering that is what helps truly individualize a vehicle. Our goal, and what helped us win the iF Design Award, is that we blend design with functionality. Taking LiDAR as an example, paint has to be developed in a way that does not block the sensor's signal to ensure autonomous driving capabilities without compromising aesthetical appeal. Regarding lightweighting, our Performance Materials division has worked for several years to replace metallic substrates with polymeric and composite solutions. Our innovations have provided not only similar results to metallic components but in some cases surpassed the alternatives in terms of stress and endurance.

Q: As a leading German company investing in Mexico, what areas of opportunity have you detected in the local supply chain and how can you help address them?

A: There are already over 2,000 German companies operating in Mexico, generating more than 150,000 jobs, which clearly shows Germany's belief in the country's potential as an investment destination. BASF values self-learning and individual training with coworkers as the optimal tools to develop the Mexican workforce. We have created several mentoring and development programs for our employees, training Mexicans outside of Mexico so they can gain international experience, implement it in their everyday activities and share it with their peers. We believe that talent exists in Mexico. We are investing in training for our customers and by the end of 2018 we will re-inaugurate our training center for automotive refinishing in Toluca after a complete renovation.

BASF is a chemistry company founded in Germany in 1865. It has operations in over 80 countries and has been present in Mexico for over 50 years through its corporate headquarters for Mexico, Central America and the Caribbean



SHEDDING LIGHT ON MEXICO'S VALUE CHAIN

LUIS MORENO

SP Business Director of OSRAM México

Q: How is OSRAM planning to insert its lighting solutions into the assembly lines of newly-arrived OEMs?

A: As a Tier 2, OSRAM does not directly target OEMs; we target Tier 1 suppliers like HELLA and Valeo. Our strategy is to remain close to our customers and help them provide OEMs with a comprehensive product offering that solves their lighting requirements. As more European companies arrive to Mexico, we expect to continue growing alongside them. We also see many opportunities to collaborate with Asian companies. For instance, OSRAM is already collaborating with South Korean groups present in Mexico such as Hyundai MOBIS, as well as Japanese companies like North American Lighting, which is part of the Japanese Koito Group.

Q: How do you expect the automotive lighting market to evolve toward more innovative systems?

A: OSRAM is focused on strengthening its lighting system division, which we expect will gradually displace our mature markets. Products in OSRAM's traditional segments, such as halogens and incandescent lighting, have little room for technological development, so the company is targeting new products with increased efficiency. Light bulbs with a useful life of 1,000 hours will be substituted for others with twice that lifespan. Our traditional division is focusing on capturing market share in a technology area that already exists and in which we are very strong.

Q: What milestones has OSRAM reached by introducing more LED, OLED and other innovative products to the Mexican supply chain?

A: We have only included OLEDs in a few business platforms as we believe that OSRAM's future is in LED illumination, OS components integrated into automotive systems and self-driving technologies. We want to increase our participation in LED solutions oriented to illumination, signaling and movement detection, both with visible and

invisible light. Our solutions for self-driving technology are important for OSRAM and will continue to be for the next 20 years, but other segments are key for the short term. For instance, OSRAM focuses on developing interchangeable LED products through the standardization of LED-based light technologies through its Exchangeable Light Source (XLS) line. XLS will make the design and application of LED products less expensive and more efficient for OEMs.

Q: What challenges is OSRAM México facing in the current economic and political environment?

A: Uncertainty is having a heavy impact on the automotive market. Part of our business is oriented to the aftermarket, which has taken several hits from the troublesome political and economic environment reigning in Mexico. Some of our clients have stopped or reduced their investments in inventories because they do not have a clear image of what the future holds. In terms of original equipment, depressed vehicle production in the NAFTA region has impacted our releases of mature products. To counter this, OSRAM is focusing on the development of new OS products. We are pursuing an aggressive growth strategy in the original equipment segment. We should grow between 3 and 4 percent in original equipment, including both traditional and OS production oriented to the NAFTA region.

Q: What is OSRAM's strategy in the face of US tariffs on automotive imports and potential stricter rules of origin within NAFTA?

A: Our strategies target improved cost-competitiveness. OSRAM was already working to reduce its costs but President Trump's rhetoric has enticed us to pay greater attention to this area. OSRAM is also adding value to LED products made in Malaysia and incorporated into lighting systems here. This strategy could help us dodge the 25 percent import tariff that the US has levied on some Chinese products. By importing them to Mexico and adding value to them before exporting them to the US, we may be able to meet the necessary regional content to enter the US without paying tariffs. We are not letting NAFTA influence our decisions for the Mexican market, as we are working under the expectation that the deal will continue.

OSRAM, headquartered in Munich, has over 100 years of experience in the lighting industry. The company has a wide portfolio of visible and invisible light solutions for various applications, including automotive

DEVELOPING TALENT FOR A TECHNOLOGICAL FUTURE



Shinichi Nakamizo
President of DENSO México



Felipe Brondo
Corporate Vice President
of DENSO México

The industry may be moving toward a technological future but talent remains a key component in vehicle production. Depending on the low-cost nature of labor, however, will no longer be an option for companies wanting to remain competitive, according to Shinichi Nakamizo, President of DENSO México. “To be competitive in manufacturing activities, we need to invest in technology and develop the capabilities of our human talent.”

As a Tier 1 supplier of electronic components, DENSO México is no stranger to technology developments impacting the industry. The company has already set corporate goals to move toward electrification, automated driving and connectivity. Similarly, Nakamizo says DENSO has already implemented Industry 4.0 practices including Industrial Internet of Things applications and that has already permeated its Mexican operations. Overall, the company’s portfolio in Mexico includes 18 different products involving seven different business units, which means that for any new technology implemented, workers must be familiar with its functionality. “Our workforce must be knowledgeable and capable enough to manage and control advanced technology in electronics, mechanics and heat treatments,” says Felipe Brondo, the company’s Corporate Vice President.

DENSO México has strived to boost the competitiveness of its workers by offering training in new skills and the use of advanced technology. Among the strategies the company implements is the development of Kaizen Circles. “Each area in the production plant creates a team in charge of finding new ways to boost efficiency,” says Nakamizo. “Instead of being a top-down practice, Kaizen Circles are a bottom-up way of improving operations.” DENSO México has over 300 Kaizen Circles and every year it selects the best teams to compete in the National Kaizen Circle Competition hosted by the Mexican Association for Teamwork. The 2017 Kaizen Circles competition was held in Cancun and DENSO México was awarded four gold medals for its improvement models. “Kaizen Circles help our workers understand the concept of continuous improvement and let them reflect on the best way to solve a problem,” says Brondo.

DENSO México’s work with the local labor force has even won it recognition at an international level. In 2017, DENSO México participated for the first time in the WorldSkills competition, an event created by the international organization WorldSkills focused on promoting vocational education excellence among 75 countries through the implementation of best practices. “DENSO Japan has participated for many years in WorldSkills but this was the first time for Mexico,” says Nakamizo. The company took one representative from Mexico to Abu Dhabi to compete in the CNC turning division against 21 other countries, showcasing the capabilities of the Mexican workforce. According to Brondo, participating in WorldSkills was a perfect way to evaluate DENSO México’s capabilities against other global players. Meanwhile, for Nakamizo it was an opportunity to inspire the company’s workforce to keep pushing for better skills and competitiveness.

The company is not only working with the local workforce in-house. According to Brondo, DENSO México shares its best practices with partner suppliers and collaborates with universities and technical schools to boost the capabilities of the Mexican supply chain. Although DENSO México is constantly looking to grow its local supplier base, the lack of competitiveness among these players has been a challenge. “We are working with local service companies and suppliers of spare parts for our equipment but we still do not have many partners in component supply,” says Nakamizo.

The automotive industry relies heavily on globalization and local companies must now compete with countries such as Vietnam, Thailand, China and even suppliers in the US. This means that Mexican players must learn to improve their offering without relying solely on cheap labor. “The local supply chain is very limited at the moment,” says Brondo. Competitiveness is key for DENSO México and he says its suppliers must be ready to implement the latest technology and manufacturing systems. Similarly, he believes there are many companies that still need to refine their manufacturing practices and gain ISO, TS and other certifications. “Process know-how, technology and engineering are key factors to gain a place in the automotive market,” says Brondo.

MEXICO

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THE MANUFACTURING ROLLER-COASTER

VÍCTOR FUENTES

Director General of Mitsubishi Electric Automation Mexico / Latin America



Q: Automation practices are being increasingly implemented in Mexico. What are the potential associated risks?

A: I do not see risk in this process as much as I see opportunities for the industry to achieve a more agile competitiveness. Automation implies challenges, including the development of more local technologies and the training of specialists in products and solutions that boost productivity, process optimization and cost reductions. It also has an impact on jobs — or more accurately, the transformation of jobs — but Mexican companies are willing to change their production processes and make use of the workforce.

Automation is a large field in which we can advance in terms of integral automation of productive processes. This means having fully automated plants where, for instance, production lines that are usually controlled by 10 to 15 people will only need two operators. Process transformation implies greater investments in the personnel that will design, produce and operate these lines, but will also result in the development of specialized talent. It is no longer about having a worker tightening four screws eight hours a day but having a person who is designing new products and instrumentations to optimize the process adapted to a machine.

Q: How is Mitsubishi Electric making equipment more affordable for companies?

A: The company focuses on making our clients' ROI tangible and achievable from the moment a proposal is presented. Our value proposition is the lowest total cost of ownership. In simple terms: amortizing expenses at a lower cost during the useful life of a project or the components of the acquired equipment to positively impact asset management. Mitsubishi Electric supports its clients and advises them to take the best possible decision about automation-related investment costs. The keys to success are an assessment of production processes and the positive impact of automation investments, a lower ROI time and a lower total cost of ownership.

Q: How important is Mexico for the growth of Mitsubishi Electric?

A: Mitsubishi is about to turn 100 years old. 2020 represents an important milestone because it reflects the company's

consolidation as a world leader in technology development. There are five great technology suppliers on the planet. General Electric thrives in America, Siemens, Schneider and ABB do so in Europe while Mitsubishi Electric has Asia. China is our main market as it is the largest consumer of technology and components, Europe is our second-largest market and America is the third. Mexico's significance for Mitsubishi Electric lies in it being an emerging country with a planned and potential yearly growth of between 2 and 2.8 percent that could make it the eighth-biggest world economy. Mitsubishi Electric's automation division's sales have grown on a double-digit basis for six years in a row. The market share of this division amounts to 5 percent with a little more in the segment of reversing gears and movement controls. There is still plenty of room to grow and improve in the Mexican market.

Q: How much does Mitsubishi Electric expect to grow by 2020?

A: The company's main objective is to reach between 8 and 10 percent of the market between 2020 and 2025. The company's strategies are helping us approach this level but we did not expect the turbulence that has slowed down a few investments. Some companies have placed their capital investments on standby and are focused on keeping a running production until there is a clearer vision about what is going to happen. One of the strategies is targeting the domestic market. For instance, Mitsubishi Electric has several projects with a significant 100-percent Mexican client. This company wants to increase its production and reduce its costs related to personnel. Automation is replacing jobs but two factors must be considered on that matter. First, where a leader wants to take his company and the personnel he wants to train. And second, that this leader would prefer not to make such a considerable investment in automation had he not had problems with employee turnover.

Mitsubishi Electric is a global company with over 40 years in Mexico. It develops and manufactures electric products and systems including industrial robots, motion control systems, operator interfaces and computer numerical controls



METROLOGY SOLUTIONS GO NANOMETRIC

LEONARDO ROMERO

Senior Sales Manager at Helmut Fischer

Q: How did Helmut Fischer's participation in the metrology equipment market evolve during 2017?

A: Our client portfolio remains unchanged but we have explored new business opportunities. Helmut Fischer is introducing nanoindentation equipment to Mexico for the first time. The Autonomous University of Nuevo Leon (UANL) was the first to buy this technology and employ it for academic purposes. Now, we have collocated a highly sophisticated material-analysis piece of equipment in CIDETEQ. This machine does nano-superficial analysis on thin films and CIDETEQ will use it to engage in cutting-edge research and development of new technologies. We also delivered a similar machine to MAHLE, which will be used for analysis of piston rings in the company's laboratory, and another to Termoinnova in Hidalgo.

2017 was pivotal for Helmut Fischer because it is the first time we placed this technology with three different customers. This shows that the Mexican automotive industry is increasingly interested in being well-equipped and in producing more sophisticated products.

Q: What advantages can nanoindentation offer over other hardness measurement methods?

A: Hardness is usually measured with testers that hit a small area of an object with a weight. The footprint it leaves is used to calculate the hardness of the material and its capacity for plastic deformation. Helmut Fischer's nanoindentation method can gather data on how much a component can deform and how much it can recombine after applying pressure. The main advantage that nanoindentation offers over other hardness measuring methods is that it allows for the material's elongation coefficient to be measured after it regains its original geometry. In other words, traditional methods only measure plastic deformation and not the elastic characteristics of a component like nanoindentation

Helmut Fischer is a metrology equipment manufacturer that specializes in coating thickness measuring, material analysis and micro-hardness testing. The company operates in several industrial sectors where precision and speed are needed

does. This data can be used to improve component design. We want to boost micro and nanoindentation technology in the Mexican market because both have many possible applications and can improve component design processes.

Q: How can nanoindentation improve measurement processes on production lines?

A: The footprint that nanoindentation leaves on a component when hit can only be seen through a microscope. As a result, the parts that are tested with this method can be easily reintegrated into the production line. Nanoindentation is an automated method that explores the surface of components, which enables Helmut Fischer to register any detail of a component's surface and compare the characteristics of an optimized and a nonoptimized area within the same piece. Prior to this method, it was necessary to cut a component in half and analyze areas in a component that received heat or surface treatment and those that did not. Helmut Fischer's nanoindentation solution enables users to focus only on the surfacing material or coating rather than the entire piece. It is similar to testing the hardness of a person's skin without the hardness of the bone interfering.

Q: What is Helmut Fischer's position on the debate between optical and tactile measuring technology?

A: Most of Helmut Fischer's metrology solutions are tactile but the future is in optical technology. Metrology is migrating toward nontactile technology because of Industry 4.0 and automation trends. Riding the wave, Helmut Fischer is betting on the development of pulsed-laser technology. These systems can measure the thickness of several coats of car paint remotely through the detection of variations in light frequency as the laser beam penetrates the car's paint coats.

We trust pulsed laser will revolutionize the automotive industry because it will allow for all cars to be tested quickly. Car paint is usually tested manually with operators choosing a sample vehicle in the production line and revising the coating's thickness in a laboratory. Helmut Fischer's pulsed-laser technology will continuously gather data that can be used to improve processes.

A NEW VISION FOR A CHANGING INDUSTRY

JOSÉ FIGUEROA

Director General of Marposs México



Q: Considering its focus on internal combustion components, how is Marposs innovating regarding electrification?

A: Our business has focused on internal combustion engines for almost 65 years. However, Marposs' corporate vision projects an eventual decrease in production of internal combustion engines due to pollution, fuel prices and the increasing popularity of alternative motorization. With this in mind, the company decided to start working in new technologies such as hybrid and electric engines. The Marposs Group has already participated in the development of measuring applications for hybrid and electric engine components including parts for Tesla. Internationally, the group has decided to create a task force that focuses strictly on electric engines and batteries because they are the most critical components in EV production and design. We already have some applications to test battery size and leakage, as well as equipment for electric-motor drivelines and casings.

Q: How much will Mexico participate in those developments?

A: I think the country will play a larger role in the long run. Mexico has developed a strong supply chain but it has also focused almost exclusively on internal combustion vehicles, which means that production of EV components still has a long way to go. Batteries are limiting EV acceptance in the marketplace because they determine how long a vehicle can be used before it requires recharging. We expect there will be a boom in battery production. Improving battery life and ensuring quality is maintained and monitored will be a key step toward making EVs more efficient.

Q: How can Marposs' robust equipment designed for production-line applications compete against laboratory machines in terms of costs?

A: Marposs' equipment may require a higher initial investment in terms of design and production due to the necessity to create a robust, tough and reliable tool. However, having equipment with these characteristics pays off in the long run as it lasts longer and can be used right on the production floor, shortening quality-control processes and recalibration times. Laboratory equipment, on the

contrary, is not usually located near the production line. This leads to additional costs for clients when they have to stop the line to take a component to the lab, test it, bring it back and make adjustments.

Q: How is Marposs México's client portfolio divided between large Tier 1 and Tier 2 suppliers and smaller suppliers wanting to enter the automotive supply chain?

A: Most of Marposs' business — about 80 percent — is with large clients and Tier 1 companies. Only 15 to 20 percent of our projects involve small suppliers. We consider this normal because newcomers do not normally invest heavily in equipment but start working little by little while they become familiarized with Marposs' products. Furthermore, Marposs usually carries out large projects with Tier 1 clients that are returning customers.

Q: Small companies sometimes resist investing in technology. How does Marposs encourage the implementation of its equipment among these players?

A: We present clients our solutions and work depending on their needs. Marposs has met clients that continue working as they did 20 years ago. Operating that way has worked for them and they believe it is the best path to further success. Remaining close to our clients and showing them how new technologies can improve their production is part of our strategy. Marposs also consigns equipment. We visit customers and offer to test our equipment on their production line at no cost so they can convince themselves of its advantages in terms of efficiency. A key feature that clients look for is support. We can repair any damaged equipment from our Mexico offices rather than sending equipment back to Italy. That gives our customers the certainty they will not have to lose valuable production time. Marposs also provides training to its clients regarding the operation and maintenance of our equipment.

Marposs México is part of Italy-based Marposs Group. The company offers measuring solutions and is a supplier of services and products to improve manufacturing efficiency and effectiveness in ensuring product quality

MEXICO

AUTOMOTIVE REVIEW 2019

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