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***2016 auto  
industry trends***

**&**

**Automakers and  
suppliers can  
no longer sit out  
the industry's  
transformation**

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# Introduction

For the auto industry, 2015 was a mixed bag by any measure. Record sales in the U.S. gave the sector a much-needed boost, but growing economic malaise in much of the rest of the world, particularly in emerging markets, led to a flat year overall, dampening prospects for global automakers and suppliers.

Meanwhile, in design rooms and on factory floors, auto companies were dabbling with new technologies and vehicle concepts that have the potential to transform the automobile (and transportation more broadly) in perhaps the most dramatic fashion since Ford rolled out the Model T. Already we are beginning to see bits and pieces of what the so-called *connected car* will look like — a fully digitized vehicle with Wi-Fi; advanced infotainment systems and apps; vehicle-to-vehicle communications that let cars on the road “talk” to each other, exchanging basic safety data such as speed and position; real-time location services and routing based on traffic conditions; and networked Web links that facilitate vehicle diagnostics and repairs.

At the same time, the *intelligent car* is fast moving from the drawing board to the streets. As an obvious precursor to the autonomous vehicle, the intelligent car can give drivers a first taste of the experience of relinquishing control of a vehicle, with such functions as self-braking, self-parking, automatic cruise control based on road conditions, automatic accident-avoidance features, computer-operated power steering, and electric parking brakes, as well as electronic throttles and engine control.

The idea of fully autonomous vehicles is too futuristic for much of the driving public to embrace right now. But for automakers, the path from current models to driverless cars is going to be an exciting period of transformation. These new developments represent enormous opportunities even as they augur a perilous, unsteady phase for the industry. Original equipment manufacturers (OEMs) must navigate the challenges of designing, manufacturing, and upgrading traditional powertrain models while staking a claim in emerging technologies and improved customer experiences.

If you are an executive at an OEM or an auto equipment supplier, your strategic acumen — your ability to place your company in the vanguard of product trends without running afoul of ever more stringent environmental rules — will surely be tested. The critical dimensions that you will have to consider and deftly manage can be broken down into three categories: macroeconomic forces, a new era of personal transportation, and stricter regulations.

*Your ability to be at the vanguard of product trends without running afoul of environmental rules will be tested.*

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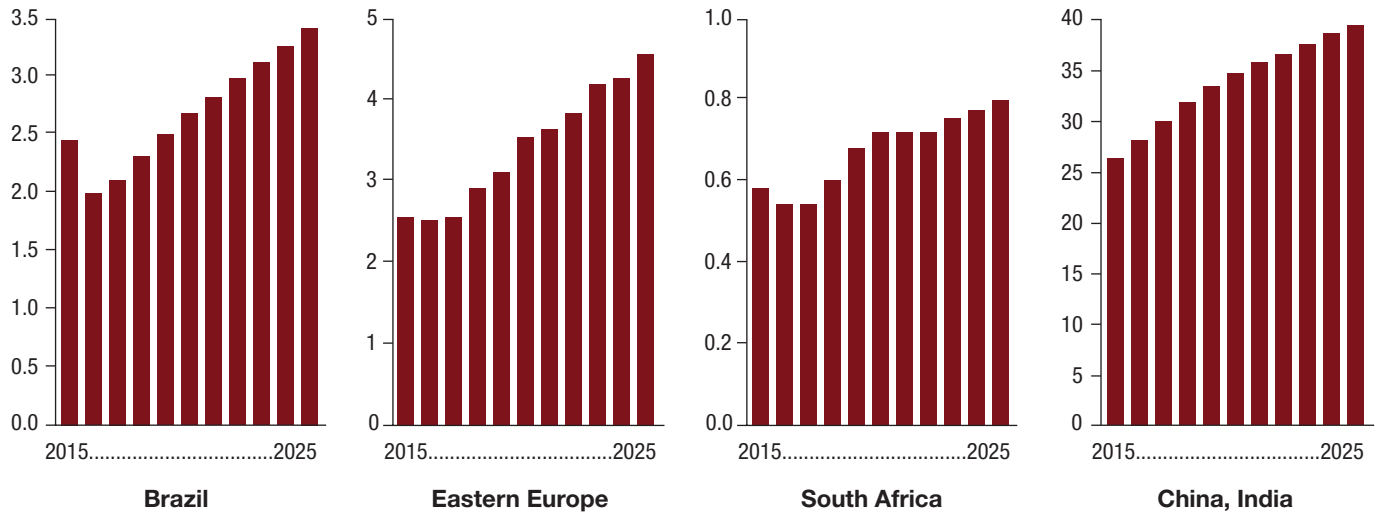
# *Macroeconomic forces*

Long product cycles and deep capital investments make planning in the auto industry a complex endeavor. For the past 10 years, OEMs and suppliers have generally chased global sales growth while hoping to improve margins by leveraging automobile platforms in multiple regions and striving for scale wherever possible. The results of this strategy have been decidedly mixed. In 2015, they turned sour as global economic conditions worsened. This trend makes any new commitment to invest in a country or region a risky one that must be deliberately crafted using a clear-eyed assessment of market conditions.

Below is our view of the auto market realities in key geographies:

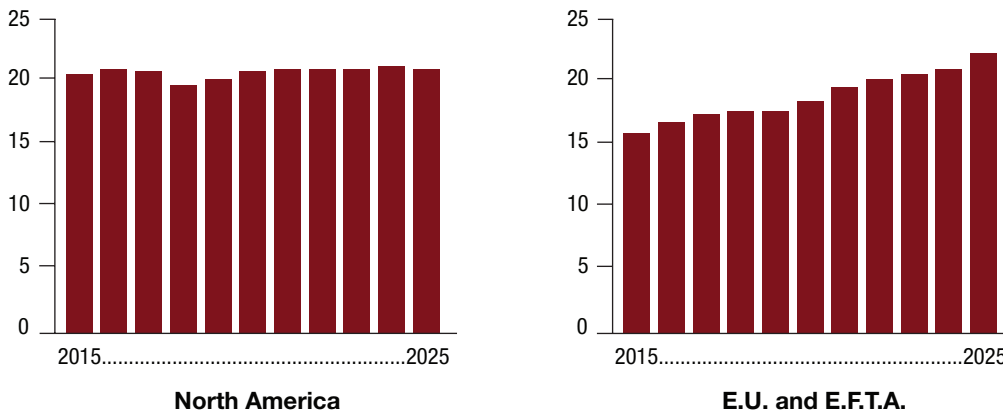
- **North America:** U.S. markets are peaking at historic levels, setting a sales record of just under 17.5 million vehicles in 2015, up 5.7 percent from the year before and topping the high-water mark of 17,402,486 in 2000. U.S. sales are likely to be relatively flat in the next two years and may face a moderate downturn in 2018, the victim of economic cycles, higher auto loan interest rates as the Federal Reserve raises overnight rates, and an expected flood of vehicles into the used car market. Mexican auto sales outpaced forecasts in 2015, jumping 19 percent to more than 1.3 million units, and are expected to surpass 1.5 million by 2021. Investments in new auto factories in Mexico are surging as well; installed capacity is likely to grow more than 50 percent over the next five years (partially for North American consumption, but also for global export). These conditions compel automakers and suppliers to manage supply chains and factory usage cautiously in the U.S., while continuing to expand in Mexico.
- **European Union (E.U.):** Sales have improved in the European Union since the financial downturn, but the E.U. auto industry is held hostage by local economies that are teetering on the edge of recession. In 2015, new car registrations in the E.U. rose 9.3 percent year-on-year, to 12.6 million units. But that is well below the record year of 2007, when more than 18 million vehicles were sold in the region. And automakers in some E.U. nations struggling to grow their economies — notably France, Greece, Spain, Italy, and Portugal — face losses or low profits, fragmented markets, and the inefficiencies of model proliferation. The

*Emerging markets are expected to show consistent growth in light vehicle sales in the next decade...*



Source: PwC Autofacts®, 2016 Q1 Forecast Release

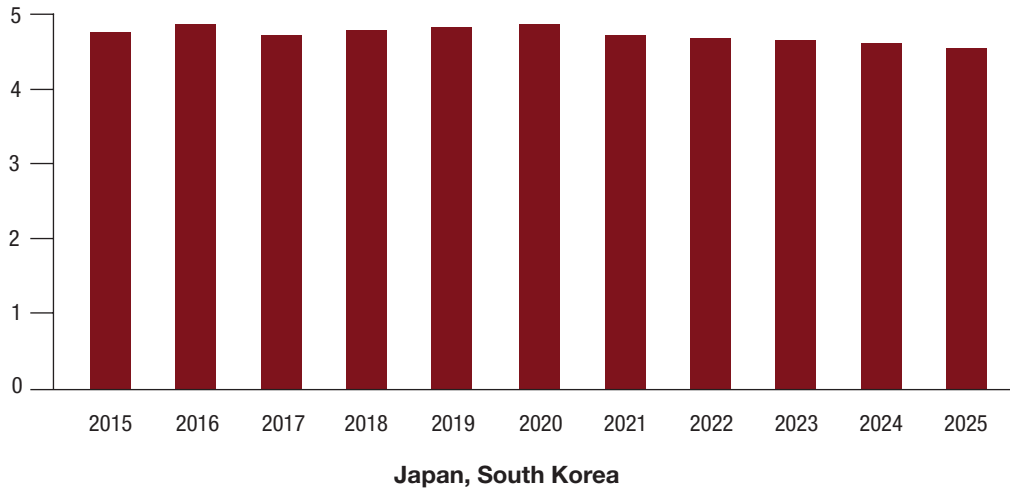
*While sales in North America and the E.U./European Free Trade Association are projected to remain steady but unspectacular...*



Source: PwC Autofacts®, 2016 Q1 Forecast Release

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*And Japan and South Korea will also be flat.*



Source: PwC Autofacts®,  
2016 Q1 Forecast Release



E.U. auto industry must figure out ways to better match production capacity to market demand, while simultaneously investing in new potentially strong product areas (for example, small SUVs and crossovers) and in new automobile technologies.

- **Emerging Nations:** Perhaps the biggest downward macroeconomic force in the auto industry today is the underperformance of emerging markets, which not too long ago represented a significant opportunity for major gains in the global auto sector. While India's sales remained roughly flat in 2015, China's year-over-year growth slowed to 7.3 percent from a 10 percent gain in 2014 and 16 percent gain in 2013. New vehicle ownership restrictions in China's largest cities will further curtail sales in the coming years. Russia had its second straight year of precipitous decline in 2015; sales were almost 50 percent below the 2012 peak. And Brazil's sales fell by nearly 1.3 million units, or 30 percent, from its record high in 2012, a drop that was larger than the entire Mexican car market.

Automakers have made massive investments in emerging market countries and must be extremely nimble if they are to successfully navigate the next few years. A very conservative approach — closely managing costs and factory capacity — is critical to staying above water in Brazil and Russia. China is a different story. Already the world's largest auto market, China is expected to boast annual vehicle sales of more than 30 million by 2020. Smart joint ventures with Chinese companies that can be counted on for consistent returns (a necessary but difficult undertaking, as many Chinese joint ventures struggle) and increased but highly managed production of more profitable, pricier models will be essential for automakers that want to take advantage of potential vehicle sales growth.

- **Middle East and Africa:** Over the next five years, the Middle East and Africa (ME&A), a laggard, relatively unmotorized region, will likely see strong and consistent automobile sales growth; the biggest improvements are expected in Iran, Egypt, South Africa, and Nigeria. Along with this growth, automaker factory activity in the region will increase significantly. By 2021, nearly 3 million cars will be built yearly in the ME&A, an output increase of about 50 percent, according to PwC Autofacts®. Substantial factory capacity improvements are likely in Algeria, Nigeria, Egypt, and Iran. Given the diversity of this region — there are more than 50 distinct markets — automakers face the obstacle of satisfying multiple unique local requirements in order to thrive. Among them are domestic assembly quotas, import and export tariffs and duties for parts and vehicles, gas or diesel preferences, and local customs that may dictate the design of interior and exterior features. To gain a strong sales foothold in the ME&A, automakers must also have a substantial factory and distribution presence.

# ***New era of personal transportation***

As noted above, connected and intelligent cars are just beginning to make inroads in the auto industry, and already they have had a powerful impact on the way automakers are adjusting organizationally. Companies are envisioning a far different future than could have been imagined a decade or so ago. Two separate worlds are melding in order to design and develop these cars: the traditional automotive company and software outfits. The industries bring with them conflicting cultures, product development models, and business operations. For example, car companies design their products once, in a painstaking five-year-long development cycle. Software companies like to fail and fix in a rapid product development process.

Although many people may be drawn to shiny new objects and assume that electric vehicles and hovercrafts represent the most likely transportation future, the reality is different: Not only will autonomous cars be a tough sell in any market, but traditional powertrains and internal combustion engines are more than likely to be the predominant type of vehicle on the road for decades to come. In that landscape, newer vehicles will be distinguished primarily by their innovative technology involving both assisted driving and global connectivity. In a recent study, 56 percent of new car buyers said they would switch to a different brand if the one they were considering didn't offer the technology and features they wanted. Similarly, 48 percent of car buyers said they would walk away from a vehicle they liked if the technology was difficult to use.

The technology necessary to make connected and intelligent cars — specifically, Web networking, sensors, and software — is not in the traditional wheelhouse for most automobile makers. That shortcoming is an invitation to high-tech companies such as Apple and Google, which are making moves to develop the technology to “own” critical components of the networking, autonomous, and communications capabilities of automobiles. The increasing presence in the auto industry of technology firms cannot be ignored or downplayed by OEMs. These companies will likely prove to have an outsized influence on the auto sector in the coming years, chiefly because their skills and the industry's needs align perfectly: They are adept at seamlessly connecting components to create networks valued by consumers for the information, entertainment, efficiencies, and experiences they deliver.

*Not only will autonomous cars be a tough sell in any market, but traditional powertrains and engines will likely dominate for decades to come.*

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# *Stricter regulations*

Even as automakers must focus on upgrading the transportation and mobility features of their vehicles, stricter fuel economy regulations are closing in. By 2025, for example, automaker fleets in Europe and the U.S. will have to average upward of 60 miles per gallon, a goal that becomes more difficult if oil prices remain low, stoking consumer interest in popular larger, less-efficient vehicles like pickups and SUVs. Meeting these standards will require step-change improvements, not incremental ones. And considering the short time frame, many of these advances will have to be applied to the traditional internal combustion engine and powertrain. Indeed, experts believe that petroleum-based vehicle fuel economy can be improved by as much as 75 percent with combustion breakthroughs focused on maximizing engine efficiency and minimizing the formation of emissions within engine cylinders; exhaust aftertreatment technologies that further reduce emissions; and the recovery of energy from waste heat.

In addition to improving overall powertrain performance, automakers will have to take risks in product development, a trend that we are already witnessing. For example, in 2014, Ford replaced the steel in its popular and highly profitable F-series truck with aluminum in order to reduce weight and enhance fuel efficiency, a move that could have scared off customers who believed that the lighter material was less rugged. So far, this approach has paid off. The 2015 F-150 had the best mileage of any gasoline pickup and held its position (by a large margin) as the best-selling vehicle of any kind in the U.S.

Honda is taking a similar chance with its recent adoption of continuously variable transmissions (CVTs) across the bulk of its car lineup. Instead of cycling through fixed gears, these transmissions operate on pulleys that constantly adjust gear ratios to provide optimal performance in transferring power to the automobile's wheels. CVT technology delivers much better fuel economy because it eliminates inherent inefficiencies in fixed-gear transmissions that result in wasted energy. However, customers are not sold on CVTs yet; some complain that these cars are listless, especially during

*To improve performance, automakers will have to take risks in product development.*

acceleration, because they lack the rhythmic higher revs and forward movement felt during traditional transmission up-shifting.

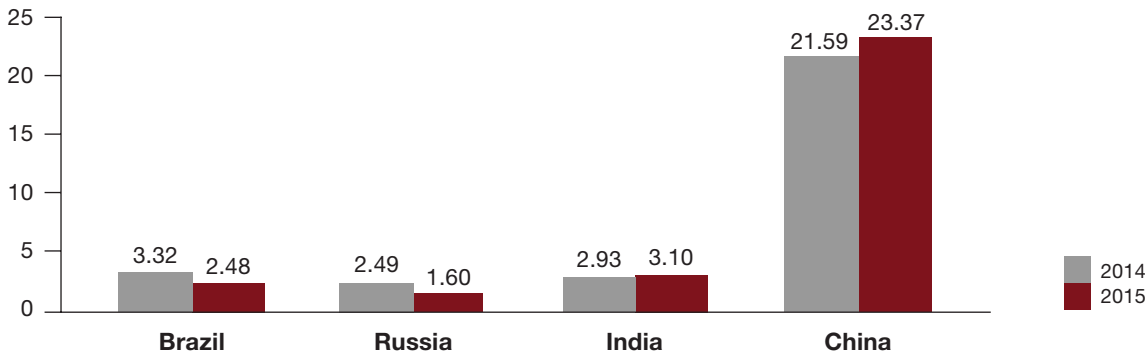
Other automakers, including BMW, Mazda, and Fiat Chrysler, are attempting to meet stricter fuel economy standards through a combination of improved aerodynamics, better performance using turbo engines, and lighter manufacturing materials, among other tactics.

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*Global auto sales hit a new record in 2015, but growth in BRIC markets was sluggish...*

**BRIC Sales by Country**

2014 vs. 2015, in millions

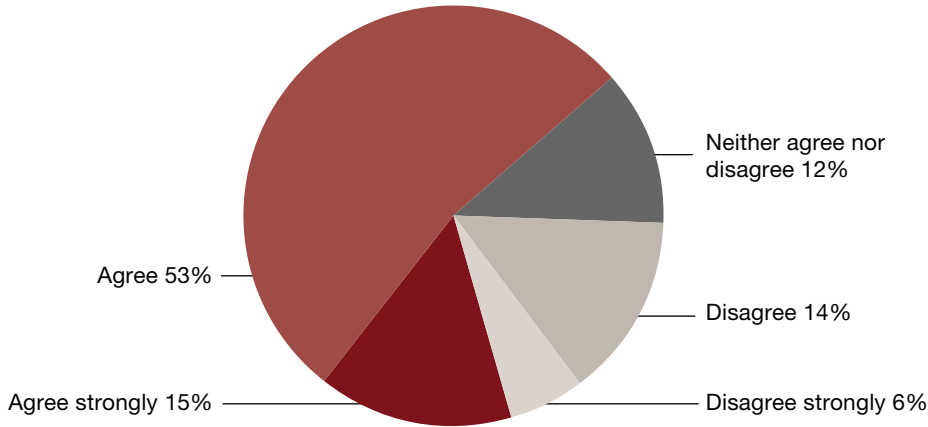


Source: PwC Autofacts®, 2016 Q1 Forecast Release

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*A troubling sign, and many automaker CEOs are feeling uneasy about the future...*

**To what extent do you agree or disagree that there are more threats to the growth of your company today than there were 3 years ago?**

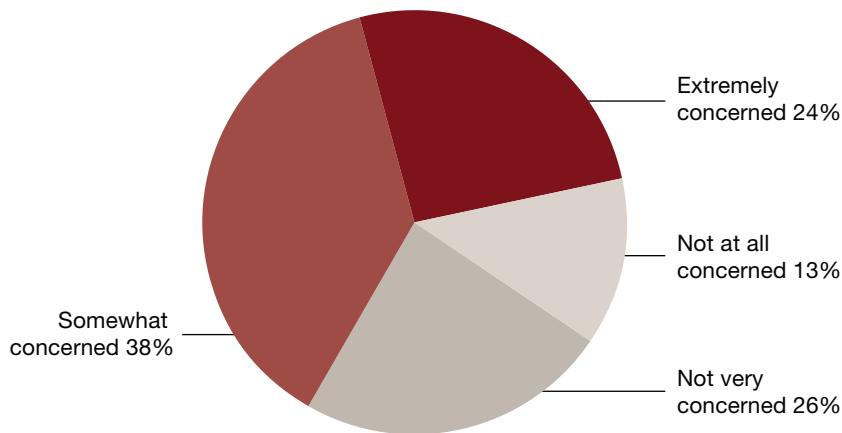


Source: PwC's 19th Annual Global CEO Survey, published January 2016

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*And wary about the speed of technological change, which includes advances in connected cars, intelligent vehicles, and powertrains.*

**How concerned are you, if at all, about the speed of technological change?**



Source: PwC's 19th Annual Global CEO Survey, published January 2016

The combined impact of these three dimensions (macroeconomic forces, a new era of personal transportation, and stricter regulations), which have taken center stage in the auto industry, is not easily managed or blunted. As an executive leading an automobile maker or a supplier, you are all too familiar with the urgency needed to confront each of these unavoidable aspects of the auto business and their effect on your company, although you may not yet have a plan to do so. We recommend that you consider these steps as the basis of your strategic plan:

- **Step 1.** Launch, learn, and adapt faster than ever — but not rashly. You should prioritize agility, but find ways to take risks without sacrificing sound execution that can jeopardize both customer satisfaction and, more importantly, safety. In short, a company must be true to its DNA while evolving as rapidly as possible.

Specifically, you should determine whether new intelligent and connected vehicle features can be developed in-house. Does your company have the capability to establish a skunkworks advanced research unit? Do your customers expect that your brand will provide unique and distinctive proprietary solutions? If this route is not the right one for your business, prepare an approach for partnering with companies from outside the traditional automotive sphere, which should include advantageous arrangements involving licensing, revenue sharing, and ownership of intellectual capital.

In addition, engineer better vehicle performance by smartly investing in new technologies, such as lightweight materials, advanced transmission and engine solutions, and alternative powertrains, to satisfy emissions rules.

- **Step 2.** In assessing the problematic macro market forces, the traditional large markets, like the U.S. and E.U., are relatively easy to steer through compared to emerging regions. Nonetheless, you need to prioritize growth in Asia and other developing areas because they represent as much as two-thirds of potential sales gains in the coming years.

The best way to approach this somewhat perilous economic period is to diligently focus on capacity management using sophisticated inventory and sales data systems to measure supply and demand. Companies that have the best market intelligence and analysis capabilities — and that use these skills to manage production output on a day-to-day basis — will excel in emerging regions, as these countries will undoubtedly go through economic ebbs and flows in their development phase.

- **Step 3.** Any strategy that you implement going forward should be predicated on capturing value. The uncertainties and transformation that will punctuate the auto industry in the next decade are too potentially damaging to confront without a clear idea of real returns, if your strategy goes as planned. The most likely avenues for value improvements include forecasting growth markets adeptly and seizing a greater share in those regions; investing in new technologies and features that attract customers and word of mouth (rather than commoditized components, such as yet another dashboard redesign); developing a rightsized and efficient factory footprint; cementing healthy collaborative relationships with suppliers; and creating a strong distribution base with a premium on customer service.

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