



# Automotive change drivers for the next decade

EY Global Automotive &  
Transportation Sector  
2016

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**Is the pace of  
innovation in  
your company  
progressive or  
disruptive?**



The better the question. The better the answer. The better the world works.

## Executive summary

# Driving change across the automotive ecosystem over the next decade

The mix of markets driving the global automotive sales has changed yet again. Growth has shifted to markets such as the US, Western Europe and China, while the emerging markets have cooled off.

Also, the pace of global vehicle sales growth is expected to slow over the next few years. The C-suite thus needs to focus on how to be more agile in identifying emerging trends and on how to change strategies faster. We believe the automotive industry is likely to witness more changes in the next decade than it saw in the last 20 years. We have identified six drivers of change that will shape the automotive ecosystem over the next decade.



**82%**

Our analysis of automotive C-suite's agenda indicates majority of the automotive organizations lack preparedness, execution and resource alignment to enable faster change.



# Accelerating pace of disruptive innovation driven by new entrants, competition and collaborations



Barriers to entry in the automotive industry are gradually tumbling. Empowered by the proliferation in digitalization and innovation, new competitors are challenging traditional business models. In response, we're seeing automakers collaborating at multiple levels – not just with suppliers and competitors, but also with players outside the ecosystem.

What is the combined effect of these developments? The pace of innovation is challenging the traditional automotive value chain, disrupting established industry principles – from value proposition to cost drivers and product life cycles.

**a**

### Value propositions



From new vehicle segments to mobility as a service; from components, modules and systems to software and services

**b**

### Challenging business model drivers of incumbents



Attacking cost drivers, pricing, customer engagement process

**c**

### Challenging the innovation pace and cycle

Leveraging software and V2X connectivity



**70%**

of all vehicles sold by 2045 expected to have autonomous capabilities, with 5% of all vehicles sold by 2050 expected to be autonomous level five-ready



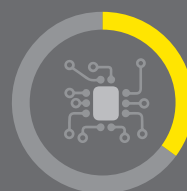
**82%**

suppliers' proportion of value added in 2015, up from 56% in 1985



**90%**

of car innovations and new features are driven by electronics, which account for 35%-40% of an average car's production cost



**35**

days for a new technology to reach a critical mass of 50 million users

Sources: Yole Développement; Statista; TTI inc; Wall Street Journal

# If software and connectivity define future vehicles, will tech companies provide the greatest value-add?

## **New business models and service-based value propositions challenge traditional vehicle-centric offerings ...**

Nontraditional players such as tech companies and mobility aggregators are targeting the fundamental value proposition that the automotive industry offers. They are leveraging connectivity and digitalization to create not only products but also service-oriented business models that challenge traditional notions of access to mobility and ownership of vehicles.

The last five years have witnessed a plethora of these companies appearing across developed as well as emerging markets. But we anticipate the trend will accelerate further over the next decade as these companies aim to take a larger share of consumers' mobility spend rather than just targeting vehicle sales.

Connected vehicles and consumers expecting ubiquitous access to their virtual worlds have opened doors for new in-vehicle content and information services. Now, the ecosystem has grown to include many new stakeholders: cities, ride-sharing operators, government agencies, technology and telecom providers, media and entertainment companies, transit service providers, energy companies and utilities, financiers, entrepreneurs and – most crucially – consumers.

Revenues from vehicle sales and related services will continue to dominate over the next decade. However, revenues from services based on mobility solutions, connectivity and data have been increasing rapidly, confirming the notion that access without ownership for mobility will be a market in the future.

## **... and raise important questions about the cost structures of the automotive value chain**

New entrants, particularly technology entrepreneurs, are challenging traditional cost structures ranging from supply chains and distribution structures to the feasibility of the asset-light business models.

Despite being in early stages of their maturity cycle, these companies have proven the success of features ranging from over-the-air-updates and direct distribution for premium vehicles to getting consumers to become advocates for key features.

Rapid evolution of the shared mobility market has not only proven the benefits of asset-light business models, but also their ability to rapidly deploy across the globe. As a consequence, these new entrants are also proving that the capital-intensive nature of the automotive industry, which served as an entry barrier until now, is in fact becoming a liability and stifling the pace of change and entrepreneurship within companies.

## **Rapid penetration of electronics and software challenges the status quo of component suppliers ...**

From keyless entry and organic light-emitting diode (OLED) instrument clusters to voice and gesture recognition, from electric and fuel cell powertrains to V2X connectivity and autonomous driving capabilities – future in-vehicle technologies demand suppliers to offer significant electronics and software innovations. In addition to challenging suppliers to restructure their portfolios, these new technologies will require companies to develop new pricing strategies considering the shorter time-to-market expectations and also product liability requirements demanded by end customers.

## **... led by nonautomotive companies that now set the pace for innovation**

New requirements for urban and individual mobility based on asset usage have also opened the doors for a multitude of new entrants ranging from journey planners to mobility aggregators that provide consumers with a one-stop interface to plan, book and pay across all modes of transport. In short, disruption has become the fundamental to the rapid evolution of the mobility ecosystem.

In terms of the automotive ecosystem, players from industries like high-tech communications and even entrepreneurs are already setting the pace for innovation in the automotive ecosystem.

Software and electronics companies are capitalizing on the unprecedented technology proliferation, as vehicles move toward facilitation of HMI and V2X interactions. In the absence of a strong challenge from traditional suppliers, these companies have the high ground as they are able to leverage their consumer electronics experience and competitive pricing to challenge traditional auto component companies.

The evolution of connected and self-driving car technologies, along with shared mobility, is also being accelerated by the partnerships and investments that automakers and suppliers are rapidly making. Both automakers and suppliers will continue establishing collaborations with tech companies and also investing in a portfolio of start-ups to not only expedite technology development but also accelerate its deployment.

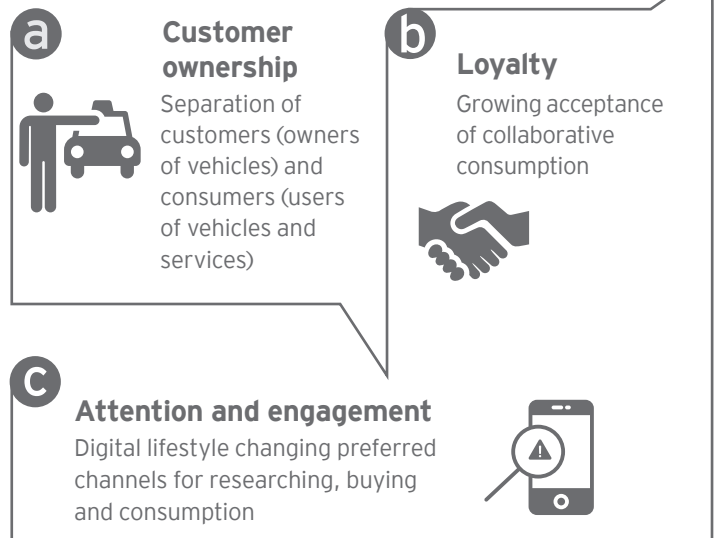
# Incumbents and disruptors across the automotive ecosystem will be battling to own relationships in a digital marketplace



Traditionally, decision-making for vehicle purchases has been driven by brand experience and cost of ownership. But in a marketplace that's being transformed by the sharing and outcome economy, we're seeing divergence between customers (the owners of assets) and consumers (the users of assets).

Mobility continues to be dominated by personal vehicles, and the market is far from the tipping point at which services start to generate more revenues than vehicles. But, the pace of adoption of various mobility solutions does raise the risks for the auto industry losing its visibility of consumers, and it has ignited discussions on customer relationship and life cycle management among automakers and retailers.

## Battle for ...



**US\$6.5b**

expected global revenue from car-sharing service in 2024 (from US\$1.1b in 2015)



**22 hours**

average time when a car stays parked during a day



**26 million**

global car-sharing memberships by 2020 (from 6.5 million in 2015)

Sources: Los Angeles Times; Navigant Research; Berg Insight; DME automotive; ICDP; EY – How to copilot the multichannel journey





## When consumers embrace shared mobility, will they still be loyal to you?

### Usage-based business models differentiate users and owners of vehicle assets ...

The outcome economy is already taking shape in the mobility ecosystem as access to mobility without ownership has caught the attention of consumers, reflected in the growing registrations for ride-sharing and car-sharing services. These service models are highlighting the significant opportunity offered by targeting the miles traveled rather than the modes used for the journey, making ownership of vehicles optional for consumers and even drivers.

Consequently, the customers that will choose to own or finance vehicles will range from sharing companies and corporates to communities and cities. In particular, a growing number of these customers are pushing for efficient, greener urban mobility solutions, which will require new business models that involve long-term investments, cooperation with nonautomotive companies and the provision of a portfolio of services.

### ... creating new mobility intermediaries and challenging the position of automotive brands

The customer life cycle in a shared mobility ecosystem, where purchasing decisions are made for every ride, is very different from the long-term decision-making behind car purchases. While the auto industry has begun a transition, its processes and strategies built around traditional customer life cycles risk irrelevance. The new customer life cycle requires totally different touchpoints, channels and content, with an accent on new technologies and new customer perspectives.

Today, drivers and occupants are, at best, peripherally served by the product-oriented traditional business models of the automotive industry. Consequently, automakers risk losing relationship with consumers whose needs are met by the variations of shared mobility, ranging from peer-to-peer car-sharing, ride-sharing and ride-hailing to integrated mobility providers. These intermediaries have a head start in owning the relationship with consumers and consequently the revenues from services generated out of miles traveled throughout their lifetime, while automakers continue to focus on vehicle and connected car services.

### Fighting to retain brand loyalty in an outcome economy ...

Eventually, both automakers as well as mobility service providers will need to find innovative ways to retain consumers' loyalty when they will no longer be tied down with capital investments or contracts to a specific brand or service provider.

In the outcome economy context, purchasing decisions made for each ride are influenced by factors including availability, comfort, ease of use, reliability ratings and pricing; this is entirely different from the world of vehicle purchase decision-making where brand perception, driving experience and total cost of ownership are principal considerations.

In short, companies in the mobility ecosystem – be it automakers or the new disruptive entrants – will be competing for almost every journey to capture a share of the consumer's mobility spend.

### ... as consumers and customers demand an engaging and seamless digital journey

Traditional marketing initiatives and dealership models in the automotive industry lag consumer experiences and leading practices compared with other industries, particularly retail.

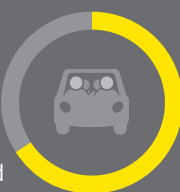
As the mobility ecosystem evolves rapidly, the purchase criteria of consumers (and customers) is likely to only become more complex with demand ranging from customized vehicles to customized or on-demand mobility packages. However, with smartphones and ubiquitous connectivity transforming the mobility purchasing and information-gathering process, consumers are demanding an engaging, seamless and intuitive digital experience that brings together their mobile, in-vehicle and offline lifestyles.

With trust, transparency and ability to customize becoming critical in the future vehicle and mobility market, the quality of the digital experience can make all the difference between retaining or losing loyalty and market share.



**40%**

of EY's survey respondents believe that dealerships of the future will need to focus on alternate mobility concepts and after-sales for stable earnings.



**66%**

of new car buyers use manufacturer websites as the first source of information.



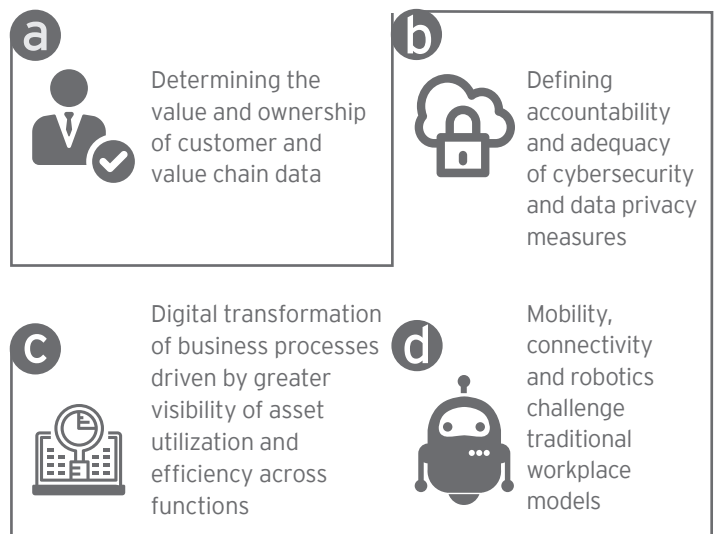
**10 hours**

is the average time spent by automotive customers on the web to search for information and to decide when and where to buy.

# Digitalization and seamless connectivity overwhelms the automotive industry's data management and process transformation capabilities

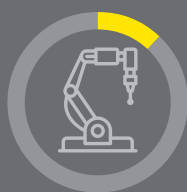


Increasing volumes of data and sophistication of connectivity across the value chain are impacting the entire industry ecosystem. From exploring the monetizing opportunities at the consumer end of the value chain, to transforming the workplaces by applying robotics, the potential for harnessing the power of digitalization within the auto industry is substantial. Unmanaged, this data threatens to overwhelm the automotive industry's systems and processes. Managed, it can be a major source of competitive edge.



**37%**

of all data generated by 2020 will have the potential to be analyzed, up from 22% in 2013.



**US\$900b**

Machine-to-machine (M2M) new economic value at stake from factory floor automation, predictive maintenance and manufacturing efficiency

**12%**

is the estimated CAGR of world industrial robots during 2014-18.



**44 zetabytes**

is the expected size of digital universe by 2020.

Sources: EMC; ID; Cisco; IF; World Robotics





## Who owns the data when everything's connected but the regulation landscape is heterogeneous?

### Monetizing consumer, vehicle and ecosystem data depends on defining ownership and access

Thanks to digitalization, companies across the automotive ecosystem now have significant access to large volumes of data for consumers (from connected vehicles and their digital lifestyles) and also from its value chain (supply chain, dealers and other partners). Clearly, those who own the relationship (be it with consumers, customers or automakers) have access to far more specific and real-time data – and therefore the opportunity to monetize. However, data ownership is still ambiguous in the absence of strict regulations and even automakers who until now claimed stake to consumers' data acknowledge they are custodians rather than owners.

While automakers, suppliers (tier one, two and three) and connectivity infrastructure companies have been leveraging their access to vehicle data to progressively drive innovation, they have had limited success in creating additional sustainable revenue streams. However, disruptive entrants into the mobility ecosystem have been able to leverage their relationship with the consumer and the driver to drive revenue growth in the ride-hailing, ride-sharing and car-sharing markets.

Over the next decade, access to data and ability to monetize will be a major indicator of performance and success in the mobility ecosystem.

### Accountability for data privacy and security: who will find and fix the weakest link?

The increasing amount of data being generated by vehicles, companies and customers has triggered intense debate around legal ownership of this data, with automakers and third parties increasingly seeking to benefit. Multiple issues arise. How, where and for what purpose a company leverages data can have

severe implications for its reputation – a look at the various tangles that technology companies are finding themselves in is further evidence. Adding to the challenge for automakers, the heterogeneous global regulatory landscape creates significant complexities for security and privacy strategy development.

With new companies entering the automotive ecosystem, the supply chain has become more complex than ever before. While companies across the ecosystem are focused on securing their respective enterprise and products, the nature of cybersecurity risk is that the lack of sufficient IT security in a peripheral partner may be enough for hackers to exploit and cause significant damage.

Although we're seeing increased risks from connectivity (across the supply chain and in vehicles), with cyber attacks and data privacy issues coming to the fore, the next decade will witness pressures on the industry to widely implement cybersecurity standards for connected vehicles.

### Reinventing manufacturing and supply chain operations ...

Given the global scale and complexity of the automotive ecosystem, digitalization also presents the most significant opportunity for the industry to improve capacity utilization, supply chain visibility and overall operational efficiency. From the industrial internet to 3-D printing and from advanced analytics to blockchain, companies across the auto ecosystem have an opportunity to leverage these diverse technologies. While a number of companies are in various experimentation stages, the speed of adoption across the business will certainly define the agility and profitability of businesses across the ecosystem.

### ... will also require the workplace to be modelled for mobility, connectivity and automation

Digitalization also challenges existing workplaces and employment practices as employees demand greater connectivity and mobility to fulfill their roles more efficiently, irrespective of their functions, across the organization. Manufacturing is no longer the only application for robotics, as software bots find wide uses in support functions to drive process automation.

Consequently, redesigning of functions – ranging from finance and HR to procurement, sales and marketing – will be imperative. This will enable dynamic collaboration resulting in increased workforce productivity while also helping secure employee motivation and attracting the right talent.

### SPY Car Act (US) of 2015

This act protects consumers from security and privacy threats to their motor vehicles. It focuses on data usage, providing consumers with the choice of opting out and prohibiting marketing on the basis of this data.

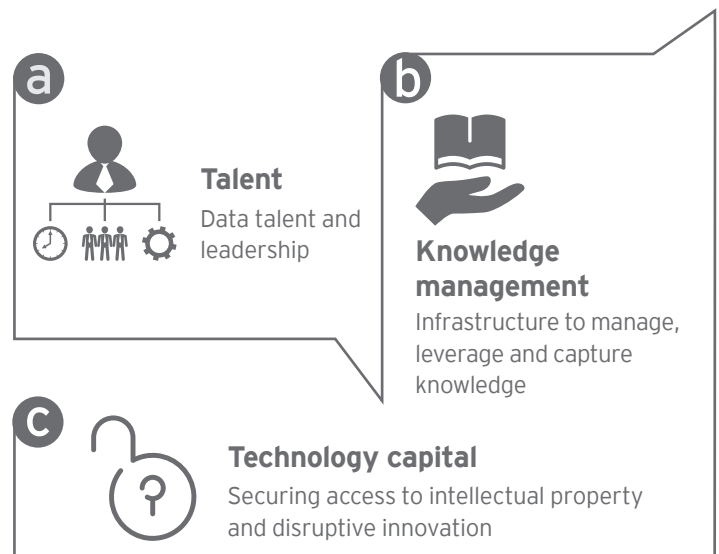
Strict cybersecurity bills are coming up across other geographies, such as Germany's IT Security Act, China's draft Cybersecurity Bill and Russia's Cybersecurity Law.



## Business plans remain at risk unless automotive companies across the ecosystem can secure vital strategic resources



With critical industry innovation being driven by nontraditional activities, disruptive market entrants are moving to stake their claims in emerging automotive and mobility ecosystems. Against this backdrop, the strategic acquisition and management of talent, knowledge and IP are imperative in an increasingly competitive and resource-driven industry.



**US\$114b**

is the estimated global automotive R&D expense in 2020, up from US\$80b in 2014.

**3%-5%**

of all patents granted in the US are awarded to the automotive industry, resulting in approximately 5,000 patents per year.

**10%-15%**

of the total long-term automotive R&D budget can be offshored or outsourced, resulting in 10%-50% savings.

Automotive companies increasingly investing in silicon valley research labs and offices will drive technological innovation.



Source: Statista; Center for Automotive Research; Car Innovation 2015; Automotive News; DHL; IDFC



# Can your leaders drive the transformation needed to survive disruptions?

## Protecting IP and driving innovation will become more critical than ever

Access to nontraditional technology and intellectual property is becoming a key differentiator within the automotive industry.

New technologies and services will coexist in the near future. But decisions to buy, share or build these new technologies and services must be made now. In addition, rapid innovation in the automotive industry and the increasing prevalence of diverse collaborations have created fresh challenges in capturing valuable IP from company-wide innovation programs and formalizing IP ownership structures in collaborations with third parties. In particular, new technologies ranging from alternate powertrains to connected and autonomous vehicles that have witnessed widespread partnerships, have increased the patent litigation risk for suppliers as well as automakers.

## Creating a thriving knowledge marketplace to breakdown silos ...

Business continuity demands human, technology and knowledge capital. But demographic changes and the focus on new technologies is threatening traditional operational knowledge. An aging workforce and early retirement schemes are a drain on the automotive industry's traditional engineering and process knowledge in many mature markets. The lack of an organized infrastructure has meant knowledge is either lost with employee turnover, or buried in functional silos.

With the increasing ease of mobility, companies and countries alike risk losing their best people – and the information, experiences and skills they contain. As the traditional drivers of growth erode for incumbents across the automotive ecosystem, tomorrow's winners will be the ones who harness their own knowledge advantage.

## ... and attract and retain the right talent ...

Companies throughout the automotive industry are competing for the best talent, not only with their peers but also with an increasing number of new market entrants. Digitalization also challenges current workplaces and employment practices as employees demand greater connectivity and mobility to fulfill their roles more efficiently, irrespective of their functions, across the organization. And that's not all. Automotive companies are also being challenged to address the lack of diversity across functions and their hierarchy.

An increasing emphasis on software and connectivity is driving demand for the key skills and technologies needed to provide state-of-the-art functions and services. Tech companies often offer different working models and incentives compared with the automotive industry. This makes attracting the right talent more challenging.

## ... and developing new management skills

Industry executives were operating in a stable environment for decades. But as software has become a principal driver of innovation, rapid innovation cycles and new industry dynamics mean different management and leadership skills are urgently required. Traditional processes must also be adapted to changes in products, services and the environment.

**56%**

of leaders acknowledge women as a critical source of underutilized talent; among the 50 largest publicly held suppliers operating in North America, less than 10% are women.

**54%**

of the automotive supply chain talent gap is at the middle management level, while entry level accounts for 26% and executive level for 9%.

Source: EY Women in automotive survey



# Global footprint exposes the automotive industry to diverse sources of unpredictability that will challenge companies' ability to deliver results



The past few decades have witnessed the automotive industry gaining significantly from the globalization opportunity. Having established a footprint across most major markets, companies across the automotive ecosystem are now being challenged by local volatilities ranging from economic uncertainty and political instability to protectionism and trade dynamics. The net effect will result in a global marketplace where it's harder than ever to see around corners and plan ahead.



**25%**

of the world GDP is constituted by the economies using negative interest rates for revival



**0.5%**

is Japan's estimated long-term potential growth rate, which means that the economy is basically always on the verge of a recession.



**80%**

Interstate conflict is rated as the most likely and fourth most impactful global risk.

growth in terrorist activity in 2014, due to the prominent rise of the Islamic State in Syria and Iraq, and Boko Haram in Nigeria, and subsequent attack in France

Sources: 2015 Global Terrorism Index; Wall Street Journal; WEF Global Risk 2015 report; Credit Suisse

# Is operating environment unpredictability a strategic or an operational issue?

## Struggling to cope ...

As the business environment becomes more volatile, it's challenging the automotive industry's existing planning and operational activities. The global value chain is now continuously at risk. Potential disruption from multi-faceted sources of unpredictability is a fact of life. Local volatilities in global markets, emerging from unforeseen economic turbulence, protectionism and political turmoil require the management to actively monitor target markets and take proactive risk mitigation initiatives.

## ... with economic turbulence outpacing corporate reactions ...

The global economy is exposed to diverse areas of turbulence across emerging and developed markets. There are multiple examples ranging from vertiginous differences in levels of demand in markets throughout the ASEAN Region to the economic downturns in Brazil and Russia and slowing growth in China.

Unpredictability across raw materials, foreign exchange and financial markets is another crucial factor. Volatility in the price of raw materials and the value of currencies has a direct impact on automakers' profitability. And volatile financial markets can impact customer demand, refinancing costs and valuations. The sharp rise in the volatility of emerging markets is another major concern. With limited growth prospects in many mature markets, the automotive industry had, until recently, been looking to these markets to boost their sales performance.

## ... and gradual and uneven economic recovery is threatening investments

The economic recovery has not been global, as a number of emerging markets slipped into recession or a slowdown in growth. Consequently, the slow returns to positive territory

in many developed economies are being offset by economic downturns in emerging markets. These undermine increases in per capita income and threaten growth. Other factors such as changing government policies or lack of funding for public education also have a significant impact.

## Geopolitical instability has many unpredictable consequences ...

The number of regions witnessing dramatic changes in their political landscape, rise in terrorism, social tensions and interstate conflicts, all signal growing worldwide instability. While demand is most likely to be affected by declining consumer confidence and the reallocation of public funds, geopolitical tensions will also lead to more volatile raw material markets as well as impact global trade and also labor flows.

## ... and global trade is substituted by regional trade agreements

In parallel, we have seen global trade plateauing. A range of issues are responsible. China's shift from a manufacturing and export-led economy to one based on domestic consumption has been a key trigger. Looking ahead, surging data flows are expected to drive demand-based localized manufacturing, which will lead to further declines in global trade.

While protectionism in developed countries has been declining for decades, the recent recession and political tensions – ranging from Brexit and dissent within the EU, to changes in the US political landscape – seems likely to spark new protectionist measures to attract and protect investments in manufacturing, technology innovation and business services.

The global expansion undertaken by automakers and suppliers over the last decade has created a capital-intensive footprint that exposes companies to the significant sources of unpredictability that will impact revenue potential and operating costs.



Twofold factors responsible for decline in commodity prices: China's slowing growth rate, large investment in global capacities



Increase in WTO's circumvention resulting in the growth of regionalism and competing trade blocs

**Approximately 450** protectionist measures adopted by US – highest globally

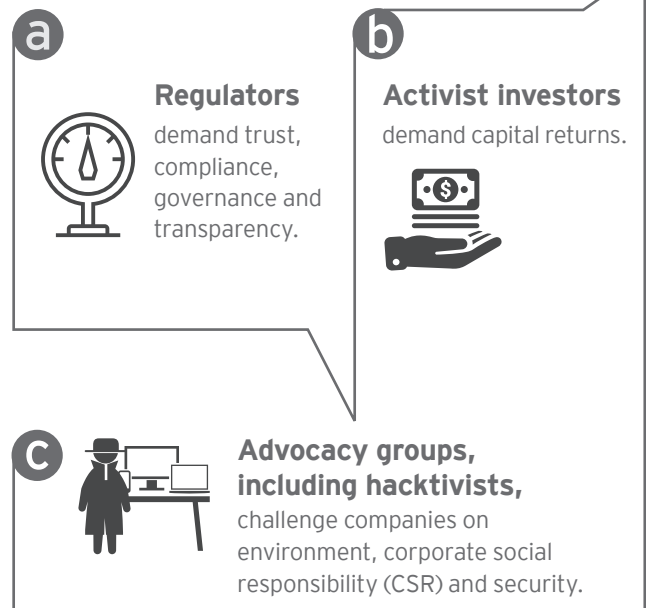


# The automotive industry faces unprecedented scrutiny from regulators, activist investors, advocacy groups and the public



The next decade for the automotive industry will witness greater pressure from external stakeholders – both traditional and nontraditional. These stakeholders now not only have significant resources to evaluate the industry from products to business processes, but also have the tools ranging from social media to boardroom representations to communicate with, influence and even penalize the industry.

From dealers and captive finance companies to automakers and suppliers, there is significant pressure to deliver higher returns on the capital employed, comply with more stringent standards for products, and also offer more transparency on the use of ethical business processes. Companies across the automotive ecosystem will need to invest in monitoring, compliance and communication strategies to minimize this risk.



**51 million**

is the record number of vehicles recalled in the US during 2015, on the back of 868 different instances of recalls.



**2%**

of microprocessors in cars had hardware security features in 2014.

**203 million**

vehicles will have the ability for Over-The-Air (OTA) updates by 2022, enabling real-time solutions to cyber threats.

**US\$50-US\$130**

is the additional cost per vehicle owing to tier-three standards as per Environmental Protection Agency (EPA) estimates.

**Up to US\$4.2b**

is the cost of complying with divergent safety regulations between the US and Europe.

Sources: NHTSA; ABI Research; Credit Suisse; Center for Automotive Research



A photograph of an automotive assembly line, showing various mechanical parts and structural elements of a vehicle. A yellow banner is overlaid on the top right corner of the image.

## Stakeholders – advocates or adversaries?

### Delivering to expectations for transparency and compliance ...

Nowadays, advocacy groups, activist shareholders and regulators are all major factors influencing corporate strategies.

As a result, the automotive industry is under ever-growing pressure to generate meaningful returns while delivering to heightened stakeholder expectations for transparency and compliance across multiple fronts.

Besides regulators and activist shareholders, advocacy groups including academia, subject-matter experts and industry enthusiasts are playing a greater role in demanding strict process definitions and adherence. Armed with social media and digital penetration, these stakeholders have the potential to trigger significant risks, which may not be detected by traditional automotive industry processes and risk monitoring.

### ... while advocacy groups gain power ...

Multiple advocacy groups challenge the industry's adherence to governance and ethical practices. In this climate, social media has become a major risk. Globally established and growing all the time, it amplifies the reach of even the smallest advocacy groups and multiplies the damage caused by negative communication. Repercussions can be hard to contain and impacts can influence policymakers and public opinion. Powerful advocacy groups represent multiple interests as outlined below.

**Environmental** advocacy groups have been among the most outspoken up to now. And, they're expected to continue to play an important role in raising environmental awareness among consumers.

**Corporate social responsibility** along the global supply chain is becoming both more visible and increasingly important for customers and business partners.

**Security and privacy** of systems and processes are a focus for hactivists, thanks to the proliferation in data, as well as the key role that software and connectivity play in vehicles.

### ... and activist investors represent a rising threat

Virtual communities are not just value creators (via crowdfunding or crowdsourcing). They also have real destructive potential. That might mean activist investors are focused solely on maximizing capital returns, whatever be the consequences. Or it could mean environmental pressure groups are directly influencing corporate strategies. That's why managing these virtual communities is a strategic priority for the automotive industry.

### Regulation getting ahead of the industry

National and international regulators are increasing the pressure on compliance, governance and transparency. This evolving and heterogeneous landscape of global regulations is driving complexity into international operations and igniting new areas of risk.

The intense focus on addressing climate concerns has been a major factor in regulatory agendas worldwide. Far greater scrutiny of emission norm compliance is now a feature of developed and emerging markets.

On top of this, volatile financial markets, new reporting requirements, intensifying focus on corporate social responsibility and evolving mobility are all playing leading roles in shaping the regulatory landscape.

The consequence for the automotive industry is the introduction of regulations that impact the entire value chain – from vehicle development to customer engagement and conversion.

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