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**Jabian Automotive Industry Insights** 



# **MARKET FORCES**

Where we chose to live, how we do business, how we communicate, and how we travel are just a few elements of our lives that are affected by the market forces around us.

Jabian's Automotive Industry Insights seeks to examine the industry through the lens of four market forces: technology, commerce, socioeconomics, and regulation.



# TECHNOLOGY

Advances in communication and transportation technology are evolving the role of the vehicle.



## П. COMMERCE

Changes in how buyers and sellers do business are transforming the market.



## Ш SOCIOECONOMICS

Cultural and population shifts are redefining the future of the industry.



## IV.

## REGULATION

Governments can play a key role through legislating financial incentives and taxes or setting standards.

## INSIGHTS

As we explore each trend, an impact section will describe how that trend is playing out in the automotive industry.

In addition, icons indicate different types of insights that will help characterize the effect of a particular trend on the industry.



## TREND IN **ACTION**

Current examples of how the trend is in play in the marketplace.



## INDUSTRY QUOTE

Comments and quotes from leaders and experts in the industry.



## IDEA

Ideas for organizations to consider to capitalize on the trend.



## STRATEGIC **PARTNERS**

Partnerships formed to capitalize on a particular trend in a way neither party could individually.



## FORWARD THINKING CONCEPT

How a trend could impact the industry well into the future.



## CONSUMER **PERSPECTIVE**

Direct feedback from consumers from Jabian's Automotive Industry Survey.





## MAPPING & NAVIGATION

Automotive companies spent years investing billions of dollars to make their engines more energy efficient, while software companies have applications to get you where you need to go using the most efficient route. Together, these systems allow drivers to reach their destination quickly, safely, and in an energy efficient manner. The market is already seeing the early generation of responsive mapping and navigation applications (e.g., Waze) that focus on providing navigation based on crowd-sourced traffic activity. This technology will continue to evolve, improving from navigation for an individual car to complete networks of cars. The increased safety and decreased traffic congestion will have major impacts on the environment, insurance, city infrastructure, and commute times.



#### STRATEGIC PARTNERSHIP

BMW, Audi, and Mercedes jointly purchased Nokia's Here mapping capability to secure high-quality digital maps available to any automotive company wishing to join their consortium. "The acquisition is intended to secure the long-term availability of Here's products and services as an open, independent, and value-creating platform for cloud-based maps and other mobility services accessible to all customers from the automotive industry and other sectors." - BMW, Audi, and Daimler in a joint news release

http://www.its.dot.gov/safety\_pilot/pdf/safetypilot\_nhtsa\_factsheet.pdf



#### TREND IN ACTION

BMW recently released EnLighten App which collects a traffic light's current state on a driver's route in real time. In turn, drivers can be aware of upcoming light changes and plan to cruise or slow down accordingly. When this data is accessible by car, improvements in fuel economy move from being delivered in the factory to being delivered on the road. Cars will be able to map an efficient route based on lights and make better decisions about engine start/stop, braking, and power delivery.



## SAFETY

Vehicle manufacturers have long held that the driver is the major cause of accidents, not the vehicle itself. To combat this, new safety features such as forward collision warning, blind spot monitoring, adaptive headlights, pedestrian detection, and drowsiness detection are being introduced into new car models today. However, the NTSB doesn't feel that forward collision avoidance is being adopted fast enough and found that in 2014 only four out of 684 passenger vehicle models included it as a standard feature. According to the NHTSA, 32,000 people lost their lives in U.S. road accidents in the past year. Up to 80 percent of accidents involving non-impaired drivers can be avoided using connected vehicle technologies.\*

http://www.its.dot.gov/safety\_pilot/pdf/safetypilot\_nhtsa\_factsheet.pdf



## FORWARD THINKING CONCEPT

Improved sensing capabilities, wireless communications, and advanced software will allow the car to gain a better sense of its surrounding environment, detecting hazardous conditions, pedestrians, and potential collisions. By 2020 cars will apply the brakes even when a driver has the gas pedal floored. Improved sensor technology will shift decision making from the driver to the car, giving it the final say.



### **CONSUMER PERSPECTIVE**

Distracted driving is one of the major causes of accidents, and current technology advancements continue to add more driver distractions into an automobile. According to Jabian's Auto Industry Survey, consumers ranked safety enhancements as the number one desirable connected vehicle service. Sixty percent of consumers indicated safety was the number one most important factor in their next vehicle purchase before maintenance, convenience, and entertainment.



## VEHICLE MANAGEMENT

The ability to source vast amounts of data from connected cars, supported by advanced analytics, allows automotive companies to better understand the needs of their drivers while improving product development and manufacturing processes. From a consumer's standpoint, the connected car can help reduce running costs and increase ease of use and maintenance. This highly valuable data is, and will continue to be, desired by insurance companies, marketing departments, OEMs, and, unfortunately, nefarious groups focused on scams and theft. The protection and privatization of consumer data will remain a concern well into the future.



#### FORWARD THINKING CONCEPT

Connected vehicles with remote diagnostic capabilities will be able to self-repair or correct based on operating conditions. Frequent software updates to electronic systems will be automatically delivered much like updates delivered to mobile phones today. Sharing of data between consumers and their preferred dealership or repair shop will revolutionize the way customers and services interact. The industry is starting to see these innovations from high-end luxury vehicle manufacturers such as Tesla, which may force automotive service departments and companies to evolve based on a shrinking need to bring automobiles in for repair and servicing.



#### CONSUMER PERSPECTIVE

Consumers overwhelmingly chose diagnostic tools as one of the top three most desirable connected vehicle services. According to Jabian's Automotive Industry Survey, of consumers that selected diagnostic tools as the most desirable connected vehicle services, 62 percent still have concerns sharing personal or vehicle data.



## DRIVER ASSISTANCE (SELF-DRIVING VEHICLES)

Autonomous (i.e., self-driving) cars continue to be a popular and rapidly developing technology that was nearly nonexistent a few years ago. Software giants and car manufacturers are to introduce the first iterations of autonomous technology in higher-end vehicles, and concept vehicles are beginning to emerge from innovation labs. Ultimately, the iterations of self-driving features will slowly evolve into a holistic autonomous driving experience.



#### TREND IN ACTION

Luxury brands, and even some moderately priced vehicles, are introducing the first components of semi-autonomous driving into their fleets. Adaptive speed cruise control, assisted parking, lane departure notifications, and many other technologies are the precursors of fully autonomous vehicles. The path to a full-fledged autonomous car will be a series of continual iterations that add in small pieces of functionality. Consumers will gradually get used to having more of their cars' capabilities operating "on their own" making the jump to full autonomy less monumental.



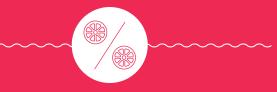
#### FORWARD THINKING CONCEPT

Is a future without car crashes, gridlock traffic, and road rage coming sooner than we think? The impact of the autonomous vehicle will ultimately lead to shared autonomous vehicles. This will take more than 15 years, but economic analysis shows that this trend will continue to grow while the number of privately owned, human-driven vehicles will decrease. This will drastically shift the automotive industry from car manufacturing to servicing and even city/ infrastructure planning.



#### **CONSUMER PERSPECTIVE**

Driver assist capabilities are among the top three advancements consumers want most in next generation vehicles, with expected safety increases being the reason why. Forty percent of survey respondents think autonomous driving is the way of the future. On the contrary, safety is the also the biggest concern for initial adoption. Interestingly though, according to the Jabian survey, higher-income drivers will still desire the thrill of driving a car themselves.



# SURVEY INSIGHTS



half of them believe they will be a high-end gadget

not intended for the masses



of consumers indicated **SAFETY** was the number one most important factor in their next vehicle purchase before maintenance, convenience, and entertainment

of consumers trust software providers the most for producing new vehicle communications technology rather than vehicle manufacturers or mobile network operators



## INFOTAINMENT

In-car entertainment began in the 1920s with the radio. Tape decks were added in the 1970s followed by CD players in the 1980s. Chrysler even had a failed attempt of adding a record player. When Apple introduced the iPod, drivers had vast amounts of digital music in their hands and naturally they wanted it in their automobiles. We were launched into the current generation of automobiles where mobile phones and streaming services are pushing the limits of in-car entertainment. Incorporating mobile operating systems, persistent wireless connections, and screens large and small into new automobiles is becoming increasingly vital.



## FORWARD THINKING CONCEPT

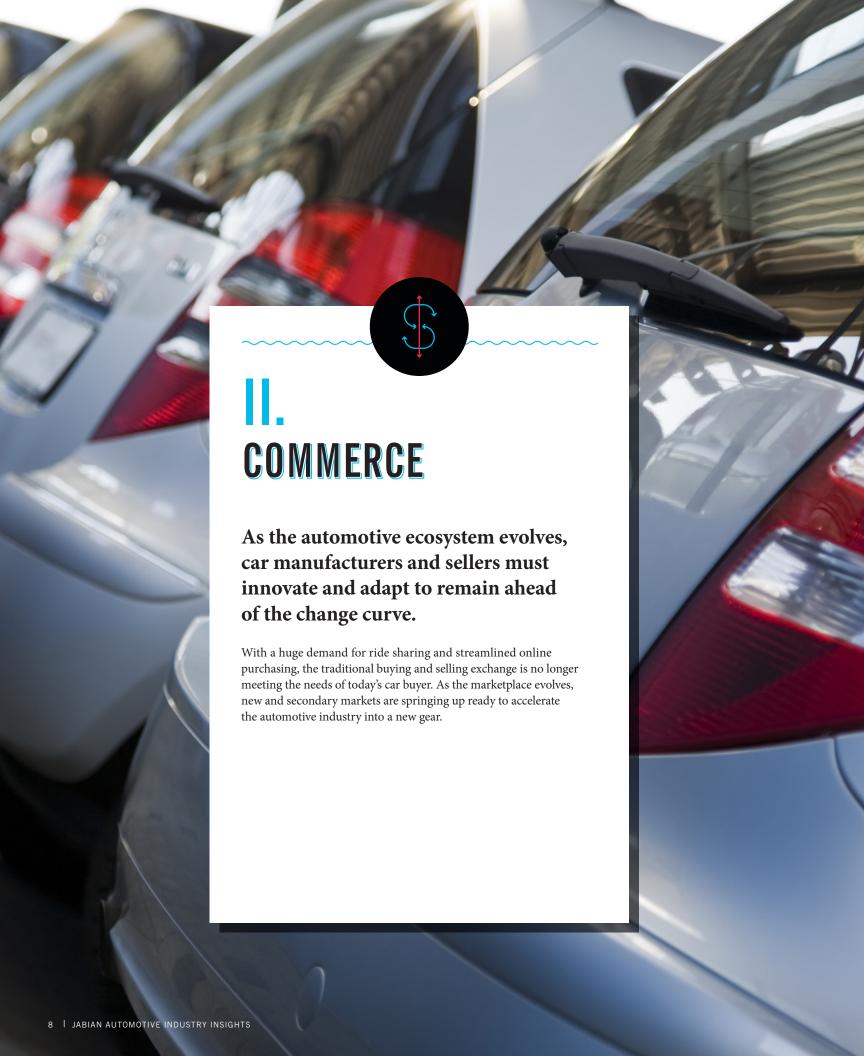
For a consumer, the mobile phone is poised to become an even more powerful piece of technology driving the experience in an automobile. We will see phones replacing the need for car keys/fobs, providing driver preferences (e.g., seat adjustments, mirror setup, radio stations, etc.) to cars, and tapping directly into, and potentially replacing, the operating system of the car. The industry is already seeing major software companies (i.e., Apple, Google) stepping into this arena.

The industry is at an inflection point for massive change ... not just evolutionary change.

TIM COOK / APPLE CEO

#### **INDUSTRY QUOTE**

Tim Cook, Apple CEO, was quoted by The Wall Street Journal stating, "We'd like people as they enter their car to have an iPhone experience in their car ... I don't know what kind of car that you have today, but the interface probably isn't in the top-10 list of what you love about your car."





## DIGITIZING THE AFTERMARKET

Autonomous driving capabilities and connected cars continue to make the headlines, but the aftermarket parts and service business is also experiencing change by leveraging technology to create new channels. Aftermarket online sales have previously targeted the DIY/accessory market. New service aggregators are working to create the Expedia of auto service where consumer vehicles can connect with garages to diagnose needs, provide competitive quotes, and schedule repairs, all of which create new purchasing channels for local service centers.



#### TREND IN ACTION

Open Bay is piloting an app that wirelessly receives diagnostic data from your vehicle, identifies service needs, and provides repair details (e.g., service center locations, quotes, and reviews). Much like the Uber model, Open Bay will even handle payments, making it a seamless experience for consumers.



#### STRATEGIC PARTNERSHIPS

Europe's second-biggest car maker, Peugeot, is in talks with online parts retailer Mister-Auto with the intent of building out online offerings and growing its share in post-sales service. Michelin has also recently completed acquisitions of two companies that specialized in online tire sales.



#### FORWARD THINKING CONCEPT

Online service aggregators (like Open Bay) have a tremendous opportunity to bring many B2C and B2B businesses together into a common online platform. They can serve as providers for consumers and facilitate transactions between parts manufacturers and service centers.



## SHARING ECONOMY

With the advent of sharing economies, the automotive space has seen services such as Uber and Lyft grow and expand rapidly. This is drastically changing the outlook of what car purchasing and ownership could look like in the future. Much still needs to be defined in the sharing economy, particularly the employment classification of those who work in the space, regulations, and the impact it will have on other areas. Cities such as New York and San Francisco are currently piloting two different options for adapting to the sharing economies.



With the success of ZipCar, Uber, and Lyft, the sharing economy is making waves and driving droves of new entrants from both start-ups and industry giants. General Motors recently announced its "Let's Drive NYC" which provides on-demand, short-term rentals to Manhattan apartment dwellers. The service further provides access to over 200 parking garages across the city. Audi has launched a similar service in San Francisco.



## INDUSTRY QUOTE

"People already are sharing everything — from books to home. We're seeing the potential for a shift from a single consumer paying for a single vehicle to several people sharing costs and benefits." - David McClelland, Ford Credit executive leading Ford's new shared-lease pilot program

http://fortune.com/2016/01/12/ford-leasing-pilot



For now it could be as simple as decentralization. While taxi fleets might shrink, individuals, who in the past might not have purchased their own vehicle, might do so with the help of augmented income from the ride-sharing economy (though things like liability and insurance will be much more complex). In the future decentralization could provide much-needed alternative transportation to help ease congestion or provide economical transportation to areas that have been historically underserved.



## 3D PRINTING

3D printing technology is continuously expanding its ability to print a broader variety of materials at a lower cost and higher speeds. Consumer versions are available at local electronics retailers. In the near future, machining will no longer be required to produce small lots of parts. The cost to prototype and design new components will be greatly reduced, having significant impacts on the automotive supply chain.



#### **INDUSTRY QUOTE**

"3D Printing in Automotive Applications to Be a \$1.1 Billion Annual Market by 2019"

http://www.smartechpublishing.com/reports/additive-manufacturingopportunities-in-the-automotive-industry-a-ten-year



#### STRATEGIC PARTNERSHIP

Ford recently teamed up with Silicon Valley start-up Carbon3D, with initial plans to use the technology to pilot customized parts for consumers (custom fit steering wheels). Ford acknowledged the technology isn't ready for mass production, but it sees value in using it for opportunities with personalized parts.



#### FORWARD THINKING CONCEPT

By decreasing the cost to manufacture, spare parts will be cheaper and quicker to obtain. Just-in-time part printing for auto repair services will allow repair shops to speed up repair times and reduce inventory by only printing what they need. Traditional supplier relationships will change as repair businesses can manufacture in-house. OEMs like Ford will be able to diversify and change vehicle designs and models more rapidly, with the ability to produce more specialized parts within their own facilities.



## ONLINE PURCHASING

Customers are now more accustomed to making online purchases than ever before. The "Amazonification" of the shopping experience has changed the way consumers purchase goods and services. With a wealth of information at their fingertips (price comparisons, reviews, etc.) and the ability to have products shipped to their homes in a matter of hours, consumer expectations are vastly different today from what they were even two years ago. The automotive industry is one of many industries working to provide new purchasing experiences to meet new customer expectations.



#### TREND IN ACTION

Online companies such as Carvana are springing up with attempts at reinventing and streamlining the purchasing process. Even luxury brands like Lexus are experimenting with a "haggle-free" purchase process at a small percentage of its dealers to attempt to provide the "one click" experience. While the majority of consumers start their research online, only 28 percent would consider buying a car completely online, noting the dealership still has a critical role to play despite changes in purchase habits.



#### INDUSTRY QUOTE

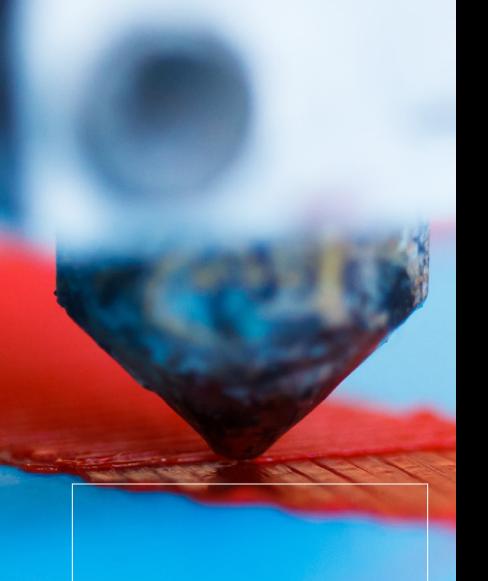
"We know that many of our customers who are shopping for a used car want to complete more of the process online, and that number is growing. GM is already a leader in online new car shopping with our Shop-Click-Drive service, and we are expanding it with the Factory Pre-Owned Collection, making GM the first automaker to offer this choice to consumers." - Mary Barra, GM Chairman and CEO, regarding its newly launched online purchasing channel

http://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/ en/2016/Jan/0113-used-car.html



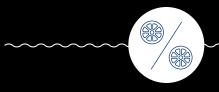
#### FORWARD THINKING CONCEPT

In the future, sellers will face pressure from new entrants to the online purchasing space that will vie for customers' attention. While this may threaten existing channels and models, it could benefit consumers by providing additional value (price competition, additional products or services, etc.).



"3D PRINTING IN AUTOMOTIVE APPLICATIONS TO BE A \$1.1 BILLION ANNUAL MARKET BY 2019."

SMARTECH MARKET PUBLISHING



# **SURVEY INSIGHTS**

What is your primary source for researching automobiles for purchase?



19% DEALERSHIP 14% ONLINE DEALERSHIP

10% PERSONAL **5**% NEWSPAPER/ MAGAZINES



28%

Majority of customers look online to start their vehicle search, but only 28% said they would consider buying a car completely online





## URBANIZATION

Global population centers within urban areas, especially in emerging markets, will continue to increase significantly over the next 35 years. The increase in population density will put a heavy strain on urban infrastructures and impact the way consumers and cities think about "mobility."



#### TREND IN ACTION

By 2050, it is estimated that 70 percent, or 6.3 billion, of the global population will reside in urban areas. That is a sharp increase from the estimated 51 percent, or 3.5 billion, today.



#### FORWARD THINKING CONCEPT

The key to addressing mobility in the urbanized future will be the seamless integration of various transportation options across different stakeholders, allowing consumers, for example, to leverage a single payment source across the different transportation options required to get to a desired destination. The urban mobility landscape will be a combination of both public and private solutions successfully integrated to meet the needs of a large, localized population.



### CONSUMER PERSPECTIVE

Consumers are more eager and willing than ever to consider transportation options other than traditional vehicle ownership such as public transportation or on-demand transit/vehicle services. Jabian's recent Automotive Insights Survey showed that 30 percent of the population would be willing to try forms of on-demand transportation with almost 25 percent of respondents preferring alternative or public transportation if it were available.



## CAR CULTURE NO MORE

Will the love affair with the automobile soon be a thing of the past? With the global population trend of urbanization, the ability to connect with others via social media, and the availability of transportation alternatives such as online shopping, virtual medicine, telecommuting, and car sharing, the necessity of driving and vehicle ownership is declining.



#### TREND IN ACTION

A number of studies show a decline in the number of driver's license holders ages 30 and under, with many younger adults delaying getting a driver's license, once a right-of-passage for their parents.



#### INDUSTRY QUOTE

"It is forecasted that by 2035, global vehicles in operation could be reduced by up to 250 million vehicles and new sales annually could be reduced by 30 million units."

https://www.ihs.com/products/automotive-urban-mobility-study.html



#### CONSUMER PERSPECTIVE

Millennials seem to prefer the option of leasing a vehicle rather than purchasing one and are opting to lease higher-priced, technologypacked vehicles. Given the pace of technology, the benefit of a lease is that the consumer can elect to upgrade to the latest vehicle technology in a short period of time, much like other technologies such as mobile phones.



## CYBER SECURITY

The average high-end automobile has over 100 million lines of code\* supporting functions from how much gas is left in the tank to self-parking and adaptive cruise control. That is about four times the lines of code needed to run an F-35 Fighter jet. With connected car and autonomous vehicle technologies increasing, the amount of technology within the average vehicle will only increase, adding to consumer fears of possible car hacking and the need for stronger vehicle cyber security.

\* http://www.informationisbeautiful.net/visualizations/million-lines-of-code/



#### **INDUSTRY QUOTE**

"Manufacturers are rushing headlong into implementing technologies that rely on connectivity without taking into account the possible unintended consequences and the accompanying increase in attack surface." – Jean Taggart, senior security researcher at Malwarebytes Labs



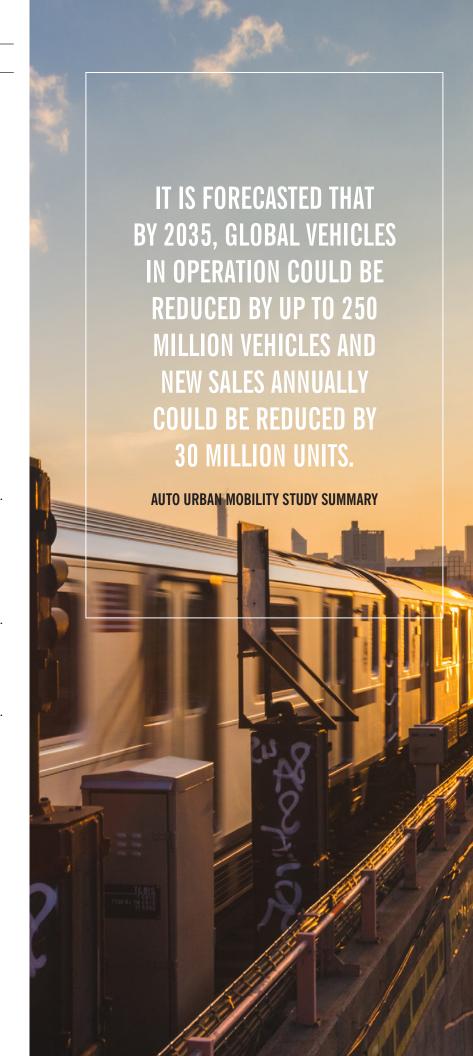
#### **CONSUMER PERSPECTIVE**

Jabian's Automotive Insights Survey revealed that vehicles being hacked and taken over were among the top two concerns consumers have about connected vehicles.



#### STRATEGIC PARTNERSHIPS

In an effort to build a layer of defense against potential car hackers, the automotive industry is working to establish an Information Sharing and Analysis Center to be an industry-wide clearinghouse for intelligence about cyber threats to vehicles and their networks. All major automakers are already planning to participate, with suppliers and telecommunications companies expected to join in the future.





## "MOBILITY" COMPANIES

Macro trends in the auto industry, such as urbanization and car sharing, have automakers transforming their businesses from not only being product companies but also "mobility" companies. Consumer attitudes regarding mobility are shifting, driven by global urbanization and the Millennial generation. Automakers are beginning to invest in new business models to address those needs and shifts.



#### TREND IN ACTION

Automakers including Ford, Daimler, and General Motors are experimenting and engaging in new business models outside of traditional vehicle production. For example, Ford is conducting experiments as part of its Smart Mobility plan while Daimler has recently acquired RideScout.



## STRATEGIC PARTNERSHIPS

Strategic partnerships, such as General Motors' partnership with Enterprise's CarShare, will continue to grow as automakers look for other markets to generate revenue in the new mobility landscape.



## INDUSTRY QUOTE

An industry that once considered itself primarily "metal movers" is quickly realizing the needed shift to redefine itself. As Ford CEO Mark Fields demonstrated in a CES keynote, "The world is changing. Consumers are shifting priorities. And great technology is evolving faster than ever before. For us, it adds up to an opportunity as big as Henry Ford's. It's an opportunity to help create a better world."



# **SURVEY INSIGHTS**



Respondents were two times more likely to consider trying on-demand transit/vehicle services (i.e., Uber, Zipcar) over a shared ownership model (pool cars)

# **VEHICLES BEING HACKED AND** TAKEN OVER WERE AMONG THE TOP TWO CONCERNS CONSUMERS HAVE **ABOUT CONNECTED VEHICLES**



of respondents that currently drive themselves would prefer to use alternative transportation if it was available

# IV. **REGULATION** Technology innovations and a focus on eco-friendly vehicles continue to drive the automotive regulatory agenda. Manufacturers strive to produce vehicles meeting aggressive fuel efficiency and emissions standards while not pricing themselves out of consumer consideration. Safety concerns — both in terms of personal safety and data security — are topics of new legislation. Federal and state governments look to find their respective positions in regulating self-driving vehicles. In the meantime, manufacturers continue to test their self-driving vehicles and other new assisted driving features with little resistance. 16 | JABIAN AUTOMOTIVE INDUSTRY INSIGHTS





Regulatory bodies continue to push automakers toward alternative fuels and more efficient traditional fuel-powered vehicles. Electric vehicle producers push for stricter emissions and higher fuel efficiency. Traditional manufacturers are making eco-friendly strides but have concerns over their ability to meet aggressive fuel efficiency standards over the coming years while producing a product at a price the consumer is willing to pay.



#### IDEA

According to the National Automobile Dealers Association, U.S. Corporate Average Fuel Economy (CAFE) standards going into effect in 2016 could add as much as \$1,000 to vehicle production cost.

According to current CAFE targets, vehicles must average 54.5 mpg by 2025. However, manufacturers argue that the higher cost of lighter materials and new fuel technologies will drive up production costs and sticker prices, hurting sales and delaying the benefits they provide. Expect negotiations and potential modifications to current regulatory fuel economy targets.



#### **INDUSTRY QUOTE**

"Given the same power, the new (lighter weight aluminum body F-150) is guicker, it handles better, and it stops shorter. Most importantly, it uses less fuel. And even if that improvement works out to only two or three miles per gallon across the board, millions of these trucks could hit the road over the next few years."

- Ezra Dyer, Popular Mechanics



## **VEHICLE SAFETY STANDARDS**

In light of recent, highly publicized recalls, Congress is working on legislation to mandate vehicle safety features and increase transparency and responsiveness on the part of automakers to disclose information regarding incidents and potentially defective parts. According to the Transportation Policy and Revenue Study Commission, a systems approach is needed when developing federal regulations, shifting from a fragmented, single-issue focus (e.g., safety, energy, or emissions) to a broader, more integrated systems approach. The approach would help achieve reductions in fossil fuel use, greenhouse gases, road injuries, and fatalities while simultaneously increasing the efficiency of our national transportation system.



#### IDFA

Governance of driver override systems, laser headlamps, active vehicle health monitoring, and active windshield display developments are a few of the many technological safety advances that will keep legislators busy during the next 5-10 years.



#### CONSUMER PERSPECTIVE

New low/no emission vehicles are now so quiet that they introduce new safety risks to pedestrians and bicyclists, especially the hearing impaired. Congress has drafted legislation mandating noise generating devices for alternative fuel vehicles to address the safety risk. As with all federally mandated safety enhancements, manufacturers would have at least 18 months to comply with the new standard.



#### FORWARD THINKING CONCEPT

Government will create incentives for research and the testing of new vehicle and internet technologies in urban centers to manage traffic flow and make roadways safer for passengers and pedestrians as part of the Obama administration's "smart cities" initiative, announced in late 2015. Automotive manufacturers will develop integrated technologies to interface with the new "grid" of information available to connected vehicles.

https://www.whitehouse.gov/the-press-office/2015/09/14/fact-sheet-administrationannounces-new-%E2%80%9Csmart-cities%E2%80%9D-initiative-help



## CYBER SECURITY & PRIVACY STANDARDS

Over the past few years, vehicle security has come to mean much more than locks and alarm systems. Recent, highly publicized remote "hacks" of moving vehicles, including manipulation of stereo, braking, transmission, and other systems, have opened the public's eye to the trade-off of having vehicles that function in many ways like any other internet-connected device, with accompanying data, and in this case, physical security risks.



#### IDEA

Developing vehicle security technologies such as remote vehicle shutdown and vehicle tracking will be subjects of lively regulatory debate as privacy concerns are brought to bear against the intended security benefits.



## TREND IN ACTION

The Security and Privacy in Your Car (SPY Car) Act and related legislation seek to establish minimum standards automakers must meet to protect and inform consumers of how well driver security and privacy are protected beyond those minimum standards. Look for customers to begin considering security as a key component in their vehicle purchase decisions as they become more aware of the tradeoffs between the benefits and risks of connected vehicles.



#### INDUSTRY QUOTE

"Drivers shouldn't have to choose between being connected and being protected. Controlled demonstrations show how frightening it would be to have a hacker take over controls of a car. We need clear rules of the road that protect cars from hackers and American families from data trackers." - Senator Ed Markev of Massachusetts



## AUTONOMOUS VEHICLE REGULATION

Regulatory bodies are playing catch-up as manufacturers have begun autonomous vehicle test programs in earnest. Circumstances where an autonomous vehicle assumes or overrides driver control have introduced new legislative challenges in terms of safety and liability as regulators struggle to balance freedom vs. privacy and efficiency vs. general societal benefits.



#### **INDUSTRY QUOTE**

"Most states don't expressly prohibit automated vehicles," but, "It's not just what's on the books; it's what's enforced. If a police officer sees you driving down the road with no hands, he could determine that's reckless and still give you a ticket." - Bryant Walker Smith, professor of law and engineering at the University of South Carolina



Most regulation of autonomous vehicles will come through state channels, as federal regulations tend to focus on vehicle design and safety standards, whereas behavior enforcement codes, tolerances, and insurance policy tend to fall to the states. Some states have taken deliberate measures to accommodate autonomous vehicle tests, perhaps in hopes of wooing manufacturers and high-tech ventures into placing production or test facilities in their states. As more autonomous prototypes come to life, liability and insurance laws will be another challenge states will have to tackle.



#### FORWARD THINKING CONCEPT

Federal regulators generally own the own the safety and environmental domain of vehicle design. A recent example in the context of autonomous vehicles is the U.S. government's issue that computer systems can be considered as a driver of a vehicle. The decision was a win for Google, whose autonomous vehicle was previously required by California DMV to have a licensed driver at the controls. This is merely a starting point in defining standards for a new wave of vehicles with fundamental design differences such as vehicles with no steering wheel, gas or break pedals, or other operating controls.



# **SURVEY INSIGHTS**



of respondents would consider buying an electric or alternative fuel vehicle for their next purchase



Consumers ages 18-44 are

to purchase an alternative fuel vehicle compared to older consumers



## ALTERNATIVE FUEL VEHICLE TAX CREDITS

Highly favorable federal and state tax credits for alternative fuel vehicles have resulted in unit sales skyrocketing to over 400,000 per year from 2012 through 2014. However, federal tax credits for light-duty fuel-cell powered vehicles expired at the end of 2014, and credits for plug-in electric vehicles are being phased out as sales thresholds are met. If tax credits are not reinstated, manufacturers will need to find new ways to get buyers to purchase the next generation of low-emission, alternative fuel vehicles.



#### FORWARD THINKING CONCEPT

With many vehicles coming off-lease during the next two years, manufacturers, dealers, and remarketers will need new strategies for evaluating, retooling, and remarketing off-lease, early generation electric, and fuel-cell powered vehicles to consumers with little understanding of the longevity and replacement cost of vehicle parts. Unless tax incentives are reinstated, sales of the next generation vehicles may be stifled by consumer preference for the more affordable used vehicle as a green vehicle entry point.



#### TREND IN ACTION

Car buyers are increasingly trading in their off-lease alternative fuel vehicles for SUVs. According to an Edmunds.com survey, "about 22 percent of people who have traded in their hybrids and EVs in 2015 bought a new SUV. The number represents a sharp increase from 18.8 percent last year, and it is nearly double the rate of 11.9 percent just three years ago." The case for purchasing alternative fuel vehicles, especially without generous tax incentives, is weakened substantially with falling gasoline prices and seems to indicate consumers are purchasing alternative fuel vehicles for economic rather than environmental reasons.



## IDEA

The lapse in tax credits is likely more indicative of the slow pace of the legislature than a loss of appetite for subsidizing the low/no emission vehicle incentives. Look for a push from automakers and consumers to reinstate tax credits to make the popular vehicles accessible to the general public, highlighted by a struggle between hydrogen fuel cell and electric vehicle manufacturers for favored consideration as they vie for consumer favor.

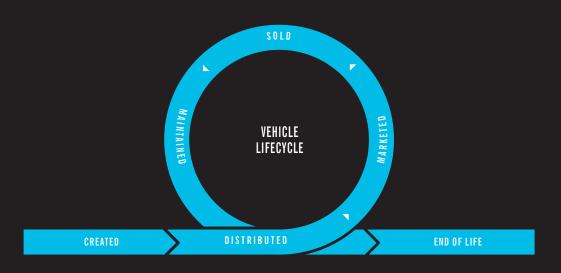
## **VALUE CHAIN & IMPACT HORIZON**

Jabian's Vehicle Value Chain represents the key functions within the automotive industry through which market segments have evolved.

At the highest level, it defines the various stages of the automotive vehicle lifecycle. From there, each function, from market research to salvage, breaks down further into key activities that help to describe the steps vehicles experience through the value chain.

Aligned to the value chain are the trends described within this publication as well as impact horizon. This matrix will provide players within the industry insight as to where the impacts will occur, as well as lead time to develop new business models or innovations.

VEHICLE LIFECYCLE	CREATED				DISTRIBUTED		
& VALUE CHAIN Activities	MARKET RESEARCH	RESEARCH & DEVELOPMENT	PROCUREMENT	MANUFACTURE	VENDOR PARTNERSHIP	SOURCING	
	Data Collection Data Mining	Design Customer	Part Supplier Selection	Manufacturing Location	Vehicle Vendor Selection	Purchase Negotiation	
	and Analysis	Focus Groups	Specialty Part	Selection	Contracting	Procurement	
	Market	Prototyping	Partnership	Patent Process	Group	Cost Mgmt.	
	Feasibility	Product Stress	Source Materials	Resource Allocation	Purchasing	Transportation	
	Competitive Intelligence	Testing	Supply Forecasting	Assembly	_ Data Exchange	to Distribution Center	
	Regional	Engineering Patent Products	Inbound	Plan Creation	Planning and	Delivery	
	Analysis	Faterit Froducts	Logistics	Vehicle	Management	Acceptance	
			Warehouse	Construction Defect	Supply	Quality Checks	
				Management	Forecasting Collaboration	Returns to Manufacturer	
TRENDS				Continuous		.   Wallufacturer	
				Improvement	Advertising Coordination		
I. TECHNOLOGY							
Mapping & Navigation							
Safety							
Vehicle Management							
Driver Assistance							
Infotainment							
II. COMMERCE							
Digitizing the Aftermarket							
Sharing Economy							
3D Printing							
Online Purchasing							
III. SOCIOECONOMICS							
Urbanization							
Car Culture No More							
Cyber Security							
"Mobility" Companies							
IV. REGULATION							
Emissions Standards & Fuel Econor	ny						
Vehicle Safety Standards							
Cyber Security & Privacy Standards	;						
Autonomous Vehicle Regulation							
Alternative Fuel Tax Credits							



		MARKETED		SOLD	MAINTAINED	END OF LIFE		
	INVENTORY MANAGEMENT  Location Selection  Decide Storage Layout  Operate Inventory Management Systems  Transport Products to Locations	DISTRIBUTION AND FULFILLMENT  Tracking Systems Operation  Order Management Packaging  Delivery	SHOWCASE OPERATIONS  Customer Assistance with Selecting Goods  Customer Assistance with Placing Orders  Issue Credits, Rewards, and Transfers  Store Account Mgmt.  Inventory Tracking	Market Segment Targeting Product and Service Catalogs Marketing Campaigns Promotions Customer Loyalty Programs Brand Strategy	Merchandising User Experience Order Mgmt. Payment Collection Customer Intelligence / User Analytics Auction Warranty Financing Insurance	SERVICE AND REPAIR  Warranty Repairs  Scheduled Service/Repair  Customer Complaints  Accident Repairs  Recalls	Recycle Parts Remanufacture Dispose Parts Remarketing	IMPACT Horizon: Years
								3+
								5+
								5+
								10+
								TODAY
								3+
								5+
								5+
								5+
								10+
								TODAY
								TODAY
								10+
								TODAY
								5+
								TODAY
								10+
								3+

# **SURVEY INSIGHTS** Changing consumer preference is a major driving force of transformation in the automotive industry. To best capture that shift, over 500 U.S. consumers were polled as part of Jabian's Automotive Insights Survey. The goal of the survey was to better understand how the dynamics of the automotive marketplace are affecting consumer behaviors and how emerging trends may be received. We looked for key themes that would provide leaders with insight into the current path and future trajectory of the industry. Included below are details from the survey which identified some interesting results.

## CONNECTED CARS

The future of connected cars will be dependent on the joint cooperative efforts of software providers and OEMs, while approaching it with the consumer in mind first.



Most trusted provider for enabling new vehicle communication technology in cars:

- 44% Software provider (e.g., Google, Apple, Microsoft)
- 43% Vehicle manufacturer
- 13% Mobile network operator (e.g., AT&T, Verizon)

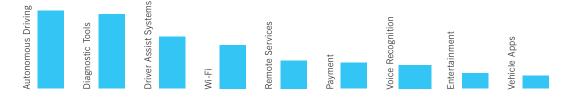


Consumers are most concerned with the following issues now that advanced connected services are available in today's cars:

- 33% Distracted driving
- 23% Risk of system being compromised
- 21% Unwanted one-time or recurring costs
- 18% Unwanted use of personal data
- 5% Lack of cohesiveness between services

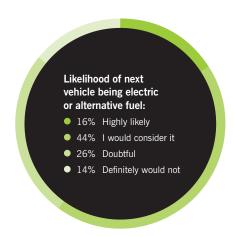


The most desirable connected services:

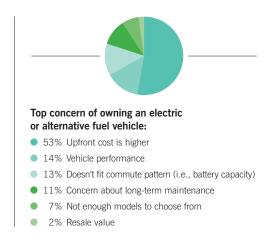


## RENEWABLE ENERGY

Alternative fuel vehicles will share a greater piece of the "pie," but consumer demand will fluctuate with the price of gas.







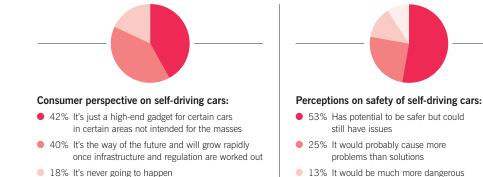
Consumers 18–44 responded significantly higher than all other age groups that their next vehicle would most likely be an alternative fuel vehicle.

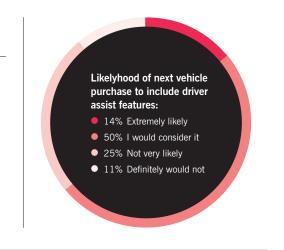
Females value environmental conservation more, while males valued reduced maintenance and tax credits.

## AUTONOMOUS DRIVING

Self-driving vehicles are inevitable. Future drivers will gradually adopt the technology as autonomous features are added bit by bit.

9% Much safer to have autonomous driving





Consumer ranking of benefits of self-driving vehicles:



REDUCE INSURANCE COST/FUEL ECONOMY

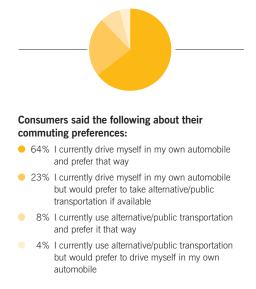




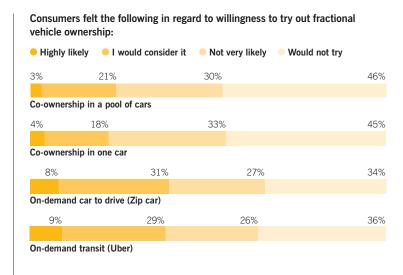


## MOBILITY

Consumer preference toward shared services will continue to grow with increased urbanization and the proliferation of fully autonomous vehicles.



Over 50% of consumers believe they will not be able to drive after 80 years old.



## PURCHASING PREFERENCES

The successful dealership of the future will find ways to integrate aspects of the buying process that customers prefer to perform online with the aspects they prefer to do in person to provide a more seamless and positive buying experience.

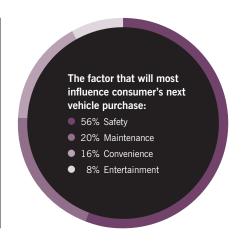


When asked if they would purchase a car completely online, consumers responded:

- 72% No
- 28% Yes

49% of consumer

of consumers spend at least one month researching and shopping for a vehicle before making a purchase. Over 70% of consumers said transparent pricing and full disclosure of vehicle history were the top factors in making them feel that they were getting a great value.



Primary sources of researching automobiles for purchase: **52%**THIRD PARTY WEBSITE

19% DEALERSHIP 14% ONLINE DEALERSHIP 10% FRIEND

**5**% NEWSPAPER



## About Jabian's Automotive Experience

Jabian Consulting provides strategic consulting services to leading companies operating throughout the automotive ecosystem. Drawing on their many years working in the industry, members within the Automotive Group at Jabian deliver solutions to drive growth and increase profitability.

For more information, visit www.jabian.com/automotive

## **About Jabian**

Jabian Consulting is a strategic management and technology consulting firm with an integrated approach to creating and implementing strategies, enhancing business processes, developing human capital, and better aligning technology—ultimately helping clients become more competitive and profitable. Jabian blends functional expertise, industry knowledge, and senior experience to think strategically and act practically. It's a Strategy that Works.







