

The evolving mobility ecosystem

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Deloitte's Future of Mobility series aims to advance the thinking about the broad set of issues associated with the emergence of the future mobility ecosystem. Our objective is to help to build a bridge between a highly uncertain futuristic vision, the realities of today's industry, and potential pathways to alternative future realities.

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How transportation technology and social trends are creating a new business ecosystem

There is a critically important dialogue going on across the extended global automotive industry about the future evolution of transportation and mobility. The debate is around whether the structure and dynamics of the current industry will evolve incrementally toward some new mobility system or arrive at something radically different than today's system—and get there in a highly disruptive manner.

A series of forces are converging to drive the industry's transformation, specifically: Shifts in powertrain technologies; rapid advances in the connected car; the emergence of autonomous drive vehicles; advances in materials; and changes in mobility preferences.

After exhaustive analysis and debate, we have concluded that for an extended period of time (perhaps the next 10-15 years), the most likely outcome will be that these two competitive visions will co-exist through four interdependent and concurrent futures for personal mobility, emerging from the intersection of two critical trends:

- Vehicle control (driver versus autonomous)
- Vehicle ownership (private versus shared)

Four future states

Incremental change: Future state one operates very much as it has for the past century. Private ownership of vehicles remains the predominant form. This future state assumes that while driver assist technologies continue to advanced, completely autonomous drive does not take hold anytime soon.

A world of car-sharing: The second future state anticipates continued growth of shared access to vehicles.¹ In this state, shared vehicle services become ubiquitous as greater scale and increased competition leads to a more expanded range of services and segmented customer experiences at lower costs.

The driverless revolution: The third future state is one in which autonomous-drive technology becomes viable, safe, convenient, and economical, yet private ownership continues to prevail. Individuals seek the driverless functionality for its

safety and other potential benefits but continue to own cars for many of the same reasons they did before the advent of autonomous drive.²

A new age of accessible autonomy: The fourth future state anticipates a convergence of both the autonomous drive and shared mobility. In this future, mobility management companies offer a range of passenger experiences to meet widely varied needs at differentiated price points.³ Over time, as smart infrastructure expands and driver usage nears a tipping point, fleets of autonomous shared vehicles will likely become ubiquitous and spread from urban centers.

Profound disruption could extend far beyond the automotive industry. Every aspect of the modern economy based on the assumption of human-driven, personally owned vehicles will likely be challenged. In the United States, the sector generated nearly \$2 trillion of annual revenue in 2014—11.5 percent of U.S. GDP⁴—from automotive manufacturers, suppliers, dealers, financial services companies, oil companies, fuel retailers, aftermarket services and parts, insurance, public and private parking, public-sector taxes, tolling and traffic enforcement, medical care, and others.

Implications for the automotive industry

Global automotive manufacturers (OEMs) face momentous and difficult decisions. Notwithstanding the resurgence from the 2009 economic downturn, production economics for automotive companies remain exceedingly challenging. The automotive industry currently struggles with the fundamental economics of an intensely competitive global business with enormous capital requirements, while operating margins and return on invested capital remain low⁵ at the very moment when the industry is experiencing some of the most favorable business conditions it has seen in decades.

OEMs should consider whether they need to evolve from a (relatively) fixed capital production, first-transaction, product-sale business into one centered on being an end-to-end mobility services provider. This would represent a profound business-model change and requires the development of new capabilities to be competitively and sustainably viable.

At a minimum, they should consider weighing how to meet the needs of a changing landscape as consumers increasingly use shared mobility and become interested in highly tailored, customized, personally owned autonomous-drive vehicles.⁶ This could require transforming product-development and innovation capabilities and reconfiguring supply chains and production operating systems to be even more lean, flexible, and “smart customization”-enabled. At the same time, consumers could begin demanding shared autonomous vehicles for different kinds of trips, which could spur the creation of more varied vehicle forms. This could drive the development of high-speed, low-cost vehicle assembly operations to create and produce vehicles with lightweight frames, custom experience-focused software, and highly customized, design-focused interiors. Light autonomous-drive vehicles can be made to be highly energy-efficient and, with a longer driving range, make electric vehicles more viable and could help automakers meet stringent regulatory standards.

Automotive suppliers will likely have to adjust as OEMs transform. As sales of autonomous-drive vehicles grow, suppliers will need lean, agile operations to serve the highly varying needs of the personally owned segment. While most of the core powertrain, chassis, brake systems, and electronic wiring components on such vehicles may be standard, giving suppliers some benefits of operational scale, the packaging for personally owned vehicles will likely be tailored and customized. Building the more standardized vehicles needed for shared mobility solutions could offer large volumes, and the demand will likely be for less complex and lower-value-added products; therefore, the economics in this new marketplace will strongly favor the lowest-cost producers.

Dealers may also find their role in the ecosystem challenged; within a decade, they might be dramatically different than today’s model. For the moment, they continue to operate as they have for decades, selling and servicing driver-controlled, personally owned vehicles. As autonomous-drive vehicles become more widely adopted, however, there are likely to be far fewer personally owned vehicles than the 250 million in operation in the U.S. today.⁷ The need for vehicle service and repair will likely continue, but may diminish as more maintenance occurs via remote software upgrades and patches. This will greatly reduce the need for the current network of over 16,000 dealers nationwide.⁸

Moreover, as the market bifurcates between highly customized, personalized, autonomous-drive vehicles and mass-produced, high-volume vehicles used by shared mobility fleet management operators, dealers could build business models and develop new capabilities to serve each segment discretely. The former requires building operations that enable customers to engage in vehicle customization and personalization. The latter involves morphing from a sales-and-service center to either supporting or becoming a fleet manager that offers “end-to-end” mobility.

In our recently published study, *The future of mobility*, we highlight the impacts to numerous other sectors, including: insurance, financial services, public sector, long haul/cargo transport, energy, technology, telecom, media, healthcare and legal.

Moving forward

In the future mobility ecosystem, sources of value shift profoundly. With this evolution still taking shape, we want to share some reflections on the strategic and operational implications for legacy incumbents, extended industry participants and disrupters as they weigh their future direction. Specifically:

1. **Industries rise and fall.** Cycles take long periods to play out but eventually change occurs.
2. **The system benefits and fundamental economics for passengers of the disrupter vision are overwhelmingly compelling.**
3. **There is a pathway for the existing automotive industry to lead the adoption to this future ecosystem but it will require fundamental and earlier change to their current business model.** Value will likely accrete to those who: 1) provide “end-to-end,” seamless mobility; 2) manage the mobility network operating system; and 3) holistically create and manage the in-vehicle experience. Everyone in today’s ecosystem should reassess how they will operate and create value during the interim period of the four states and the eventual future that will emerge.
4. **The insiders and disrupters need each other.** Despite their wariness, and highly differing outlooks and perspectives, automotive companies and technology firms should consider evolving their relationship into one that is symbiotic since they are mutually co-dependent.
5. **The disruptive effects cross industry are profound.** Whenever an industry goes through a significant transformation, there are winners and losers. Everyone in today’s automotive core and extended value chain should determine “where to play” and “how to win” in the future mobility ecosystem. Offsetting these impacts are numerous areas of opportunity that offer potentially even greater promise. Each of these new horizons can bring about new players with differentiated capabilities and change the fundamental dynamics of where and how value is created—and the market will likely decide who wins and loses.

The next decade promises to be one of eventful change as the way passengers and cargo are transported fundamentally shift and a new ecosystem emerges. Deloitte is helping our clients to systematically address these challenges and transform their enterprises to compete in a highly uncertain environment.

For more information and perspectives on how mobility is changing, please visit www.dupress.com/us/future-of-mobility.