

## Advanced Industries



# *Mobility of the future*

Opportunities for automotive OEMs



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# Mobility of the future

## *Opportunities for automotive OEMs*

### *Introduction and key messages*

For mobility – the market that includes public and private passenger transport as well as the transportation of goods – growth has been the name of the game for decades. Yet, over the first decade of the 21st century, automotive players have experienced one of the largest strategic shifts in car history. Tightening CO<sub>2</sub> regulations on a global basis have forced the industry to adopt novel technologies faster than anticipated. In addition, the emerging phenomenon of car sharing in larger cities along with widespread media coverage about the negative environmental effects of car mobility fueled concerns that consumers were seeking a replacement to the tradition of individual, private car ownership.

In light of these recent paradigm shifts in auto-mobility and the challenging years ahead, this study aims at providing a fresh perspective on the trends in the sector beyond electrification of the powertrain.<sup>1</sup> With empirical support from new market research out of Germany, McKinsey both identified consumer behavior patterns, and based on the results, highlights demands which will be key for the automotive industry in the next decades. Furthermore, designed as an overarching tool for the entire mobility market, McKinsey & Company's Mobility Matrix can decompose revenues and growth rates over time for all means of transport and along different parts of the value chain. Thereby the matrix is able to provide an overview of relative changes in the global mobility market along temporal and geographical dimensions.

With this analytical setup, some of the main questions this study addresses are:

- How is the wish for car ownership developing over generations?
- Is the nimbus of the car as status symbol eroding?
- What are the effects on the car industry regarding the consumers' increasing usage of smartphones and online content-on-the-go?
- What impact does car sharing have on automotive players?
- What are the next strategic steps for automotive OEMs to benefit from novel value pools which will open up in the future?

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<sup>1</sup> See detailed analysis on the electrification of the powertrain in McKinsey's publication "Boost! Transforming the powertrain value chain – a portfolio challenge"

The key messages of the report are as follows:

**Given current developments, the automotive industry has a unique opportunity to further accelerate growth**

In 2010, EUR 6,400 billion was spent on the transport of humans and goods globally – quadrupling since 1970 and outpacing global GDP growth. Yet, from 2000 to 2010, the car industry grew 1.5 percentage points per year slower than the mobility market. Overall, this shows that the consumer willingness to spend more on mobility is continuously growing. But the OEMs' participation in this growth can only increase if they create new products and services outside their classical business model. This has left the industry with an uncertain outlook on growth potential over the next decades, aggravated by claims of car ownership erosion and rumors about a decline of the car as status symbol.

**The next generation of consumers are car buyers with “a twist”**

New market research results in Germany dispel conventional wisdom. In particular, the research reveals that young people still strive for car ownership and express continued high and car-centered mobility needs. A new generation of consumers – mobile communicators – is emerging, fueling two key trends: media integration and car sharing.

**Media integration in cars presents itself as an untapped growth opportunity**

Monetizing the 50 minutes per day a person spends in his or her car represents a significant potential in the “attention economy.” McKinsey estimates that, for each minute in which all car passengers worldwide are attentive to mobile media content, an annualized value of EUR 5 billion could be created – *excluding* infotainment hardware revenues. Consumers are more connected today than ever before, as 28 percent of Germans acknowledge using their smartphone while driving. Manufacturers that are able to provide seamlessly integrated in-car connectivity and enhance the overall experience by forming strategic partnerships with media and Internet partners will be able to maximally monetize this driving time and avoid becoming a simple “hardware pipe.”

**Car sharing has the potential to become a winning game for automotive OEMs**

A third of the German city population are prospective users of car sharing despite current low usage rates as indicated by the McKinsey market survey. Increased car sharing will not mean “doomsday” for manufacturers because overall driven kilometers by car will not change. Instead, there is a triple-win chance for OEMs, cities, and the environment: due to a laser-focused OEM sales model, fewer vehicles on the roads and thus more parking space, and reduced CO<sub>2</sub> emissions because of a younger and more electrified car fleet.

To reap the full set of benefits that will be created in the future, OEMs will need to build competencies around monetizing online media content and find a strategic pathway into car sharing by understanding how and where this new form of car mobility is growing. Additional growth is within reach, and in light of the industry's track record, which has consistently stood the tests of time, the outlook for automotive mobility is sunny if the right strategic steps are taken today.

### *The global mobility market: stable growth for the last 40 years*

Mobility is foundational to our age. In 2010, the inconceivable amount of EUR 6.4 trillion was spent on the transport of humans and goods, almost EUR 1,000 per person on the planet. This global market for mobility effectively quadrupled in the last 40 years, growing at 3.8 percent p.a., outpacing world GDP (3.1 percent). Mobility now accounts for 13 percent of global GDP.

Within the mobility market, however, growth trajectories have diverged. From 1970 to 2010 the amount spent on fuels and other operating resources grew by a factor of 16 largely driven by an oil price increase from USD 10.1 per barrel in 1970 to USD 79.5 per barrel in 2010. Also, mobility services, enabled by modern logistics solutions, grew by a factor of 8, and long-haul transportation, driven by globalization, grew five times. Only these three elements outpaced the overall growth of the diverse and multifaceted mobility market (see “The Mobility Matrix” text box).

### *The challenge ahead for the automotive industry*

In stark contrast, the total revenues for the sales of cars, buses, ships, and airplanes only grew by a factor of 3, which means that overall asset productivity slowly increased over time. Of these slower growing areas of the mobility market, the automotive industry is a

#### *The Mobility Matrix*

The Mobility Matrix serves as a decomposition tool for McKinsey to comprehensively understand and analyze the mobility market and its past development. It takes a snapshot of the global mobility market over the last 40 years (2010 market shown here) and breaks it down in detail across all means of passenger and goods transportation, and along the value chain from production to noncore mobility services revenues. The matrix allows the identification of current client positioning while pinpointing prospective sources of growth (Exhibit 1).

The matrix shows that motorized private transport is the largest mobility segment, accounting for almost 50 percent of the global market. Analyzing the different cells of the matrix, it can be seen that value can be generated through the traditional OEM model (one-time car sale per client) as well as operating models that follow the “pay-as-you-go” format – used, for instance, in short- and long-haul public transportation. While noncore mobility services have gained a significant share of the long-haul and goods transportation segment with services such as contract logistics and travel booking services, they remain small in short-haul transport and motorized private transport. Across all means of transportation, but particularly in private motorized transport, fuel and energy services have captured almost a third of the total revenues.

As a side note, the matrix uses a market value perspective by measuring revenues; a more usage-based analysis of, e.g., kilometers driven would result in a different matrix scheme.



case in point: market growth between 2000 and 2010 averaged 2 percent p.a., which was lower than the rise in global GDP (2.5 percent) and the total mobility market (3.5 percent) during that time period.<sup>2</sup> In the mature markets of North America, Europe and Japan industry revenues from car and motorcycle sales even shrank during this period (about -0.4 percent annually). It was only the extraordinary expansion of Chinese markets – growing at 24 percent p.a. – that pushed the industry to overall growth during that decade.

Given these developments, arguments were brought forward that urbanization, environmental regulation, and shifts in society's norms were eroding the value of individual automotive ownership and mobility. Critics claimed that the car was losing its nimbus and was no longer a status symbol. At first glance, figures from the German Kraftfahrtbundesamt seem to prove these critics right. Car ownership among 18- to 29-year olds in Germany dropped a whopping 44 percent between 2000 and 2010 – from 424 to 239 cars per 1,000 persons in that age group. And if mature markets are leading the way, this trend will eventually cast a rather long shadow indeed over the automotive industry. Is there a future for auto-mobility?

<sup>2</sup> We note that individual OEMs particularly in the premium segment have outperformed the industry average significantly in this period

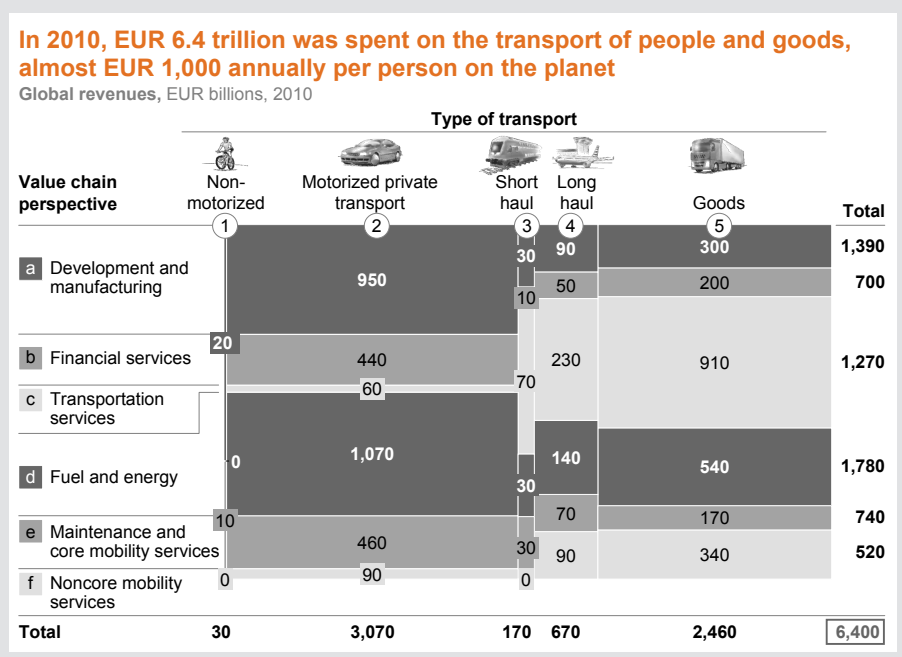


Exhibit 1

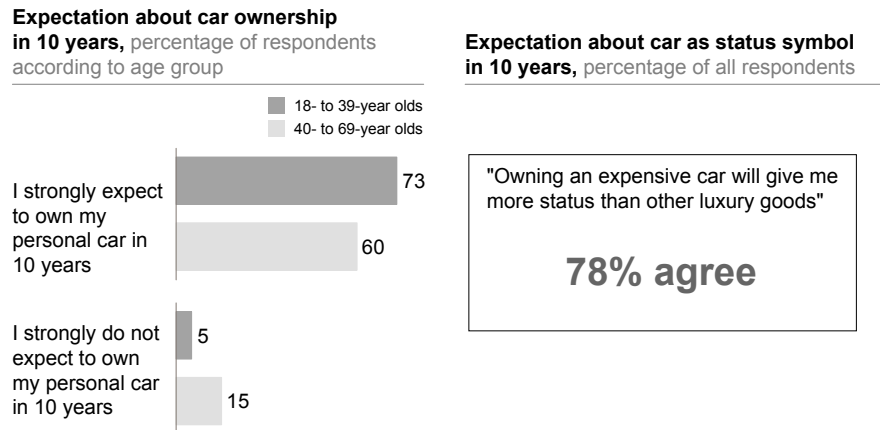
*The next generation: car buyers, but with a twist*

To evaluate the question of the mobility of the future, McKinsey conducted a large-scale market survey in Germany among a representative sample of more than 3,400 respondents. The survey focused on the current and expected mobility needs and preferences of the country’s consumers. The results are quite significant and in stark contrast to the common belief in the decline of the automobile’s appeal. More than 70 percent of today’s 18- to 39-year olds (and even 78 percent of 18- to 24-year olds) strongly agree with the statement “I will own my own car in 10 years.” Only 5 percent (or 3 percent of 18- to 24-year olds) disagree.

In addition, only 8 percent of all survey respondents agreed with the statement “I will [in the future] get more esteem from other luxury goods (e.g., smartphones) than from cars.” 78 percent of all respondents reported that they expected to see the car’s special status unchanged. This belief is also held by the younger respondents (18- to 39-year olds), though less pronounced with 12 percent strongly believing in the emergence of other status symbols and 70 percent still believing in the car being the ultimate status symbol (Exhibit 2).

**New market research in Germany dispels conventional wisdom – people will continue to own their own car and see it as a status symbol**

GERMANY EXAMPLE



**Exhibit 2**

The seeming contradiction between the results of the research by the German Kraftfahrtbundesamt – showing a reduction in the number of cars owned by the youngest generation of drivers – and the outcome of the McKinsey market survey can be explained by several factors. First, the number of students in Germany, known for rather low car ownership, increased between 2000 and 2010 by 18 percent. Secondly, the high cost of individual insurance leads younger drivers to rely on their parents’ cars, delaying ownership for themselves. In addition, in 2010 roughly 45 percent of 24-year-old men still lived at home, giving them access to other cars of the household. In fact, McKinsey’s survey shows that 78 percent of 18- to 24-year olds use a car belonging to someone in their households. Overall, purchasing may have been

### Mobility in Germany: a McKinsey market survey

In December 2011, McKinsey conducted an online survey among German adults, asking them about their future mobility patterns. With 3,428 respondents in the valid data set, a sample was generated that is representative of the German adult population between 18 and 69 with respect to age, gender, household income and community size.

Asked about their personal mobility patterns, respondents indicated that they spend roughly 50 minutes per day in the car out of the roughly 95 minutes of daily mobility. The remaining approximately 45 minutes are spent walking (20 minutes), in local transport (15 minutes) and on trains (10 minutes). The car remains the dominant means of short-haul transportation, a status secured by young people's strong expectation to increase car usage in the future. Only roughly 15 percent of the respondents foresee a reduction in personal car usage, about 55 percent of them above 50.

Based on the assessment of seven main mobility needs compiled over 26 indicators, McKinsey identified six mobility archetypes that group respondents according to their response pattern across specific categories and personal mobility needs (Exhibit 3). The segments to watch are mainly the "mobile communicators" and the "status-oriented" – that together account for 26 percent of the representative sample. Respondents under 24 are overrepresented in both of these segments (about double at 13 percent in the "status-oriented" segment and about 1.5 times at 33 percent of "mobile communicators"). Together with the group of "hedonistic ecos" these archetypes share high needs for mobile connectivity as well as an overall higher level of personal mobility than the remaining three mobility groups.

#### The survey respondents were segmented based on needs indicated – ~ 20% of Germans today are "mobile communicators"







 <p><b>Settled locals</b> Size: 27%</p> <ul style="list-style-type: none"> <li>Mostly retired, low-income people (33%) who stay local</li> <li>Relatively few car owners, more walking/public transport</li> <li>Low mobility needs and connectivity expectations</li> </ul>	 <p><b>Mobile communicators</b> Size: 20%</p> <ul style="list-style-type: none"> <li>High need for mobile connectivity: 45% use smart-phone while driving</li> <li>Highest car usage (32 hours/month)</li> <li>Higher household income younger people/many students</li> </ul>	 <p><b>Convenience-oriented</b> Size: 16%</p> <ul style="list-style-type: none"> <li>70% of mobility is by car for "getting things done"</li> <li>Dislike for planning ahead, low need for connectivity</li> <li>25- to 49-year olds (58%), middle-income housewives/husbands</li> </ul>
 <p><b>Time optimizers</b> Size: 16%</p> <ul style="list-style-type: none"> <li>Aim to minimize time in transit reflected in lowest time spent in transport</li> <li>Lowest importance for connectivity, more than 50% smartphone nonowners</li> <li>Middle-income, of age 40 to 59</li> </ul>	 <p><b>Hedonistic ecos</b> Size: 15%</p> <ul style="list-style-type: none"> <li>Environmentally-friendly mobility, and fun and relaxation in transport are important</li> <li>Above-average expected use of car sharing in the future</li> <li>Many part-time workers and retirees of middle/lower income (64% ≤ EUR 2,600/month)</li> </ul>	 <p><b>Status-oriented</b> Size: 6%</p> <ul style="list-style-type: none"> <li>Choice of transport means to build desired personal image</li> <li>High-income 18- to 39-year olds</li> <li>High mobile connectedness, need for up-to-date technology</li> <li>High interest in car sharing</li> </ul>

Exhibit 3

delayed and ownership may have been shared, but driving remains very important to consumers, and the aspiration of young drivers is still to one day own a car.

Given the findings on the mobility expectations of the young population, McKinsey conducted a segmentation analysis of the survey respondents based on their expressed needs and preferences in mobility. This segmentation identified that about 20 percent of all German adults, approximately 11.2 million people, are already mobile communicators, the segment characterized by a strong desire to stay in contact while on the move. This segment is particularly well represented by the younger generation (29 percent of the 18- to 39-year olds and a third of the 18- to 24-year olds). Well educated, with above-average income and high mobility needs, the mobile communicators are shaping a more connected and flexible way of mobility (see the “Mobility in Germany” text box).

The impact of this next generation of customers is already visible in the overall population: 67 percent of all 18- to 39-year-old respondents expect that in ten years “[they] will have access to personal data in [their] car,” and 45 percent of all 40- to 69-year olds agree. Also, 55 percent of the people younger than 40 claim it is important for them to “be accessible on [their] way.” Staying connected while driving will quickly turn into a requirement.

In big cities a second trend is emerging: 38 percent of all young Germans (18- to 39-year olds) living in cities with more than 100,000 inhabitants indicate that in ten years “[they] will use car sharing more,” and 26 percent of those 40 and older agree. With almost a third of the adult urban population as prospective car sharers, offering flexibility via car sharing will become a second requirement for the automotive industry.

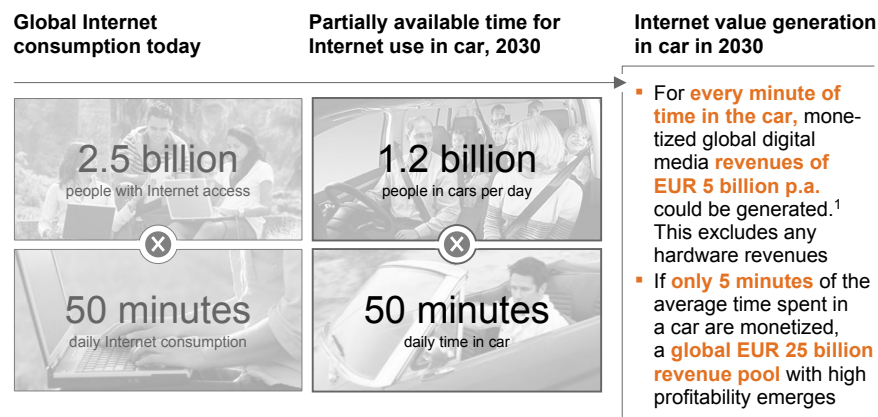
Neither of these trends is novel, but the size and immediacy of customer demand lead to a strategic need for OEMs to act today to maintain relevance in the future. And as the following sections will demonstrate, both trends actually create significant upside for the individual OEM but require a change from current business thinking in the automotive industry.

### *Mobile media connectivity: off-limits business or sleeping value pool giant?*

On average, every car passenger spends 50 minutes per day in the car. Interestingly, this almost exactly matches the average per capita daily private usage of the Internet. The monetization of the 50 minutes users spend on the Internet is in full progress by online advertisers, content providers, and social networks. The Internet already offers huge revenues and profits for leading industry players. From the eyes of the giants of this industry, the 50 minutes of driving time of potentially over 1 billion users of Internet-ready cars worldwide in 2030 represents a tremendous growth potential in the “attention economy,” where time is the scarce resource of any business (Exhibit 4).

Using global data for the pricing of mobile media services and mobile advertisement, McKinsey estimates that in 2030 fully monetizing one minute of global driving time corresponds to approximately EUR 5 billion of revenues per year (at rather high profitability). Of course, not all 50 minutes of driving per day will be converted nor should they be. But, if technological developments over the next 20 years allow for even five minutes of car-based media consumption, EUR 25 billion in revenue would be gener-

**A car owner spends 50 minutes per day in the car – monetizing this time represents a significant revenue potential in the "attention economy"**



<sup>1</sup> Assuming current valuation of mobile Internet usage of 1 euro cent per minute per person

Exhibit 4

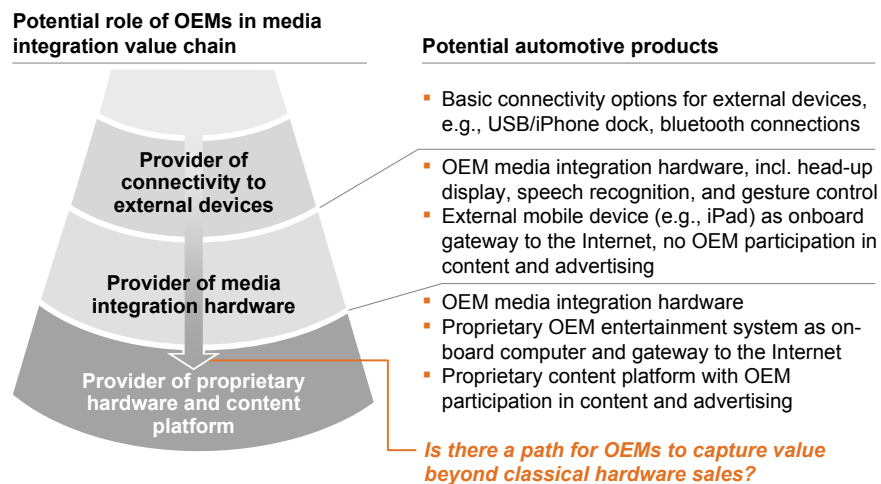
ated per year. For the foreseeable future, the driver's attention to the road remains critical despite modern assist systems and better integration of media into the driver's view, e.g., head-up displays. But as with any area of increased Internet penetration, the advantage lies with the early birds managing to define standards and occupy control points.

Two questions immediately arise: How real is this opportunity today, and how, if at all, can automotive OEMs participate?

To the first question the survey respondents delivered a striking, even disturbing answer. 28 percent of all Germans already use their smartphones while driving, in the majority of cases even for functions requiring visual attention (e.g., SMS, mobile Internet, apps). For mobile communicators the numbers rise dramatically with almost half using their smartphone in the car. At the same time, close to 70 percent of usage onboard is not just for calls. Given these results, it is not surprising that 65 percent of the 18- to 39-year-old smartphone owners in the survey strongly agree that "a safer use of smartphones while driving is very important to [them]." A similar two thirds of all respondents agreed with the statement "I will spend more on additional services like the Internet in my car over the next ten years," indicating that they expect to cover the extra cost of on-the-road connectivity.

The second question regarding automotive OEM monetization opportunity is equally important. Other industry players, like telecommunication network operators and TV OEMs, have been effectively reduced to rather commoditized "pipes" or sole hardware providers for the global Internet. A development like this would limit the auto OEMs' role to providing convenient connectivity hardware solutions in the cars, while the interfaces and traffic would be under the control of Google, Facebook, or similar companies. In a worst-case scenario for auto OEMs, customers might only use their existing mobile devices in the car. Stretching the other extreme, auto OEMs could develop

## Role of OEMs in media integration market is not yet determined



### Exhibit 5

an “iCar” with a superior hardware solution (e.g., display via augmented reality in the windshield controlled via speech recognition, gesture, and mimic control) and captive platform or interface aiming to achieve similar capture of the content value chain as Apple’s 80 percent share in the iPhone/iPad market (Exhibit 5).

Time is of the essence. The potential size of the profit opportunity and the speed of user development have already attracted novel competitors like Google that try to disintermediate the critical man-machine interface in a car. Numerous GPS turn-by-turn navigation applications, some with real-time traffic updates and crowdsourcing features using live user exchange, are already available for smartphones – apps from companies such as Waze, Skobbler, or Inrix have attracted more than 10 million users worldwide.

All of this should persuade OEMs to thoroughly (re)define their strategy to address this opportunity. These strategies need to be shaped around four key beliefs:

- **Power of the (wind)screen.** OEMs’ key strategic advantage lies in their deep expertise in the man-machine interface and the advantageous technological and general car setup. Seamlessly integrated interfaces and wide screens improve the consumers’ experience with media content in comparison to smartphones and PCs. This enables OEMs to deliver solutions superior to any stand-alone device.
- **No integrated proprietary platform.** Pure-play proprietary solutions will not prevail as users demand seamless integration and a resemblance to the solutions to which they have become accustomed in the nonauto world.
- **Dual-sourced strategic partnering and standards.** OEMs will need to carefully balance selected strategic partnerships within the industry (to define standards and create scale) and outside the industry (to tap into existing user pools and standards) with their own control points in the hardware-software stack.

- **Push for scale.** Given the speed of the mobile Internet revolution, OEMs need to both ensure rapid penetration of their connectivity solutions in their new models (“100 percent option”) as well as develop a strategy to address the existing fleet and their drivers.

The characteristics of mobile media connectivity clash with many of the automotive industry’s paradigms. The industry is currently a highly specialized B2C environment with average selling prices in the ten to hundred thousand euro range and a product renewal rate of seven years. Entering and succeeding in the market of full feature media integration means switching to a much faster-paced and stronger business networking-oriented model. In order to facilitate this transition our recommendation is that all OEMs start to think about a separate and dedicated product line “Connectivity and Media Integration” that enables the responsible team to move to high-paced development processes and new business models (e.g., pay per use and B2B) while reaching penetration at scale in both the new and the existing product fleet.

### *Car sharing: industry neutral, but triple win for OEMs, environment, cities*

The car sharing market has been the focus of intense activity by automotive OEMs recently. Many of the industry players have begun to actively engage in proprietary car sharing businesses, ranging from full in-house solutions (Daimler’s car2go) to joint ventures (BMW & SIXT with driveNow!) to innovative peer-to-peer programs for car owners looking to rent out their vehicles (GM’s cooperation with RelayRides).

The opportunities of the mobile Internet have created new and easier business models for managing and connecting the fleet and the customer base. Recent analyst reports foresee significant growth potential. Frost & Sullivan, for example, predict nearly ten million car sharing users globally by 2016 with a fleet of 150,000 cars, and potential revenues of up to EUR 7 billion in 2020.<sup>3</sup> Similar studies have also arrived at promising outlooks with value pools of EUR 4 billion in 2015 in Europe and the US and strong expansion of the trend onto four continents.<sup>4</sup> However, fears of cannibalized OEM sales prevail, and no model so far appears to have been a blockbuster success. Based on both survey results and strategic considerations, this could be about to change.

The survey results indicate that the readiness to use car sharing has arrived at scale in Germany’s urban areas. About a third of Germany’s population lives in cities with more than 100,000 inhabitants. Of these urban inhabitants, 2.5 percent claim that they make use of car sharing today, and a striking 31 percent of users say that “[they] will increase [their] use of car sharing in the next 10 years.” Among 18- to 39-year olds, this percentage rises to 38 percent. A decision funnel analysis reveals that almost 24 percent of the city population is actively considering car sharing already today (Exhibit 6). The steep drop to the number of actual users of just 2.5 percent indicates an opportunity around ease of access and usability of the existing solutions.

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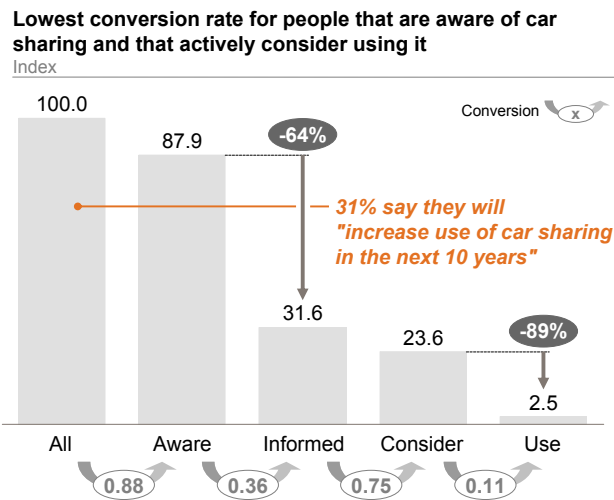
<sup>3</sup> Press release Frost & Sullivan (01/2010)

<sup>4</sup> Shaheen S. A., Cohen A. P. (2007), “Growth in Worldwide Carsharing: An International Comparison”, *Transportation Research Record* 1992, 81 - 89

### A third of the German urban population are prospective users of car sharing despite current low usage rates

GERMANY EXAMPLE

People in cities &gt; 100,000 inhabitants



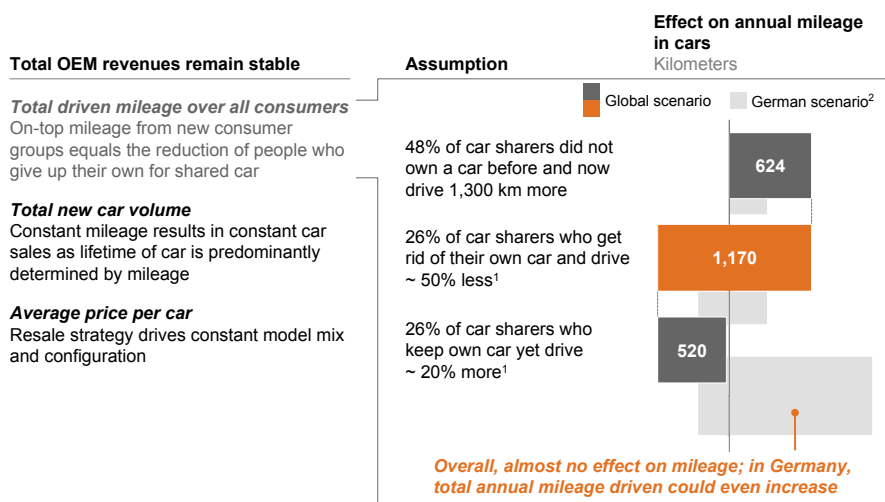
#### Exhibit 6

Historically, car sharing entrepreneurs often positioned themselves as part of an alternative "car light" lifestyle. For the majority of car sharing users today this no longer holds true. They see it as an addition to – not a replacement of – their own car, with more than 75 percent of them actually owning a car. Car sharing users also tend to be well situated and highly educated, supporting claims of the automotive industry that they leverage their offerings as novel sales channels.

Given the significance of the customer-stated opportunity, the question of the overall impact of car sharing on the industry remains. The good news is that it is likely that OEM revenues in total will not be affected negatively even by a significant pickup in car sharing. While counterintuitive at first, the argument is actually straightforward. Consumers of car sharing can be divided in three groups: a) new drivers that did not own a car before, b) existing drivers that would like to get rid of their car, and c) existing drivers that use car sharing in addition to their own car and existing mobility patterns (Exhibit 7). Based on several external publications and supported by our survey results, the total net impact of driven mileage of these three groups is slightly positive and in the worst case neutral. If we further assume a constant lifetime usage per car and a largely unchanged average sales price, the impact of car sharing is a younger, smaller, but faster turning automotive pool.



**Higher car sharing will not lead to a "doomsday" as even pessimistic scenarios do not predict a decrease in distance driven**



<sup>1</sup> Annual mileage of 9,400 km/year before car sharing

<sup>2</sup> McKinsey research shows that only ~25% of car sharers do not have their own car and ~80% of car sharers would keep their own car

Exhibit 7

Car sharing therefore leads to a triple-win situation:

- **OEMs** profit from the opportunity to significantly capture and lock in market share, especially in highly competitive megacities.
- **Cities** do not experience less traffic as the overall mileage remains constant, but win as smaller car fleets free up critical space in city centers. As a rule of thumb and based on early study results every car from a car sharing pool replaces up to three cars from the existing fleet.
- The **environment** benefits, as the faster mileage accrual of shared cars will reduce the average age of the fleet. Comparing a fleet of shared cars with an estimated 10 percent share of electric vehicles fueled with renewable energy, to a fleet of privately driven cars shows a benefit of 13 percent in CO<sub>2</sub> emissions for the shared fleet over its lifetime.

While value neutral/slightly positive for the industry, the opportunity especially for cash-rich OEMs is tremendous, as the underlying business dynamics will lead to a "winner takes all" scale game. The main reason for this is that each microregion usually allows for only one provider to efficiently penetrate a given city with a comprehensive service offering. But this game is replicable, so OEMs interested in claiming this emerging field need to move decisively and fast once a working model has been identified. Yet as in the case of mobile media connectivity, OEMs will need to acquire critical new skills around offering a service solution. Marketing, pricing, customer care, billing, maintenance, and up-sell options will all have to be adapted to the subscription and pay-per-use models of car sharing.

### *Outlook for automotive OEMs: sunny with significant upsides if action is taken*

“Doomsday” for the automotive industry is nowhere in sight. None of the recent developments in the industry – from the needs of tech-savvy drivers to alternative ownership models – are positioned to damage the industry, and the car remains the most significant symbol of individual status and mobility, even in mature markets. Our research shows that the current developments within the mobility industry open up interesting growth opportunities for automotive. Yet as customers evolve and spell out clear needs to bring their connected and highly flexible lifestyle into their mobile life, OEMs need to adapt and respond. By offering integrated connectivity solutions and the flexibility of sharing cars they can tap into significant growth and market share opportunities. Both opportunities require a departure from traditional business models and beliefs and will therefore not be easy to capture. However, given the strong first-mover advantages for both options already attracting interested players outside the industry, OEMs cannot afford to be complacent and rest on laurels earned in emerging markets. It is time for a new future for the automobile.



## *Authors*

Dr. Andreas Cornet is a Director in the McKinsey office in Munich, Germany.

Dr. Detlev Mohr is a Director in the McKinsey office in Stuttgart, Germany, and Leader of the EMEA Automotive Practice.

Dr. Florian Weig is a Principal in the McKinsey office in Munich, Germany.

Dr.-Ing. Benno Zerlin is an Associate Principal in the McKinsey office in Munich, Germany.

Dr.-Ing. Arnt-Philipp Hein is an Engagement Manager in the McKinsey office in Munich, Germany.

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### **If you have any queries, please contact:**

Andrés Sieverding

Phone: +49 (89) 5594-8755

E-mail: andres\_sieverding@mckinsey.com

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