The Future of the Automotive Industry

A closer look at electric cars, autonomous vehicles, in-car technologies, car sharing and ride sharing in Russia

PwC
The structural changes currently running through the global automotive industry are having far-reaching impact. The adoption of new technologies, the development of autonomous vehicles, the mass production of electric cars, and new modes of transport like car sharing and ride sharing are just a few of the promising areas where market players have made advances in recent years.

Yet, the pace of innovation has raised a number of challenges and risks. For example, electric car manufacturers are struggling to produce cars that can perform as well as or better than traditional cars, while companies developing autonomous vehicles need to address doubts about their safety and reliability.

This survey explores how Russian consumers perceive and embrace new technology, as consumer preferences are critical for any innovation to succeed.

We analysed the technologies that the industry is planning to introduce as well as the trends that could drastically change the way consumers use cars. We also assessed consumer interest in electric and autonomous cars, in-car technologies, car sharing and ride sharing.

The survey findings provide valuable insights for companies when designing strategies on adopting new technology to enhance mobility.

Sample and methodology

This survey on consumer perceptions of new technology in the automotive industry covered 315 men and women aged 20-64 from Moscow and Saint Petersburg. Every respondent has a driving license and drives a car at least occasionally. The online questionnaire was conducted in November and December 2017. In preparing the report, we have ensured the confidentiality of all responses.

We held in-depth interviews with CEOs of companies operating in Russia. A number of insights from business leaders are covered in the report. Further details and video clips are available at www.pwc.ru/automotive. We would like to thank all the company representatives who took the time to share their opinions.

Oleg Malyshev
Partner, Automotive Practice Leader
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The global automotive industry is currently going through a disruption that will transform the structure of the automobile market within a few years. The biggest challenge is likely to come as manufacturers and consumers gradually refocus on alternative fuel vehicles in place of traditional petrol and diesel cars.

Alternative fuel cars include the following:

- Electric cars (plug-in hybrids, range extending electric vehicles and battery electric vehicles);
- Hybrid vehicles (cannot be charged from external sources);
- Natural gas vehicles;
- Other types of alternative fuel vehicles (i.e. hydrogen, biomass, etc.).

As part of the survey, we analysed the factors that promote the adoption of electric cars in Russia and globally, and assessed the readiness of consumers in large Russian cities to use electric cars in their daily lives.

Today, electric cars account for less than 0.5% of the total global car fleet, but annual sales are increasing rapidly. According to the International Energy Agency (IEA), over the past five years, global sales of new electric cars have expanded by 16 times, amounting to 753,000 vehicles in 2016. The total number of electric cars in the world, meanwhile, passed the 2 million mark in late 2016.

The largest electric car markets are currently in China, France, Japan, Norway and the US, which together account for 80% of worldwide sales. Government policies that provide tax benefits, subsidies and incentives for electric car buyers are among the key drivers of sales.

For instance, electric car owners in some countries may use dedicated traffic lanes or enjoy free parking. Stricter restrictions on fuel efficiency and vehicle emissions have also contributed greatly to the promotion of electric cars. Car manufacturers have been encouraged to increase spending on technology and to supplement their fleets with minimum or zero emission vehicles.

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1. Plug-in hybrid (PHEV)
2. Range extending electric vehicle (REEV)
3. Battery electric vehicle (BEV)
One of the main barriers hindering the wider use of electric cars is the low density of charging stations.

In many countries, governments are putting in additional effort to address this issue by providing subsidies to companies that build charging stations and launching infrastructure programmes.

The high cost of batteries is another constraint on the development of the electric car market. Batteries alone may account for up to half the cost of electric cars. Still, the cost per 1 kWh has dropped significantly over the past six years. For example, the cost of lithium-ion batteries has dropped by 74% (from USD 800/kWh in 2011 to USD 209/kWh in late 2017), as reported by Bloomberg New Energy Finance. Driven by technology advancements and economies of scale, the cost of batteries is expected to drop further. Bloomberg New Energy Finance forecasts that the cost of batteries will drop below USD 100/kWh by 2025. As a result, electric cars will become more affordable, and the cost of ownership will be similar to traditional cars.

Electric cars have consequently become a top priority for almost every major global automotive group. This trend is likely to continue over the next few years.

Igor Antarov
Managing Partner, Moscow Tesla Club

... on incentives
“One incentive to stimulate electric car sales in Russia is to allow drivers of electric cars the right to use dedicated traffic lanes, as in Europe and the US. Another is to reduce or eliminate duties on electric car imports.”

... on whether it is worth investing in the development of electric cars
“Russian car manufacturers definitely need to invest in developing electric cars. We are facing the transformation of an entire industry, and our country has an opportunity to enter this segment and begin manufacturing. I believe it will be rather difficult for Russia to become a world-class manufacturer of petrol-based vehicles. Now is the perfect time to produce batteries, build battery plants and manufacture electric cars, given that the designs for electric cars are much simpler than for petrol cars. Russia is well-positioned to do it.”
Investors are increasingly interested in electric vehicles for commercial and public use, and investments are stepping up. For instance, several projects on electric trucks as well as next generation electric buses and minibuses have begun to attract the attention of investors.

Global practice shows that benefits, subsidies and other types of government support play a significant role in stimulating the demand for electric cars.

At the moment, Russia does not have a mature market that could support the manufacturing and sale of electric cars, although some progress has been made.

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At the moment, Russia does not have a mature market that could support the manufacturing and sale of electric cars, although some progress has been made. In the “Russian Automotive Industry Development Strategy through 2025”, electric vehicles are a top strategic priority in the area of technological innovation. Russia is also launching programmes to increase the number of public and private charging stations and provide more free parking spaces in some major cities, and is considering eliminating customs duties on imports of electric cars.

The survey shows that the decision to buy an electric car among consumers in all age groups is mainly driven by the presence and accessibility of infrastructure such as charging stations (24% of respondents).

Consumer decisions also depend on prices (20% of potential electric car buyers find this factor significant). Around 18% of respondents said they would consider potential fuel savings. Though all surveyed age groups highlighted the importance of economic factors, young respondents (aged 20-34) found it less significant in deciding to make a purchase.

Consumers are less driven by prestige and innovation and more by economic and practical factors.

Igor Antarov
Managing Partner, Moscow Tesla Club

... on infrastructure
“Both business and government should work to develop the necessary infrastructure for electric cars. Global practice demonstrates that providing tax benefits and incentives for companies that build charging stations along highways can help encourage their commitment to developing infrastructure.”

... on battery life and winter performance
“The main concerns about electric cars include winter performance and battery life. We need to raise public awareness. You can comfortably use electric cars in winter, as large electric cars have battery heating systems. Yes, battery life is shorter in the winter. Instead of two or three days, we can only go one or two days without charging. This is not that critical, however, because people charge their electric cars on a daily basis. Charging times should also not be a problem, as people charge their cars when parked. When people accept and understand that electric cars work fine in winter and they become more comfortable with charging, we will make a step forward.”
Potential buyers also focus on the reliability of electric cars in winter. This factor is equally relevant across all age groups (15%), as lower temperatures significantly reduce the maximum run time of electric cars (by 30-50%), and in this case, electric cars will perform poorly in comparison with combustion-engine vehicles.

Young respondents (15%) and older respondents (13%) raised the greatest concerns about battery life.

Notably, the least popular responses to questions about factors that would influence decisions to purchase an electric car include environmental friendliness (7%), as well as prestige, innovation and design (3%). Yet, among all age groups, young respondents more frequently stated their readiness to buy electric cars due to environmental considerations and image.

At the time of the survey, almost no respondents owned an electric car. Around 11% of respondents reported that they might buy an electric car in the next five to seven years. In the brackets aged 20-34 and 35-54, the share of potential owners is the same (13%), while in the older age group, only 5% of respondents see themselves as potential electric car owners.

Consumers are interested in electric cars, though not considerably. For residents of major Russian cities, the practicality of buying an electric car depends on the ease of operation and maintenance, as well as on the potential economic benefits.

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**Figure 1. Factors driving the decision to purchase an electric car**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower cost of electricity</td>
<td>18%</td>
</tr>
<tr>
<td>Price comparability</td>
<td>20%</td>
</tr>
<tr>
<td>Infrastructure, including charging stations</td>
<td>24%</td>
</tr>
<tr>
<td>Environmental friendliness</td>
<td>7%</td>
</tr>
<tr>
<td>Electric car reliability in winter</td>
<td>15%</td>
</tr>
<tr>
<td>Charging time</td>
<td>12%</td>
</tr>
<tr>
<td>Prestige, innovation and design</td>
<td>3%</td>
</tr>
<tr>
<td>Do not know</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry
Self-driving cars are among the topics generating a great deal of buzz in the automotive industry. Large corporations are playing a dominant role, and investments have risen to millions of dollars.

Most drivers see autonomous vehicles merely as a promising technology, rather than as a consumer product. Most of the work being done on driverless cars at the moment is focused on testing prototypes and building experimental designs that will lay the foundation for greater innovation in the automotive system generally.

The Society of Automotive Engineers (SAE) has defined six levels of autonomous driving (see Figure 2). Advanced Level 1 systems are already available on new cars (for example, adaptive cruise control, lane assist systems, etc.). Level 2 systems already control certain stages of driving (for example, park assist). Level 3 systems are not yet available for consumers, but are in the final stages of testing.

Almost all large manufacturers of passenger cars highlight the need to increase their investment in autonomous driving technologies in their strategic plans for the next five years. As of now, several carmakers have already made the leap toward autonomous vehicles by modifying existing models. In the US, driverless taxis have been launched on an experimental basis. These cars use new models designed and adapted for driverless technology.

![Figure 2. Six levels of driving automation](image-url)

Source: The Society of Automotive Engineers (SAE)
Driverless technology is also highly appealing in the trucking industry, which is close to launching the production of self-driving trucks. Germany and the US have been testing prototypes of self-driving trucks on public roads since 2017.

In certain areas (primarily where it is possible to create ideal operating conditions), the use of autonomous vehicles has become widespread. For example, operating autonomous farm machinery entails few of the difficulties that are seen on public roads (for example, fields have set boundaries and few obstructions, all of which can be detected and marked), making it possible to automate operations extensively. Autonomous systems are also widely used in warehousing and storage, as it appears to be quite easy to outfit warehouses with the appropriate infrastructure, including markings and special beacons.

Thus, autonomous vehicles have a wide range of applications in various areas and it is only a matter of time before driverless cars hit the streets.

In its efforts to develop autonomous vehicles, Russia has begun prototyping cars and systems. For example, testing is now underway for a self-driving bus known as the Matreshka. The Central Scientific Research Automobile and Automotive Engines Institute (NAMI) jointly with KAMAZ have also developed a prototype for a self-driving bus called the Shuttle.

These vehicles are designed to transport personnel to their workplaces at large industrial facilities. NAMI has also made certain progress in developing a self-driving passenger car. Using a Lada Kalina, they have designed a driverless vehicle that is currently undergoing testing.

Fifty-eight percent of the survey respondents from all age groups said they would be interested in buying a self-driving car should they be available for purchase in the near future. The greatest interest is seen among adults aged 20-34 (67%), whereas older age groups are less interested in such purchases.

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Figure 3. Percentage of consumers interested or not interested in buying a self-driving vehicle

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Interested</th>
<th>Not Interested</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-34 year olds</td>
<td>67%</td>
<td>25%</td>
<td>8%</td>
</tr>
<tr>
<td>35-54 year olds</td>
<td>57%</td>
<td>25%</td>
<td>18%</td>
</tr>
<tr>
<td>55-64 year olds</td>
<td>50%</td>
<td>22%</td>
<td>28%</td>
</tr>
</tbody>
</table>

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry

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4 http://www.volgabus.ru/news2
5 https://kamaz.ru/press/releases/kamaz_prezentoval_unikalnuyu_gorodskuyu_transportnuyu_sistemu/?sphrase_id=4980309
In response to a question about safety, 38% of all respondents said autonomous vehicles were safe, 33% said they were unsafe, and the rest were undecided. Respondents from the most financially stable age group (35-54 years) were the least concerned about safety (41%).

Will the use of autonomous vehicles help mitigate the risk of accidents? 45% of respondents were positive, while 32% said that it would not and 22% of respondents were undecided.

Potential technical problems are a concern for 56% of car owners (approximately 56-57% of respondents in each age group were wary of such problems, although the younger generation is more tech savvy).

The survey also addressed an important social aspect of autonomous vehicles. Autonomous vehicles will help to improve the accessibility of certain locations for disabled persons, elderly people and children (79% of all respondents shared this point of view, which was confirmed by experts).

Figure 4. Consumer views on the safety of self-driving vehicles

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Safe</th>
<th>Unsafe</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-34 year olds</td>
<td>34%</td>
<td>31%</td>
<td>35%</td>
</tr>
<tr>
<td>35-54 year olds</td>
<td>29%</td>
<td>30%</td>
<td>41%</td>
</tr>
<tr>
<td>55-64 year olds</td>
<td>44%</td>
<td>20%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry
Additional factors that are hindering the development of self-driving vehicles include concerns over the exposure of cars to cyberattacks or other unauthorised attempts to take control over a car remotely (55% of respondents).

In addition, 71% of respondents are anxious about the lack of a regulatory framework that would govern the relationship among autonomous vehicles.

However, 62% of respondents said that the use of autonomous vehicles would be convenient and practical if you could go about your business while on the move (read, work, etc.).

The idea of autonomous vehicles is potentially of interest to consumers. Self-driving technology could be adopted on a greater scale in the industry quite soon. Most likely, this expansion will start in areas with commercial uses (taxis, trucking, public transport, etc.) and subsequently spread to personal cars.

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Figure 5. Key advantages and disadvantages of autonomous vehicles

- Affordability for disadvantaged people and improved accessibility of social infrastructure
- More free time to do other things when on the road
- Fewer car accidents
- Potential for attackers to take control of vehicles remotely
- Technical problems
- Inadequate regulation that would provide autopilot systems with the same status as human drivers

Source: PwC analysis
In-car technologies

Apart from the increased efficiency and safety provided by self-driving vehicles and the gradual transition to electric cars, the global automotive market is also witnessing profound changes in terms of in-car technology.

As of today, cutting-edge technologies have been adopted in both the premium and mass segments. Cars in the mass segment have such features as smartphone synchronisation with multimedia systems, partial voice and gesture control, parking assistance with rear view cameras, hands-free trunk opening/closing, custom digital dashboards, etc.

In addition to these technologies, the premium segment includes such features as smartphone-enabled video-monitoring systems for parking areas, remote parking, on-board computers connected to call centres, traffic jam assistance and support on long-distance drives, wireless charging for smartphones, heads-up display devices projecting navigation info onto the windshield, etc.

The “connected car” concept has significantly improved the functionality and convenience of driving. Today, connected cars are capable of exchanging data with other vehicles, devices, networks and services. They can interact with a vast infrastructure and help to integrate the driver’s home and work life. Connected cars are enabled by core modules that extract, analyse and process information, and then transmit it to other devices. Connected vehicles have greater functionality in comparison with similar unconnected cars.

Most emerging technologies in the automobile sector can be divided into one of two categories: those designed to improve car quality and safety, and those aimed at enhancing comfort.
<table>
<thead>
<tr>
<th>Technologies that improve quality and safety</th>
<th>Technologies that improve driver comfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver override systems (i.e. the car takes over in an emergency)</td>
<td>Anatomic interiors, including adaptive ergonomic seating and wheels, etc.</td>
</tr>
<tr>
<td>Comprehensive vehicle tracking (i.e. tracking stolen or lost vehicles)</td>
<td>Monitoring of vehicle states, on-board computer data and service intervals</td>
</tr>
<tr>
<td>Reduced car weight (achieved by reducing engine size and using light alloys)</td>
<td>Keyless access and remote engine start</td>
</tr>
<tr>
<td>Laser systems and cameras that prevent collisions, automate parking and help drivers navigate through dense traffic</td>
<td>Advanced on-board computers with a wide set of functions and LCD display that help to control all the car’s devices, including customised engine and transmission settings</td>
</tr>
<tr>
<td>Telemetry on driving styles and vehicle conditions that helps to reduce the price of insurance and provide timely alerts on scheduled and unscheduled maintenance</td>
<td>Customer experience digitalisation, possibility of connecting the car to digital devices</td>
</tr>
<tr>
<td>Adaptive headlamp systems that respond to lighting, curves, obstacles and other vehicles</td>
<td>Active window displays (i.e. content and augmented reality elements can be viewed on the windshield or side windows)</td>
</tr>
<tr>
<td>Smart engines that help to optimise fuel consumption</td>
<td>Hand gesture or voice control over systems</td>
</tr>
<tr>
<td>Active health monitoring</td>
<td>Biometric vehicle access</td>
</tr>
</tbody>
</table>

Source: PwC analysis
Despite the variety of emerging technologies, not all of them will make it to market. Certain gadgets will be rejected due to their economic non-viability or consumer perceptions.

According to the survey, a large percentage (83%) of respondents are ready to pay extra for in-car tracking devices in case their car is stolen or lost (the results are distributed similarly across all age groups).

In addition, 54% are ready to pay for remote vehicle shutdown. There is a slight negative correlation between the results and the age of respondents. We see a decline from 57% on average in the youngest age group to 50% in the bracket aged 55-64.

The third most popular technology is biometric vehicle access (50% of respondents are ready to pay more for this feature). The results are approximately the same for younger and middle-aged drivers, but are slightly lower for older age groups.

Less than half (44%) are prepared to pay more for active window displays. We observe a clear negative correlation between respondents’ answers and ages. Thus, in the bracket aged 20-34, 51% of respondents said “yes”, while 45% in the group aged 35-54 and only 33% of those aged 55-64 responded positively.

Many young drivers (47%) are ready to buy driver override systems. They are followed by the bracket aged 55-64, where the percentage answering positively stood at 38%. Fewer respondents in the middle-age group (only 25%) demonstrated their readiness to make such purchases.

Only 37% of respondents said they would pay for complete integration with smartphones, whereas 45% would not, which could be due to the risk of cyberattacks. The group aged 20-34 was unsurprisingly at the top on this question. The results of middle aged and older respondents were similar, with the exception of the high percentage of undecided in the group aged 55-64.
Consumers are ready to pay for technologies that enhance safety, while they remain concerned about using a single device (smartphone) to have full access to their car. This may be related to the fact that such devices may be vulnerable to hacker attacks or may be lost or stolen. The younger generation (20-34 years) is more willing to adopt innovative technology. This can be explained by the fact that, first, younger drivers are the earliest adopters of new technology, and, second, they have less driving experience and tend to rely on in-car assistance. From this perspective, respondents in the older age group tend to demonstrate a more cautious approach to technologies that require active engagement, but are rather positive about the technologies that can provide assistance in emergencies or operate in passive mode to make driving easier.

The success of a given new technology will largely depend on consumer expectations and attitudes. This suggests that as demand shifts toward consumers who are comfortable with new technology, such projects will gradually become an indispensable part of vehicles in the future.

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**Figure 8. Consumer readiness to pay for new technologies**

<table>
<thead>
<tr>
<th>Technology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote vehicle shutdown</td>
<td>83%</td>
</tr>
<tr>
<td>Biometric vehicle access</td>
<td>54%</td>
</tr>
<tr>
<td>Windshield HUD</td>
<td>50%</td>
</tr>
<tr>
<td>Complete integration with smartphones</td>
<td>44%</td>
</tr>
<tr>
<td>Driver override system</td>
<td>37%</td>
</tr>
<tr>
<td>Comprehensive tracking for stolen and lost vehicles</td>
<td>35%</td>
</tr>
</tbody>
</table>

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry
The recent explosion of the Internet and mobile technology has paved the way for alternative forms of transport that might completely disrupt our travelling patterns in future. In addition to traditional forms of transport (car ownership, car rentals), consumers now have the choice of renting cars by the minute (car sharing) or finding fellow riders to travel together (ride sharing). Several factors are driving the rise in consumer interest in car sharing and ride sharing in a number of global markets.

**Urbanisation.** Accelerating urbanisation is leading to an increase in the number of vehicles, and, subsequently, in road congestion. This, in turn, means more traffic, more emissions and higher costs for developing and maintaining infrastructure.

**Regulation.** Local authorities are making efforts to reduce traffic congestion and cut emissions (for example, introducing driving and parking restrictions in high gridlock areas and encouraging people to use public transport).

**Consumer preferences.** We are now seeing a gradual shift in consumer preferences away from car ownership and toward temporary use. This can be beneficial for both consumers (because of significant cost savings) and carmakers (who now have an additional opportunity to manage their brand perception).

**Technology.** The development of new mobile apps as well as satellite navigation and telematics has made it much easier to find, book, drive and return rental cars.

**Pollution.** Increasing emissions are a cause of grave concern for governments and consumers alike. One way to counter pollution is to adopt measures that encourage a reduction in the level of car ownership.

New ride-sharing and car-sharing services are intended to reduce car ownership. At the same time, they help support consumer mobility, cut the cost of car maintenance, reduce the impact on the environment and improve road congestion.

**Figure 9. Main concerns over cars**

- Traffic jams and lost time in traffic jams: 66%
- Parking problems (inadequate parking space, high parking fees): 65%
- High cost of fuel and car maintenance: 63%
- High purchase prices for cars: 17%
- Personal safety: 11%

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry
Car sharing is a service that provides short-term car rentals via a mobile app (generally, at per minute rates and with the option to leave the car at any location within a certain area).

The main difference between car sharing and traditional car rental is that users can make short rides around the city, the booking/rental process is automated and there are numerous rental points. Unlike traditional rentals, petrol and insurance are normally included in the fee.

Car-sharing models have been used since the early 2000s in the West, where car-sharing companies are already expanding beyond local markets. The largest car-sharing companies have fleets consisting of more than 10,000 vehicles.

In Russia, the first car-sharing services date back to 2013. Today, you can find such services in large Russian cities (primarily in Moscow, which is home to more than 10 car-sharing operators). At the end of 2017, there were more than 3,000 vehicles in the car-sharing system. The Moscow Government estimates the potential market capacity at 10,000-15,000 cars and intends to support car-sharing companies.

In 2017, for example, the Moscow Government spent RUB 158 million in subsidies to help car-sharing operators buy or lease cars.

Stanislav Groshov
Deputy CEO, Delimobil

… About the role of the government in developing the car-sharing market
“At this stage, we believe that government involvement in the car-sharing segment is not necessary. This is an emerging market that is evolving according to its own rules. Essentially, the regulations that are in place right now are quite sufficient.”

… About the advantages of car sharing for consumers
“Users drive the car themselves. They do not need to trust a complete stranger with their life, as when getting into a taxi. Another advantage is the low cost. Consumers do not have to pay for the time when the car is not needed. Ease of use is also an advantage: the service is managed on a mobile platform.”

… About the advantages of car sharing for the city
“Experience shows that one shared car can replace from 8-12 personal cars in the city. In addition, car sharing occupies fewer parking spaces.”

… About the disadvantages of car sharing
“The main disadvantage of car sharing is that you have to walk to the nearest available car. There are zones in the city where there are still not enough cars, but this issue will be addressed in the next few years as the market matures and as fleet sizes grow.”

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6 https://www.mos.ru/mayor/themes/2299/4189050/
7 https://www.mos.ru/news/item/31909073/
Although car sharing appears to directly compete with taxi services, and in some cases is more cost effective, approximately 44% of respondents would still opt for a taxi. Although the percentage of respondents familiar with car-sharing services is not high, most people strongly believe that the service will become more popular. In the next five to seven years, consumers will increasingly adopt alternative forms of transport (according to respondents, the share of the population using car-sharing services will increase by three times).

More than 50% of the respondents admitted that they would use this service more often if car access points were more conveniently located.

Car sharing may become an efficient means to travel in urban environments where owning a car is no longer necessary.

Research reveals that younger audiences are more attuned to technological innovations. Thus, car sharing is popular among 25% of respondents aged 20-34, but less popular among older population groups (15% among respondents aged 35-54 and 9% among those aged 55-64). Only 17% of all respondents have ever used car sharing.

Around 76% of respondents agreed that car sharing has fewer hassles than owning a car. When talking about the main disadvantages of car ownership, users referred to the high cost of fuel and car maintenance, parking problems and road congestion.

However, 70% of respondents said that a personal car is more comfortable than other forms of transport.

Ride sharing means travelling together in a car when all passengers share expenses.

In some parts of the world, ride sharing is legalised, for example, in Western Europe, the US and Canada. Moreover, in some countries there are special lanes for ride-sharing vehicles. In California (US), cars with more than three passengers are allowed to drive in high-occupancy vehicle lanes.

The main advantage of ride sharing is the possibility of making rides cheaper for both drivers and passengers. Other advantages include the ability to find the best alternate route when travelling between two locations and to create routes in the shortest time possible.

However, this service fits best for short rides. For long-distance rides, the most viable options are buses and trains, while public transport is best for short city rides.

Figure 10. Percentage of respondents who have ever used car sharing

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry
Ride-sharing services in Russia are not yet that popular and the regulatory environment is not sufficiently developed. However, a growing number of Russians have developed an interest in this form of transport.

**According to the survey, 11% of all respondents have used ride-sharing services at least once.**

Respondents aged 20-34 and those older than 55 are equally interested in ride-sharing services (13% in each group), while only 9% of those aged 35-54 expressed demand for such services.

More than 75% of respondents say that ride sharing is more affordable than taxis. However, ride sharing falls behind taxis when it comes to safety (40% of respondents said that taxis are much safer). Around 74% of all respondents are concerned that their interests might be inadequately protected by legislation.

It should be mentioned that respondents are unsure about whether ride-sharing services will help to address the problem of traffic jams. (32% of all respondents shared this view, 38% disagreed, and another 30% were undecided).

Only 2% of respondents expect to use ride-sharing services regularly within the next five to seven years.

**Ride sharing has significant growth potential, although it requires greater attention to such issues as the regulation of relations between consumers and service providers. In addition, the transparency of payments needs to be ensured, and steps need to be taken to prevent possible illegal activity.**

**Figure 11. Consumer views on the safety of ride-sharing services**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Safe</th>
<th>Unsafe</th>
<th>Do not know</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-34 year olds</td>
<td>43%</td>
<td>29%</td>
<td>28%</td>
</tr>
<tr>
<td>35-54 year olds</td>
<td>37%</td>
<td>31%</td>
<td>32%</td>
</tr>
<tr>
<td>55-64 year olds</td>
<td>42%</td>
<td>31%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Source: PwC Survey of Consumer Perceptions on New Technologies in the Automotive Industry
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