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Driverless: Vehicles on road to viability



A journalist takes a photo while riding in an autonomous vehicle in Chongqing in October. LI HE / XINHUA

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Progress had been generally going smoothly until July, when a short video went viral on social media of one of Baidu's Apollo Go driverless vehicles hitting a scooter in Wuhan, capital of Hubei province.

Baidu was quick to explain that the accident was because the scooter driver had run a red light when the driverless vehicle started to move.

Despite the accident being a minor one, as shown in the footage, it ignited complaints from local drivers and residents.

Apollo Go's Chinese name is *Luobo Kuaipao*, which literally means "robots run fast". But in Wuhan they are called "dumb robots", as more footage emerged showing their mishaps.

One driverless vehicle is seen stopping on the road in front of an empty plastic bag, causing a traffic jam. In another video, two vehicles are seen braking to face each other, and not knowing what to do next.

Safety questioned

But safety is the real concern. When that vehicle in Wuhan failed to see the scooter, local residents started to doubt the safety and reliability of driverless vehicles, as manufacturers have long claimed they are safer than human drivers.

At an event in May, Baidu's vice-president, Wang Yunpeng, said the number of insurance claims of its Apollo Go vehicles over the past two years was one 14th of that for human drivers.

In the second quarter of this year, Baidu's Apollo Go provided about 899,000 rides for passengers, up 26 percent year-on-year. As of July 28, the cumulative rides provided to the public by Apollo Go surpassed 7 million, the company said in its latest financial results.

The safety level of autonomous driving is 10 times that of manned driving, according to Pony.ai vice-president, Zhang Ning. The company had conducted 3.5 million km of driverless testing globally as of May this year.

However, a robotaxi doesn't have a quick solution when an injured passenger or road user needs help and needs to wait until the fleet operator sends someone to the scene.

If the accident is a minor one, the insurance company can try to settle and offer a certain amount of money.

However, the issue becomes muddier in the case of a more severe accident that causes injury or death and entails prison time.

It is likely the fleet company will be held accountable, but it is unclear who would be sent to jail — the software engineer, the CEO, the company owner, or possibly more than one of them.

Fresh pickup lines

Taxi drivers are also complaining that robotaxi firms are stealing their customers by offering generous subsidies.

A receipt for a 28-km, 64-minute robotaxi trip in Wuhan showed that the fare was just 26.52 yuan ($3.65 yuan), much cheaper than a normal taxi fare. But a closer look revealed that it had a discount of 109.52 yuan.

Wuhan has over 3,300 km of roads eligible for robotaxis, the longest in China. Robotaxis booked 850,000 rides in the first half of this year, more than for the whole of 2023, according to a Hubei Daily report.

In July, an Apollo Go vehicle booked up to 20 rides in one day, the same amount as a regular taxi, according to Shanghai-based news portal Jiemian.

There are around 400 Apollo Go vehicles in Wuhan, said Baidu CEO Robin Li. "Our fleet accounts for just 1 percent of Wuhan's total taxi fleet. It may take quite some time, even many years, to grow (the proportion)," said Li.

William Li, founder and CEO of NEV startup Nio, has sided with the taxi drivers.

He said that the goal of technology such as smart driving is to alleviate the burden of driving, and not to steal jobs from low-income earners. "It is not a very inspiring story. We will never do robotaxis," he said.

Nio has been investing heavily in driving-assist functions, and is one of the first carmakers in the world to adopt the latest Nvidia chips made for such features.

Gu Dasong, executive director of the Southeast University's Research Center for Transportation Law and Development, said robotaxis might reduce the need for commercial drivers, such as taxi drivers and freight drivers, to some extent over the long term.

However, the move to robotaxis will profoundly transform the labor market, with new job opportunities arising from such services.

Congestion concern

Baidu insists that robotaxis, if applied at a city-level, can solve problems such as traffic jams and road accidents.



A passenger gets on an autonomous driving minibus in Hangzhou, Zhejiang province, on May 22. HUANG ZONGZHI / XINHUA

However, as long as there are drivers and robotaxis on the road at the same time, reduced congestion and collision-free motoring will not happen, analysts said.

Robotaxis tend to be good at following traffic rules and staying alert, but human drivers sometimes cut lanes and don't always focus on road conditions, they added.

Zhang Xiang, an auto analyst at North China University of Technology, said it will take at least 10 years for large-scale business operations of robotaxis to come to fruition.

Besides technological glitches that need to be improved, robotaxis now in operation attract customers who are not in a hurry and who want to have a novel experience.

Unlike regular taxis, they pick up and drop off passengers at fixed stops. They also have more conservative rules about road safety, and operate slower than regular taxis.

Robotaxis may suit customers who want to be left alone. But they may not be attractive to out-of-town visitors who want recommendations about a city from the driver. However, they remove the potential of a driver taking an unnecessary detour to charge more.

Business sense

Despite the teething problems, robotaxis will soon make sense commercially. Baidu said with decreasing hardware costs and increasing orders, Apollo Go is expected to become profitable by 2025.

Apollo Go loses almost $11,000 a car annually in Wuhan, Haitong International Securities estimated. A lower-cost driverless model could enable per-vehicle annual profit of nearly $16,000, the securities firm said.

Chen Zhuo, Apollo Go's general manager, said the firm would become "the world's first commercially profitable" autonomous-driving platform.

Pony.ai is confident about the sector's prospects as well. In a 160 square-km designated zone in Beijing's E-Town, a national-level economic-technological development area, the company operates nearly 100 robotaxis.

Compared to years ago, the rides are much smoother with no abrupt braking, and the vehicles run in a similar way to other taxi services.

Pony.ai aims to increase its single-city robotaxi fleet tenfold by 2025 or 2026, said the company's vice-president, Zhang, in an interview with Xinhua.

"We've now come to the stage where it is possible to reduce costs on a larger scale of commercialization," he said. "As long as the robotaxi fleet reaches above 1,000 in one city, we will be able to break even in operation (terms)."

Pony.ai is teaming up with Japanese carmaker Toyota to roll out new-generation vehicles. They will have pre-installed autonomous driving technology, making production more efficient.

"Five or six years ago, most people doubted whether autonomous driving could take root in China. There are no such doubts now," Zhang said.

Attracting financing

Investor interest is also fueling the sector's progress.

Pony.ai has secured more than $1.4 billion of financing from both domestic and foreign investors since 2017. The company was valued at $8.5 billion as of October last year.

The investment environment for the industry has been improving since last year, despite fluctuations in previous years, according to the company.

WeRide, based in Guangzhou, Guangdong province, plans to offer 6.45 million American depositary shares at a price range of $15.50 to $18.50 in its upcoming initial public offering, according to a company filing with the US Securities and Exchange Commission in August.

The company reported revenue of 401.8 million yuan in 2023. For the first six months of this year, its revenue was 150.3 million yuan, according to the filing.

WeRide generates most of its revenue from sales of its Level 4 autonomous driving vehicles, "primarily including robobuses, robotaxis and robosweepers, and related sensor suites; and ... the provision of L4 autonomous driving and advanced driver-assistance system services, including the provision of L4 operational and technical support services as well as ADAS research and development services", the filing said.

The Society of Automotive Engineers International defines six levels of automation from Level 0 to Level 5. Level 4 means the vehicle can operate itself in most circumstances, while L5, also known as full driving automation, requires no human participation.

All China's robotaxi companies are working on Level 4 vehicles.

World-leading growth

Global consulting firm McKinsey & Company has forecast that China will become the world's largest market for self-driving vehicles, with revenue from such vehicles and mobility services exceeding $500 billion by 2030.

"We've seen an acceleration in China. There's certainly now a rapid pace of permits being issued," said Boston Consulting Group managing director Augustin Wegscheider. "The US has been a lot more gradual."

Alphabet's Waymo is the only United States firm operating unmanned robotaxis that collect fares.

The company has about 700 cars operating in San Francisco and Los Angeles in California, Phoenix in Arizona, and Austin, Texas, but not all of them are in service at all times.

Cruise, backed by General Motors, restarted testing in April after one of its vehicles hit a pedestrian last year. Cruise said it operates in three cities, with safety its core mission.

"There's a clear contrast between US and China" with robotaxi developers facing far more scrutiny and higher hurdles in the US, former Waymo CEO John Krafcik said in an interview with Reuters.

China will operate the world's largest robotaxi fleet of about 12 million self-driving vehicles by 2040, followed by the US with around 7 million, according to a report by research company BloombergNEF.

Li Hengyu, vice-president of Pony.ai and head of its robotruck business unit, said: "The central and local governments in China rank first in the world in terms of their openness and understanding of autonomous driving."

China has also been stepping up efforts to integrate vehicles, roads, and cloud computing, which is a crucial step to grow smart vehicles into smart cities.

In July, five ministries, including the Ministry of Industry and Information Technology and the Ministry of Transport, issued a notice to identify 20 cities or city clusters, including Beijing, Shanghai and Guangzhou, as pilot areas for the technology.



A fleet of robotaxis goes through an on-road trial of autonomous vehicles in Ordos, the Inner Mongolia autonomous region, in July, 2023. WANG ZHENG / FOR CHINA DAILY