WAVE OF REORGANIZATION SHAKING UP AUTONOMOUS DRIVING INDUSTRY
―NON-CONTACT NEEDS POINT TO NEW DEVELOPMENT―

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SUMMARY

- While companies' appetite for investment is weakening in general, large-scale investments in autonomous driving-related businesses noticeably stand out.
- In April-June 2020, the amount of funds raised and the number of investments by autonomous driving startups reached the highest ever for a quarter. Signs suggest that autonomous driving will transition out of the "disillusionment" phase and move into a stable "expansion" period.
- However, the landscape of the autonomous driving domain is shifting from a rivalry among many to a consolidation of players, and the reorganization is accelerating. Given that, the funds raised are seen as the product of such realignments.
- The COVID-19 crisis will likely drive the industry into the "expansion" phase, and initiatives related to unmanned delivery services, in particular, are expected to pick up as the needs for non-contact services are increasing.

INTRODUCTION

The COVID-19 crisis is having a major impact on corporate investment activities. Amid the deterioration in business performance and the increasing difficulty of arranging financing, companies are refraining from M&As and investments, and are hurrying to secure cash on hand. Against this backdrop, some companies are even announcing suspensions or postponements to already agreed-upon deals.

In contrast, new investment are also being formed. Of these, several large-scale investments are made in companies related to autonomous driving, and this domain becomes one of those that shows unique trends in this challenging circumstance.

In this report, the CB Insights database is used to ascertain how autonomous driving-related projects fared out of overall investments in April-June 2020. Then, based on the changes in investment in this domain to date, the report explores the kinds of changes occurring at the moment, and presents an outlook for the evolutionary phases of autonomous driving and future points of interest.

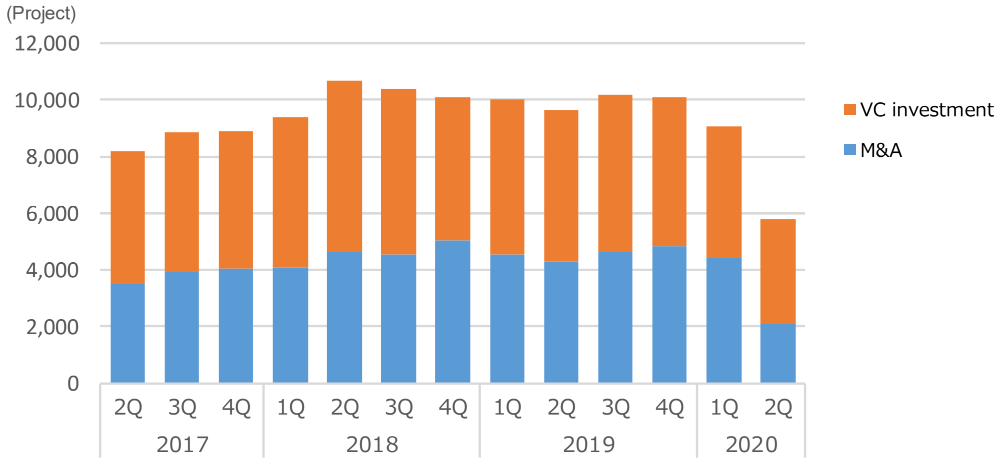
1. INVESTMENT TRENDS IN THE COVID-19 CRISIS

(1) Sharp drop in number of investments

In the April-June quarter of 2020, the number of M&A (global basis) totaled 2,110, falling to half year on year (Figure 1). The downward trend began in March when the World Health Organization (WHO) declared a pandemic, and it shows that many companies started to reduce or refrain from investments during this period.

As a decrease of this magnitude has not been seen since the global financial crisis of 2008, it is evident that the COVID-19 pandemic is having a major impact on M&A trends.

Figure 1: Number of investment projects (global)



Note: Data as of June 30, 2020
Source: Compiled by MGSSI based on CB Insights data

The number of venture capital (VC) investments is also decreasing, although not so much as M&As. In April-June 2020, the number of VC investment projects (global basis) was 3,687, down 30.9% YoY.

(2) Investments in autonomous driving stand out

While corporate investment interest is declining in general, deals in the field of autonomous driving are growing conspicuous. A look at the top money investments in April-June 2020 shows that among them were many large-scale deals related to autonomous driving. They include deals involving Zoox, which is one of the prominent autonomous vehicle development startups in the US; Waymo, seen as a front-runner in the same field under the umbrella of Alphabet (Google's holding company); and DiDi Autonomous Driving (hereinafter "DiDi AD"), which was spun off from China's largest ride-hailing service provider DiDi (Figure 2). Moreover, in a press release dated May 4, Intel explained that the purpose of its acquisition of Moovit was to collaborate in its autonomous transportation business, and, as such, the deal is also considered one related to autonomous driving. Further still, Volkswagen recently made an additional investment in Argo AI.[1] These and other examples show that fund flows and corporate moves in the autonomous driving field are growing more active.

Figure 2: Major acquisitions/investments by value in April-June 2020 (top five M&As & top five VC investments)

Company	Year established	Country	Business field	Investment form	Date	Value (US$)	Company making acquisition/investment
Colonial First State	1988	Australia	Asset management	M&A	2020/5/13	1.7 billion	KKR
H-Line Shipping	2014	South Korea	Shipping	M&A	2020/5/26	1.5 billion	Hahn & Co., Hana Financial
Zoox	2014	US	Autonomous driving systems	M&A	2020/6/26	1.2 billion	Amazon
MGI Tech	2016	China	Gene sequencing	Investment	2020/4/24	1 billion	IDG Capital
Moovit	2012	Israel	Journey planner (MaaS)	M&A	2020/5/4	90 million	Intel
Waymo	2016	US	Autonomous driving systems	Investment	2020/5/12	750 million	T. Rowe Price, and three other companies
Conga	2006	US	Document management software	M&A	2020/5/7	720 million	Apttus
Stripe	2010	US	Payment processing software	Investment	2020/4/16	600 million	Andreessen Horowitz, and three other companies
DiDi AD	2019	China	Autonomous driving systems	Investment	2020/5/29	500 million	Softbank Group
Sana Biotechnology	2018	US	Cell engineering	Investment	2020/6/23	480 million	Google Ventures, and 10 other companies

Note: KKR, Hahn & Co., and Hana Financial are private equity funds.
Source: Compiled by MGSSI based on CB Insights data

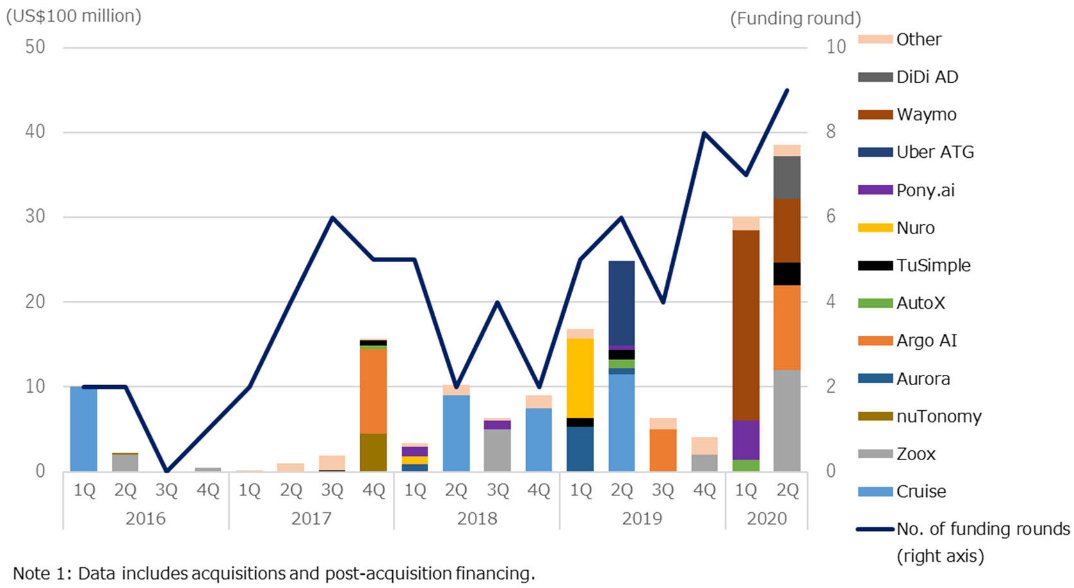
[1] Argo AI is an autonomous driving startup, but because this additional investment by Volkswagen was made after the acquisition of Argo AI by Ford, it is not formally considered an M&A or VC investment.

2. REVIVED EXPECTATIONS FOR AUTONOMOUS DRIVING, AND INDUSTRY RESTRUCTURING TRENDS

(1) Changes in investment in the autonomous driving industry

Although the autonomous driving industry has been attracting attention over the last few years, the industry has never seen this great a concentration of deals in such a short period. A look at the fundraising by major startups over the past few years shows that both the number of investments and the amount of money procured are currently at their highest levels ever, which could be the sign of changes in these trends (Figure 3).

Figure 3: Fundraising by major autonomous driving startups



Note 1: Data includes acquisitions and post-acquisition financing.
Note 2: Other includes funding rounds with US$10 million or more.
Source: Compiled by MGSSI based on CB Insights data

Full-fledged investment in the field began with GM's acquisition of Cruise in 2016. After that, the cumulative amount of investment in the industry grew due to the acquisition of Argo AI by Ford,[2] additional investment in Cruise by Honda and others, investment in Nuro by the SoftBank Group, and investment in Uber ATG by Toyota and others. At the same time, many problems surfaced, not only on the technology front, but also with respect to social acceptability and institutionalization. These included issues highlighted by the March 2018 accident that occurred with a self-driving vehicle operated by Uber, and the delay in systematic implementation related to autonomous driving Level 4.[3] As a result, there was a period when expectations for the autonomous driving market cooled off. For these reasons, US research firm Gartner positions autonomous driving (Level 4) in the "disillusionment" phase in terms of its Hype Cycle[4] (published in August 2019).

With this in mind, it is worth noting that the industry most recently recorded the highest-ever amount of funds raised in a quarter. Gartner cites a fundraising increase as one of the criteria for the phase transition to the "enlightenment" after "trough of disillusionment," and they are the signs suggesting that autonomous driving may move to a new phase.

The "enlightenment" phase refers to one in which market uptake of a new technology resumes, after disillusionment had set in due to inflated expectations, and for the purposes of this report, is called the "expansion" phase.

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[2] Volkswagen's subsequent investment has made it and Ford equal shareholders in Argo AI, with the combined shareholding of the two companies representing the majority.

[3] A classification of automated driving in which the system controls all operations under certain road conditions.

[4] Invented by Gartner as an indicator of the stages of evolution of new technologies. The cycle is divided into 5 phases: "innovation trigger," "peak of inflated expectations," "trough of disillusionment," "slope of enlightenment," and "plateau of productivity."

(2) Transitioning from a period of competition among many to consolidation

However, the inflow of funds to the autonomous driving field does not necessarily mean that players in the industry will grow uniformly. Rather, the flow of funds at present should be interpreted as being a product of realignments.

Amazon's acquisition of Zoox illustrates this point clearly. As the deal's estimated value of US$1.2 billion was the largest of corporate deals, excluding M&As by private equity (PE) funds, in the most recent quarter, it attracted a great deal of attention from inside and outside the industry. However, the acquisition price was well below Zoox's corporate value, estimated to be US$3.2 billion in 2018. Against this backdrop are the financial constraints at Zoox. The low acquisition value can be attributed in part to Zoox's inability to attract much funding in the form of investments amid the impact of COVID-19.

In the case of Waymo as well, some aspects of its procurement of money make it different from mere fundraising. The amount raised in investment rounds (initial round on March 2 followed by May 12) totaled US$3 billion. While the amount was the largest ever raised by an autonomous driving company, the more important point is that it was the first time for Waymo to acquire funding from external sources. Waymo has been operating as a unit under Alphabet thus far, but in the course of such fundraising, more than 10 companies have become stakeholders, and that will increase Waymo's independence from Alphabet. This development suggests Alphabet's plans for a Waymo IPO after conducting extensive fundraising like this.[5] An IPO has yet to be achieved by an autonomous driving startup, so if the company were to succeed in this regard, it could lead to potentially even more fundraising.

Meanwhile, moves aimed at scaling down the autonomous driving business are also emerging. Uber and Cruise, which are suffering from financial difficulties caused by the COVID-19 crisis, have both announced personnel cuts. On June 19, BMW and Daimler also announced that they will suspend the joint development of autonomous driving technology, which they began pursuing about a year ago.

In this way, selection pressure is influencing the formation of large deals and the scaling-down of operations, and it is thought that the industry restructuring is accelerating to shape an autonomous driving industry by consolidation, rather than rivalry among many. This reorganization is also perceived as a prelude to the next "expansion" phase.

3. NEW BENEFIT OF AUTONOMOUS DRIVING IDENTIFIED AS A CONSEQUENCE OF THE COVID-19 CRISIS

(1) Impetus toward social implementation

As mentioned above, the reorganization and accompanying movement of funds can be regarded as a step toward the "expansion" phase, but unless specific examples showing the social benefits of autonomous driving accumulate, the transition to the next phase will not happen. In other words, key points for forecasting future trends include not only the developments within the industry, but also whether the momentum for social implementation will pick up in the background that companies' efforts and changes in people's value perspectives fuel reciprocally.

Although autonomous driving offers significant economic benefits, such as labor cost reductions and route optimization, it also carries the risk of jeopardizing people's safety and security, if not used cautiously. In order to overcome such concerns and promote the adoption of self-driving vehicles, incentives other than economic efficiency are necessary, but they have not always been clear. Although it has been shown that autonomous driving is theoretically safer than human driving, it is difficult to say that people's understanding of such merits has spread, because of the lingering impression left by the aforementioned accident, and other factors. Having

[5] "Waymo Raises $2.25 Billion After Courting Outside Investors for First Time," *The Wall Street Journal*, March 2, 2020.

said that, the new value of "non-contact" has been identified as a corollary of the COVID-19 crisis, and the possibility that society will become more accepting of automated driving, as a potential means to make various operations non-contact, is emerging. In this regard, in a May 12 press release by Waymo, which the startup issued to announce the additional US$750 million it had raised, the company said: "COVID-19 has underscored how fully self-driving technology can provide safe and hygienic personal mobility and delivery services." Using the term "hygienic" to explain the newly identified benefit of autonomous driving, Waymo is displaying its keenness to accelerate social implementation.

In this area, specific examples attracting attention are unmanned delivery services utilizing Level 4 autonomous driving technology.

(2) Specific initiatives to satisfy "non-contact" needs that attract attention

While Nuro is taking the lead in the unmanned delivery space, Waymo and Pony.ai, which had been focusing on the robotaxi business (taxi service using self-driving vehicles) to date, are also attempting to make full-scale forays into the delivery field. Even though the robotaxi business is described as using self-driving vehicles, in most cases, drivers are present in the car so that they can respond to emergencies as needed, and, for this reason, robotaxi companies have been forced to suspend their operations due to COVID-19. There are signs of a resumption of services by some companies, but it is unclear if the current mode of operation, which can hardly be called non-contact (de facto Level 3 operation), will gain consumer acceptance in the with/after COVID-19 era. As such, these companies are turning their attention to the delivery business, where demand is rapidly increasing due to COVID-19. Pony.ai, which raised US$460 million from Toyota and other investors on February 25, partnered with EC company Yamibuy (US), which sells Asian food ingredients, to launch a food and luggage home delivery service in mid-April using self-driving vehicles in California. Waymo has also revealed its intention to strengthen its delivery business, Waymo Via, by leveraging the money procured through external funding.[6] In the case of delivery services, even if a driver is present in the vehicle to respond to an emergency, as long as the recipient handles unloading of the delivery, the service retains the merit of a self-driving vehicle and could still be deemed "non-contact".

Amazon, which took a giant leap into the autonomous driving field with its acquisition of Zoox, will also likely give greater attention to unmanned delivery services. The company has not only invested in Aurora, which is another self-driving startup like Zoox, but is already pursuing initiatives for unmanned delivery services, such as by conducting pilot tests of an originally developed delivery bot (low-speed autonomous robot for sidewalks). As it has been estimated that Amazon could achieve cost savings of approximately US$20 billion per year[7] by streamlining EC delivery operations using automated driving technologies developed by Zoox and others, it is highly likely that the company will further gear up its efforts to realize unmanned deliveries.

In this way, the market is starting to see signs and movements of companies' efforts to promote social implementation by using the money procured or infused. The COVID-19 crisis is increasing the possibility that society may welcome the unmanned delivery business ahead of the robotaxi business, which had been focused by companies. Will such trends create a new path toward the social adoption of autonomous driving? It will be worth paying attention to the moves of companies that survive the industry reorganization.

CONCLUSION

This report has addressed signs of change in the evolutionary phase of autonomous driving, as indicated by investment trends therein in the context of the overall investment picture, and the flow of funds. Going forward, it is highly likely that players who have succeeded in raising funds will promote their initiatives more aggressively, and competition in the area of Level 4 autonomous driving will intensify.

[6] Press release by Waymo dated May 12, 2020 and an article published by *The Wall Street Journal* on March 2, 2020.

[7] An estimate by Morgan Stanley ("Amazon acquires self-driving start-up Zoox for over $1.2bn," *Financial Times*, June 26, 2020).

In particular, it is expected that more initiatives will be directed toward unmanned delivery services that can satisfy increasing non-contact needs. If the COVID-19 crisis brings about changes in social acceptability and regulations, and the unmanned delivery business expands, the modality of logistics will change drastically. The trends should be closely monitored to discern what sort of outcome the accelerating pace of restructuring in the autonomous driving field brings.