Shaping the Future of Transport in the Digital Era

The Volvo Group

Executive Summary

At present, the world is at the historical juncture of a new round of scientific and technological revolution and breakthroughs in digital transformation. The new generation of information and communication technologies, in combination with a substantial reduction in the cost per performance ratio, and their convergence of human production and life have become the leading force for innovation and business revolution.

This paper finds in this digital era, the digital economy is entering a new stage of system restructuring, dynamic transformation and paradigm shift, pushing forward industrial transformation and economic transformation, injecting strong impetus into economic and social development. Furthermore, this paper finds that the transport industry falls typically into the realm of "integration of traditional industries into the digital economy by means of digitalization", and with the digitalization transformation, increased production quantity, measurable effects on quality and production efficiency could be expected. This paper argues that digitalization is accelerating the three mega trends within commercial transport, namely, electromobility, automation and connectivity. While it offers a wide array of new opportunities, a variety of challenges remain.

The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment as well as marine and industrial engines. We also provide

complete solutions for financing and services. Our industrial footprint includes product development and manufacturing or assembly plants in more than 18 countries and we sell our products in more than 190 markets. In 1992, the Volvo Group set up its very first office in China. Today, the Volvo Group's combined businesses in China cover more than 22 provinces, cities and autonomous regions with approximately 6,000 employees. China has become the second "home market" after Sweden, where Volvo's Global Headquarters is located. Apart from being one of the world's largest manufacturers of commercial vehicles, the Volvo Group has long been a leading pioneer and major driver of innovation in the three mega trends within commercial transport.

Faced with opportunities and challenges in the digital era, based on our previous 26 years' experiences of successful business operation in China, and with our in-depth knowledge and extensive expertise in technological innovation and digitalization of the automobile industry, the Volvo Group is in a unique position to drive the business revolution of the global commercial transport sector in the digital era. And we are ready to commit ourselves to making valuable contributions to China's social and economic development.

At a general level, this paper provides the following policy recommendations for China's innovation-driven development of the automobile industry in the digital era:

1. Adopt comprehensive policies for intelligent connected vehicles that promote both a level playing field for business operations and technological development.

2. Ensure equal footing for all players by creating a stable and predictable legislative environment that is conducive to the sustainable development of new

energy vehicles.

3. Adopt holistic and broader policy perspectives related to vehicle digitalization in order to address a number of legal and political issues.

I. Introduction

At present, the world is at the historical juncture of a new round of scientific and technological revolution and breakthroughs in digital transformation. The new generation of information and communication technologies, in combination with a substantial reduction in the cost per performance ratio, and their convergence of human production and life have become the leading force for innovation and business revolution.

In this digital era, the digital economy is entering a new stage of system restructuring, dynamic transformation and paradigm shift. The new generation of information and communication technology is accelerating its diffusion from local to global, as well as from a single sector to the entire industrial chain, becoming a leading force for innovation and transformation, and injecting strong impetus into economic and social development. The digital economy has become an integral part of the modern economic system and an important driver for the sustainable and high-quality development of the real economy.

i. Definition of Digital Economy

Digital economy refers to a series of economic activities that take the use of digital knowledge and information as key production factors, the modern

information network as important carrier, and the effective use of information and communication technology as important driving force for the efficiency improvement and economic structure optimization.

Digital economy is consisted of two parts. Simply put, the digital industrialization and the industrial digitalization. To be more specific, the digital industrialization is more about the information and communication industry, including electronic information manufacturing industry, telecommunications industry, software and information technology service industry, Internet industry, etc. Whereas the industrial digitalization refers to the integration of traditional industries into the digital economy with the help of application of digital technologies. The increased output of traditional industries, in terms of production quantity, quality and production efficiency, constitutes an important part of the digital economy.

ii. Opportunities that Digital Economy brings

The digital infrastructure characterized by evolution, ubiquity, dynamics and autonomy provides important support for the development of the digital economy. The rapid development of the digital economy has had a profound impact on the economy and society. It enriches the supply of factors by digitalization, improves the efficiency of factor allocation by networking, and enhances the efficiency of output by intellectualization.

To put into a nutshell, digital economy brings opportunities for two major transformations:

First, industrial transformation. The Moore's law and the result of going beyond

the Moore's law provide the industry with a strong incentive for continued innovation with a great momentum. The rapid development of the new generation of information and communication technologies, represented by mobile internet, industrial internet, cloud computing, big data and artificial intelligence, has triggered the upgrading of core technology systems, including software and hardware, and profoundly adjusted the industrial landscape.

Second, economic transformation. Accelerated pace of digitalization, networking and intelligent transformation of the traditional industries has introduced new features into the industries, such as network-connected, platform-supported, software-defined and data-driven, creating a huge space for the development of the digital economy.

iii. Trends of the Digital Economy development

Generally speaking, there are four trends of the digital economy development:

First, the global digital economy continues to expand in size and scale, rapidly taking an even greater proportion of the GDP, making it a new commanding height of global competition.

Second, the new type of digital economy, such as cloud computing, big data, artificial intelligence, autonomous driving, is taking shape and has already accelerated its penetration and integration with all sectors of the economy and society, driving further technological innovation, industrial upgrading, economic transformation and social progress.

Third, the global electronic information manufacturing industry and information

communication service industry have slowed down and entered a period of steady growth. The overall scale growth of the basic digital economy has slowed down significantly, and its proportion in GDP is significantly lower than the historical peak.

Fourth, the digital economy is accelerating its expansion from the consumption end to the production end. New business models and formats, such as the industrial Internet and intelligent manufacturing, are emerging and taking shape.

iv. How digitalization reshape the Transport Industry

The transport industry falls typically into the realm of the second category of the digital economy, which is the integration of traditional industries into the digital economy by means of digitalization.

Digitalization refers to the adoption or increased use of digital technologies by an organization, industry, country and so on. It is the integration of digital technologies into the traditional industries by the digitalization of everything that can be digitized. In other words, it is the use of digital technologies to improve processes, lower costs, gain productivity and, to some extent, establish new business models which provides new revenue or value-producing opportunities.

With the digitalization of the transport industry different types of entities, such as appliances, machineries, vehicles and even transport infrastructures become interconnected, making it more likely that new capabilities will emerge and that previously separate activities could be connected, integrated, and restructured, introducing increased production quantity, measurable effects on quality and

production efficiency.

Moreover, digitalization serves as the foundation for the future development of the intelligent automobile industry. It penetrates not only into the supply side of the vehicle design, logistics support, manufacturing processes, management model and assembly line, it is now gradually infiltrating into the demand side of product marketing, maintenance and services, finance and insurance, networking service, people interaction, visualization, travel services, traffic safety management, extending and creating much space for value creation.

As a matter of fact, at the core of the IoT lies the digitalization of information, which represents a new form of general-purpose technology that is giving rise to a new level and form of connectivity among multiple heterogeneous ideas and actors. Through better connectivity, the design space of the OEMs and other producers of the transport industry become denser: more ideas can be created, new ideas can be tried, implemented or rejected more quickly, and the knowledge base can be expanded through more experimentation, making possible a vast new array of possible combinations. Ever increasing new combinations help OEMs and other producers respond more quickly to changing consumer demand, making possible new products and services, even new industries.

II. How does the Volvo Group see digital transformation in automobile industry

i. Business revolution is gathering storm

In the view of the global economic landscape and outlook, a new round of business revolution is taking shape, introducing fierce innovation competition. For

many advanced economies such as the USA, Germany, UK and Japan, they stipulated relevant policies, welcoming and encouraging this new round of technological and industrial revolution, pushing forward an innovation-based business revolution in the digital era.

Against this backdrop, one of the most prominent features of a modernized economic system in the digital era is innovation, which helps nations break through development restriction, increase total factor productivity, and propel economic growth. As the backbone of any national economy, the manufacture industry, including the automobile industry, should not only provide foundation for the ongoing economic and social transformation, but also strive to be the champion and pioneer for technological innovation, thus pushing forward further business revolution in the digital era.

In the modern world, one single stakeholder rarely has the ability to solve these challenges on their own. Instead, close collaboration among stakeholders from different technical and scientific fields is needed to form a holistic solution, and to create a multi-partnership mechanism and platform. Start-ups, large companies, suppliers, academic institutions, research institutions, and the public sector (such as cities) and enterprise experts are invited to work with each other, especially in the field of automation and electric vehicles. The research may include data analytics, block-chain and artificial intelligence solutions being developed, which are at the forefront of business innovation. The Volvo Group's latest CampX concept provides a physical meeting place for this initiative, and Volvo Financial Services' ILABX project provides testing, research, and opportunities for start-ups to implement cutting-edge solutions for their participation. In the end, it is

possible to get investment from the Volvo Group to further realize the project.

ii. Mega technology trends

The Volvo Group sees today that there are several clear mega technology trends that will impact our world between now and 2030. Developments within electromobility, automation and connectivity will transform the automobile industry and contribute to increased productivity and efficiency, lowered environment impact and improved traffic safety.

The automobile industry is on the cusp of change, a change that some analysts consider to be dramatic. And the automotive market of the future will be more or less starkly different from that of today. Rapid development of the digital economy is changing consumer expectations and old business models are being adapted, changed or even scrapped. Digital transformation, fueled by technological innovations, is creating a host of opportunities which allow for new innovations and the development of cleaner, more efficient and safer vehicles.

There is much hope that digital transformation will pave the way for mobility as a service, where the traveler is provided with time-responsive, multi-modal information on the best way to make their trip, including planning and payment. Private and public transport modes, including ride and vehicle-sharing services, are increasingly joining forces to transport people in an efficient and sustainable way. Moreover, digital transformation is firmly placing the customer at the center of developments, and it is customer behavior, together with technological innovation, which will be the main driver of change, leading to the emergence of new mobility services.

From an operational point of view, digitalization for the Volvo Group refers to the use of electronics, computer-based systems, communication technology, sensors and other enabling technologies in order to develop intelligent products, services, production systems and business solutions. One example of digitalization is when vehicles communicate with each other, including the development of the fundamental electrical and electronic architectures that enable vehicle-to-vehicle (V2V) communications.

Digitalization (in its industrial form) largely pertains to the description of physical objects and work processes in digital forms, and to the utilization of the processing power in modern computers (CPUs). In a modern truck, there are approximately 40 “unseen computers” that are referred to as embedded systems (built-in systems). An increasing number of functions are being controlled by software (applications) and the automotive industry is becoming a software-based and software-defined branch of industry.

Volvo believes that success in the market requires mastering of well-known as well as new technologies. The Volvo Group must thus be at the cutting edge with respect to managing the combination of mechanics, electronics and software. The key phrases in this effort are “systems approach” and “integration,” and expertise from many different disciplines will be required in order to develop innovative and intelligent products.

The Volvo Group is also active in the field of enabling technologies. One example is that the Group is co-founder of a center for artificial intelligence (AI Innovation of Sweden). Another is quantum computing. Quantum computers have the potential to (in the future) act as powerful accelerators for AI calculations.

iii. Main opportunities

The digital transformation of the automobile industry makes different types of data collection easier, more accurate, at lower costs, and in real-time. In addition, it provides a means for new types of remote control and automation. These developments enable new opportunities for nearly all aspects of the transport sector.

In the context of public transport, digital transformation can support the development of a more sustainable society in many ways, briefly illustrated as follows:

First, environmental sustainability:

- By optimizing routes, time-tables, style of driving, vehicle dimensions, etc., the direct emissions from the public transport system can be reduced;

- By increasing the attractiveness and use of public transport, it is possible to reduce the in-direct emissions (i.e., the emissions from the non-public transport system) and improving land use (e.g., reducing the space dedicated for parking).

Second, social sustainability:

- By increasing accessibility to public transport for vulnerable groups (e.g., elderly, and disabled), it is possible to improve social equity in public transport;

- By increasing the coverage of public transport services, equity and sustainable living is supported. In addition, by increasing the coverage of public transport, the access to different activities will increase, and therefore, the feeling

of social inclusion and life satisfaction might increase;

- By increasing public transport safety, personal safety can be improved.

Third, economical sustainability:

- By optimizing the use of resources in public transport, money can be saved by the public transport providers;

- By minimizing the travel time, the travelers can do more productive things than traveling and waiting for transport services.

iv. Main challenges

While the digital transformation opens up for new opportunities, there are some challenges that need to be carefully addressed as per the three mega technology trends of the automobile industry, namely, electromobility, automation and connectivity. They can be categorized into two groups:

First, technical challenges:

- Data Collection. Determining what type of data is possible to collect, both in real-time and in retrospect; Identifying what type of data is actually useful for the different actors in different situations; Collecting and storing data in the best and most efficient way; How to ensure that the collected data is of sufficient quality; How to handle situations with insufficient quantity of data;

- Interoperability. Interoperability concerns the ability of systems to work together, which is of particular importance in machine-to-machine contexts. As

the IoT is characterized by a largely heterogeneous blend of connected devices, provided by different vendors using different types of technology, the interoperability issues will constitute some of the main challenges for a well-functioning, connected IoT infrastructure. Challenges related to interoperability include the development and usage of standardized protocols and interfaces for communication and service provision.

- Scalability. Scalability is the ability of a system to function with growing number of users, and sensors and devices that continuously collect and process large amounts data. Challenges include how to store all the collected data in a way that privacy and integrity is preserved, how to analyze and process all of the collected data to transfer it into meaningful information that can be used by various types of actors.

- Information Security. There are many types of potential malicious actors that, for various reasons, may attack the information systems of public transport. How is it possible to make it more difficult for malicious actors?

Second, non-technical challenges:

- Business models. A major challenge is the need for effective business models, which regulates how the revenues should be distributed in order to cover for the costs of the involved actors. In particular, business models need to regulate the distribution of costs and revenues for sharing and using the collected data and the generated information, and for providing services for end users, companies and other organizations. It is important that there are business opportunities for the companies who want to provide the necessary services but are out of the scope of

the transport operators and public authorities; they need to get a return of their investments.

- Privacy and integrity issues. In a real world where various types of sensors continuously monitor and record the activities of people and items, and where end users submit information about their activities, there are challenges of how to protect the privacy and integrity of the individuals that are being monitored. To gain the trust of the travelers it is important that no personal information is used or distributed without explicit consent.

- Usability. How easy it is for the involved actors to make use of the provided information and services. High usability is a prerequisite for achieving the benefits of IoT and is important in particular in order to reach the travelers. If the interaction is not intuitive, the services will not be used. Challenges include how to present data and information in a way that humans and machines can easily use the information, how to design appropriate interaction models so that the users can interact with services and devices in an intuitive way.

- Deployment. It concerns the user acceptance of new technologies and services, which in addition to the acquisition of necessary equipment, e.g., a smartphone, may also require changed behaviors. Moreover, related to the privacy and integrity issues as aforementioned, the IoT solutions usually collect data from the users through sensors or manually, requiring the users to be willing to share data.

III. What the Volvo Group's ready to offer

Apart from being one of the world's largest manufacturers of commercial vehicles, the Volvo Group has long been a leading pioneer and major driver of innovation in the three mega trends within commercial transport, namely, electromobility, automation and connectivity.

Faced with opportunities and challenges in the digital era, the Volvo Group is in a unique position to drive the business revolution of the global commercial transportation sector in the digital era.

i. Electromobility

The Volvo Group believes that the main advantages of electrification come from the following:

First, electric vehicles are more energy efficient and therefore more environmentally friendly than diesel and gas powered vehicles. For example, Volvo's pure electric buses consume 80% less energy than regular diesel buses. Second, electrification can achieve zero-emission transportation. Vehicles do not emit nitrogen oxides and particulate matter, nor do they emit carbon dioxide. Third, electrification enables virtually noise-free transportation. Traffic noise has become an increasingly serious health problem in many cities. Since there is no noise (except for tire noise) in electric vehicles, this opens up new possibilities for urban planning, such as setting up indoor bus stops and night delivery.

Advances in technology, especially in energy infrastructure, energy storage and battery charging, will gradually reduce transportation operating costs and improve

vehicle performance, making the concept of electrification more feasible, even on some heavy vehicles. It is also electrically powered. The transition to zero-emission traffic will eventually become a global trend. The power to charge cars will increasingly come from renewable sources to achieve a carbon dioxide-neutral transport mode.

The Volvo Group is convinced that electrification will play an increasingly important role in the future transportation society, especially urban logistics. We developed the first hybrid concept truck designed for long-haul transportation. The truck can be shut down for up to 30% of the total travel time by using a hybrid engine during long-haul transportation. This will save 5-10% of fuel (depending on the vehicle and its driving cycle). The first batch of 50 Volvo diesel hybrid buses delivered by Volvo Buses to the Singapore Road Traffic Authority (LTA) can be powered by electricity from a standstill to a 15-20 km speed range. In the quarry and aggregate industry, Volvo Construction Equipment is developing a purely electrified job site that will reduce carbon emissions by 95% and total cost of use by 25% compared to conventional diesel operations.

In China, we support the use of incentives and government subsidies to further promote the deployment and development of electric vehicles. We also hope to be provided a level playing field for imported and local new energy vehicles and promote technology neutrality in new energy vehicle policy options to drive market growth.

ii. Automation

The Volvo Group believes that the automation of vehicles includes assisted

driving on public roads, guided and automated maneuvering, platooning and fully automated vehicles in restricted areas. The technologies involved include advanced vehicle control, positioning and communication (V2X – Vehicle-to-Vehicle and Infrastructure), mission control, operator interaction and job site control and management. Driver interaction is the key to the design process. Automation has enormous potential to increase transportation productivity, safety, energy efficiency and reduce the environmental impact of transportation.

The energy efficiency will be improved through platooning, optimized driving scenarios, optimized freight and logistics, and optimized truck driving behavior. From the earliest attempts in the truck platooning to the fully automatic loader at the electrification site, and further to the hub-to-hub automatic driving program that was previously exhibited in Beijing, the Volvo Group is pioneering in a series of cutting-edge explorations in automation. In particular, the hub-to-hub automated driving solution enables self-driving trucks in closed/semi-enclosed areas such as ports through a FH-type truck equipped with Volvo's self-developed dynamic steering system and I-Shift automatic transmission. The solution was officially launched earlier this year, transporting limestone from the open-pit mine in Brønnøy Kalk AS, Norway, to a nearby port, the first commercial case of the program worldwide.

At the same time, automation means improving the working environment of the driver/machine operator and reducing the risk in a hazardous environment (mining, etc.). The Volvo Group's fully-automated Volvo FMX truck for underground mining in 2016 has largely eliminated the risk of personal safety threats to the

driver due to the working environment. The driving and loading of the vehicle is automatically carried out by the truck.

The realization of autonomous driving is inseparable from the support of a powerful data network from communication carriers. Currently, the Volvo Group works with six operators around the world to enable online vehicle data roaming in approximately 128 countries. Volvo Construction Equipment set up a local 5G network on the test track of Volvo Construction Equipment in Eskilstuna and tested the self-driving vehicles in 5G environment with Telia (Swedish largest telecom operator).

The combination of electrification and automation will also bring disruptive changes to the human society and the transportation industry. The pure electric self-driving bus R&D project, collaborated by Volvo Buses and Singapore's Nanyang Technological University (NTU, is a part of the future sustainable public transport solution created by the Singapore Land Transport Authority. In March 2019, the world's first 12-meter-long self-driving pure electric bus was unveiled in Singapore and will soon be trial tested in the campus of Nanyang Technological University. This is also the Volvo Group's first self-driving pure electric bus that serves public transportation.

In China, we support performance-based standards and regulations which shall be set in place by relevant government authorities. We want to promote the legislation for high levels of automation, at least for demonstration purposes, in order to fully explore the future potential and opportunities with automated vehicles. We also strongly support international harmonization of standards, regulations and traffic laws regarding commercial vehicles.

iii. Connectivity

Connectivity is an enabler for new business models, new services and new products in the transport industry. Today's connectivity solutions lower costs (through fleet optimization and fuel savings) and improve productivity (through improved uptime) for customers. Connectivity solutions also have the potential to increase transport and resource efficiency in society through optimized traffic flows and a higher utilization of existing infrastructure as well as through new business models within logistics.

We foresee that connectivity will lead to lower environmental impact from transport and improved traffic safety, going from today's IoT or cellular network-based services that enable fleet management and cost optimization, via traffic predicting software and sensors to the Intelligent Transport System of the future.

As the first company in the industry to offer communications-based solutions to its customers (Dynafleet, a dynamic vehicle management system in the early 1990s), we have more than 850,000 vehicles are connected in our rolling fleet around the world, including trucks, construction equipment and buses. The figure is projected to reach 1 million in 2020. These connected vehicles generate massive amounts of data of up to 3 terabytes per day. Data requires an advanced analytics team of business translators, data scientists, and data engineers to turn it into insight and value through tools and processes. Companies can provide customers with the most targeted solutions to reduce time-to-market for new services and solutions to further increase customer productivity and profitability. The Volvo Group Connected Solutions, a new Volvo Group Connected Solutions, is such an advanced data analysis transformation center.

In China, We are glad to see China released the Intelligent and Connected Vehicle (ICV) Technology Roadmap which defined the development stages, targets and critical technologies for ICV development. We hope to see the establishment of a cross-sector coordination mechanism among authorities to guild authorities, think tanks and industry alliances to promote key aspects of vehicle digitalization (road testing, data exchange, V2V, V2X, and etc.). It is Important that we do not "pick winners" in terms of technology. In our view "vehicle to vehicle" communication as well as "vehicle to infrastructure" communication can be made through the use of the 4G network and through short range communication (e.g. DSRC). However, that is not to say that we are against a faster, better and more reliable cellular network, which will also be called 5G.

IV. Policy Recommendations

Last year marked the 40th Anniversary of China's Reform and Opening-up. Looking back at the past four decades, we, the Volvo Group, congratulate the great achievements made by the Chinese Government and the Chinese people through strenuous effort.

We are impressed by China's strong determination to further its reform and openness, as evidenced by President XI Jinping's speech at the World Economic Forum in Davos in 2017, as well as the consecutive release of Notices of the State Council on Several Measures and other relevant documents regarding further openness and foreign investment in China.

We congratulate that China has indeed delivered meaningful progress in the previous 5 years, most notably in environmental protection, consumer goods and

healthcare, as well as through some improvements to local business environments. Additionally, international enterprises investing in financial services, automotive, shipbuilding and aerospace had one of their longstanding recommendations accepted, with announcements that foreign investment barriers in those industries would be overcome in the coming years.

From a more general perspective, any country that wants to be in the lead in digitalization needs to address the aspects of,

- Digital Infrastructure. A reliable and well-functioning digital infrastructure is important for industry as well as the public sector,

- Digital Security. The system needs to be robust and able to resist cyber-attacks etc.,

- Competence supply. This includes university graduates in sufficient amounts and with the right skill sets as well as actions for life-long learning,

- Integrity. The public, industries and public bodies need to trust the digital products, services and systems. Relevant legislation and public policies therefore need to be in place,

- Overall coordination. Public policies need to be coordinated. It is also advisable to organize collaboration platforms where public bodies, industry, academia, research institutes and other relevant stakeholders can meet develop the solutions society needs. The “digital competence” of people responsible for public procurement needs to be secured.

Having said that, we do see great potentials for future improvement in the following areas and hereby advise the following for the Chinese Government's kind consideration:

1. Adopt comprehensive policies for intelligent connected vehicles that promote both a level playing field for business operations and technological development. The Chinese Government has been slow in producing overarching guidelines on intelligent connected vehicles and automated vehicles, and has intervened in technological development by prescribing technological pathways for companies.

The Chinese Government is advised to:

- Provide foreign companies with equal access to China's national initiatives for intelligent connected vehicles development and promote advanced technologies and products in China.
- Adopt a market-oriented and technologically-neutral policy approach to allow diversified choices for businesses to choose partners and for customers to choose products.
- Encourage local authorities' cooperation with on-road vehicle testing applications and test licenses.

2. Ensure equal footing for all players by creating a stable and predictable legislative environment that is conducive to the sustainable development of new energy vehicles. Compulsory regulations are becoming more stringent for new energy vehicles producers, while policy incentives to motivate customers' demands are being phased out, adding to the unpredictability of an already-challenging market.

The Chinese Government is advised to:

- Involve all stakeholders in the discussion of new energy vehicles polices, to improve transparency and predictability.
- Release the new energy vehicles 2019—2020 subsidy scheme as early as possible, and do not produce further technical requirement enhancements for 2019—2020, as there is not enough lead time for original equipment manufacturers (OEMs) to plan and react.
- Consider and incorporate industry input for new energy vehicles credit policies beyond 2020 to ensure that realistic targets are set.
- Provide equal access to free license plates for all qualified new energy vehicles and abolish preferential treatment for local producers.

3. Adopt holistic and broader policy perspectives related to vehicle digitalization in order to address a number of legal and political issues. The Chinese Government's current slow progress in producing overarching regulations on vehicle digitalization, that take into account concerns of all stakeholders, may inhibit technological innovation.

The Chinese Government is advised to:

- ensure data is securely accessed on the manufacturers' backend systems in order to guarantee vehicle safety;
- create policies to allow road tests for the purpose of promoting autonomous driving R&D activities;
- carry out new forms of legislative support to keep pace with increasingly rapid technological development.

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