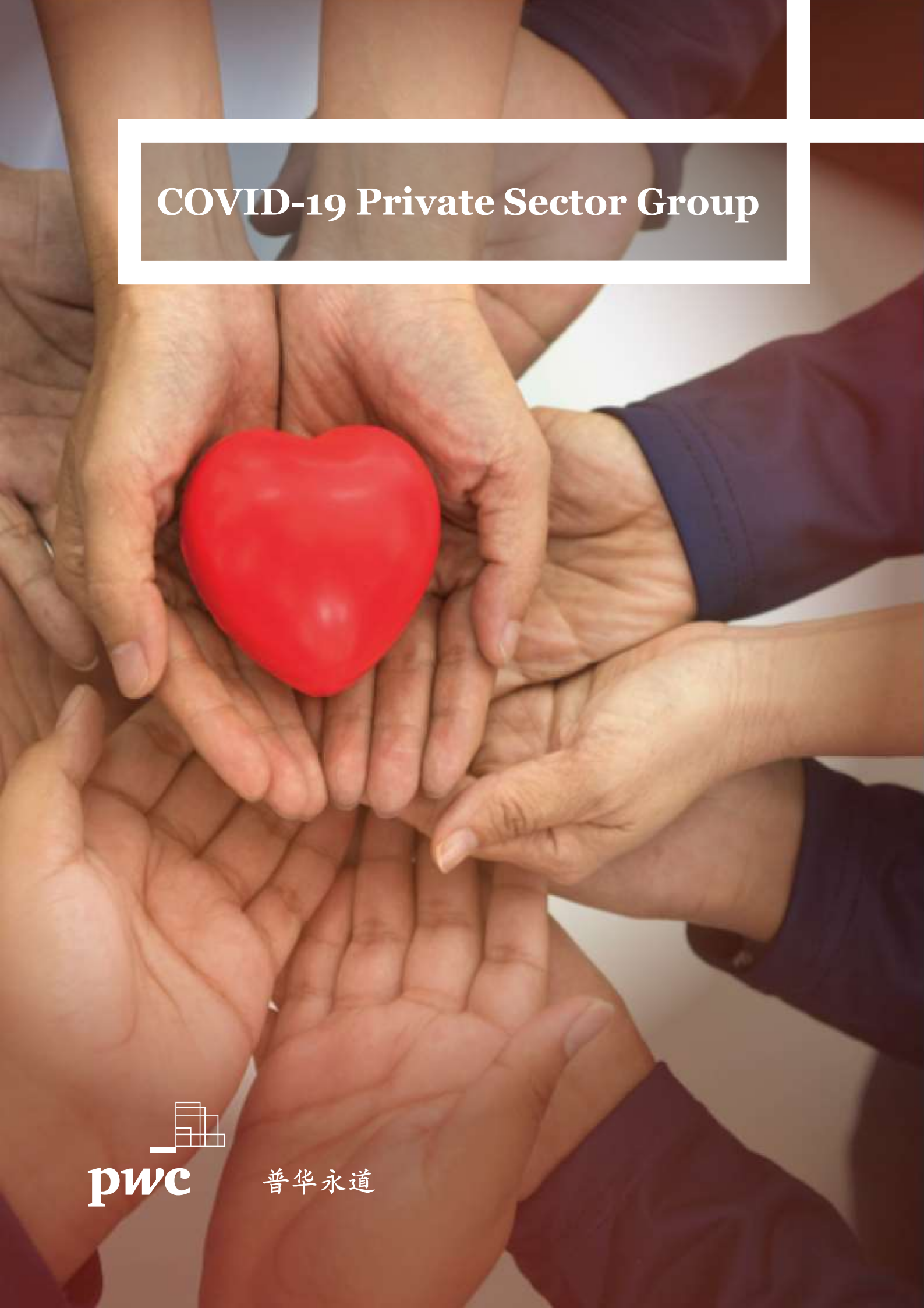

COVID-19 Private Sector Group

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COVID-19 Private Sector Group

Memo from the Sixth Meeting on 4 June 2020

Due to COVID-19, some countries are implementing isolation measures, and international trade has been significantly hampered, with cross-country circulation of goods and services almost coming to a stop. With upstream factories understocked and midstream logistics and delivery hindered, the supply chain constraints have forced the enterprises into an extremely difficult position. As things stand, the disease has emphatically underscored the impact of the instability, uncertainty and complexity of the supply chain on the development of the whole industry. On 4 June, the COVID-19 Private Sector Group (CPSG) invited senior executives from automotive and medical enterprises and PwC's supply chain management experts to discuss supply chain management after the crisis in the sixth CPSG meeting. As the CPSG secretariat, PwC hosted the meeting and has summarized the highlights and insights of the meeting as follows:

I. The Impact of COVID-19 on Global Supply Chains

1. The pandemic has created serious challenges to the global supply chains

COVID-19 has seriously challenged the supply chain management of enterprises around the world, as the disease has caused significant decrease in the demand and supply along the global industrial value chains and significantly interrupted and hindered the international and regional movement of goods.

The demand has been weak after the outbreak. There has been a sharp drop in international orders, with an average decrease of 40% in new orders at the end of the first quarter. In the steel industry, for example, the net profit of steel enterprises has plummeted by more than 50% due to decrease in domestic demand for steel products, which was compounded by a drastic fall in overseas demand due to the spread of the pandemic across the world. In 2020, the decrease in global demand for energy has dropped by 6%, and it is seven times than during the financial crisis.

Supplies have been cut off or down. The disease has forced many enterprises to suspend or cut down their production, and supply chains that are typically long and diverse as in automotive and similar industries have taken a serious hit. 12 countries have restricted their food export one after another, and the Food and Agriculture Organization of the United Nations has warned about the danger of the break-up of the food supply chains, which might trigger a 20% increase worldwide in children suffering from severe malnutrition.

The logistic links between the supply and the demand are broken up or hindered. Lockdowns in European and American cities one after the other caused regional and international movement of goods to be interrupted and delayed. A succession of container shipping companies announced their suspension plans, which, compounded by the decrease in demand, will lead to a 5% shrinking in the global container trade volume in 2020, as estimated by Clarksons, a world leading shipping service provider. Given the interruptions of bulk commodity supplies and the lack of demands of major consumption centers, plus the delay in the recovery of international dry bulk shipping, the markets will remain low in a general climate of apprehension.

As unanimously agreed in the meeting, the pandemic is having a significant short-term impact on the global supply chains and seriously challenging the resilience of the global supply chain systems with supplies interrupted or cut down along the supply chains. With the movement of goods hampered, the orderly recovery of the whole supply chains would take a long time. In the long term, caution must be taken with respect to the irreversible changes in the way of production due to the disease, notably potential interruption and relocation of industrial chains as well as the changes in enterprises' approach to supply chain management. In supply chain planning, the supply chain's resilience in reserves and localization will become more important.

2. Opportunities co-exist with crises, and China has become a more important player in the global supply chains

The pandemic has significantly compromised the deeply integrated global supply chain system, and all countries are rethinking about and trying to improve their own supply chain structures, including building multi-tier supply chain system both globally and locally, increasing resilience of the closed-loop supply chains, and diversification of systematic risks. China faces challenges arising from the shifts of supply chains, but also stands to benefit from the opportunities from deep involvement in the global supply chain restructuring.

The disease also compels global enterprises to rethink their global supply chain strategy, and in the short term, China's position as the World's Factory will be weakened as some of the supply chains are planning to relocate. Google and Microsoft, for example, will relocate their mobile phone and personal computer businesses from China to Southeast countries, such as Vietnam or Thailand, to find alternatives to "Made in China". A Japanese sportswear company has announced its plan to relocate its outsourced operations in Wuhan to Vietnam and Indonesia. On the other side, China has gained world recognition and experience in successfully managing the pandemic, and has recovered its productivity steadily when productions in other countries have been shut down on a mass scale. As such, China is well positioned in the restructuring of the global supply chains.

As recommended in the meeting, the next two to three years are a critical strategic window in the global supply chain restructuring. In the post-pandemic global environment where relaxed monetary policies are widely adopted, China should take the opportunity to attract world's liquidity into China, and strategically build manufacturing industrial chains in China. At the same time, China shall also make solid contributions as a leading manufacturing country to global economic governance by building an open and favourable business environment, speeding up 5G and other new infrastructure construction initiatives, and attracting world's leading industrial chain enterprises to set up base China.

3.Industrial chain clusters will become a key feature of the global industrial chain restructuring

During the outbreak, industrial chain clusters have demonstrated exceptional competitiveness, as some have seen an increase in orders. Clusters will be a major path forward in the global industrial chain restructuring.

The production through clustering of businesses may maximally reduce the transportation costs, shorten logistic time, and improve overall operational efficiency. During the outbreak, some enterprises have had their orders increased rather than decreased, such as electronics manufacturing businesses in Suzhou and Chongqing, among other places. At the core, this is because they have formed their own industrial chain clusters, with more than 80% of the spare parts needed for electronics manufacturing locally produced. By building production bases housing business clusters, the enterprises along the industrial chain are no longer distributed all over the world, but within a radius of 50 to 200 kilometers, where more than 70% of the spare parts and semi-products in the whole industrial chain are produced, an option that effectively reduces the risks associated with global procurement and improves the risk mitigation capabilities of the industrial chain. In addition, the clustering of the industrial chains will encourage the clustering of related service and trade enterprises as well as industrial chain finance enterprises, and the combination of industrial clusters and value chain clusters may achieve better synergies in economic and operating efficiency.

4.Now is better than later and some enterprises have already taken action to implement their strategies

Leading enterprises regard the post-pandemic period as a strategic stage of development, and in order to be strategically positioned, they turn the crisis into an opportunity to drive comprehensive business upgrade and transformation to ensure better business stability in the future.

Firstly, establish proprietary brands. Enterprises should consider upgrading themselves from a party being integrated into a supply chain to one party who integrates a supply chain through a combination of initiatives, including establishing proprietary brands, increase client diversification, raising the costs for business clients to change their suppliers, and strongly expanding their personal client base. For those enterprises with established brands, they should work to reduce their risk of their demand being replaced to the risk of their demand being delayed, by focusing on cultivating their brands, upgrading their brands at the right time, and increasing their client loyalty.

Secondly, increase their efforts in digital transformation to achieve AI-enabled production. On the one hand, investments should be made to upgrade the equipment and processes to improve the level of AI capabilities and automation. In the semi-conductor industry, for example, the highly automated wafer manufacturing process has suffered significantly less impact in the outbreak as compared with the labour-intensive wafer assembly and testing processes. On the other hand, efforts should be made to increase the interconnection of things in the supply chain system. Emerging technologies with huge potentials, including 5G, IoT, big data, and AR/VR, can be used to assist the enterprises in achieving remote collaboration and enable the enterprises to intelligently stay current with the dynamic changes on both the supply end and the demand end, which will further contribute to their capability to mitigate risks.

Thirdly, redesign the global strategy. Some enterprises are actively considering the global distribution of their productivity. They are implementing their overseas strategies by taking advantage of the favourable “go global” policies and the Belt and Road initiatives to establish a stronger position in terms of local labour force, critical raw materials and geographical locations, a move that helps diversify the risk of concentration in production and improve their capability to respond to future similar crises.

II. Development and Reforms in Supply Chain Management Concepts

Supply chain management is not a new idea. In the 1990s of the last century, global enterprises began to pay attention to how to maximize output with minimal input, which gradually developed into lean supply chain management concepts centring low costs. When cost control goes to the extreme, however, there are two risks: one is the risk of the whole supply chain being severely endangered if the low cost compromises the quality in one link of the supply chain, and the other is the risk of the whole supply chain being broken due to unexpected failure in one link of the closely interdependent supply chain. Given these two obvious risks, many enterprises have moved from lean supply chain management to agile supply chain management that centres on improving the overall service level of the supply chains. Agile supply chain management emphasizes the ability to deliver quality services in the shortest time possible in response to changes in the marketplace and the customer needs. In recent years, following the emergence of the customer-to-manufacturer (C2M) trend and on top of the agile supply chains, more resilient flexible supply chain management is attracting the attention of the managers. Flexible supply chains enable the manufacturers to come into direct contact with the customers and quickly mobilize materials from the numerous service providers along the supply chain to manufacture and deliver tailored products in response to the customers' individualized service needs. To be able to do so, however, it quired highly integrated data platforms and powerful AI-enabled processing systems. In a world where major disasters and emergencies occur increasingly more frequent, flexible supply chains are demonstrating their advantages in mitigating risks, especially when certain links or areas fail, as flexibility enables enterprises to quickly identify alternative resources and channels to maintain business continuity and restore the operations of the supply chains to normal.

In the automotive industry where the supply chains are highly globalized, the volume of China's of automotive spare parts import amounted to USD 36.711 billion. The volume of import from Germany, Japan, South Korea and the US alone accounted for more than 67%. The trade volume of the top five countries in the global automotive industrial chain, namely the US, Germany, Japan, Mexico and China, accounted for 44% of the global trade. As the pandemic and trade wars escalate, bilateral and regional trade agreements become the order of the day, and the global automotive supply chain becomes increasingly fragmented, forcing enterprises to actively look for more flexible localized alternative. On the one hand, improving the flexibility of product offerings and building agile supply chains enable enterprises to reduce overdependence on any single supplier or any single region. On the other hand, enterprises can increase modularized products and the interchangeability of parts to further improve the resilience of the supply chains, as they can be positioned to more efficiently mobilize resources to maintain the operations of the supply chains in the event of emergencies.

Going forward, the enterprises should maintain an adequate balance between the resilience and the cost of their supply chains in implementing their supply chain strategies. Findings from PwC's survey of Fortune 500 enterprises indicate that as high as 75% of the respondents have experienced interruptions in supplies. The survey also shows that only 44% of the enterprises put emphasis on the flexibility of their suppliers during contract negotiations, as enterprises used to pay limited attention to the agility and flexibility of their suppliers or the whole supply chains, but those that have adopted flexible supply chains have an average of 7% premium in the capital markets.

As agreed in the meeting, the three concepts in supply chain management, namely leanness, agility and flexibility, each has its advantages and relevance. In developing their supply chain strategies, enterprises don't have to choose one of them. Instead, they can developed a mixed strategy in light of their own stage of development, the industry in which they operate, the characteristics of their own production lines and SKU systems. When the external environment becomes highly unpredictable, enterprises must improve and maintain high agility to enable rapid responses. When the demands remain stable and there is no great need for rapid responses in the supply chain, high investments to improve responsiveness would undoubtedly eat into the logistic costs. In this case, a lean supply chain would be the best strategic option.

A Comparison of Three Major Types of Supply Chains

	Lean supply chain	Agile supply chain	Flexible supply chain
Definition	• Derived from lean management theories, and aimed to reduce waste, **lower costs**, and maximally eliminate unproductive activities	• Apply agility concepts to supply chain management, emphasizing the **speed** in **responding to the diversified customer needs**	• Ability to maintain continued supply and quickly return to normal capability when **part** of the supply chain fails
Characteristic	• High output in standard time	• High responsiveness	• High resilience
Cost	• Lowest	• Acceptable	• Acceptable
Product Lifecycle	• Relatively long	• Relatively short	• End-to-end
Market demand	• Predictable	• Variable	• End-to-end
Product profitability	• Relatively low	• Relatively high	• Relatively high
Competitive advantage	• Cost advantage	• Product availability	• Rapid recovery from emergency events
Informatization level	• Medium	• High	• Relative high
Typical product categories	• General (e.g. daily use products)	• Innovative products (e.g. electronic consumer goods)	• End-to-end

Source: PwC analysis

III. Considerations in Supply Chain Restructuring

Major global emergencies in recent years have had huge impact on the enterprises, and the enterprises' considerations mainly focus on three major areas with respect to supply chain restructuring. Every enterprise needs to reconsider and re-strategize its supply chain in line with their own industry specifics and corporate strategy.

1. Closed loop for supply chain managements

This meeting focused on three major industries that have been significantly affected by the pandemic, namely electronics, automotive and medical materials and equipment, to analyse the structural changes in their global supply chains after the outbreak, and discussed their future trends.

——The global supply chains of the electronics industry are trending inward, moving from the lowest trading cost principle toward the lowest social cost principle, and with enterprises in certain regions giving more considerations to industrial repatriation and industrial clustering, changing from global closed loops to continental closed loops. Currently, the electronics industry is highly segmented, with the US, Japan, South Korea and Netherlands focusing on export of upstream products and equipment, China and Germany focusing on high- and mid-end manufacturing, and the other countries engaged in low-end assembly and manufacturing. In the post-pandemic era, certain parts of the supply chains will remain globalized, while the other parts will be transformed to continental supply chains due to repatriations and deepened regional collaboration. This will lead to shorter chains, with tighter vertical structures, and as some of the core parts are relocated back, those outsourced divisions may be moved back within the multinational enterprises. There will also be a higher level of regionalization, with increasingly greater regionalized horizontal collaboration and clustering for concentrated and clustered production in a specific region, as multinational begin to shift away from their globalized strategies.

——With respect to the automotive industry characterized by highly globalized manufacturing, automotive manufacturers in China as well as in other countries will pay greater attention to the localization of their production capacity and parts supplies in the post-pandemic era, as they shift from their global closed loops to partial continental closed loops and localization to improve the risk mitigation capacity of their supply chains. Currently, automotive manufacturing is highly globalized, supported by globalized supply chains. In China, for example, the wholly domestically made auto parts account for basically more than 95% of a domestically made vehicle, but the core control units and core chips as well as connectors still rely heavily on import. Of the imported parts, those from Germany, Italy, Japan and the US accounted for more than 60%. After the outbreak, automotive manufacturers have taken action to explore opportunities for transformation and upgrade, with a shift in their supply chains favouring localized alternatives and home-based solutions. At the same time, they will further increase the percentage of home-made parts, identify alternative suppliers as strategic reserves, and shorten the physical distances of their supply chains through localization. As the world's largest market and the current haven for the manufacturing companies, multinational automotive companies and upstream suppliers will become more attracted to the Chinese market.

—— Medical materials and equipment are strategic supplies and have a direct impact on the public security of a country. In the post-pandemic era, some governments will take administrative actions to enable the manufacturing of some medical materials and equipment in the home country to ensure supplies within the country and lower their dependence on any single country or region. In the future, the medical materials and equipment supply chains will also gradually shift from the continental closed loops to national closed loops. In the case of surgical masks, for example, China produced about 5 billion masks in 2019, representing more than 50% of the world's output, while the total production in Asia accounted for more than 90% in the world, with Europe and the US retaining only a portion of the production capacity.

At the same time, the whole industrial chain has been built in the Asian region to form a closed industrial loop from raw material processing to finished goods production, from polypropylene to melt-blown fabrics to masks. In the post-pandemic era, for national security considerations, certain countries, including the US, will work to bring the medical materials and equipment supply chains back to the home country to ensure the reliability and security of their medical supplies.

As discussed in the meeting, the physical distances of the industrial chains will more likely be shortened to ensure demands are met with respect to medical materials and equipment that are of importance to the national strategies and people's livelihood, and some countries and regions may be able to produce them all locally. Enterprises in the electronics and automotive industries and other such industries highly dependent on specific technologies or suppliers, forced to suspend productions or operate at higher costs, have been driven to look for local or continental alternatives as strategic reserves to improve the resilience of their supply chains.

	Trends	Importance to national strategy and people's livelihood	Dependence on technology/ suppliers	Dependence on specific resources	Effective economic radius
Electronics	**Global closed loop -> Partial continental closed loos**	• Closely related to industries critical to people's livelihood, including computer, communications, military, medical industries	• High dependence on overseas suppliers for core parts and equipment, including high-end materials and chips, and photolithography machines	• High dependence on certain natural resources, including silicon and rare earth, for upstream raw materials and in the production of core parts	• Highly globalized divisions and highly concentrated, with extensive economic service radius
Automotive	**Global closed loop -> Continental closed loos**	• Less important to the national strategies and people's livelihood as compared with the medical materials and equipment industry	• Still relies on import for core control units, including engines and transmission, and the core chips for electronic stability control	• Low dependence on special resources, but lithium batteries for new energy vehicles still rely heavily on rare materials, such as nickel and cobalt	• Highly dependent on globalized supply chains for parts due to economic globalization, with extensive transportation radius
Medical material and equipment	**Global closed loop -> National closed loos**	• Extremely important with direct impact on people's health and life's security, whether in daily life or during public health emergencies	• Low dependence on specific suppliers thanks to low technological barriers for basic medical materials and equipment, with principal raw materials being bulk	• Relatively high dependence on petrochemical materials as masks, PPEs, and certain basic drugs are downstream products of the petrochemical industry	• Low transportation costs for raw material, such as polypropylene and melt-blown fabrics, with wide economic radius

2. Adjust production and logistic network setups

As recommended by the meeting, in view of the development trends in supply chains and in light of their own individual development stages, enterprises should regularly review and improve the setups with their production and logistic networks to align with and support their strategic development and optimal overall operating objectives. Enterprises should further enhance the resilience of their supply chains to more effectively manage their risks.

Optimization of the production network involves: determining the optimal number of factories, improving the utilization of production capacity and reducing overall production costs based on multi-dimensional analyses, covering the financial statement performance of each factory, their production technologies, the major areas in the distribution of clients they serve, relevant local policies, among other things; relocation of production tasks among different factories; and relocation of products among their factories based on product categorizations (generic products for national markets and specific products for local markets) and market channels.

Optimization of the logistic network involves: selection of the most suitable model from the traditional delivery model, point-to-point delivery model and mixed delivery model, among others, to most effectively support business operations and development; including all cost factors in the assessment and decision-making systems, including inventory cost, warehousing cost, transportation cost, stockout cost; determining the optimal economic radius by balancing costs and client satisfaction, among other considerations; determining the optimal number of layers of logistic nexuses, their numbers, locations, and sizes; determining whether to self-build or outsource and how to manage the network capability; and selecting the best business partners through public bidding, etc.

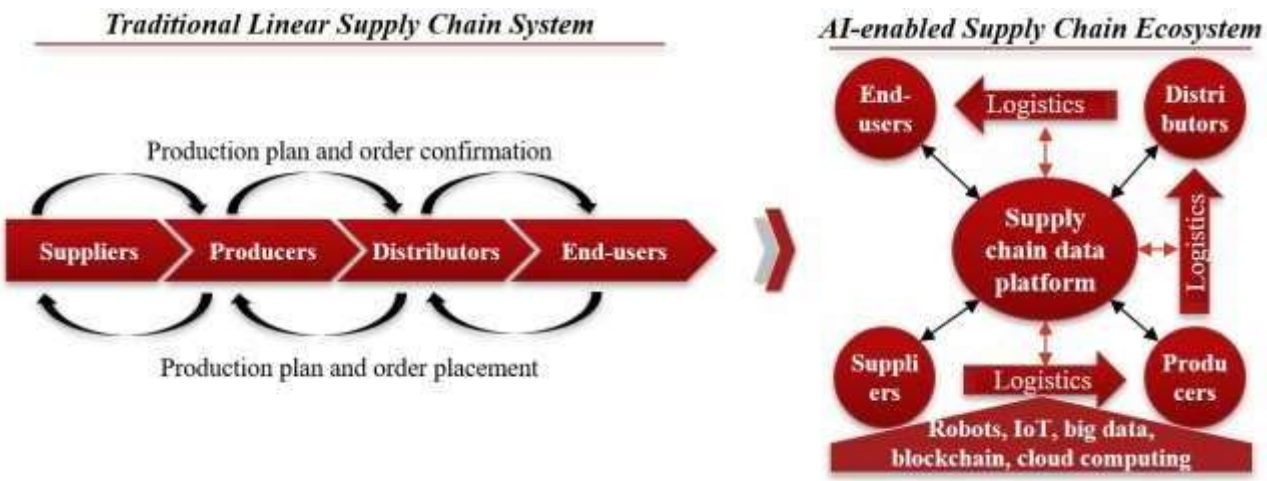
3. Accelerate the building of AI-enabled supply chains

At the present time, supply chains mostly operate on a linear basis in the communications of orders and production plans, a model low in efficiency and weak in risk mitigation. The COVID-19 outbreak has laid bare the weaknesses of traditional supply chain systems in terms of agility and risk mitigation capability. There have been numerous cases of the links between supply and demand being severely compromised due to inadequate communications and low transparency in the supply chains, among other causes, as supply chains have experienced spikes or in demands, stockouts or overstocks during the outbreak.

In the post-pandemic era, driven by necessity and new technologies, enterprises will shift to the AI-enabled solutions to extract greater value from the supply chains. On the one hand, enterprises are actively exploring alternative options to human labour, and adopt robotic technologies to reduce dependence on human labour and realize unmanned operations. A leading e-commerce logistic company has set up logistic routes in 11 provinces for delivery using drones, and has completed deliveries in more than 35 thousands of flights, with delivery using robots a standard operation in more than 20 cities. On the other hand, emerging technologies will be used to bridge information silos, improve the transparency of the supply chains, and boost the overall efficiency of the supply chains. The Chinese government places a high priority on the digitization of the supply chains, and in the Guidelines for Active Promotion of Supply Chain Innovations and Applications issued by the State Council at the end of 2017, sets out the targets to develop new technologies and new formats in support of supply chain development and basically build a national AI-enabled supply chain system that covers all major industries in China by 2020.

The CPSG members shared their experience and insights in use of the C2M method by auto manufacturers to accelerate the resumption of work and production by precisely matching production needs and supply chain capabilities. These auto manufacturers have built their supplier collaboration platform. When consumers have placed their orders on the online sales platforms, the requests for relevant spare parts and assembly modules will be automatically routed to the suppliers, while simultaneously through the collaboration platform, the suppliers prepare the supplies accordingly for delivery. Enterprises improve the circulation of spare parts and ensure the efficient and AI-enabled operation of the supply chains through a Central Control Room, which maintains visible monitoring and facilitates the automatic calculation of spare part consumption, automatic generation of spare part request forms, intelligent and precise instructions for the delivery of the spare parts, and intelligent receipt of the supplies.

The GPSG members also shared experiences where medical companies have ensured that their medical service supply chains were not interrupted through Internet-based platforms. In response to the outbreak, the online Anti-COVID-19 platform was quickly set up to provide free online medical consultations and psychological guidance. On the one hand, this solution offers the option for patients to seek attention from the doctors they know without having to go to the hospitals in person, and it ensures uninterrupted medical services that meet the patients' medical needs without the risk of cross contagion. On the other hand, such platforms can serve as centers for coordinating resources from the medical industrial chain, and through online consultations, facilitate the rapid communications of medical demand information and help connect the stakeholders along the industrial chain, from raw material producers, to raw material processors, to medical product producer, to sales agents, and to the end users.



The meeting calls out to the enterprises to value and make good use of the opportunities arising from the global supply chain restructuring, and make active efforts to turn this crises into opportunities for driving new development by building diversified supplier networks to improve their resilience to short-term risks and improving their supply chain efficiency through heightened flexibility, cost control and digital upgrade.

We express special thanks to the following special guests and representatives of the CPSG member organizations who shared their insights in the meeting:

Mr. ZHOU Xinyuan, General Manager, Channel Innovation Department, JD Health

Mr. MEI Songlin, Chief Data Officer, WM Motor

Mr. Julius SHEN, Strategy& Partner, PwC