

Current Chinese Economic Report Series

Ling Wang · Shao-ju Lee · Xiao-fan Wu ·
Bing-lian Liu · Jian-hua Xiao *Editors*

Contemporary Logistics in China

Persistent Reformation, Continual
Opening and Vibrant Innovation

 Springer

Current Chinese Economic Report Series

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Chapter 1

Development of China's Logistics Industry During 40 Years of Reform and Opening-Up: Achievements, Thrusts, and Outlook



Ling Wang

2018 marked the 40th anniversary of China's "reform and opening-up." In December 1978, the Third Plenary Session of the 11th Central Committee of the Chinese Communist Party began the grand journey of China's "reform and opening-up" and the modernization of socialism. Along with the reform and opening-up, China's logistics industry has also embarked on a new era. After 40 years of development, China's logistics industry has made notable achievements and has become a fundamental and strategic industry that supports the development of China's national economy. Looking forward, China's logistics industry will transition from rapid development to high-quality development, and China will transition from a vast logistics country to a logistics powerhouse.

This chapter consists of three sections. Section "[Achievements of China's Logistics Development](#)" expounds on the achievements that China's logistics industry has made during the 40 years of reform and opening-up. Specific subjects include: the overall scale of China's logistics market, the logistics infrastructural network, the strength of logistics enterprises, the professional logistics system, the operational models of logistics and supply chain, the level of logistics equipment, the logistics policy system, and the logistics management system. Section "[The Development Momentum of China's Logistics Industry](#)" discusses the intrinsic thrust of the development of China's logistics industry. Section "[The Outlook for China's Logistics Industry](#)" presents an outlook of China's logistics industry.

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Achievements of China's Logistics Development

With 40 years of reform and opening-up, the overall scale of China's logistics market has taken the lead in the world. A network of logistics infrastructure has been established. The strength of logistics enterprises has increased considerably. Meanwhile, a professional logistics system has been basically established. Various operational models of logistics and supply chain have been innovated and developed. The level of logistics equipment has been greatly elevated. Additionally, the policy system of China's logistics is continually improved, and the management system of the logistics industry is gradually optimized, which foster a sound environment for the healthy development of the logistics industry.

The Overall Scale of China's Logistics Market Takes the Lead in the World

After 40 years of development, the overall scale of China's logistics market has expanded markedly; the total value of social logistics has grown significantly and the share of total social logistics expense in GDP has decreased steadily. Meanwhile, the market size of express delivery has ranked first in the world for the past five consecutive years. The market size of third-party logistics, the freight volume, and the freight turnover have taken the lead in the world as well.

From 1991¹ to 2018, the total value of China's social logistics and total expense of social logistics rose from 3.02 trillion RMB and 0.52 trillion RMB, respectively, to 283.1 trillion RMB and 13.3 trillion RMB, respectively. The average annual growth rates were 18.3% and 12.8% respectively, which represent a 92.7-fold and a 24.6-fold rise, respectively. The share of added value of the logistics industry in GDP increased from 6.6% in 2005 to 6.8% in 2013²; the added value of the logistics industry accounts for 14.8% of the added value of the service industry (NDRC, National Bureau of Statistics, China Federation of Logistics and Purchasing 2014). Figure 1.1 shows the total value of social logistics and the total expense of social logistics for 1991–2018.

From 1991 to 2018, the share of China's total social logistics expense in GDP declined from 23.6 to 14.8%, a decrease of nearly nine percentage points. Figure 1.2 shows the share of total social logistics expense in GDP for 1991–2018.

¹Note: The statistical data of total value of social logistics and total expense of social logistics in China were first published in 1991.

²Note: The statistics of the logistics industry added value published by the National Logistics Report was only updated up to 2013.

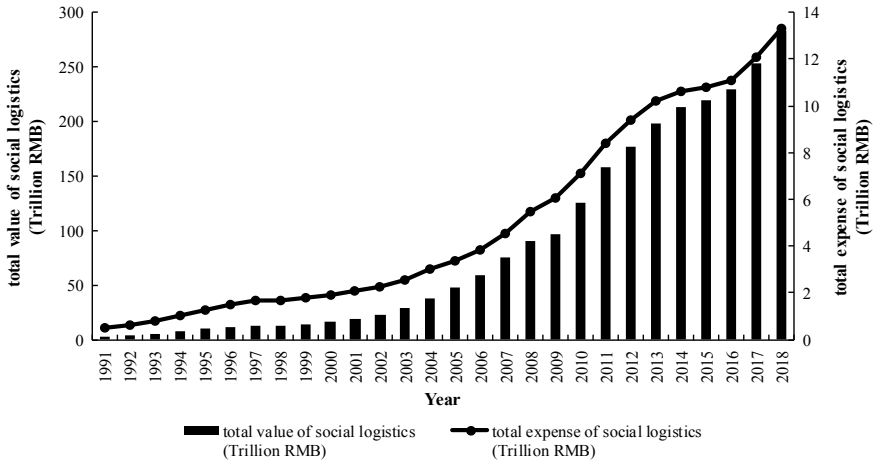


Fig. 1.1 Total value and total expense of social logistics for 1991–2018. *Source* Compiled from the DRCNET Statistical Database System and *National Logistics Operations Bulletin for 2010–2018*, published by the National Development and Reform Commission, and the China Federation of Logistics and Purchasing

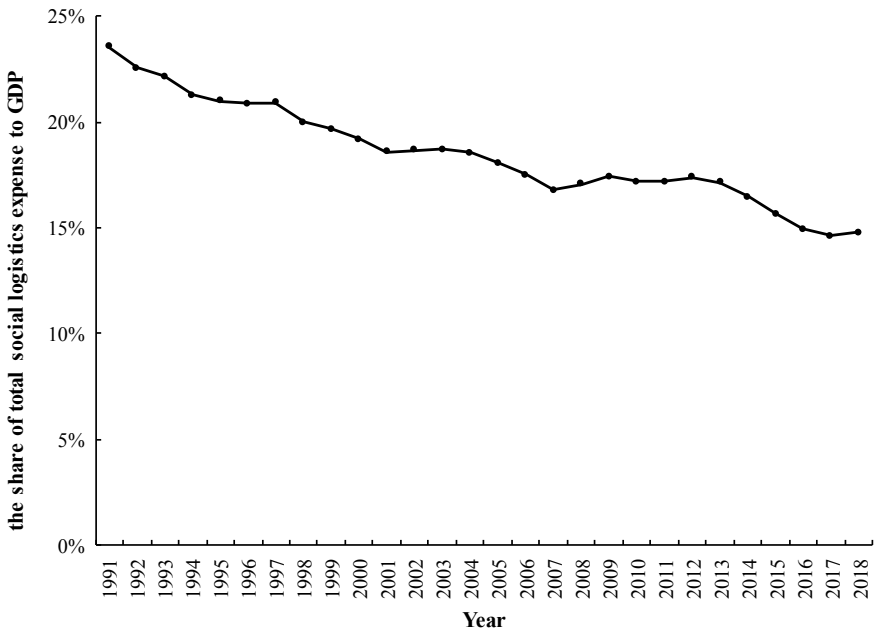


Fig. 1.2 The share of total social logistics expense in GDP for 1991–2018. *Source* Compiled from the DRCNET Statistical Database System, and *China Statistical Yearbook (2018)*, published by the National Bureau of Statistics of China, and *National Logistics Operations Bulletin for 2010–2018*, published by the National Development and Reform Commission, and the China Federation of Logistics and Purchasing

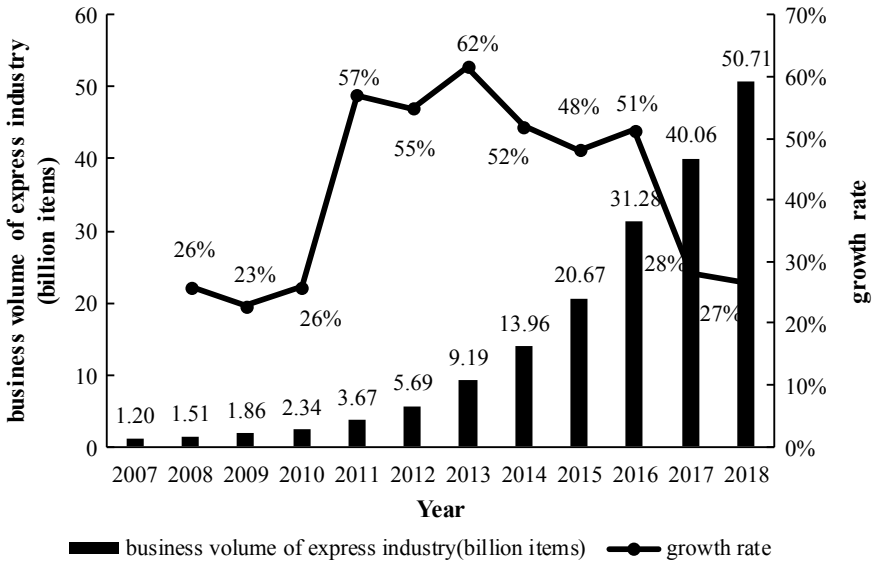


Fig. 1.3 Business volume and growth rate of express delivery industry in China for 2007–2018. *Source* National Bureau of Statistics of China. <http://data.stats.gov.cn/easyquery.htm?cn=C01>, 2019-04-30

From 2007 to 2018,³ the business volume of China's express delivery industry increased from 1.2 billion items to 50.71 billion items, with an average annual increase of 40.5%. In 2014, China's express delivery market overtook that of the US to rank No. 1 in the world, with the business volume of 13.96 billion items; it has remained at the No. 1 ranking in the world ever since. Figure 1.3 shows the business volume and growth rate of the express delivery industry in China for 2007–2018.

According to data released by the Armstrong & Associates, Inc., China overtook the US and became the largest global third-party logistics market in 2012. In 2018, the total income of China's third-party logistics was 203.2 billion USD, ranking second in the world. This amount accounted for 56.6% of the total income of third-party logistics in the Asia and Pacific region, and for 21.8% of that globally (Armstrong and Associates, Inc. 2020).

From 1978 to 2018, China's freight volume and freight turnover increased from 2.49 billion tons and 0.98 trillion ton-kms, respectively, to 50.63 billion tons and 19.94 trillion ton-kms, respectively; the average annual growth rates of both figures were 7.8%, and both figures increased by 19.3 times. In 2017, China railway's freight volume and the highway freight volume and freight turnover all ranked first in the

³Note: The statistics of the business volume of the express delivery industry began in 1989. Up to 2006, the statistics only included Express Mail Service (EMS). From 2007 on, the statistics included the business volume of express delivery service companies that are above a certain scale (i.e., with annual business income of over 2 million RMB). In order to ensure the comparability of statistics, this research only analyzes the business volume of the express delivery industry from 2007 on.

Table 1.1 Comparison of China's freight volume and freight turnover for 1978 and 2018

Indicator		1978	2018	Average annual growth rate (%)
Freight volume (billion ton)		2.49	50.63	7.8
Among which:	Railway	1.10	4.03	3.3
	Highway	0.85	39.57	10.1
	Waterway	0.43	7.03	7.2
	Cargo throughput of port	0.21 ^a	14.4	11.4
	Civil aviation (thousand ton)	64	7385	12.8
Freight turnover (trillion ton-km)		0.98	19.94	7.8
Among which:	Railway	0.53	2.88	4.2
	Highway	0.03	7.12	14.7
	Waterway	0.38	9.91	8.5
	Civil aviation (billion ton-km)	0.10	26.24	15.0

Source Compiled from *China Statistical Yearbook (1981)*, published by the National Bureau of Statistics of China, and *China Statistical Bulletin of Transportation Industry (2018)*, published by the Ministry of Transport of China

^aThe statistics of port throughput began in 1979

world. Both the cargo and mail turnover of civil aviation and the railway freight turnover ranked second in the world. The cargo throughput and container throughput of port have ranked first in the world for more than a decade. Table 1.1 shows the comparison of China's freight volume and freight turnover for 1978 and 2018. Table 1.2 shows the world rankings of some indicators of China's logistics industry in 2017.

Table 1.2 World rankings of some indicators of China's logistics industry in 2017

Indicator	Volume	Ranking
Third-party logistics revenues	180.3 billion USD	2
Business volume of express industry	40.06 billion items	1
Railway freight volume	3.69 billion tons	1
Railway freight turnover	2.7 trillion ton-kms	2
Highway freight volume	36.87 billion tons	1
Highway freight turnover	6.67 trillion ton-kms	1
Cargo throughput of port	12.6 billion tons	1
Container throughput of port	240 million TEUs	1
Cargo and mail turnover of civil aviation	24.35 billion ton-kms	2

Source Compiled from the website of National Bureau of Statistics of China, http://www.stats.gov.cn/zjtj/ztfx/ggkf40n/201809/t20180911_1622071.html, 2019-03-01, and *Statistical Bulletin of Transportation Industry (2017)*, published by the Ministry of Transport of China, and Armstrong & Associates, Inc

The Logistics Infrastructure Network Has Been Established

During the 40 years of reform and opening-up, China has made marked achievements in the construction of the logistics infrastructure network. The total mileage of China's high-speed railway and expressway ranks first in the world, as does the number of berths with a capacity of 10,000 + tons of port nationwide. The number of airports ranks first in the world. The "Five Vertical and Five Horizontal" (5V5H)⁴ comprehensive transportation channels were all linked up by the end of 2016. Besides, the nationwide warehouse space increases steadily, as does the scale of logistics parks. The development of the national logistics service network is being accelerated.

In terms of railways, from 1978 to 2018, China's total mileage of railways increased from 51.7 to 131 thousand kms, gaining a 1.5-fold increase. The railway network density increased from 53.3 to 136.0 km/10,000 km², showing a 2.6-fold increase. In 2018, the total mileage of China's high-speed railway reached 29 thousand kms, amounting to two-thirds of the global total mileage of high-speed railways and ranking first in the world. The total mileages of electrified railways and total mileage of double-tracked railways were 92 thousand kms and 76 thousand kms, respectively; the proportion of electrified railways and proportion of double-tracked railways were 70.0% and 58.0%, respectively; in 2017, these numbers were 68.2% and 56.5%, ranking first and second in the world, respectively (China Railway Corporation 2019). Presently, cross-region, fast, and powerful passages are being constructed (including channels: (1) from the Beijing-Tianjin-Hebei area to the Northwest, the Yangtze River Delta, the Peral River Delta, and the Northwest and Southwest regions; (2) from the Yangtze River Delta to the Northwest, Chengdu and Chongqing, Yunnan and Guizhou and the Peral River Delta; (3) from the Peral River Delta to the Southwest; (4) from Shandong Peninsula to the Northwest; (5) from the Northwest to the Southwest regions), as well as a freight railway network

⁴Note: In November 2007, NDRC released the *Mid-and-long-term Development Plan of Comprehensive Transportation Network*, which stipulated that China to build the comprehensive transportation channels consisting of Five Vertical and Five Horizontal lines (5V5H) in 2006-2020. The five vertical channels include South-north Coastal Transportation Channel, Beijing-Shanghai Transportation Channel, Manzhouli-HK-Macao-Taiwan Transportation Channel, Baotou-Guangzhou Transportation Channel and Linhe-Fangchenggang Transportation Channel. The five horizontal channels include North in Northwest China Maritime Transportation Channel, Qingdao-Lhasa Transportation Channel, Continental Bridge Transportation Channel, Along-Yangtze-River Transportation Channel and Shanghai-Ruili Transportation Channel.

Note: In November 2007, the NDRC released the *Mid-and-long-term Development Plan of Comprehensive Transportation Network*, which stipulated that China would build the comprehensive transportation channels consisting of Five Vertical and Five Horizontal lines (5V5H) in 2006-2020. The five vertical channels include the South-North Coastal Transportation Channel, Beijing-Shanghai Transportation Channel, Manzhouli-HK-Macao-Taiwan Transportation Channel, Baotou-Guangzhou Transportation Channel, and Linhe-Fangchenggang Transportation Channel. The five horizontal channels include the North in Northwest China Maritime Transportation Channel, Qingdao-Lhasa Transportation Channel, Continental Bridge Transportation Channel, Along-Yangtze-River Transportation Channel, and Shanghai-Ruili Transportation Channel.

with comprehensive coverage and connectivity (NDRC, the Ministry of Transport of the People's Republic of China (MOT), China Railway Corporation 2016). In terms of highways, from 1978 to 2018, the total mileage of China's highways increased from 890.2 thousand kms to 4.85 million kms, representing a 4.4-fold increase with an average annual growth rate of 4.3%. The highway network density increased from 9.27 to 50.48 km/100 km². A road network that extends in all directions has been formed. The total mileage of expressways increased from 147 kms in 1998 to 142.6 thousand kms in 2018, with an average annual growth rate of 41.0%. The total mileage of expressways ranks first in the world. The road network covers 97% of cities with more than 200,000 residents and prefecture-level administrative centers across the country. Currently, the "5V7H"⁵ national road main trunk line has opened, and construction of the "7918"⁶ Expressway Network is being accelerated.

In terms of ports, from 1978 to 2018, the number of operating berths rose from 735 to 23,919, up by 31.5-fold, with an annual growth rate of 9.1%. The number of berths with a capacity of 10,000 + tons of port rose from 133 to 2444, showing a 17.4-fold increase, with an average annual growth rate of 7.5%. In 2018, the container throughputs of ports of Shanghai, Zhoushan (Ningbo), Shenzhen, Guangzhou, Hongkong, Qingdao, and Tianjin were among the top 10 ports in the world (Liu 2019). Presently, an inland waterway network of "2 horizontal, 1 vertical, 2 networks, 18 channels"⁷ has been preliminarily established. The grading of waterways⁸ has been improved gradually. Yangtze River has become the busiest navigating river with the largest volume in the world.

In terms of airports, from 1978 to 2018, the number of China's airports rose from 70 to 235, which is an increase of more than three times. The cargo and mail

⁵Note: The "Five Vertical" consists of five vertical high-level roads that run from the North to the South. They are: Tongjiang-Sanya, Beijing-Fuzhou, Beijing-Zhuhai, Erenhot-Hekou, and Chongqing-Zhanjiang. The "Seven Horizontal" consists of seven horizontal high-level roads that run from the East to the West. They are: Suifenhe-Manzhouli, Dandong-Lhasa, Qingdao-Yinchuan, Lianyungang-Khorgas, Shanghai-Chengdu, Shanghai-Ruili, and Hengyang-Kunming.

⁶Note: The *National Highway Network Plan*, reviewed and approved by the State Council in 2004, with a planning period of 30 years, adopts a plan that combines radiating channels with a vertical-horizontal network in order to constitute a massive passage that radiates outward from certain central cities and runs from east to west and extends from south to north. This network is constituted by 7 radiating channels out of the Capital, 9 south-north vertical channels, and 18 east-west horizontal channels, hence is dubbed the "7918 network."

⁷Note: The "2 horizontal" refers to the Yangtze River trunk line and the West River trunk line. The "1 vertical" refers to the Beijing-Hangzhou Grand Canal. The "2 networks" refers to the high-level waterway networks in the Yangtze River Delta and the Pearl River Delta. The "18 channels" includes: "10 channels" that run along the Yangtze River, including the Min River, Jialing River, and Wu River; "3 channels" that run along the Pearl River, including the Youjiang River, Beipan River-Hongshui River, Liujiang River-Qianjiang River; "2 channels" that run along the Beijing-Hangzhou Grand Canal and the Huai River and Shaying River; "2 channels" that run along the Heilongjiang and Song-Liao waterway, including the Heilongjiang River and Songhua River, as well as the Min River.

⁸Note: According to the *Navigation Standard of Inland Waterways (GB50139-2014)*, there are 7 grades of inland waterways. The grade-I waterway can accommodate 3000-ton level navigation; the grade-VII waterway can accommodate 50-ton level navigation.

throughput in Shanghai Pudong International Airport has placed it among the top three in the world over the past 10 years. The number of air routes increased from 174 in 1979 to 4418 in 2014, representing a 24.4-fold increase, with an average annual growth rate of 8.9%. The mileage of air routes increased from 148.9 thousand kms in 1978 to 7.48 million kms in 2017, showing a 49-fold increase with an average annual growth rate of 10.6%. China has established a modern national comprehensive airport network with sensible placement and compatibility of hub airports, trunk line airports, and auxiliary line airports; it also possesses a hub-and-spoke air route network with Beijing, Shanghai, and Guangzhou as the three main hubs, Chengdu and Xi'an as regional hubs, and a certain gateway hubs as core nodes.

In terms of warehouses and logistics parks, the completed area of China's warehouses has increased steadily. By the end of 2017, the commercial general warehouse area was more than one billion square meters across the country (NDRC, the Ministry of Transport of the People's Republic of China (MOT) 2018). In 2018, the total capacity of refrigerated storage was 52.38 million tons, about 130 million cubic meters (Cui 2018). Since the first logistics park was built in 1998, the number of above-standard logistics parks of various types had reached 1638 at the end of 2017 (the China Federation of Logistics and Purchasing 2018). Apart from freight service, production service, port service, business, and commerce service, and comprehensive service logistics parks, specialized logistics parks such as e-commerce, express, cold chain, and medicine parks have also been constructed. Meanwhile, emerging logistics parks, such as intelligent logistics parks, multimodal transport logistics parks, and bonded logistics parks, are being constructed and put into use. Additionally, a collection of national logistics parks is being built with mode replication and collaboration; hence, a national logistics service network is being established.

As for international logistics network, China opened its first international highway, Kunming-Bangkok Road, in 2008. Since then, China has built cross-border highways with Russia, Vietnam, Kazakhstan, and Myanmar, including China-Kyrgyzstan-Uzbekistan and China-Kazakhstan-Russia international freight transportation routes. An international transportation layout that goes to Central and Western Asia has been established (BELT AND ROAD PORTAL 2019). By the end of 2018, China's ports had established shipping route connections with more than 200 countries including more than 600 major ports in the world. Chinese enterprises are involved in the construction and operation of 42 ports in 34 countries. These are mainly located in the Indian Ocean and South Pacific Ocean, i.e. along the western and southern routes of the "Maritime Silk Road" (Caixin.com 2019). Chinese cross-border e-commerce enterprises and logistics enterprises have accelerated their construction of overseas warehouse networks. JD Logistics alone has set up more than 110 overseas warehouses across five continents (Sohu.com 2018). Since the launching of the Belt and Road Initiative, China has started working with countries along the B&R route in areas of harbors, railways, and highways; international freight passages have been connected swiftly. Currently, China has built international railways with Russia, Vietnam, Mongolia, and Kazakhstan. The number of China-Europe freight trains increased from 17 in 2011 to 120,000 in 2018, reaching 49 cities in 15 countries in Europe (BELT AND ROAD PORTAL 2019).

The Strength of Logistics Enterprises Improves Significantly

Since the reform and opening-up, China's traditional transportation and warehousing industries have accelerated the transformation to the modern logistics industry. The scale of logistics enterprises keeps expanding, while the service standard of logistics enterprises improves significantly. Yardstick enterprises that keep up with or surpass world-leading standards have emerged. The rapid development in logistics industry can be characterized as follows.

1. The number and scale of logistics enterprises have increased significantly. Since the establishment of the first modern logistics enterprise at the beginning of the reform and opening-up, the number of legal person logistics enterprises has reached nearly 400,000 (He 2018). From 2005 to 2018, the number of level A logistics enterprises increased from 26 to 5680, showing an increase of 217 times with an average annual growth rate of 51.3% (China Federation of Logistics and Purchasing 2019). The number of 5A enterprises, possessing the highest national standard of its kind, increased from 9 to 310. From 2005 to 2018, the operating revenue of the enterprise that ranked first among the national top 50 logistics enterprises rose from 93.47 billion RMB to 178.62 billion RMB, with an increase of 85.15 billion RMB; the operating revenue of the logistics enterprise ranked the 50th nationwide increased from 260 million RMB in 2005 to 2.96 billion RMB in 2018, showing an increase of more than 10 fold; the number of enterprises with more than 10 billion RMB worth of operating revenue rose from 3 to 23.
2. The service capability of logistics enterprises has improved substantially. For instance, the COSCO Shipping Logistics Co., Ltd. coalesces the advantageous resources of China COSCO Logistics Co., Ltd., China Shipping Logistics Co., Ltd., and China Shipping Agency Co., Ltd., and sets up branches in 30 provinces, municipalities, and the autonomous regions in China and 17 countries. Meanwhile, this enterprise owns more than 500 sales and service posts across the world, thus forming a service network throughout China and radiates across the world and becoming a leading international logistics enterprise in China. As one of the first 5A comprehensive service logistics enterprises, the Yuan Cheng Group Co., Ltd. comprises five business sections, namely Yuan Cheng Logistics, Yuan Cheng Express, Yuan Cheng Supply Chain, Yuan Cheng Logistics City, and Yuan Cheng Cold Chain, and has formed a multi-level, wide-reaching, and unique comprehensive logistics system. As the first enterprise that registered with the term "logistics" in its name under the approval of former State Administration for Industry and Commerce of the People's Republic of China, P. G. Logistics Group Co., Ltd. has founded subordinates, branches, and offices in more than 80 cities across the country; it has invested in and developed 22 large modern logistics bases in 16 central cities nationwide, thus forming a national business operations network and information network. This enterprise has forged strategic alliances with Red Bull, Unilever, Procter & Gamble, Johnson & Johnson, Samsung, and other Fortune Global 500 companies, as well as large domestic manufacturers, and become a prominent Chinese logistics enterprise.

3. A host of yardstick enterprises that catch up with or overtake world-leading standards have sprung up. On the list the 2018 Fortune Global 500 enterprises, China Post Group Corporation, which runs mail express delivery businesses, ranked 113th; TEWOO Group Co., Ltd., which deals in the circulation of production resources, ranked 132nd; W. Z. Group, which runs commodities circulation services, ranked 270th; COSCO Shipping Logistics Co., Ltd., which runs ocean shipping, ranked 335th (Fortune China 2018). Among the top 50 third-party logistics enterprises in the world, Sinotrans Limited made into the top 10 for the first time in 2013 and remained among the top 10 for the next five years (Armstrong and Associates, Inc. 2019). Among the 2018 Top 50 Global Freight enterprises in the world, China Railway Corp. ranked 3rd, COSCO Shipping Holdings Co. ranked 14th, and SF Express ranked 20th (Transport Topics 2019a). Fifteen Chinese enterprises were listed among the top ocean freight forwarders in the world in 2018, of which Sinotrans Limited ranked 2nd and Kerry Logistics Network ranked 7th (Transport Topics 2019b). In the 2018 global liner transport enterprise ranking, COSCO Group ranked 3rd (Alphaliner 2019).

The Professional Logistics System Begins to Take Shape

With the rapidly increasing demand for logistics and the proliferating subdivision of the markets for logistics demand, China's specialized and socialized logistics service capabilities in agricultural products logistics, manufacturing logistics, and commerce logistics have been bolstered considerably. Meanwhile, the level of logistics service is improved continually, and specialized logistics service system begins to take shape.

In the area of agricultural products logistics, a collection of logistics nodes and grain logistics parks with certain radiating capability and exemplary effect that cover major grain production and consumption areas are built up. A modern grain logistics system has thus taken preliminary shape. Infrastructure for agricultural cold chain logistics gradually improves. Meanwhile, agricultural cold chain logistics enterprises begin to spring up and develop towards networked, standardized, scaled, and grouped business modes.

In the area of manufacturing logistics, logistics enterprises are actively getting involved in the manufacturing supply chain and engaging in businesses such as VMI, integration services of warehousing and distribution, and supply chain finance. Logistics enterprises and manufacturing enterprises have deepened their strategic cooperation and set up the manufacturing industry logistics service system that adapts to the new type of industrialization. The coordinated development of manufacturing and logistics industries has led to the formation of a host of well-known, third-party, specialized logistics enterprises and exemplary enterprises in areas of equipment manufacturing, steel, electronics, chemical engineering, construction materials, automobiles, and home appliances.

In the area of commerce logistics, logistics network has sped up its reach to middle-sized and small cities, as well as rural areas, township, and residential communities,

which makes commerce logistics service more efficient and convenient. Personalized services such as “speedy delivery” and “scheduled delivery” and one-stop service such as “door-to-door service” are becoming more common. The service capability of commerce logistics has been enhanced appreciably. Meanwhile, China's e-commerce logistics has sustained a rapid pace of development. The subject of e-commerce logistics enterprises has extended from express delivery, postal service, transportation, and warehousing industries to production and distribution industries. Multiple models of organizations, such as the third-party logistics model, the supply chain model, the platform model, and the enterprise alliance model, develop rapidly. A batch of renowned e-commerce logistics enterprises has emerged. The service capability of e-commerce logistics is improved appreciably. E-commerce logistics has become an important part of China's modern logistics industry and a new driver to propel the national economy forward.

Innovation and Development of Logistics and Supply Chain Models

The development of different economic models, such as the digital economy, platform economy, and sharing economy, and the deepening adoption of emerging technologies, such as the Internet, Internet of Things, big data, cloud computing, and artificial intelligence, drive the automatic, unmanned, and smart development of the logistics industry in areas of information sharing, operational organization, and platform transactions. China has continually innovated its logistics service models; a host of platform operation and sharing service models based on “Internet plus logistics” and “Internet plus supply chain service” have sprung up in the following realms.

1. Various service platforms of highway freight transportation and joint distribution modes have emerged. Currently, the following types of platforms have appeared: trunk transportation “vehicle-to-cargo matching” platforms with intermediary service as their core business, trunk transportation “fleet management” platforms with vehicle service as their core business, trunk transportation “trunk special route alliance” platforms with cooperation among transportation lines as their core business, trunk transportation “network alliance” platforms with “hub + trunk” as their core business, trunk transportation “park service” platforms with hub services as their core business, and “urban delivery” platforms with same-city-wide store delivery and home delivery as their core business. Based on various platforms, China's logistics enterprises continue to develop innovative service models of sharing logistics resources and construct a new sharing logistics model that shares freight information resources, terminal delivery resources, warehousing facilities resources, and warehousing equipment resources and unitized appliances.
2. The rapid boom of supply chain integration service platforms and the supply chain ecosphere. Logistics enterprises and supply chain enterprises actively

develop supply chain integration service platforms to offer online and offline comprehensive services to enterprises on the supply chain, such as centralized purchasing, distribution execution, logistics services, platform transactions, and financing payment, in order to meet the demand of resource integration and function improvement from various enterprises. A number of supply chain collaboration platforms, supply chain transaction platforms, supply chain integrated service platforms, and supply chain public service platforms were established accordingly. Some specialized supply chain integrated service platforms kept upgrading their operations mode to build a cross-sector, sharing, and co-existing supply chain commercial ecosystem.

The Level of Logistics Equipment Improves Immensely

China's logistics equipment has improved on a full scale. The level of automation and intelligence is being enhanced continually. New logistics equipment such as unmanned aerial vehicle, unmanned vehicle, unmanned warehouse, and logistics robot has been widely employed.

1. The number of transportation tools has increased sizably. From 1978 to 2018, the number of China's freight trucks rose from 148 thousand to 13.56 million units, marking an increase of 90.6 times. The number of railways freight trains rose from 253.6 thousand to 830 thousand units, showing an increase of 2.3 times. The number of motorized ships rose from 28.3 thousand to 125.8 thousand ships, representing an increase of 3.4 times.
2. Transportation tools have become larger in capacity and more specialized. In 2018, the average tonnage of operational freight trucks was 9.49 tons, an increase of 3.62-ton compared with that of 1986. The average tonnage of large-sized freight trucks accounts for 94.2% of the total tonnage. In 1978, all of the 148 thousand freight trucks were of regular size, while by 2018, out of 13.56 million freight trucks, 526.3 thousand were specialized trucks, 2.38 million were tractors and 2.49 million were trailers. The average net deadweight capacity of waterway transport ships increased from 154.88 tons/ship in 1978 to 1.83 thousand tons/ship in 2018, an increase of 10.84 times (National Bureau of Statistics, the Ministry of Transport of the People's Republic of China (MOT) 2018).
3. The technology level of logistics equipment has improved notably. China has developed an automatic driving system for electric freight trucks, holding its own intellectual property rights for this world-leading technology. Green and intelligent automobiles, such as new energy vehicles, intelligent trailers, and unmanned vehicles, are gradually adopted and promoted. The market share of electric forklifts, warehousing forklifts, and new energy forklifts has risen gradually, whereas that of combustion forklifts has declined. The industrial structure of logistic equipment begins to move toward green and intelligent (Industrial Trunk Institution, China Construction Machinery Association (CCMA) 2018). China's manufacturing technologies of loading equipment, specialized ships, and

container equipment suite at large specialized harbors are world-leading. The fully automated container ports at Shanghai Yangshan Terminal have become the largest container ports with the highest level of automation in the world. China leads the world in the development and application of unmanned warehouses. SF Express, Cainiao, JD Logistics, and certain other enterprises have successfully developed unmanned aerial vehicles and made significant progress. JD Logistics successfully built the first whole-process unmanned warehouse in the world. Large e-commerce enterprises, like the Alibaba Group, Suning.com, and VIP.com, have successfully utilized unmanned warehouses and unmanned delivery systems.

The Logistics Policy System Continues to Improve

The Chinese Government places high emphasis on the development of modern logistics industry and constantly issues logistics policies in order to steer its development. Led by the various guiding opinions and national-level strategic plans, China's logistics policies and standardization system continue to improve. This not only elevates China's logistics industry's standing in the national industrial strategy, but also provides a sound policy environment for the development of the logistics industry.

1. The Government has issued a series of medium- and long-term plans which direct the development of the logistics industry. In 2009, China released the *Logistics Industry Restructuring and Revitalization Plan*, which was its first national development plan for the logistics industry. It brought the importance of developing the logistics industry up to the national strategic level, thus elevated the standing of the logistics industry in the national economy. Additionally, the *Medium- and Long-Term Development Plan of Logistics Industry (2014–2020)* issued by the State Council served as the guiding document for China's logistics industry under the new norm of economic development. Meanwhile, China issued a series of special national plans, including the *Development Plan for Modern Grain Logistics*, the *Development Plan for Agricultural Product Cold Chain Logistics*, the *Development Plan for Coal Logistics*, the *Development Plan for National Logistics Parks*, the *13th Five-Year Development Plan for the Grain Logistics Industry*, the *Special Development Plan for Business and Trade Logistics*, the *Special Development Plan for National E-commerce Logistics (2016–2020)*, and the *National Logistics Hub Layout and Construction Plan*. These plans shed the light on the direction of the development of China's logistics industry's sub-divided industries, as well as the construction of logistics parks and hubs.
2. A policy system that guides the development of the logistics industry has been formed. In 2001, the former State Economic and Trade Commission, along with six other Departments, issued the *Several Opinions on Accelerating the Development of China's Modern Logistics Industry*. This was the first policy document on the development of the modern logistics industry in China. Subsequently, the

Chinese Government issued a series of policy documents to promote the healthy development of China's logistics industry, including the *Opinions on Promoting the Development of China's Modern Logistics Industry*, the *Guiding Opinions on Accelerating the Development of Modern Logistics in the Circulation Area*, the *Guiding Opinions on Promoting Informatization of the Logistics Industry*, the *State Council's Several Opinions on Promoting the Development of the Express Delivery Industry*, the *Implementation Opinions on 'Internet + ' Efficient Logistics*, the *Notice by the General Office of the State Council of Forwarding the NDRC's Special Action Plan for Cost Reduction and Efficiency Improvement in the Logistics Industry (2016–2018)*, the *Guiding Opinions on Promoting the Work of Improving the Quality of Logistics Services*, and the *Opinions on Promoting the High-Quality Development of the Logistics Industry in Order to Form a Strong Domestic Market*. In particular, the *Guiding Opinion on Actively Promoting the Innovation and Application of the Supply Chain* in 2017 was the first guidance document issued by the State Council regarding the supply chain. It raised the development of the supply chain to the national level, which also ushered China into a new era of innovation and application of supply chains.

3. The logistics standardization system has been continually improved. In 2005, initiated by the Standardization Administration of P.R.C., eight national Commissions and Ministries issued the *Development Plan of National Logistics Standards 2005–2010*. This plan set the primary stage of the logistics standard system and the universal standard and technical standard of the logistics industry, and played a crucial role in amending the lacking and lagging of logistics industry standards. In 2010, eleven Departments including the Standardization Administration of P.R.C. jointly issued the *Special National Plan for Logistics Industry Standards*. This plan established the logistics standard system structure cored on the logistics industry's foundational and universal standards and the public and specialized logistics standards, which further optimized the standardization system of the logistics industry. In 2015, fifteen Departments including the Standardization Administration of P.R.C. jointly issued the *Medium and Long-term Development Plan for Logistics Standardization (2015–2020)*. This plan put forward six major tasks and eight pilot projects aiming to reinforce the amendments of foundational, universal, and specialized logistics standards. This plan affords significant implications for the adaptation of China's logistics standards to its rapidly developing logistics market, and the constantly innovated logistics technologies.

The Management System of the Logistics Industry Gradually Optimized

Regarding the optimization of the management system of the logistics industry, the Government has instituted the following mechanisms.

1. It has formed a new comprehensive management system. The Ministry of Transportation of China, founded in 1949, was originally responsible for overseeing all the waterway and highway industries across the country. In 2008, the State Council carried out an organizational restructuring and re-assigned the Civil Aviation Administration and the State Post Bureau to the Ministry of Transportation of China. In 2013, with another organizational restructuring, the State Council abolished the Ministry of Railways and replaced it with the State Railway Administration, which was under the direction of the Ministry of Transportation of China. Presently, China's railway, highway, waterway, civil aviation, and postal service industries are all under the management of the Ministry of Transportation of China, thus constituting China's new comprehensive management system.
2. It has built up a new national logistics coordinated management mechanism. To vigorously strengthen the comprehensive organization and coordination of the modern logistics work across the country, as well as fully maximize the performance of varied departments, the State Council approved the formation of an inter-ministerial joint conference system for national modern logistics work in 2005. The fifteen members of the joint meeting include the National Development and Reform Commission (initiator), the Ministry of Commerce, the former Ministry of Railways, the former Ministry of Transportation, the former Ministry of Information Industry, the former Civil Aviation Administration, the Ministry of Public Security, the Ministry of Finance, the General Administration of Customs, the former State Administration for Industry and Commerce, the State Taxation Administration, the former General Administration of Quality Supervision, Inspection and Quarantine, the Standardization Administration, the China Federation of Logistics and Purchasing, and the China Communications and Transportation Association. With these offices coordinating and sharing information with one another, a network of logistics tasks with smooth horizontal communication and a convenient vertical exchange is preliminarily formed. This new management mechanism is intended to resolve the persisting issues of decentralized management and difficult coordination in logistics management. It bears a significant role in promoting an all-round, rapid, coordinated, and healthy development of the modern logistics industry.

The Development Momentum of China's Logistics Industry

The reasons for the great achievements of China's logistics industry are: First, the reform and opening-up offered the primary drive for the development of China's logistics industry; Second, the economic and social development created demands for the development of China's logistics industry; Third, policy guidance provided the thrust for the development of China's logistics industry; Fourth, constant innovation afforded continual momentum for the development of China's logistics industry.

Reform and Opening-Up Offered the Primary Drive for the Development of China's Logistics Industry

China's logistics industry developed and grew during the progression of reform and opening-up. The reform and opening-up provided the fundamental drive for the development of the logistics industry. China's logistics industry started the marketized reform from areas such as transportation, warehousing, and distribution. Governmental offices kept simplifying administrative procedures and delegating powers, promoting the separation of government and enterprises, whereas enterprises engaging in marketized practices. These measures allow the logistics industry governance to gradually transition to a market mechanism where "the government adjusts the market and the market guides the enterprises," thus stimulating the logistics market and improving the efficiency of the logistics market resource allocation.

Meanwhile, China's logistics market continues to open up to foreign capital. As foreign capital-funded logistics enterprises are deeply embedded into the supply chain system of production, circulation, and consumption, they provide valuable opportunities for Chinese logistics enterprises to learn the world's advanced logistics technologies and concepts. Through opening up, bringing in, taking in, and re-innovating, the development of China's logistics industry links up with the outside world, thus greatly enhancing China's logistics technologies and management level.

Economic and Social Development Create Demands for the Development of China's Logistics Industry

China's economy has achieved a rapid increase since the reform and opening-up. From 1978 to 2018, China's GDP rose from 367.9 billion RMB to 90.0 trillion RMB, with an average annual growth of 14.7%; China has become the second-largest economy in the world. The total volume of import and export volume of goods increased from 35.5 billion RMB to 30.5 trillion RMB, with an average annual growth of 18.4%; China has become the largest trading nation in the world. The industrial added value rose from 162.2 billion RMB to 30.5 trillion RMB, with an average annual growth of 14.0%; China has become a manufacturing powerhouse in the world. From 2008 to 2018, China's total amount of e-commerce trade rose from 3.14 trillion RMB to 31.63 trillion RMB, with an average annual growth of 26.0%. The total retail scale of online sales skyrocketed from 0.13 trillion RMB to 9 trillion RMB, with an average annual growth of 52.8%; China has become the leading online retail nation in the world. The rapid development of China's national economy and the perpetual growth of economic aggregate create massive demands for the development of China's logistics industry. From 1991 to 2018, the total value of China's social logistics rose from 3.02 trillion RMB to 283.1 trillion RMB, sporting a 92.7-fold increase.

Meanwhile, China's manufacturing industry has accelerated its transformation and upgrading. As manufacturing logistics is highly specialized and the operations are highly complex, the demand for specialized logistics service becomes ever more pressing; hence professional logistics service systems such as home appliances, equipment manufacturing, chemical engineering, and garment sectors have come into being. Additionally, to meet the elevated level of consumption, the demand for more sophisticated logistics emphasizing timeliness, quality, and security becomes more apparent, thus promoting the rapid development of fast-moving consumer goods logistics, cold chain logistics, and cross-border e-commerce logistics.

Policy Guidance Provides the Thrust for the Development of China's Logistics Industry

Since the reform and opening-up, the Chinese Government has been paying much attention to the development of the logistics industry and has issued related policies to guide its development at different stages and during key development periods. China has formed a logistics policy system that is guided by logistics macro-policies, structured by the logistics industry's policies and the industries' logistics policies, and supported by logistics infrastructure policies and logistics supporting environmental policies (Ling et al. 2015), thus effectively promoted the sustainable and healthy development of China's logistics industry. Since China issued the first policy document on the development of the modern logistics industry in 2001, the strategic status of China's logistics industry has been raised constantly. The institution and implementation of a series of polices has resolved many issues in the course of the development of the logistics industry.

Moreover, the issuance of a series of general planning and specialized logistics plans further ascertained the long-term development strategy and direction of China's logistics industry, and drew the grand blueprint of China's logistics industry. The introduction of China's first logistics industry's special plan, the *Logistics Industry Restructuring and Revitalization Plan*, helped the Chinese logistics industry survive the global financial crisis.

Constant Innovation Provides Perpetual Momentum for the Development of China's Logistics Industry

Innovation is the key to the development of China's logistics industry. Since the reform and opening-up, China has made significant innovations in the following aspects, which provided continual momentum for the development of the logistics industry.

First, the innovation of the administrative system. China integrated fifteen Departments and Offices to set up the national modern logistics inter-ministerial joint meeting system. This system remedied the persisting issues of highly centralized, segregated, and uncoordinated practices in logistics management. It substantively promoted an all-round, rapid, coordinated, and healthy development of the modern logistics industry. Second, the innovation of technologies. China insistently followed the progressive path of “adsorption, adoption, and independent R&D” of high and new technologies. Emerging technologies, such as The Internet of Things, Big Data, Cloud Computing, and Artificial Intelligence, are being rapidly applied to the logistics industry. High-tech logistics equipment, such as unmanned aerial vehicles, unmanned vehicles, and unmanned warehouses, are put into use. These actions have provided important backing for China’s logistics industry to transition from traditional to modern logistics. Third, the innovation of business models. Thanks to economic modes such as the digital economy, platform economy, and sharing economy, a collection of platform operations and sharing service models based on “Internet Plus Logistics” and “Internet Plus Supply Chain Service” have sprung up, which contribute tangibly to the transformation and upgrading of China’s logistics industry.

The Outlook for China’s Logistics Industry

The 19th CPC National Congress (held in October, 2017) put forward that China would embark on a new journey of building a comprehensive socialist modernized country after attaining a well-off society in 2020. With the guidance of this new development philosophy, China’s logistics industry will speed up its transformation from “rapid development” to “high-quality development,” and will support China’s economic development at a higher level.

The New Development Philosophy Will Guide the Development of China’s Logistics Industry

In 2015, President Xi Jinping put forward the philosophy of innovative, coordinated, green, open, and shared development at the Fifth Plenary Session of the 18th CPC Central Committee. The new development philosophy accords with China’s national conditions and the demands of the era. China’s logistics industry will continue to transform and upgrade based on the substantiation of this new development philosophy in the upcoming phase.

1. Innovation is the fundamental momentum of the development of China’s logistics industry in the new phase. Looking forward, in terms of strategic innovation,

China will develop a clear global supply chain strategy. In terms of technological innovation, China will propel the logistics industry into the digital supply chain era. In terms of model innovation, China will further raise the degree of resource integration, the degree of industrial integration, and the degree of enterprises' concentration. In terms of system innovation, China will innovate sensible market regulatory methods. In terms of culture innovation, China will populate the humanistic culture within the logistics enterprises.

2. Coordination is the basic means to push the development of China's logistics industry forward in the new era. Looking forward, China will focus on coordinating the relationships between urban and rural logistics, inter-regional logistics, domestic and international logistics, physical logistics and virtual logistics, and productive logistics and livelihood logistics, as well as the relationships between business flow, logistics flow, capital flow, and information flow.
3. Green is the rudimentary requirement of the development of the logistics industry in the new era. Green logistics and green supply chain are the inevitable requirements for the future development of the logistics industry. Recycling of packaging materials and pollution reduction will be the focal issues.
4. Openness is the principal path to developing China's logistics industry in the new era. Looking forward, China will continue to encourage logistics enterprises to "go abroad." Meanwhile, logistics enterprises will respond to the Belt and Road Initiative, through which China will further link up with other nations and regions via opening-up strategies, such as pilot free-trade zones and free-trade ports.
5. Sharing is the main target of China's development of the logistics industry in the new era. Looking forward, China will develop the logistics platform economy, supply chain finance, Non-Transporter Operating Common Carrier (NTOCC), and joint distribution through sharing, in order to achieve the transition from external expansion to improving internal connotation (Junfa 2018).

China's Logistics Industry Will Transform from Rapid Development to High-Quality Development

Currently, China's Socialism with Chinese Characteristics has entered a new era. China's economic development has entered a new era as well; it has transformed from a state of high-speed growth to that of high-quality development. The high-quality development of the logistics industry is an important part of the high-quality development of the economy, and an important part which is indispensable in pushing the economy forward to a high-quality level. Some active steps are as follows.

1. Build a high-quality logistics infrastructure network system, including the construction of a national logistics hub network, amending the shortfall in the connective facility for multimodal transport, improving the urban-rural consumption logistics system, and establishing the logistics public information platforms based on shared resource.