

Chapter 2

Logistics Facilities and Technological Development

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This chapter discusses the progress China made in 2015 in building the logistics nodes and channels, and presents the latest development in logistics facilities, logistics IT development and standardization in the country. In 2015, China's comprehensive transportation network had kept improving with enhanced level of environmental protection of its transportation infrastructures. Layout in logistics parks/centers was optimized and rapid progress was made in building e-commerce logistics centers, bonded logistics centers, grain warehousing facilities, and Chinese herbal medicine warehousing facilities. At the same time, the level of intelligent and green development of logistics facilities kept improving. Various logistics information platforms were widely adopted. The big-data logistics management model was gradually promulgated; a series of new logistics standards were launched, covering a wider range and providing better standards for elevated efficiency in China's logistics industry. These advancements also afforded further assurance for the transformation and upgrading of the logistics industry.

This chapter has four sections. Section 2.1 gives an overview of the latest progress in 2015 in building the transportation infrastructures and comprehensive transportation network. Section 2.2 describes the new features in constructing China's logistics parks/centers and warehousing facilities under the background of the Belt and Road Initiative and the national strategy of Yangtze River Economic Belt. Section 2.3 presents the changes in the number of applications and the technologies of logistics vehicles and warehouse equipment in 2015 in China. Section 2.4 discusses the new progress in logistics IT and standardization in China.

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2.1 Transportation Infrastructure

In 2015, China continued to improve its comprehensive transportation network. The comprehensive transportation channels have been basically established in China. Construction of transportation network has been built rapidly in the Central and Western Regions, rural areas and poor areas of the country. The grade of highways and waterways was continually improved and the network structure of coal railway transport was gradually upgraded. This not only helps improve the accessibility of logistics channels, transportation efficiency and green development in China, but also lays the solid hardware foundation for China to implement the Belt and Road Initiative and the national strategy of Yangtze River Economic Belt.

2.1.1 Highway Infrastructure

2.1.1.1 Scale of Highway Network

In 2015, total mileage of highways in China rose by 113,400 km from the end of previous year, reaching a total of 4.58 million km. The highway density stood at 47.68 km/100 km², increasing by 1.18 km/100 km² over last year's density. Figure 2.1 shows the total highway mileage and highway network density for 2006–2015. In terms of input towards environmental protection, China invested 14.05 billion RMB in its highway environmental protection, of which 65.1% was spent on ecology-preserving facilities and 21.5% on pollution-control facilities (Ministry of Transport of P.R.C. 2016).

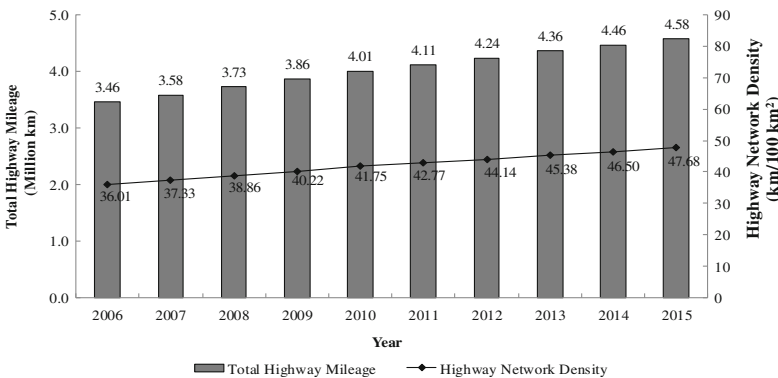


Fig. 2.1 Total highway mileage and highway network density for 2006–2015. *Source* Compiled from the *China Statistical Yearbook for 2011–2015*, published by the National Bureau of Statistics, the *Statistical Bulletin of Highway and Waterway Transportation Industry* (2006–2012), and the *Transportation Industry Statistical Bulletin for 2013–2015*, published by the Ministry of Transport

2.1.1.2 Structure of Highway Network

In 2015, the proportion of graded highways in China continued to rise. The mileage of graded highways reached 4.05 million km, increasing by 145,500 km from the end of previous year. The proportion of graded highways in total highway mileage was 88.4%, increasing by 1.0% point from the end of previous year. The mileage of grade-II and above highways reached 574,900 km, growing by 29,200 km, accounting for 12.6% of the total highway mileage and rising by 0.3% points from the previous year. The mileage of expressways in China amounted to 123,500 km, extending by 11,600 km from the end of previous year (Ministry of Transport of P. R.C. 2016). Of the latest five years, 2015 saw the largest annual increase in expressway mileage.

2.1.1.3 Highway Construction in Rural and Poor Areas

In 2015, China invested 322.73 billion RMB in building highways in rural areas, growing by 6.5%; 505 impoverished counties received a 347.47 billion RMB investment on highway construction, increasing by 0.9%. Investment in impoverished-county highway construction accounted for 21.0% of the total annual highway construction investments in China. About highway mileage growth and upgrading of highways, in 2015, rural highway mileage in China reached 3.98 million km, increasing by 99,000 km from the end of previous year. Meanwhile, China built or renovated 252,800 km of rural highways. In terms of highway accessibility, by the end of 2015, villages/towns having access to highways accounted for 99.99% of the total villages/towns nationwide. Of the total administrative villages, 99.87% of them have access to highways (Ministry of Transport of P.R.C. 2016).

2.1.1.4 Highway Construction in the Western Region

Many important highways in the Western Region were put into operation in 2015. In July 2015, the Rongcheng-Wuhai Highway, which connects Shanxi, Hebei and Inner Mongolia, had its Shanxi-Hebei border section completed. In October 2015, the Shiyan-Tianshui Highway (Gansu Section) and the Jinchang-Alashan Youqi (Gansu-Inner Mongolia border), which are part of the Wuwei-Jinchang Highway were completed and put into operation. These highways constitute the integral part of the horizontal line in the Fuzhou-Yinchuan National Highway. Besides, the total highway mileage in operation in Tibet reached 77,900 km (Guangming Daily 2016), rising by 60,800 km, or 28.1%, from the end of 2010 (China Transportation Year Book Publishing House 2011).

2.1.2 Railway Infrastructure

2.1.2.1 Scale of Railway Network

China continued to expand the scale of its railway network in 2015. Total mileage of operating railways in the country reached 121,000 km, rising by 8.2% from the end of previous year. The railway network density reached 126 km/10,000 km², growing by 9.5 km/10,000 km² from the previous year (China Railway 2016). Of the previous five years, 2015 had the largest annual increase in railway network density.

2.1.2.2 Structure of Railway Network

In 2015, the structure of railway network continued to improve in China. Double-tracked railways rose by 12.5% from the previous year, reaching 64,000 km. The proportion of double-tracked railways reached 52.9%, improving by 2.1% points from the previous year. Mileage of electrified railways increased by 12.9% from the previous year and totaled 74,000 km. The proportion of electrified railways was 60.8%, growing by 2.5% points from the previous year (Ministry of Transport of P.R.C. 2016). Besides, mileage of operating railways in the Western Region grew rapidly to 48,000 km, rising by 10.1% from the previous year. Figure 2.2 gives the total railway operating mileage and growth rate of the Western Region for 2006–2015.

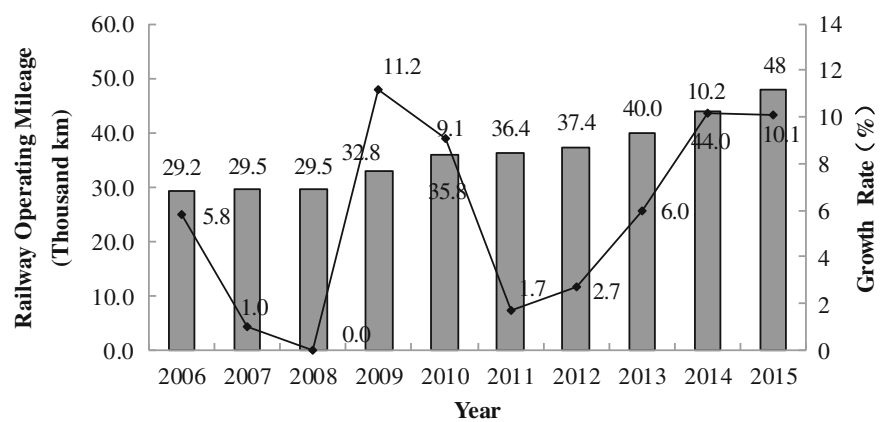


Fig. 2.2 Total railway operating mileage and growth rate of the Western Region for 2006–2015. *Source* Compiled from data in the official website of the National Bureau of Statistics and the *Railway Statistical Bulletin (2015)*, published by the National Railway Administration of P.R.C

2.1.2.3 Railway Channels for Coal Transport

In 2015, new progress was made in constructing railway channels for coal transport. Several railway channels for coal transport were commenced or completed, gradually improving the railway network structure for coal transport. In July 2015, West Inner Mongolia-Central China railway channel for coal transport, which is the new national strategic channel for “transporting coals from North China to South China,” was commenced. In December 2015, the Huangling-Hancheng-Houma Railway, which connects the central part of Shaanxi Province and the southern part of Shanxi Province, was put into operation. Besides, the Zhangjiakou-Tangshang Railway was put into operation, which would boost the coal excavation in Inner Mongolia and meet the national needs for energy transport.

2.1.2.4 High Speed Railway Construction

High speed railways in China continued to develop rapidly, with 3306 km of high speed railways newly built in 2015. Total mileage of operating high speed railways exceeded 19,000 km, ranking No. 1 in the world and accounting for over 60% of total high speed railway mileage in the world (Peoplerail.com 2016). Evident progress was made in high speed railway construction in Northeast China, in which high speed railways connecting many core cities were put into operation. For example, Harbin-Qiqihaer High Speed Railway, Shenyang-Dandong High Speed Railway, Jilin-Tumen-Hunchun High Speed Railway, and Dandong-Dalian Fast Railway were put into operation in about 2015. These railways helped improve the transportation structure in the Northeast Region and rejuvenate the old industrial base in Northeast China. Besides, in June 2015, the high speed railway was put into operation that connects Hefei (capital city of Anhui Province in Central China), with Fuzhou (capital city of Fujian Province) in Eastern China, thus bolstered the inter-connectivity between the Silk Road and the Maritime Silk Road. In December, the high speed railway that connects Chengdu and Chongqing, the two core logistics hubs in Southwest China, was put into operation.

2.1.3 Waterway Infrastructure

2.1.3.1 Scale of Waterway Infrastructure

2015 saw continued expansion of waterways infrastructure in China. For inland-river waterways construction, by the end of 2015, the navigation mileage of inland-river waterways in China reached 127,000 km, increasing by 721 km from the previous year. Of this increase, the navigation mileage of Yangtze River waterway and Huai River waterway increased by 478 and 169 km, respectively (Ministry of Transport of P.R.C. 2016). On port construction, China built,

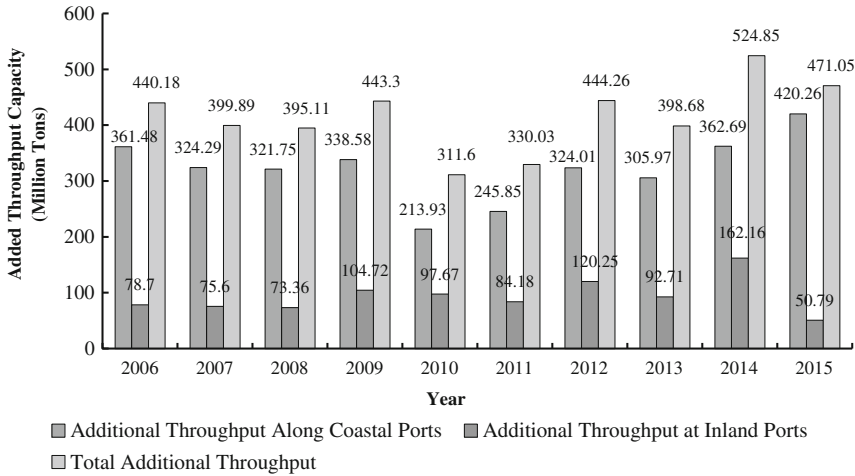


Fig. 2.3 China's added port throughput capacity for 2006–2015. *Source* Compiled from the *Statistical Bulletin of Highway and Waterway Transportation Industry (2006–2012)*, and the *Transportation Industry Statistical Bulletin (2013–2015)*, published by the Ministry of Transport

renovated or expanded 130 berths in coastal ports, with newly increased throughput capacity of 420.26 million tons; of this newly increased throughput capacity, 303.81 million tons were for berths of 10,000-ton and above. Besides, the country built, renovated or expanded 161 berths of inland-river ports with 50.79 million tons of newly added, throughput capacity in which 29.81 million tons of newly increased throughput capacity were for berths of 10,000-ton and above. Figure 2.3 shows China's added port throughput capacity for 2006–2015. In terms of the construction of environmental facilities at ports, China invested 2.659 billion RMB in port environmental protection in 2015, in which 22.0% was spent on ecology-preserving facilities and 64.7% was on pollution-control facilities (Ministry of Transport of P.R.C. 2016).

2.1.3.2 Grading and Structure of Inland Waterway

In 2015, proportion of China's high-grade waterways in inland rivers continued to rise. By the end of 2015, mileage of graded inland-river waterways in China reached 66,300 km, accounting for 52.2% of the total mileage of inland-river waterways, growing by 0.4% points from the previous year. Of these waterways, there were 11,545 km of grade-III and above waterways and 30.100 km of Grade-V and above waterways, accounting for 9.1 and 23.7% of the total, increasing by 0.5 and 1.2% points, respectively (Ministry of Transport of P.R.C. 2016). Mileage of graded inland waterways and its proportion in total inland waterway mileage for 2006–2015 are as shown in Fig. 2.4.

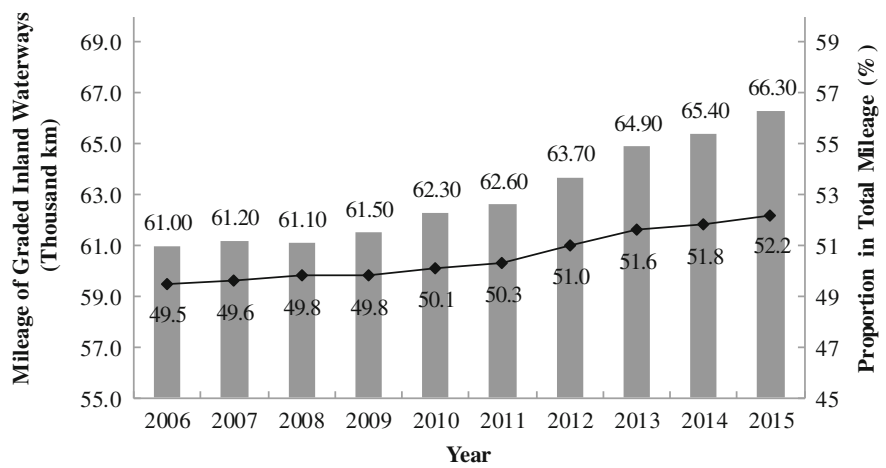


Fig. 2.4 Mileage of graded inland waterways and its proportion in total mileage for 2006–2015. *Source* Compiled from the *Statistical Bulletin of Highway and Waterway Transportation Industry* (2006–2012), and the *Transportation Industry Statistical Bulletin for* (2013–2015), published by the Ministry of Transport

2.1.3.3 Berths at Port

In 2015, berths at port in China continued to gravitate toward larger size. As of the end of 2015, China’s ports had 2221 berths at 10,000-ton and above, increasing in number by 111 from the end of previous year. Coastal ports had 1,807 10,000-ton and above berths, rising by 103. The inland-river ports had 414 10,000-ton and above berths, rising by 8 (Ministry of Transport of P.R.C. 2016). Figure 2.5 shows the number of port berths with capacity of 10,000 tons and above for 2006–2015.

2.1.4 Civil Airport

In 2015, China had 210 (certified) civil airports nationwide (excluding Hong Kong, Macao and Taiwan; same for statements below), including 206 airports for regularly scheduled flights, reaching 204 domestic cities. In 2015, additional cities reachable by regularly scheduled flights include Huizhou in Guangdong, Haixi in Qinghai, Fuyun in Xinjiang, Ninglang in Yunnan, Rizhao in Shandong, and Xinzhou in Shanxi. Shihezi Huayuan Airport in Xinjiang and Yingkou Lanqi Airport in Liaoning were certified, but without regularly scheduled flights in 2015. Flights in Shaanxi Ankang Airport and Xinjiang Qiemo Airport were suspended (Civil Aviation Administration of China 2016). Airport Distribution by Regions in 2015 is as shown in Fig. 2.6.

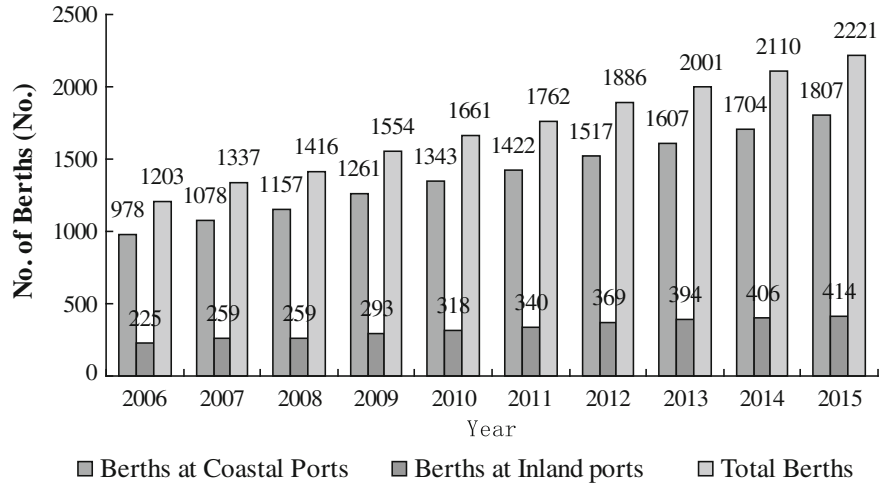


Fig. 2.5 Port berths with capacity of 10 thousand tons and above for 2006–2015. *Source* Compiled from the *Statistical Bulletin of Highway and Waterway Transportation Industry (2006–2012)*, and the *Transportation Industry Statistical Bulletin (2013–2015)*, published by the Ministry of Transport

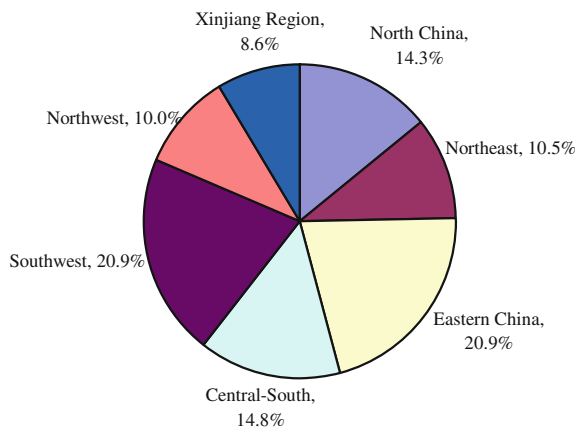


Fig. 2.6 Civil Airport distribution by regions in 2015. *Source* Compiled from the *National Airport Productivity Statistical Bulletin 2015*, published by the Civil Aviation Administration of China. In the pie chart, the North China region includes Beijing, Tianjin, Hebei, Shaanxi and Inner Mongolia Autonomous Region; the Northeast China region includes Heilongjiang, Jilin and Liaoning; the East China region includes Shanghai, Jiangsu, Zhejiang, Shandong, Anhui, Fujian and Jiangxi; the Central-South China region includes Henan, Hubei, Hunan, Guangxi, Hainan and Guangdong; the Southwest China region includes Sichuan, Chongqing, Guizhou and Yunnan; the Northwest China region includes Shaanxi, Gansu, Ningxia and Qinghai; and the Xinjiang region refers to Xinjiang Autonomous Region

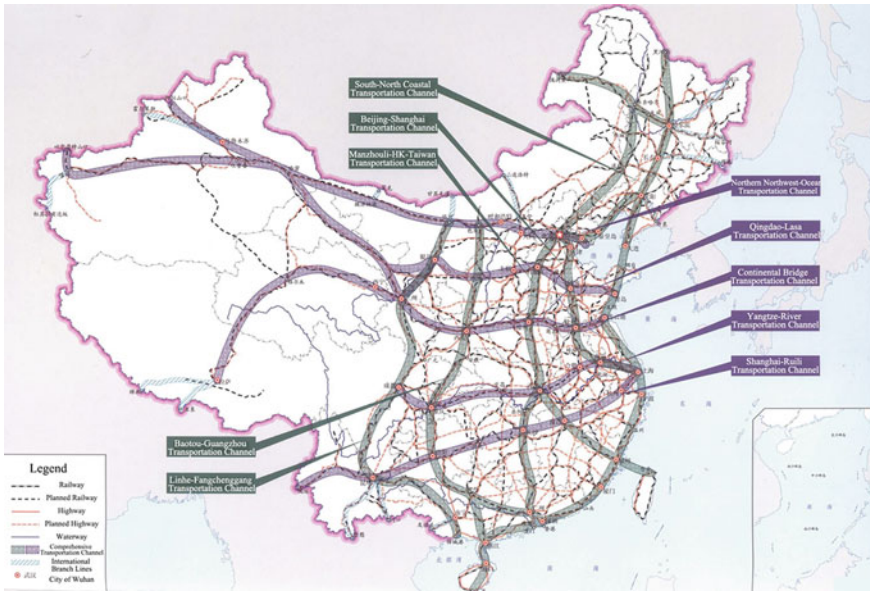


Fig. 2.7 The “5H5V” comprehensive transportation channels

2.1.5 Comprehensive Transportation System

In 2015, China basically completed and operated the “Five Horizontal and Five Vertical” lines (5H5V),¹ thus initially established the comprehensive transportation network. The construction of comprehensive hubs was evidently accelerated, with various transportation means gaining greater efficiency in connection. In 2015, of the 5H5V, new progress was made in constructing the North of Northwest Maritime Transportation Channel, the Qingdao-Lhasa Transportation Channel, the Along-Yangtze-River Transportation Channel, the Baotou-Guangzhou Transportation Channel and the Linhe-Fangchenggang Transportation Channel. Figure 2.7 shows the “5H5V” comprehensive transportation channels.

¹In November 2007, NDRC released the *Mid-and-long-term Development Plan of Comprehensive Transportation Network*, which stipulated that China would build the comprehensive transportation network consisting of Five Horizontal and Five Vertical lines (5H5V) in 2006–2020. As shown on the map, the five horizontal lines include the Northern Northwest-Ocean Transportation Channel, the Qingdao-Lhasa Transportation Channel, the Continental Bridge Transportation Channel, the Yangtze-River Transportation Channel and the Shanghai-Ruili Transportation Channel; the five vertical lines include the South-North Coastal Transportation Channel, the Beijing-Shanghai Transportation Channel, the Manzhouli-HK-Macao-Taiwan Transportation Channel, the Baotou-Guangzhou Transportation Channel and the Linhe-Fangchenggang Transportation Channel.

2.2 Logistics Parks (Centers) and Warehousing Facilities

In 2015, China continued to add the number of logistics parks steadily. Notable progress was made in constructing bonded logistics centers and e-commerce logistics centers, thus promoting the development of the Belt and Road export-oriented economy and e-commerce economy. At the same time, guided by Government policies, construction and management of warehousing facilities were moving towards green development. Construction of warehousing facilities for grain and Chinese herbal medicine was sped up. Construction of refrigerated warehouses continued to move forward rapidly to meet the rising demand for cold-chain logistics in China.

2.2.1 Development Status of Logistics Parks (Centers)

2.2.1.1 Number of Logistics Parks

According to the *Report of the Fourth Survey of National Logistics Parks/Bases*, there were 1210 logistics parks in China, either in operation, under construction or in planning in 2015, rising by 60% from 754 in 2012. Among these logistics parks, 857 of them were in operation, increasing considerably from that of 2012. Economic development zones in Northern coastal areas had the largest number of logistics parks at 216 (CFLP and CSL [2015](#)).

2.2.1.2 Bonded Logistics Centers

In 2015, many bonded logistics centers in Jiangsu, Chongqing and Zhejiang passed the acceptance check or had started operation; construction projects of bonded logistics parks in Hubei, Chongqing, Sichuan and Xinjiang were approved. Commencement of construction and gradual opening of operations of these bonded logistics centers would help develop the export-oriented economy in relevant cities along the Yangtze River Economic Belt and the Silk Road Economic Belt, thus enhancing the radiating economic influence of the two Belts.

2.2.1.3 E-commerce Logistics Centers

Year 2015 witnessed the accelerated construction of e-commerce logistics centers in China. Some regions had issued relevant supporting policies and measures, providing stronger support for the construction of e-commerce logistics centers, particularly in the Central and Western Regions and rural areas. As cross-border

e-commerce developed, many regions in China started to build cross-border e-commerce industrial parks; some enterprises began to construct dedicated cross-border e-commerce bonded warehouses. Many e-commerce companies and express-delivery companies had begun or completed building new e-commerce logistics centers/distribution centers, which had rapidly increased the e-commerce logistics nodes and improved the efficiency of China's e-commerce logistics.

2.2.2 Warehousing Facilities

2.2.2.1 Grain Warehousing Facilities and Chinese Medicine Warehousing Facilities

In 2015, China continued to increase the grain yield to 621.44 million tons, rising by 2.4% from that of 2014 (National Bureau of Statistics of the P.R.C. 2015). Confronted with the bumper harvest for several years, China experienced a shortage of grain warehousing facilities. Thus many regions were speeding up their construction of such facilities. The Government, in November 2015, released policies to expand the investments in warehousing facilities, speed up the construction of grain depots, repair and renovate the grain warehouses. To better protect grain and oil warehousing and logistics facilities, and ensure warehousing capacity for grain and oil can meet the needs of food security, the State Administration of Grain made the *Draft Regulations on Protecting State-owned Grain & Oil Warehousing and Logistics Facilities*, which began to collect public opinions since December of 2015.

In terms of the construction of Chinese herbal medicine warehousing facilities, the Ministry of Commerce, in 2014, issued the *Notification about Guiding and Facilitating Construction of Modern Logistics System for Chinese Herbal Medicines*. In April 2015, the State Council's General Office relayed the *Plan of Protecting and Developing Chinese Herbal Medicines for 2015–2020* made by twelve departments, stipulating that China would initiate building the modern production and distribution system of Chinese herbal medicines. In July 2015, the First China Conference on Chinese Herbal Medicines Logistics was held, which was co-hosted by the China Association of Warehousing and Storage (CAWS) and the China Association of Traditional Chinese Medicine (CATCM), and supported by the China Chamber of Commerce for Import & Export of Medicines and Health Products, the China Association of Pharmaceutical Commerce and the China Medical Pharmaceutical Material Association. The Conference proposed the development plan of building Chinese medicine logistics bases; it also provided consultancy and review of such bases, and approved development plans of six such bases. These measures would push forward the construction and regulated operations of Chinese-medicine warehousing facilities.

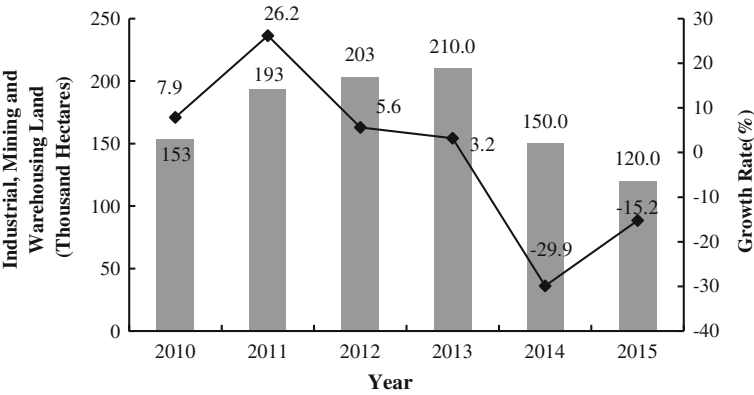


Fig. 2.8 Land area of industrial, mining and warehousing and growth rate for 2010–2015. *Source* Compiled from the *China Statistical Bulletin of National Economic and Social Development (2010–2015)*, published by the National Bureau of Statistics of China

2.2.2.2 Area of Warehousing Land

As land and labor cost rise in recent years, enterprises are giving more emphasis on high-rise warehouses. In 2015, area of general commercial warehouses in China approached 1 billion cubic meters, of which 30% is high-rise warehouses. In general, warehouse facilities have basically met the logistics needs (CAWS 2016). At the same time, as China’s economic growth slows down and development pattern changes, the total area of industrial, mining and warehousing continued to shrink to 120,000 hectares, falling by 15.2% from the previous year. But the rate of decline was reduced by 14.7% points from the 29.9% of the previous year (National Bureau of Statistics of the P.R.C. 2016). Figure 2.8 gives the area of industrial, mining and warehousing land and growth rate for 2010–2015.²

2.2.2.3 Cold Storage

As commercial and trade logistics and agricultural product logistics developed and the *New Law of Food Safety* was put into practice, the cold-chain logistics have been receiving more emphasis and development. Cold storage warehouses in China continued to be constructed. In 2015, 3.90 million tons of cold-storage warehouses were completed, increasing by 11.76% year-on-year. The total tonnage of cold-storage warehouses reached 37.10 million tons, or equivalent to 92.75 million cubic meters (Cui 2015).

²Since the land area for warehousing was not specified separately by the National Bureau of Statistics, the land area of industrial, mining and warehousing is cited here to give an indication of the overall change.

2.3 Logistics Equipment

In 2015, China continued to improve its heavy-load capacity of transportation tools and elevate its intelligence level of warehousing equipment. Usage of AGV and intelligent express boxes has broadened continually. And environmentally-friendly warehousing equipment has captured wider attention of various parties.

2.3.1 *Development of Transportation Tools*

2.3.1.1 Possession of Transportation Tools

In 2015, China had 723,000 freight trains, rising by 12,900 units from the previous year. Due to the development of highway freight trucks and freight ships toward heavier loading capacity, and aged vehicles and ships being replaced more frequently, in 2015, China had 13.9 million highway freight trucks, reducing by 4.4%, and 165,900 transport ships, reducing by 3.5% from the previous year (the Ministry of Transport 2016). According to preliminary statistics, as cold-chain logistics develop, number of refrigerator trucks in China was expected to rise by 14,000 units in 2015, making the total possession of refrigeration trucks in excess of 90,000 units, rising by 18.4% year-on-year (jnews.com.cn 2016). Besides, as e-commerce developed rapidly in China, more and more express delivery enterprises chose to establish their own fleets.

2.3.1.2 Technological Level of Transportation Tools

In 2015, loading capacity of various transportation tools in China continued to grow. The average tonnage of freight vehicles in China reached 7.46 tons/unit, rising by 0.38 tons/unit, and recording the largest average tonnage growth of freight vehicles over the past five years. The average net load of transport ships rose by 9.5% year-on-year, reaching 1642.16 tons/ship; the average total tonnage of containers rose by 12.3% to 2.60 million TEUs.

Regarding the green development of transportation tools, since 2015, the “National Standard IV” ordinance was enacted and China made greater efforts to eliminate vehicles with high level of emissions. More new-energy vehicles were adopted in the freight industry; new-energy express delivery/distribution vehicles were allowed access into some cities (He 2016).

2.3.2 Warehousing Equipment

2.3.2.1 Pallets

China continued to increase the quantity of pallet usage, with the proportion of environmentally-friendly plastic pallets rising rapidly and the standardization level of pallet improving evidently. As of the end of 2015, China had 1.02 billion pallets, increasing by 16% from the previous year. At present, of the five types of pallets in use, wooden pallets still account for the highest proportion of 78%. However, the proportion of plastic pallets has been rising rapidly in the past two years.

In terms of pallet standardization, at the end of 2014, the Ministry of Commerce and Standardization Administration of the P.R.C. convened the Action Plan of Commercial and Trade Logistics Standardization to spearhead the standardization of pallets and took the lead publicizing the utilization, recycling and sharing of standard pallets in FMCG and agricultural products and byproducts. Guided by this Action Plan, pallet standardization has been pushed forward in 14 pilot-test cities in China, with 40 enterprises in the pallet industry involved in it (Wei 2016).

2.3.2.2 Forklifts

In 2015, Chinese enterprises accelerated their usage of more environmentally-friendly forklifts. The newly-added demand for electric forklifts accounted for 36.7% of total demand, rising by 6% points from the previous year. According to the survey made by the Subsector of China Construction Machinery Association, total demand for motorized industrial vehicles amounted to 327,600 units in 2015. The demand for internal-combustion balanced heavy-load riding forklifts stood at 207,500 units, declining by 16.80% from the previous year; the total demand for electric forklifts was 120,100 units, including 38,100 units of electric balanced heavy-load riding forklifts and 82,000 units of various electric warehousing forklifts (Zhang 2016), rising by 9.0% from the previous year.

2.3.2.3 Automated Guided Vehicles

Chinese enterprises have begun to place more emphasis on efficient, energy-saving and environmentally-friendly moving technologies, resulting in more demand for AGV.³ In 2014, newly added demand for AGV in China reached 3150 units, rising by 29% from the previous year. In 2015, the newly added demand for AGV amounted to 4300 units, increasing by 37% (Libo and Chuan 2016). Figure 2.9

³Automated Guided Vehicle (AGV) refers to vehicle equipped with electromagnetic or optical guiding devices, which can drive along the designated route. AGV provides safety protection and movement functions.

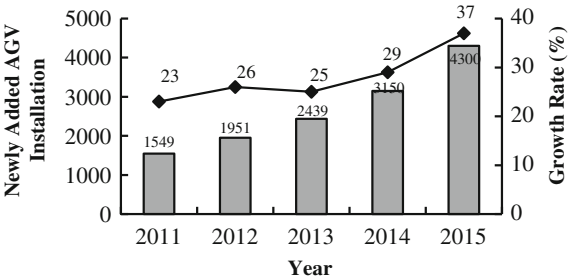
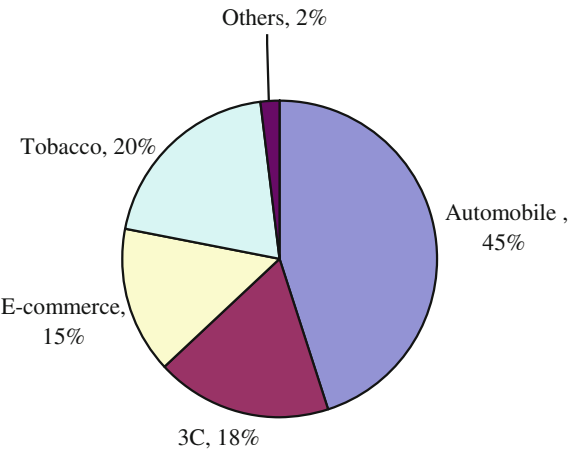


Fig. 2.9 Newly added AGV installation and growth rate. *Source* Luo Libo, Dai Chuan; Evolution from Equipment Manufacturer to System Integrator—On New Trend in Development of Intelligent Logistics Facilities; Logistics & Materials Handling, Volume 3, 2016

Fig. 2.10 Proportion of AGV demand in different sectors for 2015. *Source* Compiled from the Annual Operations and Outlook on AGV Industry for 2015–2016, Institute of New Strategic Robot Industry <http://robot.ofweek.com/2015-12/ART-8321202-8420-29040690.html> (2015-12-16)



describes the newly-added AGV installation and growth rate in the past few years. In 2015, the newly-added AGV demand came mainly from sectors in automobiles, 3C,⁴ e-commerce and tobacco; of these, automobile manufacturing recorded the largest new demand for AGV (robot-china.com 2015). Figure 2.10 exhibits the proportion of AGV demand in different sectors for 2015.

2.3.2.4 Intelligent Express Boxes

As an effective technical means to alleviate the “last mile” problem in urban logistics in China, intelligent express boxes, thanks to the promotion by the

⁴3C Industry refers to the household appliance industry consisting of computers, communications and consumer electronics.

governments and enterprises, are being used more extensively. According to statistics by the State Post Bureau, as of May 2015, 50 large Chinese cities had installed 31,000 units of intelligent express boxes with 1.18 million bins. In these 50 cities, 113 million pieces of items were delivered via the intelligent express boxes. In November 2015, the General Office of State Council issued the *Guiding Opinions on Speeding up the Structural Upgrading of the Livelihood Service Industry*, which promoted the expanded usage of parcel bins and intelligent express boxes. As an innovative means of end-node delivery service, the broader adoption of intelligent express boxes will push forward the development of efficient logistics in China under the Internet Plus movement.

2.4 Logistics Informationization and Standardization

In 2015, as China issued the *Guiding Opinion of the State Council about Facilitating Internet Plus Action*, logistics IT development in the country was propelled forward notably. While improving the national and regional logistics public information platform, China has also gradually constructed professional logistics information platforms in e-commerce and cold-chain logistics. In particular, along with the e-commerce logistics development, logistics management based on big data has been disseminated on the basis of E-sheets. The *Mid-and-long-term Plan of Developing Logistics Standardization for 2015–2020* was formally issued. China has also hastened the group logistics standardization and commercial and trade logistics standardization pilot tests and demonstration work. A number of national fundamental logistics standards and professional logistics standards have been instated or enacted.

2.4.1 Development of Logistics Informationization in China

2.4.1.1 National Public Logistics Information Platform

China continued to push forward the establishment of national logistics public information platforms, thus improving its logistics IT development in the country. In 2015, business volume of LOGINK (National Transportation and Logistics Public Information Platform) continued to grow, with enriched contents on domestic and overseas logistics information. In January, Sichuan Logistics Public Information Platform was hooked up to LOGINK, sharing data on vehicles and goods. In April 2015, LOGINK and TransFar launched “park_tong,” the first Internet product applied among national logistics parks. This platform would improve the IT management level of logistics parks in China and encourage SMEs to use Internet, cloud computing and other technologies to drive their transformation.

2.4.1.2 Regional Logistics Cloud Platforms

In 2015, some regions in China continued to construct logistics cloud platforms to improve the logistics IT development level and logistics service level in these regions and the surrounding areas. For instance, in June 2015, Fujian launched three logistics trading platforms online, which were successfully integrated with the Fujian Transportation Logistics Public Information Platform. In October 2015, Henan launched the Zhixinbao logistics information platform, which is a logistics big-data e-commerce platform, supported by data from WEB platform, mobile APP and specialized intelligent devices for truck drivers. The terminals of the platform encompass many logistics nodes, including truck drivers, logistics companies, freight information departments and warehouses.

2.4.1.3 Professional Logistics Information Platforms

In 2015, some trade associations and administrative institutions launched more industry-specific professional logistics information platforms to promote the IT level and efficiency in logistics industry. In August 2015, China-Russia cross-border e-commerce public service platform and crton.com, a comprehensive service platform, were launched online. In December 2015, China Cold Chain Logistics Alliance and Z-Park Green Cold-chain Logistics Industrial Alliance launched the cold chain platform “lengzhizhu.com” to launch online.

2.4.1.4 Logistics Management Based on Big Data

In 2015, as various e-commerce logistics cloud platforms were developing rapidly, implementation of logistics management based on big data grew more extensively. In August 2015, spearheaded by the Cainiao Network, the top 15 mainstream express-delivery companies, whose market shares accounted for more than 90% of the e-commerce market in China, began to use E-sheets.⁵ In December 2015, Cainiao Network launched China's first express-delivery logistics cloud platform, based on the top 10 logistics information service platforms which were mandated in the *Action Plan of Commercial and Trade Logistics Standardization* issued by the Ministry of Commerce and the Standardization Administration of the P.R.C., and were successively placed online. The launching of these platforms has promoted the sharing of various logistics data and helped the application and popularization of logistics management based on big data.

⁵E-sheet is the electronic express-delivery sheet to be filled out for express delivery.

2.4.2 Status of Logistics Standardization

2.4.2.1 New Policies for Logistics Standardization

In 2015, China released many policies regarding logistics standardization. In October 2015, the Standardization Administration of the P.R.C., the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Public Security and the Ministry of Transport compiled and issued the *Mid-and-long-term Plan of Developing Logistics Standardization for 2015–2020*, which specifies the objectives, major tasks, key fields and principal projects of logistics standardization by 2020. It is the essential guideline document for the standardization work.

In December 2015, the State Council's General Office issued the *National Plan of Building Standard System in China for 2016–2020*, which lists modern logistics standardization project as one of the top 10 standardization systems in China. It stipulates that China should push forward the development, implementation, supervision and internalization of logistics standards to meet the requisites for transformation and upgrading of the logistics industry. At the same time, it also raises specific requirements for carrying out the tasks of logistics standardization.

2.4.2.2 Initiation of Group Logistics Standardization

In March 2015, the State Council issued the *Plan of Reforming Standardization Work*, which clearly pointed out the need for establishing group standards. In June 2015, CFLP was approved by the Standardization Administration of the P.R.C as one of the first batch of pilot-test organizations engaging in group standards, which means it would institute group standards on logistics honesty, vocational qualifications of logistics personnel, chemicals logistics, medicine logistics, agricultural products logistics, household logistics, purchase and supply chain logistics, etc. In November 2015, CFLP established and released the *CFLP Regulations on Group Standards*, which regulates the organizational structure and duties of group standards, the process of setting group standards, the implementation and evaluation means of such standards.

2.4.2.3 Development of Trade Logistics Standardization Demonstration Pilot Work

Based on the *Action Plan of Commercial and Trade Logistics Standardization* issued by the Ministry of Commerce and the Standardization Administration in 2014, the Ministry of Commerce, in 2015, incorporated the standardization of commercial and trade logistics as one of its 16 major tasks. The *Action Plan* focused on large commercial and trade chain enterprises, pallet leasing service

providers, FMCG producers, pallet producers and third-party logistics enterprises as the major players, and it relied on the support of associations, chambers of commerce and corporate alliances. Starting with the task of “developing pallet standardization and recycle and sharing system,” it selected some cities and demonstration enterprises to steer the establishment of standards for vehicles, warehouses, forklifts, shelves, and packaging.

2.4.2.4 Compilation of National Fundamental Logistics Standards

In 2015, China made, revised, issued or enacted many national fundamental logistics standards, raising requirements for logistics standardization in the fields of logistics service, vocational capability of logistics personnel, logistics operation and logistics IT development. In December 2015, China, for the first time, issued the national standards on vocational capability of logistics personnel, which raises the systematic requirements on the qualifications of the logistics workers.

2.4.2.5 Compilation of National Professional Logistics Standards

In 2015, many industries in China issued the national professional logistics standards. In particular, a number of logistics standards in tobacco logistics, cold-chain logistics and medicine logistics were made, issued or executed. In November 2015, China announced the first industrial service standards for e-commerce logistics. In September 2015, China started to execute its first compulsory standards in the postal industry.

2.5 Summary

In 2015, guided by the Belt and Road Initiative and the national strategy of Yangtze River Economic Belt, China continued to push forward the construction of comprehensive transportation networks. It expanded the scale of transportation networks in the Central Region, Western Region and the rural areas, and optimized the national transportation network structure, in particular the railway network structure for coal transportation. Number of logistics parks continued to grow and evident progress was made in bonded logistics centers and e-commerce logistics centers. Meanwhile, China began to swing towards green development in construction and management of warehousing facilities, and accelerated the construction of grain and Chinese herbal medicine warehousing facilities. In terms of transportation tools, China continued to augment the number of freight trucks and airplanes. However, as transportation tools developed towards heavier loads in general, the number of freight trains and ships declined in 2015 from that of 2014. Various types of warehousing equipment continued the trend of intelligent and green development.

In particular, AGV and intelligent express boxes were used more extensively in the logistics industry. In 2015, China launched a few national-level logistics public information platforms, regional logistics cloud platforms and professional logistics information platforms, making the model of big-data logistics management more feasible. As plans of developing various logistics standards were announced, the group logistics standardization and commercial and trade logistics standardization pilot-test and demonstration were conducted, China began to gain more definite focus on logistics standardization, and methodically compiled a number of logistics standards.

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