A.T. KEARNEY

Russian Rail, Containers, and Growth

The rail container shipping market in Russia is set to soar

The economic recovery is upon us. World output levels have improved notably; in April the IMF's World Economic Outlook projected global economic growth of 4.3 percent in 2010, compared to minus 0.5 percent in 2009. This is welcome news for the transportation industry, both internationally and in Russia, as transportation is inherently tied to macroeconomic factors and global trade. Rail container transportation is particularly well positioned to capitalize on this growth, as all signs indicate up to 10 percent annual growth in rail container volumes through 2015. Yet to participate in this growth spurt, rail container operators will have to broaden their service portfolios—moving beyond pure rail transportation to focus on providing value-added services such as door-to-door delivery, logistics management and warehousing services.

The worldwide container market began in the United States in the 1950s and has since grown to more than 140 million containers or TEUs shipped per year.[1] The market has become the impetus for global trade and, in turn, has been driven by the exponential growth of intercontinental trade, especially in Asia, Europe and North America. The shipping of maritime containers launched the industry into a whole new realm.

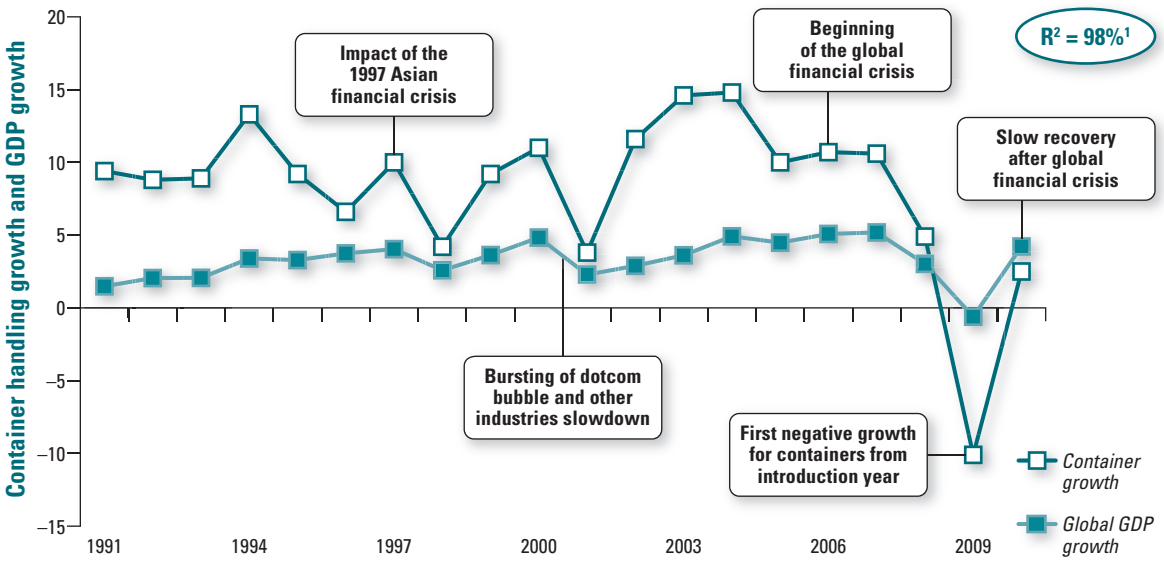
Industries served by containers and the products shipped in them tend to be of high "value add," meaning they are not the resource-type products shipped in bulk. It is not surprising then, that the container industry is cyclical, sensitive to global economic conditions and the inevitable peaks and troughs *(see figure 1 on page 2)*. Thus, when the economic crisis hit, volumes of maritime container shipments fell sharply, by 12 percent in 2008-2009.

Now, as the global market is seeing signs of recovery, the container market is forecast to grow at a stable 7 percent compound annual growth rate (CAGR) in 2010-2015 *(see figure 2 on page 2)*. Yet the recovery in the global economy is expected to be asymmetrical, with emerging markets growing substantially faster than developed economies both in terms of output and trade. From this perspective, the BRIC countries (Brazil, Russia, India and China), despite their deeper fall during the crisis, are expected to recover faster and grow stronger than developed markets. In the next 10 years, emerging markets are likely to grow at an average annual rate of 5 to 7 percent compared with 1 to 2 percent average annual growth rates for developed economies during the same time period.

[1] *Container transportation volumes are measured in TEUs, twenty-foot equivalent units.*

Figure 1

Relationship between container handling growth and GDP growth (%, 1991-2010)



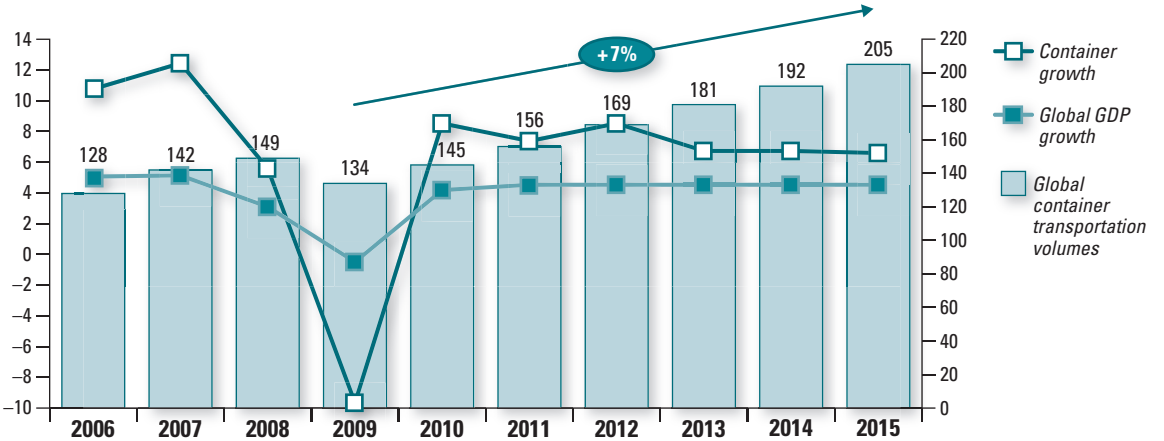
¹Based on cumulative growth

Source: World GDP data from the IMF World Economic Outlook 2010. Container handling growth data reported from Drewry Shipping Consultants; A.T. Kearney analysis

Figure 2

Steady growth forecast for maritime container market

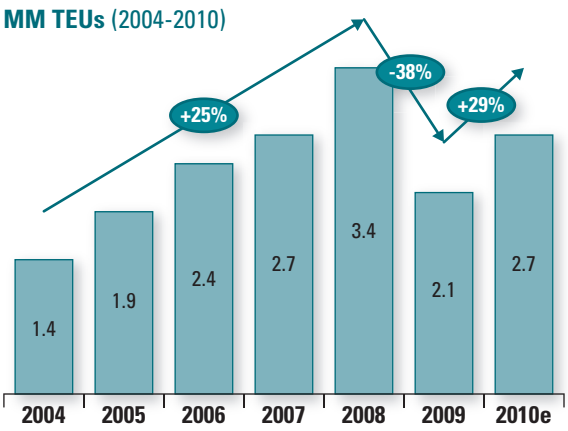
Maritime container traffic growth (% YoY); **GDP growth** (% YoY); **global container transportation volumes** (MM TEUs)



Sources: Economic Intelligence Unit, Drewry Shipping Consultants, International Monetary Fund; A.T. Kearney analysis

Figure 3

Growth in transshipment of containers in Russian ports



Sources: Association of Russian Parts (ASOP), RBC report, A.T. Kearney analysis

The Russian Container Market

The maritime container market in Russia is in its adolescence and for years has been growing rapidly, with rates resembling the global container market in the 30-year period from the 1970s through the 1990s *(see figure 3)*. Growth was fueled by structural improvements in the Russian economy, the development of port infrastructure, and the introduction of new container lines. In 2009, when the economic crisis caused a 38 percent decline in container shipments, it exposed a true vulnerability in Russia's container transportation market. The good news, however, is that the "immature" state of the Russian container freight market promises a faster recovery post-recession and stronger future growth.

Indeed, as the economy begins its upturn, the Russian container market is well positioned to pursue growth due to the following factors:

- Strong historical and projected macroeconomic outlook
- Significant potential to increase containerization levels, considering the existing gap with current international benchmarks
- Ambitious investment plans in port infrastructure

Strong historical and projected macroeconomic outlook. During the pre-crisis years of 2000-2008, Russia demonstrated a strong 7 percent average annual growth rate in both GDP and external trade. Consequently, the country's share of world GDP (as reported by Economist Intelligence Unit) increased from 2.6 percent in 2000 to more than 3.2 percent in 2008. In 2009 Russia's GDP was comparable to that of Brazil or India.

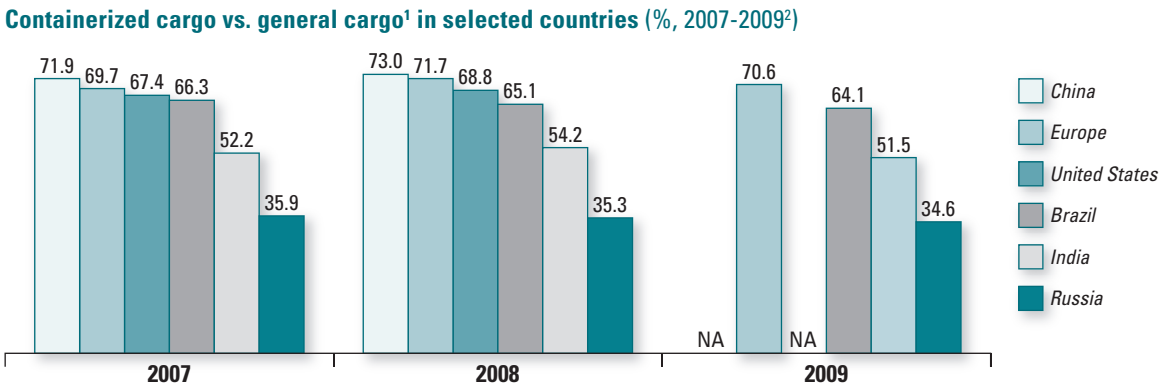
Over the next 10 years, Russian macroeconomic indicators are expected to grow at a stable pace with imports having the highest growth potential. Exports are expected to remain, on the whole, raw-material oriented. We anticipate that imports will continue to be a major driver of containerization in Russian ports. The overall increase of import flows will thus have a positive impact on container handling volumes in Russia.

Significant potential to increase containerization levels, considering the existing gap with current international benchmarks. While in most developed countries and in the other BRIC countries containers dominate in maritime export and import flows of general cargo, Russia still has some way to go to reach these levels. Figure 4 on page 4 presents maritime containerization levels for a number of countries, expressed as the share of containerized cargo in general cargo handled at ports.

Most markets saw a further increase of containerization levels in 2007 and 2008 while Russia appears to have plateaued at around 35 percent. Export of containerized consumer goods has made China the world's leader in containerized general cargo. Both Brazil and India have containerization levels of more than 50 percent due to highly developed container-handling infrastructures.

Figure 4

Compared to other countries, Russia has significant growth potential in port containerization



[1]Weight of cargo transported in containers divided by total weight transported without bulk and liquid cargo
[2]Data for 2009 not available for all analyzed countries and regions
Sources: Agencia Nacional de Transportes Aquaviarios, China Ports Statistics Yearbooks, Eurostat, European Seaports Organization, Indian Ports Association, Ministry of Statistics and Programme Implementation of India, Sea Information Center under Ministry of Transportation of Russia, American Association of Port Authorities, U.S. Waterborne Commerce, official ports websites, BMI, Drewry Shipping Consultants; A.T. Kearney analysis

Dry and liquid bulk commodities can distort international comparisons as they have limited potential to be shipped via container. Therefore, we have calculated containerization levels for general cargo only. If assessed on a total cargo basis (including bulk), the gap between containerization levels of Russia and Brazil will be lower, while the gap between Russia and other regions will be higher.[2]

We believe that over the next five years Russia could bridge the gap with other BRIC countries and increase its ports containerization levels up to 40 or 50 percent.

Ambitious investment plans in port infrastructure. Many major ports are planning to expand capacity to facilitate further growth in container transshipments. Leading stevedoring companies and port authorities have announced their investment plans in Russia, which, if realized, will increase overall capacity of Russian container terminals in ports by more than 50 percent by 2012, and by more than 100 percent by 2020.

Under the "Federal Program of the Ministry of Transport on Development of Russian Transportation Systems in 2010-2015," funds will be allocated to the development of port infrastructure. In particular, the program includes development of road and rail connections to the largest export-oriented ports, including those with container terminals. Among the ports stated in the program are Baltiysk, Murmansk, Ust-Luga, Novorossyisk, Olya, Vostochny, Nakhodka and Vanino.

Infrastructure Is Key

One of the key enablers of container transportation is the availability and quality of container-related infrastructure and a well-developed network of inland distribution. This includes container terminals, both at ports and inland, road and rail connections, and seamless intermodal transfers. Brazil and India made significant investments in their container-related infrastructures which led to an

[2] *Containerization levels in 2008 based on total cargo: China (29.8 percent), Europe (29.2 percent), India (17.6 percent), United States (15.2 percent), Brazil (9.5 percent) and Russia (7.0 percent).*

increase in their container transportation levels.

In the past, container shipments in Russia were limited by the capacity of container terminals at ports and the congestion of rail and road approaches to ports. The most congested rail lines were those serving the largest container ports, including Saint Petersburg, Novorossiysk and Vostochny. At its worst, this resulted in suspension of container freight to these ports, which happened in April-May 2009 when rail container transportation to the port of Saint Petersburg halted. Road congestion has also proved to be a challenge, especially in northwest Russia, where more than 80 percent of container shipments to and from the port of Saint Petersburg travel by road.

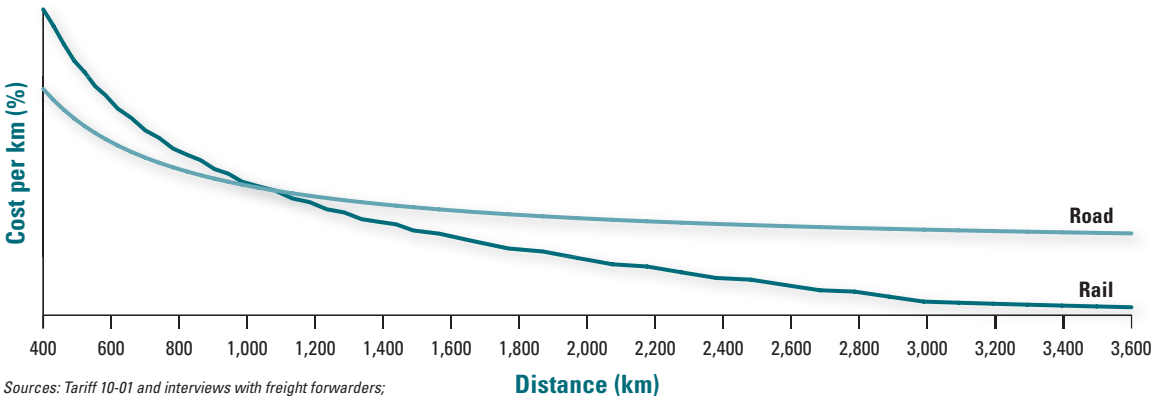
In terms of container volumes *lifted*, roads are currently the main transportation mode to and from ports.[3] Share of road in container transportation to and from major ports varies from 50 percent for Far East basin ports, to more than 80 percent in Northwest and South basin ports. In terms of container volumes *transported*, share of road is much lower, as roads are usually used for short-distance deliveries or for first- and last-mile rail connections.

Shippers' choice between rail and road for inland container transportation is determined by the following criteria: price, speed of delivery, reliability and flexibility of service. The significance of each criterion depends on the industry. For example, food retailers dealing with products with a short shelf life will focus on speed of delivery; this may not be a focal point for other industries such as heavy machinery.

However, it should not deter from the fact that shippers are inherently price-sensitive. Although they have been less so since the 1990s, price continues to remain the key differentiator for many shippers in Russia. This price sensitivity ultimately benefits rail freight, which charges lower prices for longer distances (greater than 1,000 kilometers). For shorter distances, due to a high share of costs attributed to "origination and completion" operations in the rail tariff, rail becomes less competitive *(see figure 5)*.

Figure 5

Comparison of cost per kilometer of transportation of a cargo unit by rail and road (%)



Sources: Tariff 10-01 and interviews with freight forwarders; A.T. Kearney analysis

[3] *Freight lifted (in tons) measures total volume of cargo on a weight basis only; freight transported (tons/km) measures total volume of cargo on the basis of weight and the distance across which it was transported.*

Freight forwarders and logistics companies quote road prices up to 10 to 20 percent lower than rail on distances of less than 1,000 kilometers. For example, the cost of transporting a 40-foot container from Moscow to Saint Petersburg by road is 10 percent less than by rail, demonstrating savings equivalent to approximately US$200. Transporting the same container 850 kilometers from Moscow to Ulyanovsk by road generates savings of 20 percent or US$400 compared to rail.

The price for road and rail transportation becomes more comparable for the distance of about 1,100 to 1,200 kilometers. So it would cost approximately US$300 (or 15 percent) less to ship the aforementioned 40-ft container by train than by road if sending it the 1,500 kilometers from Moscow to Novorossiysk. Shipping the container more than 3,000 kilometers (for example, Moscow-Novosibirsk or Moscow-Krasnoyarsk) will cost almost twice as much by road than by rail.

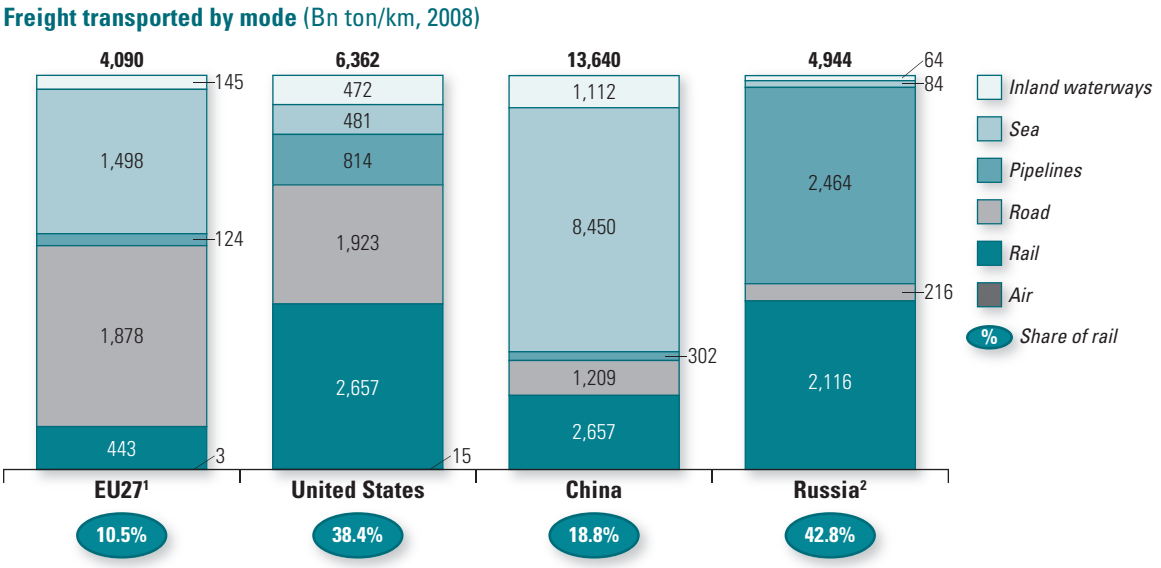
Russia, Rail and Container Transportation

Overall, rail is well positioned to benefit from the growth in inland container transportation. There are several reasons why:

- Significance of rail for the Russian economy
- High growth rates of rail transportation, both historical and forecasted
- Government commitment to develop the rail infrastructure
- Ongoing liberalization of rail industry (resulting in increased competition and flexibility of rail tariffs)
- Significant potential to increase share of containerized cargo, considering existing gap with international benchmarks

Figure 6

Rail is the dominant mode of transport in Russia and the backbone of the economy



[1]Figures for EU27, United States and China are for 2006
[2]Figures for Russia are for 2008
Sources: Rosstat, Eurostat, United States Bureau of Transportation Statistics, National Bureau of Statistics of China; A.T. Kearney analysis

Significance of rail for the Russian economy. The Russian economy relies heavily on rail. Russia is one of the largest countries in the world with production facilities concentrated in several industrial "pockets" across the country. Moreover, certain locations are hardly accessible by road due to climate conditions and landscape. For such regions rail is the only reliable transportation mode. In many areas roads are insufficient and in poor condition leading to a heavy use of rail transport. All of these factors have led to a significant share of rail transport in Russia, which clearly boasts one of the largest rail systems in the world *(see figure 6)*.

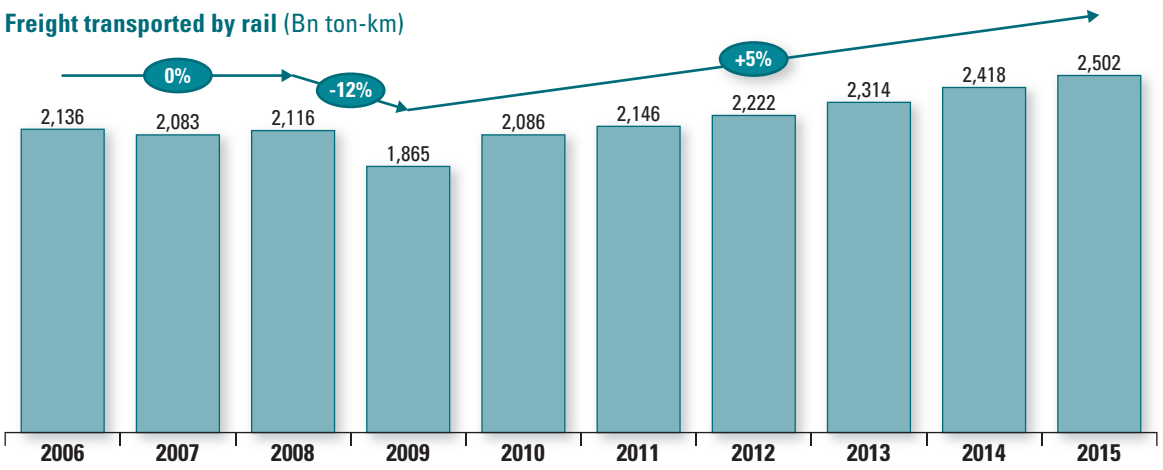
Overall share of rail in Russia is 43 percent compared to 38 percent in the United States and much higher than in China and the EU 27, which have 19 percent and 11 percent shares, respectively. Importantly, the share of rail in Russia would be much higher if we took into account structural differences between these countries' economies: Excluding pipeline transport, share of rail in Russia accounts for 88 percent.

The dominance of rail transport stems from the significant distances between the industrial pockets and thus the need to travel vast expanses. The average transportation span traveled by rail in Russia is among the longest in the world, comparable only to the United States—1,450 and 1,479 kilometers, respectively, dwarfing the 760 kilometers of average rail cargo transportation distance in China and 350 kilometers in Europe.

High growth rates of rail transportation, both historical and forecasted. Over the past eight years (2000-2008), rail freight transportation volumes transported in Russia grew at an average annual rate of 6 percent, demonstrating higher growth than road transport, which only grew at an average rate of 4 percent. We expect this growth to continue into the future, although at a slower pace *(see figure 7)*. The rate of increase will largely be attributed to the growth of

Figure 7

Total rail growth rate will continue but at a slower pace



Sources: Historical data from RZD and A.T. Kearney rail forecast model; A.T. Kearney analysis

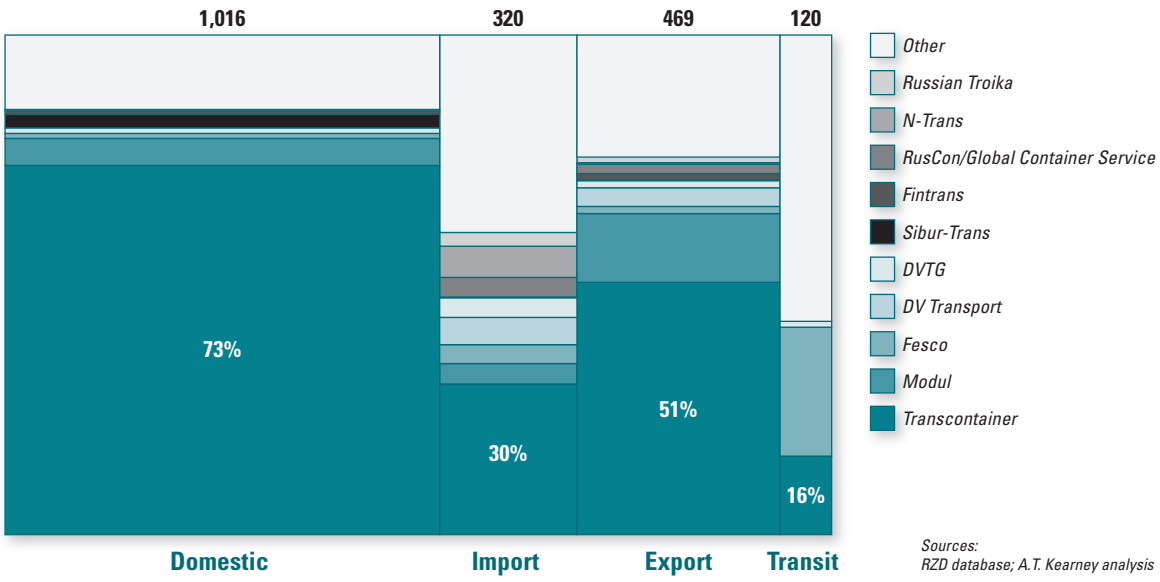
domestic and export transportation. Domestic transportation will be fueled by a thriving Russian economy, while exports will be driven by high export volumes of ferrous metals, construction materials and chemicals, and major users of rail freight services.

Government commitment to develop the rail infrastructure. The government is committed to infrastructure development, and within the next five years around 2 trillion RUB (US$65 billion) is expected to be invested in constructing new lines and modernizing existing infrastructure. These investments are seen as obligatory given the high utilization rates of rail infrastructure in Russia, which are among the highest in the world. For example, in comparing freight turnover per kilometer of track in 2008 (MM ton-km/km), only China (32.3) surpassed Russia (24.8), followed by Kazakhstan (15.7), United States (12.6), Ukraine (11.8), India (9.0), Canada (7.4) and Germany (2.8).

Ongoing liberalization of rail industry (resulting in increased competition and flexibility of rail tariffs). Railway reform, which started in 2001, is in its third and final stage. A significant part of the reform was the spin-off of TransContainer and Freight One to develop a competitive environment within cargo transportation. TransContainer was created in 2006 to serve a niche segment of the container transportation market and to compete effectively with other market players. Since then, the container transportation market has expanded to include numerous new market players, ranging from international freight-forwarders to small "mom-and-pop" businesses. However, rail container transportation in Russia remains a concentrated industry, with the top six players accounting for 70 percent of the market. In 2009, the six

Figure 8

Rail container transportation by market players in 2009 (%, '000 TEUs)



Sources:
RZD database; A.T. Kearney analysis

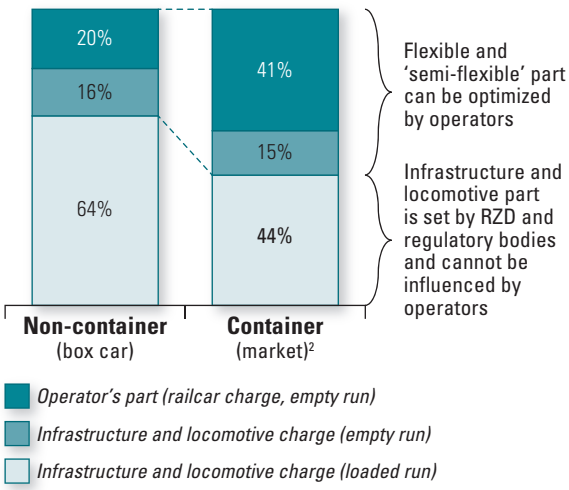
largest players had the following market share: TransContainer (57 percent), Modul (6 percent), Fesco (3 percent), DV Transport (2 percent), DVTG (2 percent) and Sibur-Trans (1 percent).[4]

Still, the remaining 30 percent of the market is fragmented with more than 1,000 small players *(see figure 8)*.

Liberalization of rail container transportation means Tariff 10-01 no longer provides a benchmark for container transportation prices. Therefore, for the time being, rail container operators have more flexibility in setting prices. The structure of the tariff for rail container transportation is different than other rail segments, with a lower share of "fixed" charges for infrastructure and locomotive use *(see figure 9)*.

Figure 9

Tariff structure: container vs. non-container rail transportation (%)[1]



[1]Box car is used for comparison as the potentially containerizable cargo (3rd tariff class) is now transported in box cars
[2]Empty run share is calculated based on tariff 10-01 provisions: e.g., full tariff is 36,858 RUB, out of which the tariff for private operators for the use of infrastructure and traction is 19,326 RUB, discount for use of own containers and platforms (30%) is 11,057; empty run is then 36,858-11,057 = 6,475. Market price is higher than tariff 10-01 and amounts to 43,604 RUB due to higher railcar and container charge
Sources: Tariff 10-01; A.T. Kearney analysis

This affects the development of the industry in two ways. First, operators have more incentives and opportunities to compete effectively with each other and to optimize their transportation routes, thus minimizing empty runs. Second, operators have more flexibility and can adapt their prices to market situations, thus strengthening their positions in competing with other modes.

However, pricing alone will not be sufficient to win a greater share of the business, and rail operators will have to expand their value propositions to include value-added services (as discussed in more detail later in this paper).

Significant potential to increase share of containerized cargo, considering existing gap with international benchmarks. In the past few years, container transportation volumes grew faster than overall rail transportation (13 percent CAGR vs. 2 percent CAGR) as shown in figure 10 on page 10. In just four years, rail container freight increased by 43 percent from 1.7 million TEU lifted in 2005 to 2.5 million TEU in 2008 (including empty containers). This growth was mainly driven by import and export flows, and was supported by a booming Russian economy, development of a container handling infrastructure, and growth of the third-party logistics provider (3PL) market.

Such significant growth notwithstanding, share of containers in overall rail freight lifted (excluding oil and coal) is still low compared to other countries. Figure 11 on page 10 presents the containerization levels in select countries.

It should be noted, that rail containerization levels are lower than the containerization levels at ports for all noted countries, as shown in figure 4. There are two reasons for this, which are common for all countries: high share of road in total container freight lifted in ports (lower number of

[4] *In the first half of 2010, there was a change among the largest players. The top six companies were: TransContainer (53 percent), Modul (7 percent), Fesco (3 percent), N-Trans (3 percent), DV Transport (2 percent), Fintrans (2 percent).*

Figure 10

Container transport market outgrew total rail transport

Rail and rail container (including empty containers) transportation volumes (MM tons and '000 TEUs)

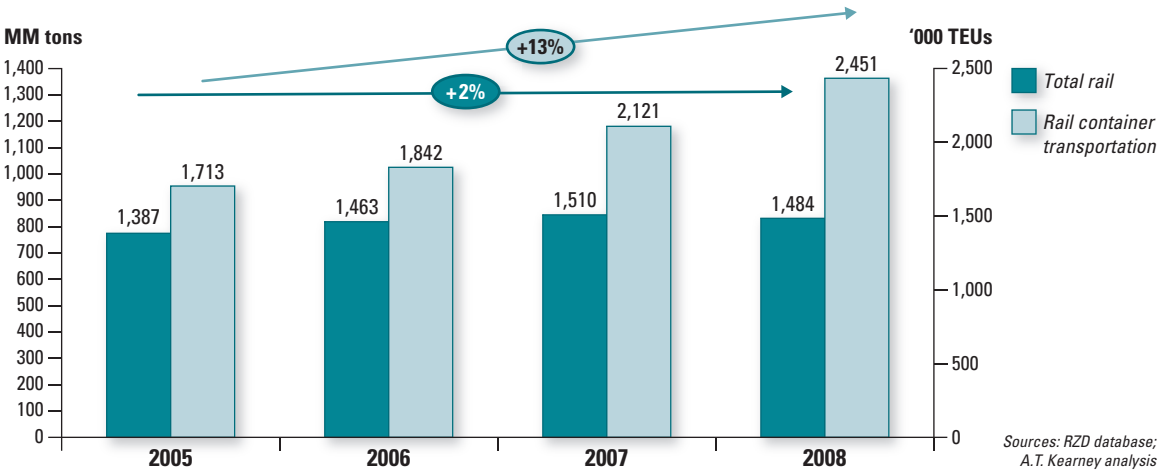
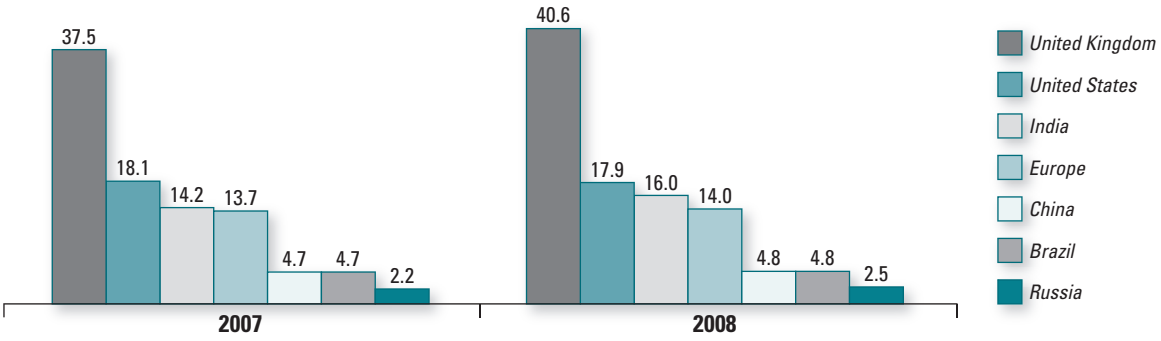


Figure 11

Rail containerized cargo versus total rail cargo, excluding oil and coal (%)



Sources: RZD database, Eurostat, National Statistics services, Ministry of Railways and Government of India, Concor, Department for Transport of the United Kingdom, MDS Transmodal, Department for Transport of the United Kingdom, American trucking association, HIS, Association of American Railroads, BMI, Drewry Shipping Consultants; A.T. Kearney analysis

containers lifted by rail) and inclusion of low-containerized rail domestic transportation (higher volumes of freight lifted in railcars versus containers). There are also some country-specific explanations. For example, in China, transporting containers to ports via rivers and locating many production centers next to container ports result in rail containerization levels significantly lower than at ports.

Interestingly, in the United Kingdom, the large number of containers transported by rail is mainly explained by the structure of freight flows

(large number of imported containerized goods) and increasing road congestion.[5]

Clearly, Russia has significant growth potential in rail containerization. The growing use of containers in export and import transportation will drive their use in domestic transportation to utilize capital-intensive assets better, including container terminals, flatcars, and containers themselves, and to balance container flows. We also expect, as previously mentioned, strong growth in imports of high-value-added goods, which are usually brought into the country in containers, and shipped out in containers. In addition, the industries we expect to grow fastest, such as automotive and chemical, are also the industries that use the most containers.

Therefore, while it is feasible that Russia will reach the current containerization levels of Brazil and China, it is unlikely to happen within the next five years.

Forecast for Rail Container Transport — 9 to 10 Percent Growth

Our forecast of future rail container transportation volumes is based on a bottom-up approach. We selected nine industries where containers are systematically used for transportation, and which jointly accounted for approximately 90 percent of total container transportation in TEUs. We then forecasted the future development of these industries (output, consumption, import and export) based on a number of macroeconomic indicators, industry research and historical performance. Based on the volumes of output, consumption, import and export, we estimated resulting domestic, international and transit transportation flows. We also interviewed executives from the selected industries and several logistics companies.

Based on our understanding of these industries, feedback from the one-on-one interviews, and historic trends, we concluded the potential future split between rail and road transportation, the growth of Russia's rail containerization, and the country's total rail container transportation volumes *(see figure 12)*.

Rail container transportation was dramatically affected by the recent crisis, plunging by 21 percent from 2.5 million TEUs in 2008 to 1.9 million TEUs in 2009. However, due to the fast recovery of the Russian economy (real GDP growth is forecasted to be 4.8 percent, 4.0 percent and 4.4 percent in 2010, 2011 and 2012 respectively) it is expected that container transportation will reach pre-crisis levels as early as 2011.

Figure 12

Containerization level by industry

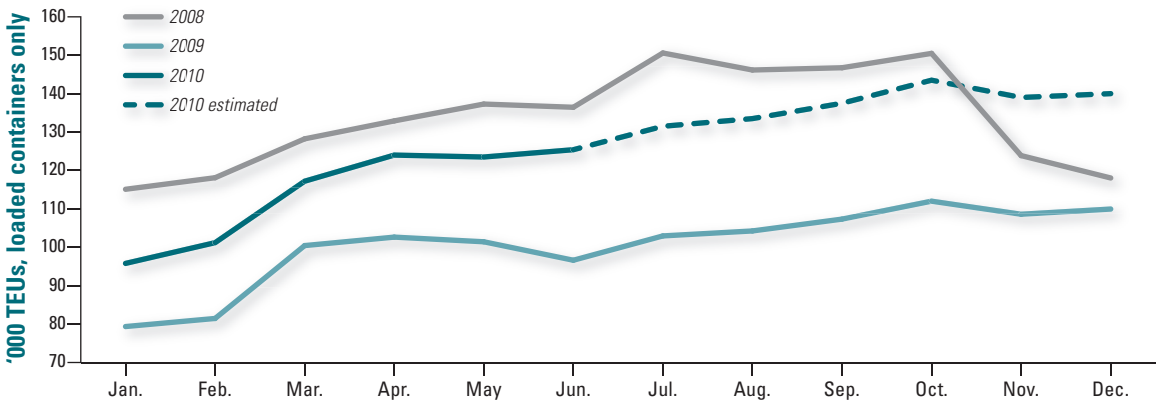
Industry	Containerization level[1]	
	2009	2015
Automotive parts and components	23.6%	37.7%
Chemicals	9.1%	10.6%
Construction materials	2.4%	3.9%
Ferrous metals	1.7%	1.9%
Food	7.6%	7.0%
Machinery and equipment	21.8%	25.3%
Non-ferrous metals	24.4%	27.5%
Non-food	35.4%	39.8%
Pulp and paper	40.5%	42.3%
Empty run and other	0.7%	0.7%
Overall	**2.7%**	**3.1%**

[1] *Based on freight lifted, all types of cargo, excluding coal and oil*
Sources: Historical data from RZD and A.T. Kearney container rail transportation forecast model; A.T. Kearney analysis

[5] *When comparing containerization levels, we adjusted volumes transported by rail to exclude oil, oil products and coal, which constitute the largest part of bulk cargo transported by rail. This is done to avoid distortion due to the commodity-based industry focus of some countries. If rail containerization levels were assessed on the basis of total cargo volumes, in 2008 they would be as low as 1.7 percent in Russia, 2.1 percent in China, 3.5 percent in Brazil and 8.2 percent in India.*

Figure 13

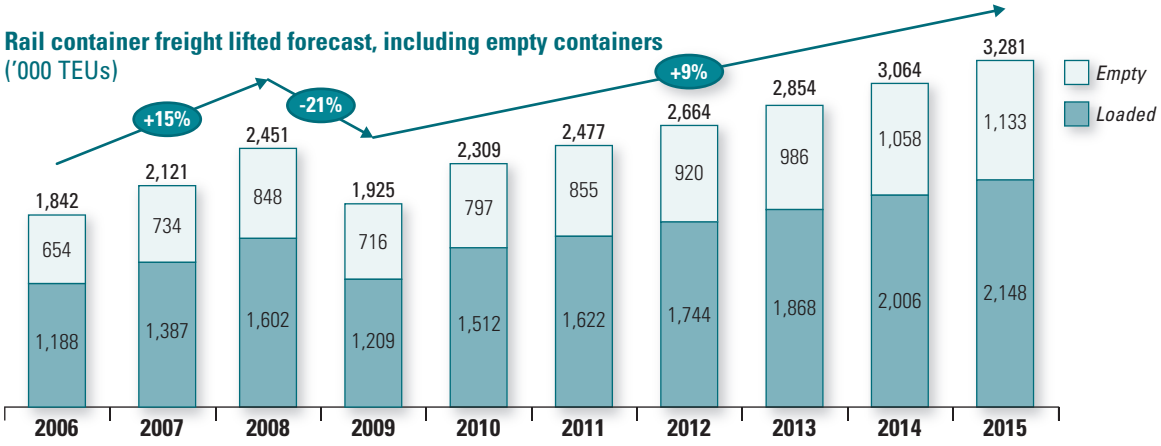
Rail container freight lifted forecast, monthly (2008-2010)



Sources: RZD database; A.T. Kearney analysis

Figure 14

Rail container forecast

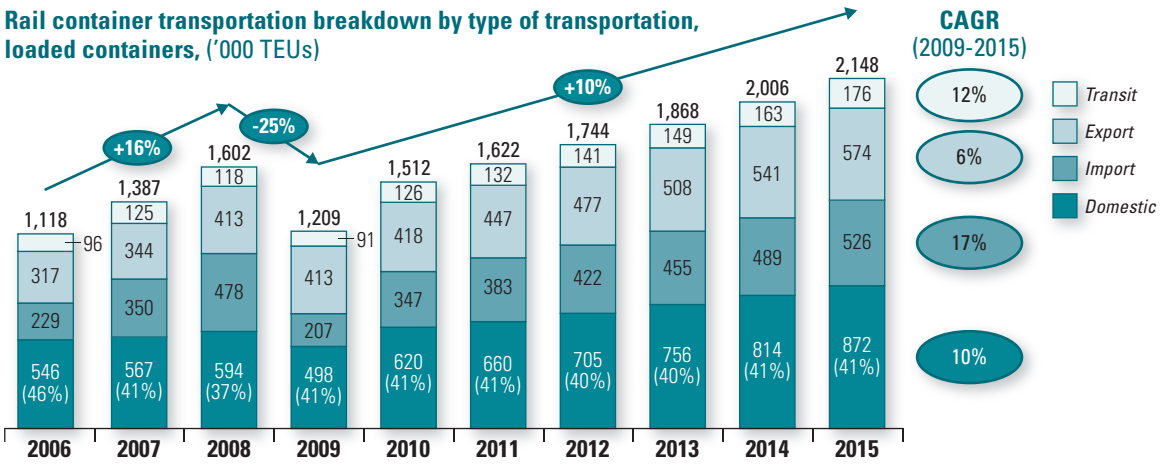


Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

Our expectation of improved rail container traffic in Russia is further supported by the signs of recovery within the industry during the first and second quarters of 2010. Monthly container transportation volumes in 2010 gradually approached those of 2008 and are expected to exceed them in November 2010 *(see figure 13)*. From 2009 onward, we expect container transportation volumes to grow at 9 percent CAGR—nearly double real GDP growth. In absolute terms it means 3.28 million TEUs lifted in 2015 *(see figure 14)*.

Figure 15

Growth in rail container transportation by type



Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

Domestic transportation constituted 41 percent of total transportation volumes in 2009 and its share is not expected to change significantly by 2015, while the fastest growth rates are expected in import transportation (17 percent CAGR in 2009-2015), as shown in figure 15. This trend reflects the increase of import share in Russia's external trade forecast by the Economist Intelligence Unit. We envision the slowest growth rates in export container transportation (6 percent CAGR in 2009-2015) due to the low share of high-value-added products in export structure of Russia, which is mostly represented by bulk and liquid commodities.

The following discusses each area in more detail.

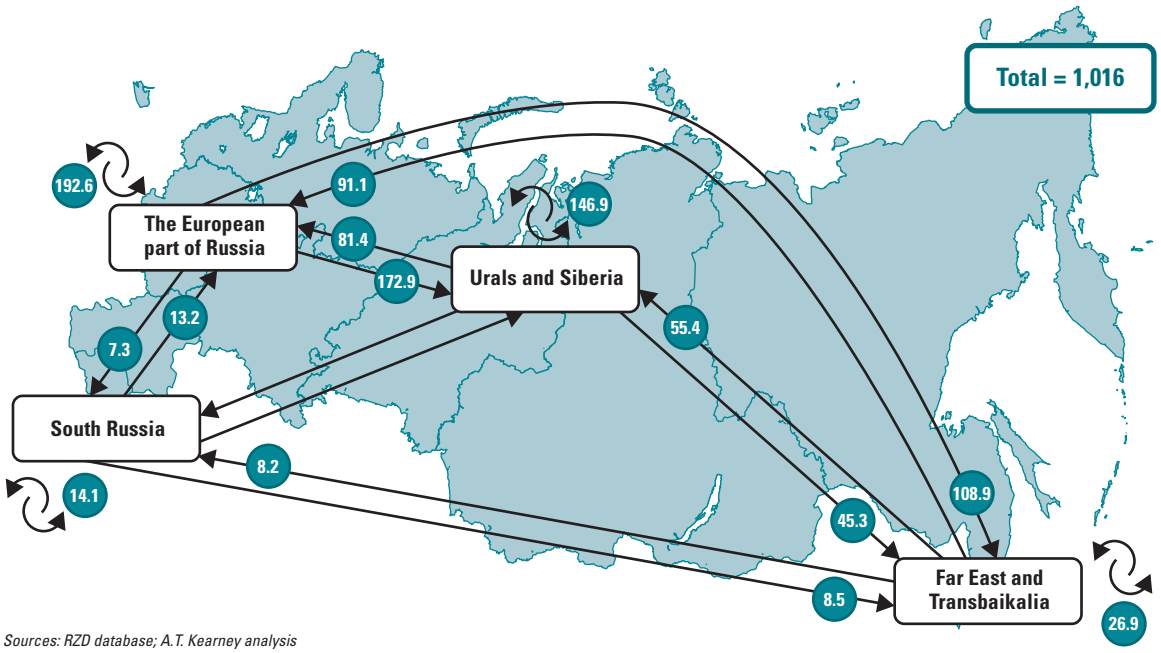
Domestic transportation. Domestic transportation is mainly formed by the transportation between European and Siberian parts and transportation within the European part of the country *(see figure 16 on page 14)*. In 2005-2008 domestic freight grew at 5 percent, driven mainly by transporting pulp and paper, chemicals, machinery and equipment, and ferrous metals. By 2008, food and non-food consumer goods were the largest segments in domestic rail container transportation, collectively accounting for almost 40 percent of total container volumes *(see figure 17 on page 14)*.

Growth in container transportation (2009-2015) will be fueled by construction materials, pulp and paper, chemicals and non-food consumer goods transportation, which will increase at 16 percent, 19 percent, 12 percent and 8 percent per year respectively.

Construction materials. Demand for construction materials will mainly be driven by new residential, industrial and commercial construction, and renovation of existing buildings. Construction of new residential buildings is expected to rebound after the crisis: 424 million square meters of housing are expected to be built in 2010-2015. Construction of new industrial, commercial and office premises is forecast to be

Figure 16

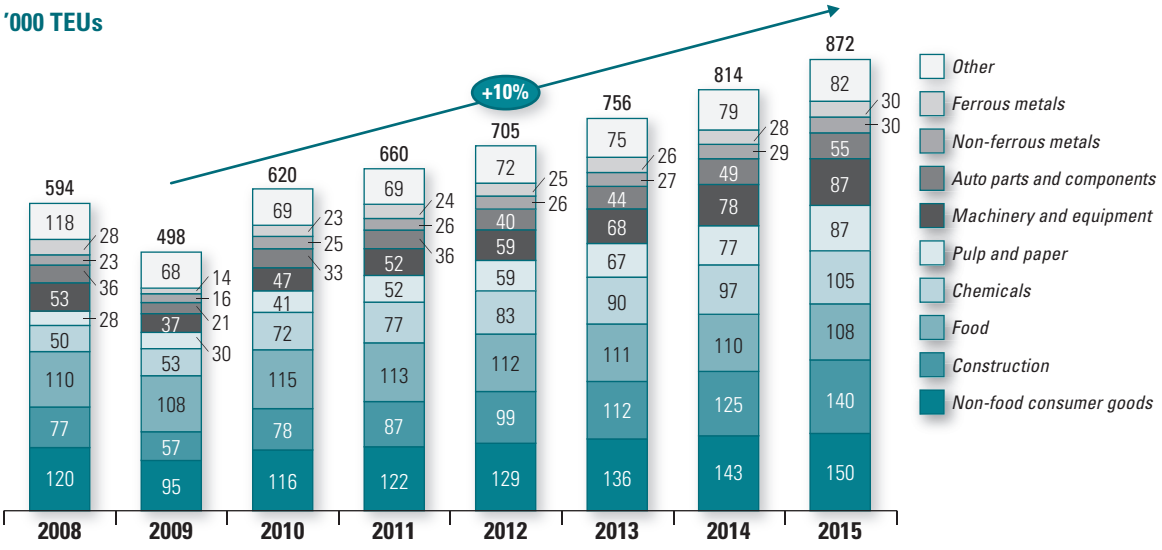
Major domestic rail container flows in 2009, including empty containers ('000 TEUs)



Sources: RZD database; A.T. Kearney analysis

Figure 17

Rail container freight lifted by industry, domestic transportation (loaded containers)



Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

built, along with 19.6 million square meters of housing in the same period. The renovation market is expected to be significantly fueled by growth of GDP per capita, and the Olympic Games in Sochi will make a further contribution to construction materials transported in containers.

Pulp and paper. Pulp and paper transportation will be driven by the overall development of this industry, both in terms of volume and product structure. The industry's strategic intent is in import substitution and the growth of high-value-added goods production within the country. Additionally, individual companies aim to optimize fee logistics costs and use of existing facilities (developed for largely containerized exports) by transferring more railcar volumes onto the container.

Chemicals. Unlike most of the industries in our study, chemicals experienced only a moderate decline during the crisis and, supported by a steady growth in coming years, will achieve significant volume growth by 2015.

Food. Food freight is expected to increase in 2010 due to growth in containerization levels; however, it could gradually decline afterward as overall rail transportation loses ground to road. This trend is mainly due to the developing distribution network in Russia, which, while consolidating volumes, effectively reduces the average transportation distance and makes roads more attractive than rail. With no major changes in the size of the population and physical consumption of food per capita, the decrease in the share of rail translates into a decrease in container rail transportation.

Non-food consumer goods. We also expect a shift from rail to road in non-food consumer goods transportation. However, unlike food, the demand for non-food consumer goods is expected to grow significantly, fueled by per-capita GDP growth. This will result in a stable increase of non-food consumer goods transportation, which will capture its largest share in total transportation volumes in 2015.

Collectively, food and non-food consumer goods, construction and chemicals are expected to account for almost 60 percent of domestic rail container transportation volumes.

Import transportation. Import transportation is mainly formed by flows from the Far East and Eastern Europe *(see figure 18 on page 16).* From 2005 to 2008, import transportation grew at 42 percent, driven mainly by automotive parts, ferrous metals and construction materials *(see figure 19 on page 16).* By 2008 automotive components held a dominant share of almost 40 percent of total container volumes followed by chemicals (16 percent) and non-food consumer goods (15 percent).

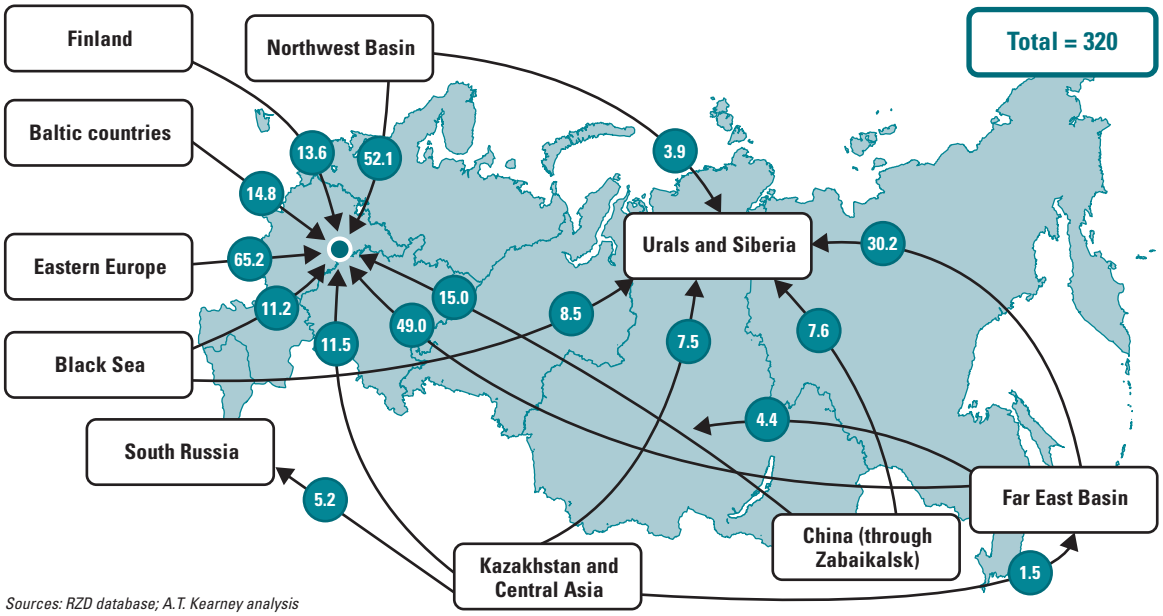
Import container transportation volumes suffered most during the economic crisis, plunging more than twofold in 2009. The reason for this was a significant decrease of overall Russian imports caused by a fall in disposable income: Imported goods tend to be more expensive and were therefore substituted with local goods.

Although import volumes in these industries fell drastically in 2009, they are expected to regain ground in 2010. Throughout the after-crisis years, all three industries will set on a recovery path, with automotive components being the most significant contributor to growth in total rail container volumes.

Automotive parts and components. Products in the automotive industry that can be transported in containers include CKDs (completely knocked down) and spare parts. Car penetration rates are highly correlated with GDP per capita and are therefore expected to grow steadily in the coming years. The growth of imported automotive parts will be further fueled by the increasing share of foreign cars in the total fleet: The number

Figure 18

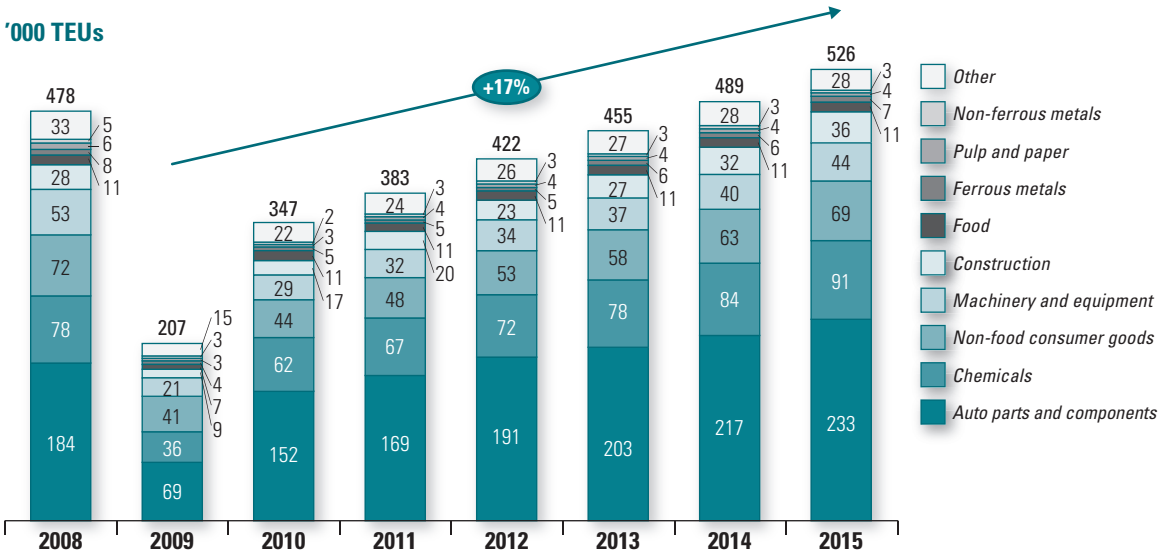
Major import rail container flows in 2009, including empty containers ('000 TEUs)



Sources: RZD database; A.T. Kearney analysis

Figure 19

Rail container freight lifted by industry (import transportation)



Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

of foreign cars built in Russia is expected to double in 2010-2015 *(see sidebar: Russia Falls for Foreign Cars).* Combined with more imported readymade cars this will lead to increased demand for imported spare parts. Thus, imports of automotive parts and components are expected to exceed pre-crisis levels in 2012 and grow in share of total container imports to 44 percent.

Chemicals. Chemicals are used in a wide range of industries, and the demand for imported chemicals will follow the dynamics and development of the overall economy: Import transportation volumes will rebound in 2010 and set on a stable growth path to retain its second largest share in import container transportation in 2015.

Non-food consumer goods. The demand for non-food consumer goods will be revived and further fueled by the growth of GDP per capita. Transportation of non-food consumer goods is expected to account for 13 percent of total container transportation volumes in 2015.

Consequently, the structure of import transportation is forecast to remain stable and in 2015 will not change significantly from 2008.

Exports. Container rail exports in Russia are mostly directed to the Northwest and Far East ports and to Eastern Europe *(see figure 20 on page 18)*. From 2005 to 2008, export transportation grew at 14 percent, driven mainly by ferrous and non-ferrous metals, construction materials and food. Most of the export rail container transportation in 2008 was attributed to pulp and paper (35 percent), chemicals (17 percent) and non-ferrous metals (19 percent):

Russia Falls for Foreign Cars

Overall containerization of automotive parts increased from 16 to 40 percent in 2005-2008, mostly due to the large growth in import containerization, which rose from 57 to 91 percent in the same period.

Such growth is largely the result of production of foreign cars in Russia, which gave rise to producing CKD (completely knocked down) cars there. Between 2005 and 2008 Renault, Volkswagen and Fiat opened plants in Moscow, Kaluga and Naberezhnye Chelny with combined capacity of 390,000 cars. Not included in these estimates are CKD cars produced at Ford, Toyota and GM plants located near Saint Petersburg and an Avtotor plant in Kaliningrad. Foreign automakers located inland plan to increase production of cars between now and 2015 *(see figure).*

As a result automotive parts are expected to account for 15 percent of all rail container transportation in 2015—the second largest share among all industries—with more than 70 percent of automotive parts attributed to imports.

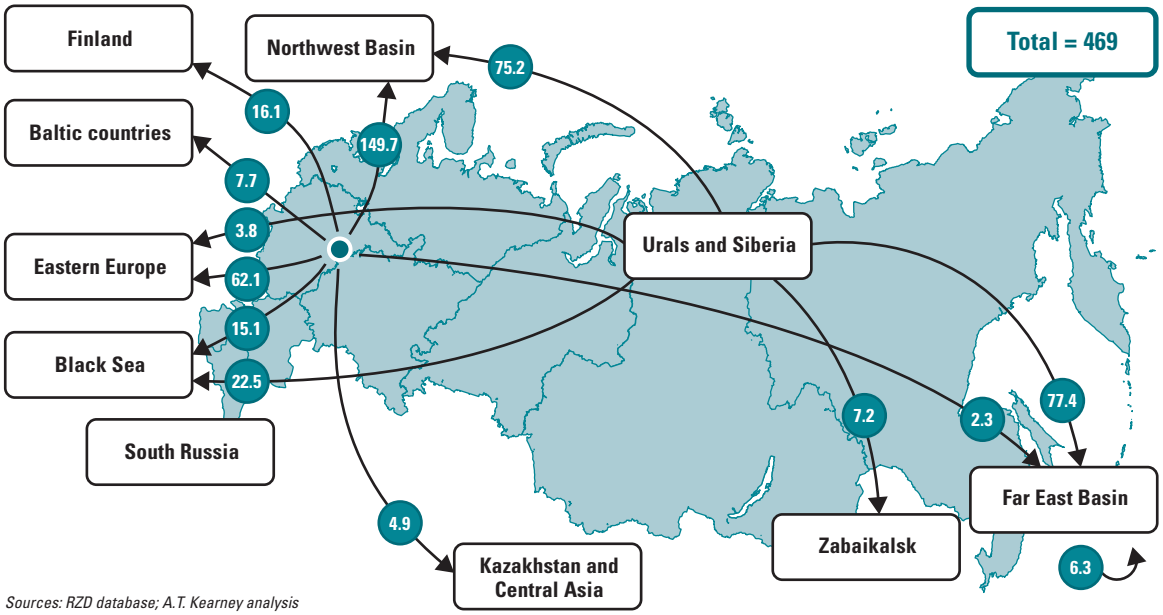
Figure: Expected output of select foreign auto plants in Russia

Automotive plant	Capacity (millions units) 2010	Capacity (millions units) 2012	Capacity (millions units) 2015
Renault, Nissan	0.160	0.190	0.190
Volkswagen	0.100	0.150	0.150
Hyundai, Kia	0.050	0.220	0.220
PSA, Mitsubishi	0.010	0.045	0.045
Fiat	0.016	0.080	0.080
Total	**0.340**	**0.690**	**0.690**

Sources: Datamonitor, Autoreview, manufacturers' production plans; A.T. Kearney analysis

Figure 20

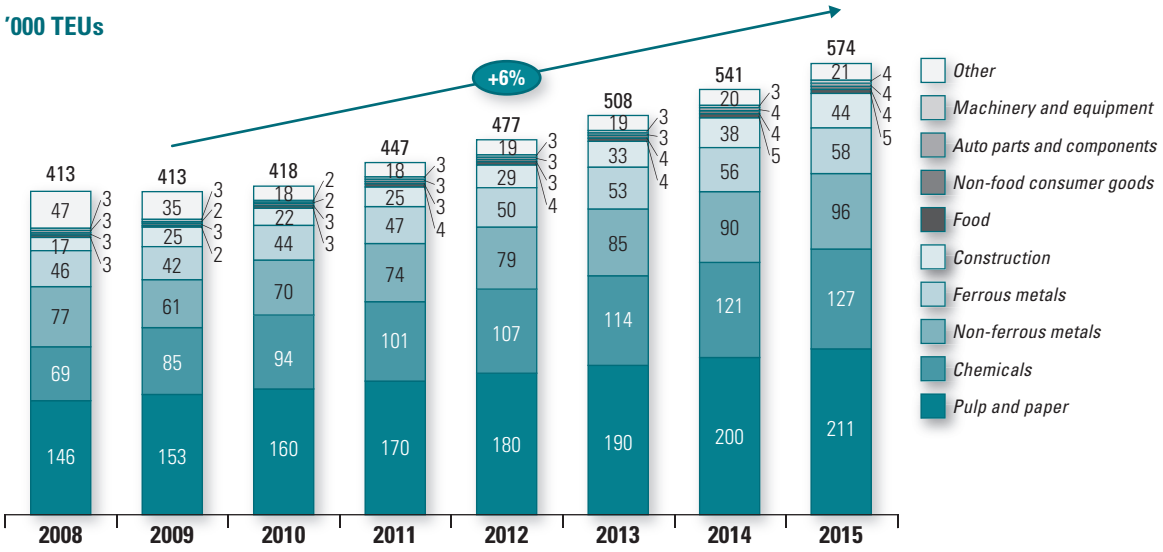
Major export rail container flows in 2008, including empty containers ('000 TEUs)



Sources: RZD database; A.T. Kearney analysis

Figure 21

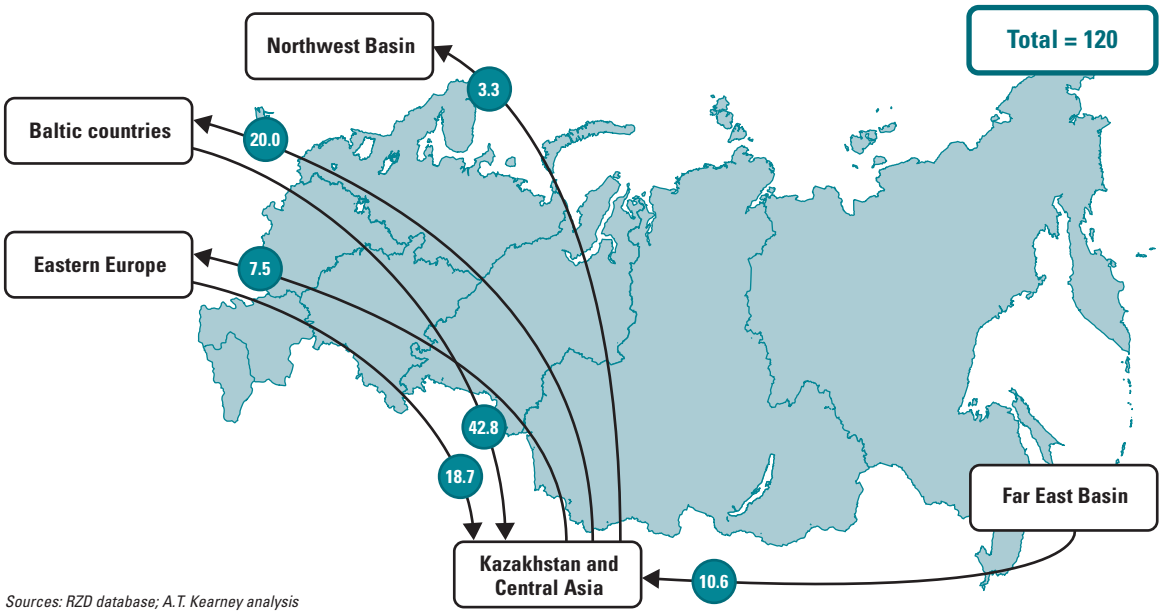
Rail container freight lifted by industry (export transportation)[1]



[1]*Leaded containers*
Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

Figure 22

Major transit rail container flows in 2008, including empty containers ('000 TEUs)



Sources: RZD database; A.T. Kearney analysis

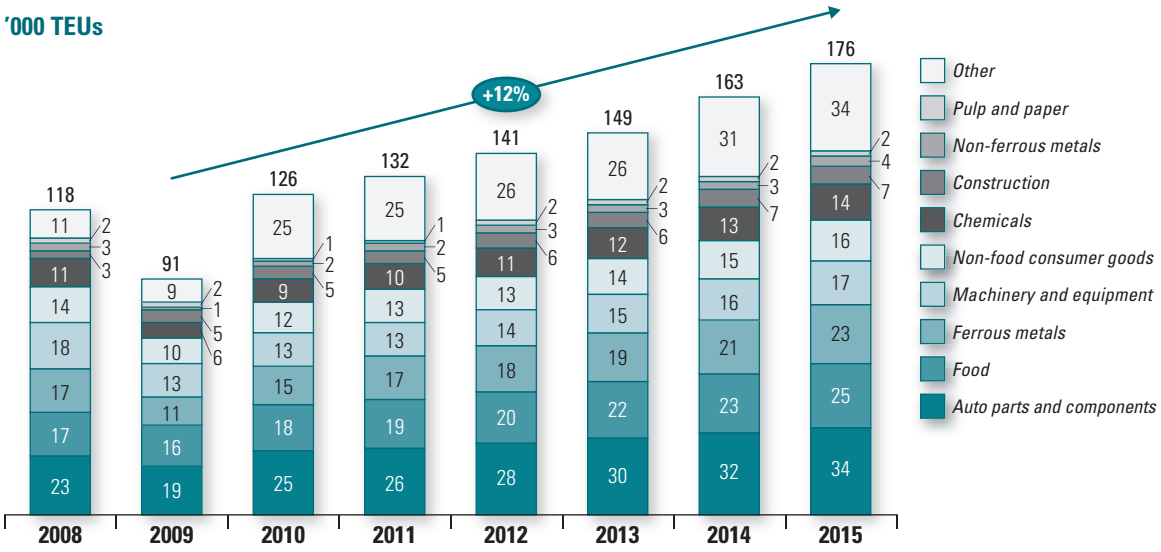
Pulp and paper and chemicals. As shown in Figure 21, container transport of pulp and paper and chemicals increased in 2009. Although there was a decline in the overall export of these products, the loss was offset by a rise in container shipping, which resulted in an almost 11 percent volume increase over 2008. Both industries—pulp and paper, and chemicals—are expected to export more products via containers due to an improved container-handling infrastructure. Given their overall export levels combined with their increased containerization levels, this will result in transportation volumes of 211,000 TEUs (pulp and paper) and 127,000 TEUs (chemicals) in 2015. As a result, pulp and paper and chemicals will increase their combined share in total export transportation volumes to almost 60 percent.

Non-ferrous metals. Export transportation of non-ferrous metals was more vulnerable to the world economic downturn, falling by more than 20 percent in 2009. However, reviving world demand for aluminum, supported by growth in containerization levels, will bring export container transportation volumes back to pre-crisis levels in 2012. We expect non-ferrous metals to continue stable growth and arrive at a 17 percent share of the rail container export market in 2015.

Transit transportation. Transit rail container flows are mostly represented by transportation from Eastern Europe and the Baltic States to Kazakhstan and Central Asia *(see figure 22)*. In 2005-2008, transit transportation volumes fluctuated due to changing tariffs. The split of rail container volumes by industry was rather even, with automotive parts having slightly larger share than other industries *(see figure 23 on page 20)*.

Figure 23

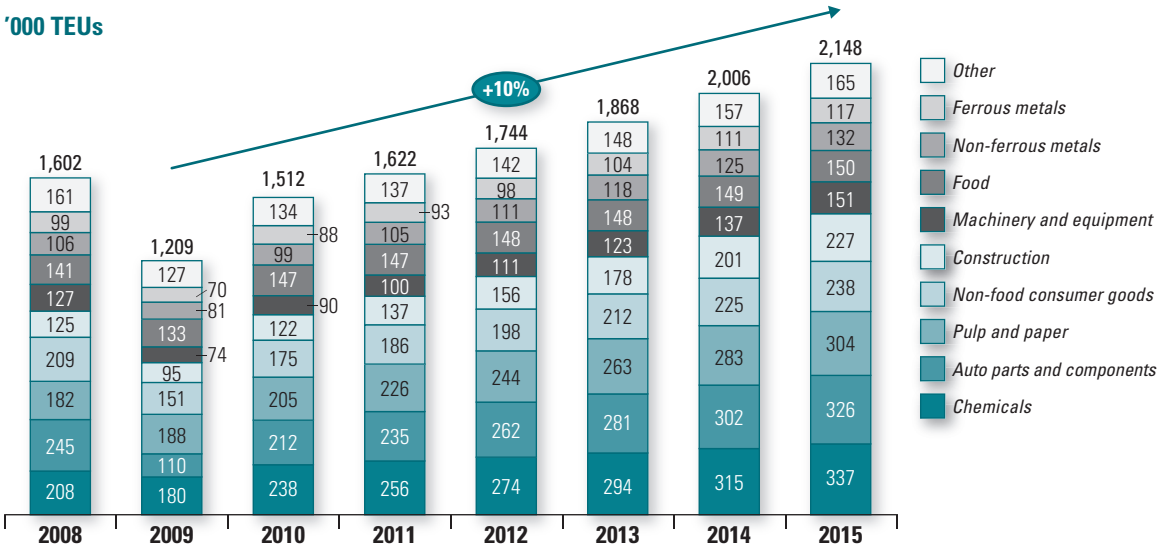
Rail container freight lifted by industry, transit transportation (loaded containers)



Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

Figure 24

Rail container transportation by industry (loaded containers)



Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

The overall transit rail transportation market is expected to rebound in 2010, driven by the revival of trade between Central Asian and Eastern European countries. Transit rail container transportation is expected to regain pre-crisis levels as early as this year, helped by the growth in containerization. In the 2009-2015 time period, the transit rail container market is expected to reach 12 percent CAGR, and a total volume of 176,000 loaded TEUs in 2015. The split of transit rail container transportation volumes by industry will remain relatively constant, with minor changes due to the difference in containerization levels by industry. The increasing competitiveness, both in terms of cost and speed of delivery, of the TransSiberian transit route compared to sea routes is another driver of rail transit volumes.

Total container transportation. A major factor in the growth of rail container transportation is the rise in containerization. Overall containerization levels in total cargo (excluding oil and coal) is expected to increase with 2.4 percent 2009-2015 CAGR to reach 3.1 percent in 2015.

We anticipate significant growth in containerization in several industries, including automotive components, non-food consumer goods, machinery and equipment, and non-ferrous metals. Because production in these industries can be expensive, security of delivery becomes especially important and the shipper is often ready to bear the additional cost of rail transportation. Apart from that, the industries in our analysis demonstrate historically high levels of containerization growth.

Containerization in automotive parts is mostly driven by foreign carmakers deploying their production facilities in Russia and by the increasing share of foreign cars in the total car fleet. This translates into additional flow of imported parts and components transported via containers. In non-food consumer goods, further containerization will be primarily driven by improvements in container transportation services, including the growing number of regular block trains and cargo-tracking systems. Metal companies, which already export goods in containers, will increase usage of their container handling infrastructure for domestic shipping to cut costs and standardize their logistics processes. In 2015, the largest shares of total rail container transportation will be in chemicals (16 percent), automotive parts (15 percent), pulp and paper (14 percent) and non-food consumer goods (11 percent). Growth in rail container transportation will reach 10 percent 2009-2015 CAGR, reaching 2.1 million loaded TEUs in 2015 *(see figure 24).*

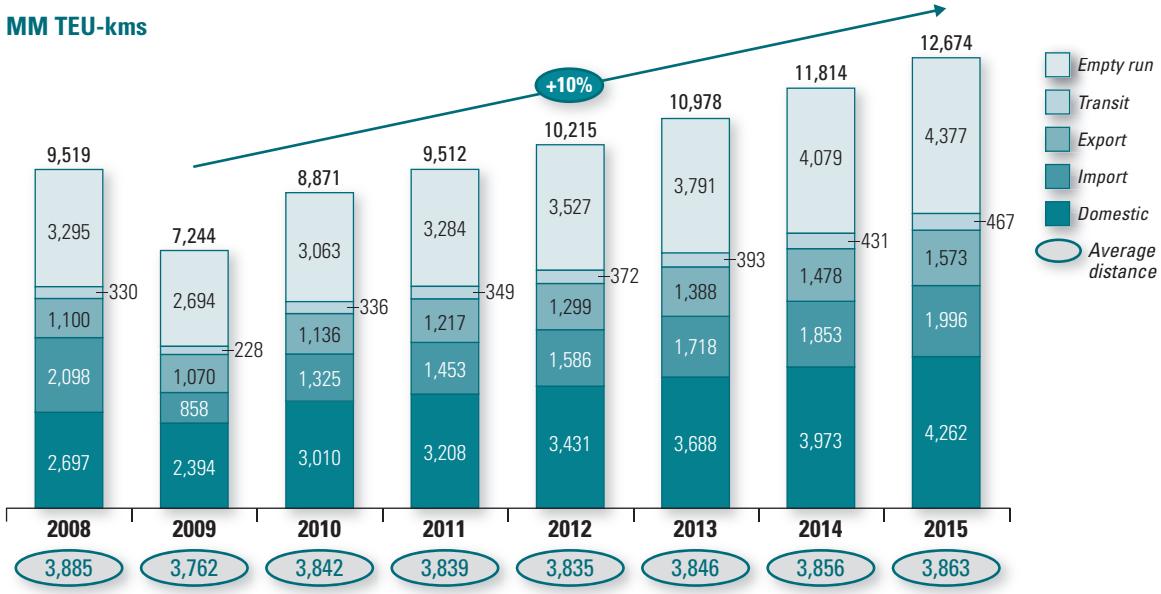
Rail container freight *transported* follows the dynamics of total freight *lifted* with a slight adjustment on average distance. Thus, rail container freight transported is forecast to grow at 10 percent CAGR 2009-2015 and to amount to 12.674 billion TEU-kms in 2015, including empty run *(see figure 25 on page 22).*

Rail Container Operators Are Diversifying

To attract customers in the container rail segment, operators are increasingly providing reliable, regular and integrated services, especially in industries where cargo can be aggregated to form container block trains. Those that offer an integrated, value-added logistics solutions with first- and last-mile connectivity are finding this a key differentiator between rail and road movement. Such solutions allow rail container operators to offer a seamless transportation service to their clients. For first- and last-mile connectivity, operators either partner with truck operators or operate their own trucks for road haulage.

Figure 25

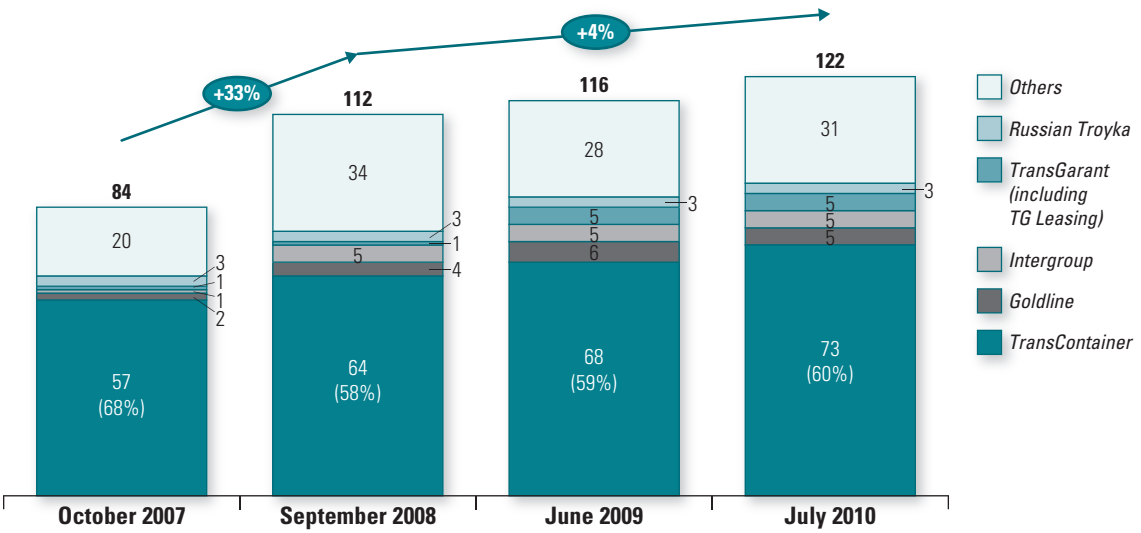
Rail container transportation by type, including empty containers



Sources: RZD database, A.T. Kearney analysis, A.T. Kearney rail forecast model

Figure 26

Fleet ownership structure adjusted by TEUs ('000 of TEUs)



Sources: RZD database; A.T. Kearney analysis

By combining the cost-effectiveness of rail and the point-to-point delivery of road, customers can outsource their logistics requirement to a container rail operator and drive the volume shift from road to rail. Already, leading rail container operators, such as TransContainer, Fesco, Modul and Eurosib, have moved beyond offering pure rail transportation services to also providing road linkage and other value-added services that address the growing demands from their customers *(see Appendix 1: The Russian Logistics and Value-Added Services Market on page 27).*

Investing in the Fleet

To avoid a future deficit of assets, operators are assessing *available fleet* versus *required fleet* over the next five years to identify possible gaps. The gaps represent purchases required against projected capacity of flatcar manufacturers.

Available fleet. The "theoretical fleet" available on the market in 2015, not considering purchases of new flatcars, comprises currently existing flatcars minus write-offs. A significant number of flatcars are expected to be retired during 2010-2015 due to the age of the fleet and technical regulations. The current fleet comprises nearly 42,000 flatcars, which is equivalent to 122,000 TEUs.

Significant investments were made into the fleet in 2007 following the spin-off of TransContainer and the liberalization of rail container transportation in mid-2006. In September 2008, flatcars were equivalent to 112,000 TEUs, rising to 116,000 TEUs by June 2009. And while significant investments were made by private operators and leasing companies, the incumbent operator, TransContainer, remains the largest fleet owner with 60 percent of the market, roughly 10 times more than its second-largest competitor *(see figure 26).*

Investments into the fleet are determined by the increase in transportation volumes and by the need to replace old fleet about to be written off due to age. In the future, write-off levels are expected to reach an average of 1,300 cars per year with figures fluctuating from as low as 900 in 2011 to 1,600 cars in 2015. We assume that writeoffs are not dependent on supply-demand balance but by technical regulations.

Required fleet. Fleet requirements are determined by the projected outlook for rail transportation container volumes—whereby total rail container transportation volume will increase 1.5 times compared to current levels and 20 percent compared to pre-crisis levels by 2015. Key parameters are container traffic projection and fleet efficiency.

As container rail is highly capital- and time-intensive, asset efficiency levels (turnaround time and utilization) are key. Factors driving asset turnaround time and utilization are:

Average transportation distance. Average transportation distance is dependent on the geographical blueprint of a particular industry and the transportation flows (split between international and domestic). Although we don't expect significant changes in transportation distance within each segment, the average distance will change due to varying growth rates of different segments, as noted earlier in figure 24.

Share of empty run. In rail container transportation an "empty run" can be treated in two ways. In this specific context empty run refers to the flatcar rather than the container. The container itself represents a cargo to be loaded on a flatcar and, in order to balance container flows, empty containers are transported to the point of the next load. Hence, the "empty run of flatcars" figures are relatively low (2 percent of total transportation distance in the previous period). This is unlikely to increase in the future.

Also, transportation of empty containers represents a significant part of the container transportation market. In 2005-2006, empty containers represented 36 percent of the market, subsequently falling to and remaining at 35 percent of total containers transported by rail.

Time required to load, unload, sort and consolidate containers, and auxiliary operations. These operations are largely dependent on access to, and capacity of, rail container terminals and their coverage of the rail network. In Russia, container handling at terminals is highly concentrated, with the top 10 terminals handling more than 26 percent of containers (in 2008), six of them belonging to TransContainer. Currently, TransContainer is the largest operator of container terminals *(see figure 27).*[6]

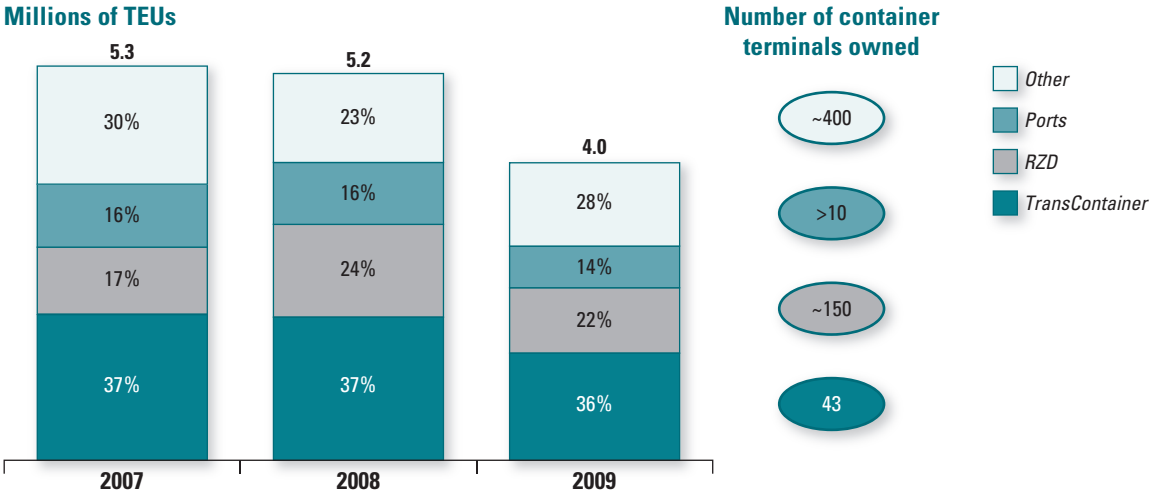
To increase capacity and support growing container traffic investments, many market players are allocating investments to the development of existing terminals and construction of new terminals, including "dry ports."

The time required for operations, relating to container handling at terminals, will have an impact on the overall turnaround time of the fleet, extending the duration by three days for each journey. Based on our forecast for container volumes and fleet efficiency factors, we estimate the overall required fleet to reach almost 57,000 flatcars by 2015 *(see figure 28).*

Manufacturing Capacity: Flatcars

Necessary purchases are determined by the required fleet and expected write-offs based on the fleet age structure. Our analysis finds that approximately 15 percent of the existing fleet will be written off by 2015 and total demand for flatcars by 2015 will be approximately 57,000 *(see figure 29).*

Figure 27
Container handling at rail terminals (MM TEUs)



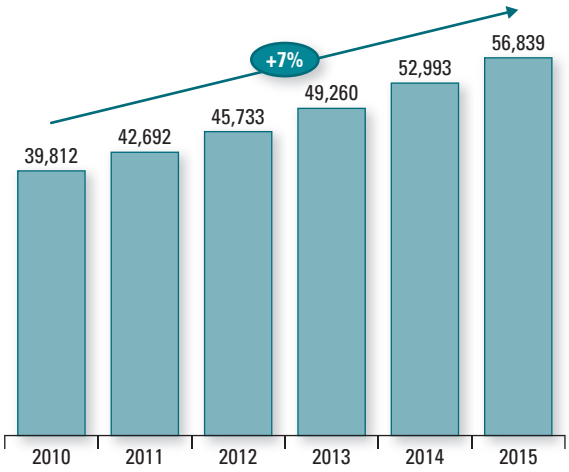
Note: Data for terminals handling 20- and 40-foot containers
Source: RZD database; A.T. Kearney analysis

[6] *In the first half of 2010, there were only slight changes in players' market share: TransContainer (34 percent), RZD (21 percent), ports (16 percent), others (29 percent).*

Figure 28

Required fleet, number of flatcars

Required fitting platforms fleet, units (2010-2015)

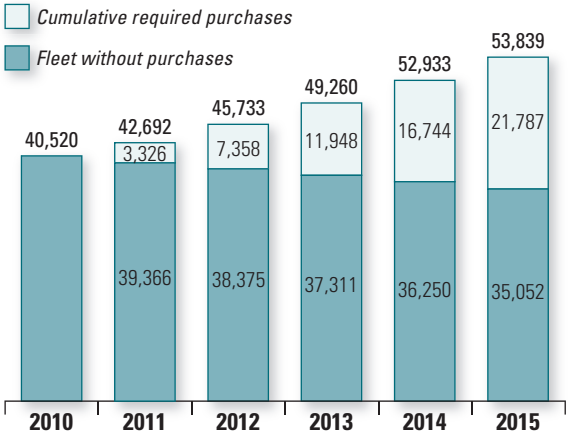


Sources: RZD database, A.T. Kearney analysis, A.T. Kearney fleet forecast model

Figure 29

Approximately 15% of the existing fleet will be written off by 2015

Actual fleet without purchases and required fleet[1] (units, 2010-2015)



[1]*Year-end total fleet includes required fleet and 26,000 railcars used for internal RZD needs*
Sources: RZD database, A.T. Kearney analysis, A.T. Kearney fleet forecast model

Will the manufacturing capacity of railcar producers be sufficient to support the projected growth? We have observed a significant shift in manufacturing capacity from other non-specialized railcars to support growth in rail container traffic, with flatcar manufacturing output steadily increasing over the past few years *(see figure 30 on page 26)*.

Current utilization levels of flatcar manufacturers averages less than 80 percent; at Transmash, utilization levels are around 72 percent; Dneprovagonmash's utilization is just over 80 percent, with the ability to accommodate moderate increases in production. We estimate demand for new flatcars at approximately 5,500 units per year for the period of 2010-2015, which is well below the level of actual production output reached by CIS railcar manufacturers in 2008.

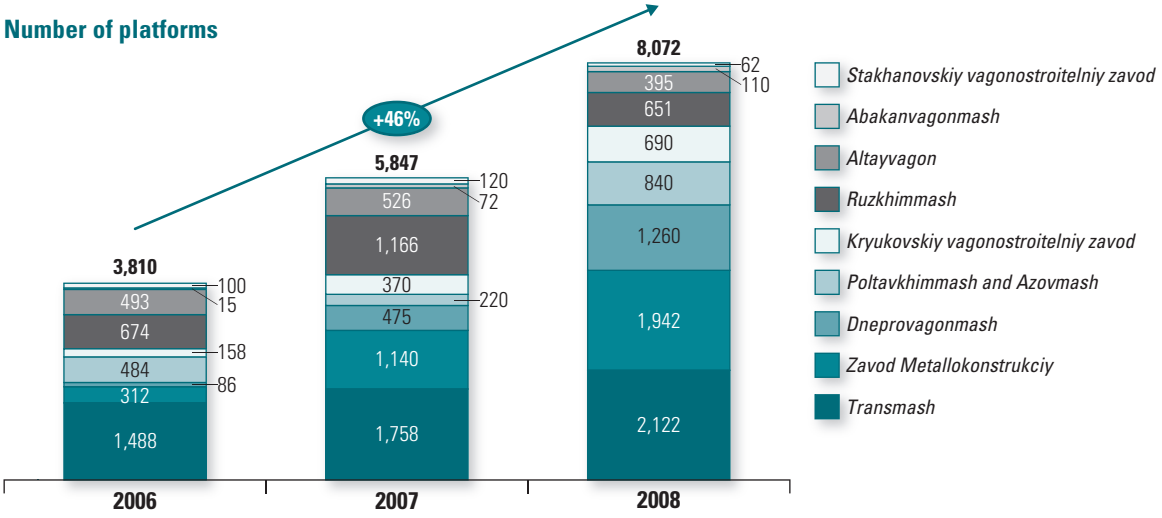
Therefore, taking into account estimated demand for new platforms, current capacity utilization, flexibility of production, and investment and production plans of flatcar manufacturers, overall manufacturing capacity appears to be sufficient to satisfy the growing demand in flatcars.

Conclusion

Containers as a means of transportation are becoming more attractive to shippers of goods as Russia's container infrastructure becomes more developed, the third-party logistics provider market grows, container companies improve their services, and tariffs become more competitive. Growth was long supported by a favorable macroeconomic environment—at least until it faltered following the world financial crisis. Nonetheless, today the Russian economy and those of its trading counterparts are promising a rapid recovery across the Russian rail container market. A full recovery of rail container transportation volumes

Figure 30

Manufacturing output has steadily increased over the past few years



Sources: Expert interviews, InfoLine, Metalinfo, RBC; A.T. Kearney analysis

is expected in 2011-2012. We expect a CAGR of 9.3 percent from 2009-2015, before settling in at 7 percent growth as the industry matures. Container transportation companies and rail-based operators are already adapting to the changing environment. Price was the most important factor in the past, but it is gradually giving way to quality of service and customer care. The industry is moving beyond rail—creating value, developing relationships and building partnerships.

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Appendix 1:

Russian Logistics and the Value-Added Services Market

Let us start by defining the logistics market. For the purposes of this paper, we define logistics as only those services provided on a commercial basis, excluding all in-house operations.

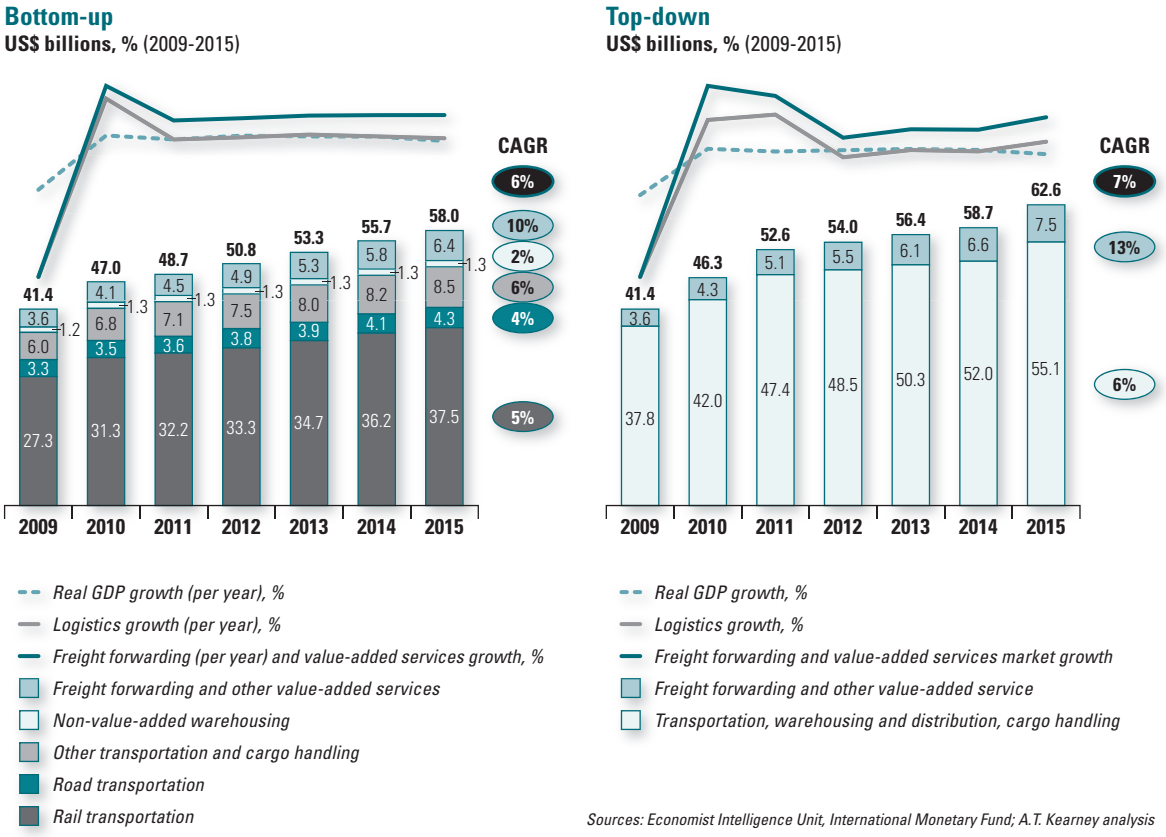
Experts estimate the level of logistics outsourcing in Russia to be approximately 30 percent, compared to 47 percent in North America, 51 percent in Latin America, 66 percent in Europe and 62 percent in Asia-Pacific. We believe that this relatively low starting point certainly implies that the future shift from in-house logistics and transportation services to logistics service providers (LSPs) represents a significant potential for growth.

Supported by growing transportation volumes, demand for better quality warehousing space and increasing interest in value added services, the logistics market is expected to reach US$58 to US$63 billion (in real terms) by 2015 *(see figure 31)*.

The value-added services segment currently represents approximately 9 percent of the total

Figure 31

The growth of the logistics market compared with GDP

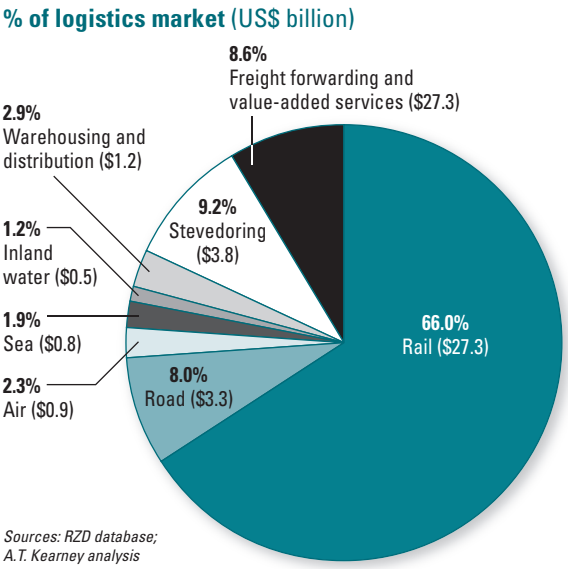


Sources: Economist Intelligence Unit, International Monetary Fund; A.T. Kearney analysis

logistics market in Russia. At a high level this includes all freight-forwarding, logistics management and value-added warehousing services, which are outsourced to either second-party or third-party logistics providers (2PL or 3PL) *(see figure 32).*[7]

Due to the growing complexity of business and supply chains, and the improved range and level of services offered by the LSPs, we expect growth in the freight-forwarding and value-added services segment to be higher than the rest of the logistics market. As shown in our top-down (GDP based regression) and bottom-up (individual development of each market segment) forecasts, the value-added services market could reach between US$6.4 and US$7.5 billion by 2015, accounting for as much as 11 percent of the overall logistics market.

Figure 32
Russia logistics market structure



Sources: RZD database; A.T. Kearney analysis

Appendix 2:

Containerization level by industry (2009 and 2015)[8]

Industry	Containerization level (2009)				
	Domestic	Imports	Exports	Transit	Total
Auto parts and components	7.0%	86.2%	9.8%	67.3%	23.6%
Chemicals	4.9%	24.2%	15.2%	3.6%	9.1%
Construction materials	2.6%	4.6%	1.6%	7.5%	2.4%
Ferrous metals	0.7%	1.6%	2.7%	9.8%	1.7%
Food	9.0%	2.2%	1.4%	13.0%	7.6%
Machinery and equipment	19.4%	28.8%	15.5%	31.7%	21.8%
Non-ferrous metals	19.7%	28.1%	28.4%	4.4%	24.4%
Non-food consumer goods	36.8%	47.2%	9.0%	29.6%	35.4%
Pulp and paper	18.9%	6.0%	58.5%	5.0%	40.5%
Other	0.3%	0.5%	0.2%	1.5%	0.3%
Total	1.6%	4.2%	4.3%	6.9%	2.4%
Empty containers and other	0.6%	1.1%	0.4%	3.1%	0.7%
Total (incl. empty containers)	**1.8%**	**4.5%**	**4.4%**	**7.6%**	**2.7%**

Industry	Containerization level (2015)				
	Domestic	Imports	Exports	Transit	Total
Auto parts and components	12.0%	92.1%	14.1%	74.3%	37.7%
Chemicals	6.0%	29.9%	14.4%	6.9%	10.6%
Construction materials	4.5%	7.5%	2.0%	7.8%	3.9%
Ferrous metals	0.9%	1.7%	3.0%	10.5%	1.9%
Food	8.1%	2.8%	1.9%	13.6%	7.0%
Machinery and equipment	24.2%	33.2%	9.2%	31.8%	25.3%
Non-ferrous metals	20.6%	33.7%	35.2%	5.2%	27.5%
Non-food consumer goods	41.1%	53.8%	8.7%	30.1%	39.8%
Pulp and paper	26.4%	7.2%	63.3%	4.8%	42.3%
Other	0.3%	0.7%	0.2%	1.3%	0.3%
Total	1.8%	6.4%	4.7%	4.9%	2.8%
Empty containers and other	0.6%	1.5%	0.4%	2.7%	0.7%
Total (incl. empty containers)	**2.0%**	**6.9%**	**4.8%**	**5.9%**	**3.1%**

[7] *Freight-forwarding accounts for approximately 70 percent of the value-added segment, warehousing services for 19 percent and logistics management for 11percent.*
[8] *Based on freight lifted, all types of cargo, excluding coal and oil.*

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