

CONCEPT
OF RAIL DRY PORTS NETWORK
IN THE RUSSIAN FEDERATION

Moscow
2011

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Summary

The present Concept shall define technological and organizational interaction of participants of the project for development of Rail Dry Ports (hereinafter DP) network within the territory of the Russian Federation, based on the Russian Railways infrastructure.

The Concept has been designed on the basis of The Strategy of Rail transport of the RF, taking into account upgrade of the customs procedures, the Russian Railways' Concept of container business development, etc. Furthermore, the Concept provisions correlate to the related RF regions development strategies.

System solutions defining basic range of DP services proceed from the analysis of the target market conjuncture and its key trends and include the following:

- DP operating model;
- DP development site criteria;
- DP units and functionality;
- basic parameters of technological processes and unified technology requirements;
- interaction of various transports, etc.

The present Concept classifies DP types (i.e. rail ports, DP, satellite terminal complexes), provides systematic requirements to the basic parameters of DP network establishment and operation.

DP network establishment envisages step-by-step implementation. At first stage core DP network shall be constructed with a view to stimulate potential investors to extend it further into the country regions at the next stage.

The Russian Railways JSC (RR) investments within the project frameworks are expected mainly to provide necessary rail connections to and inside the terminals. That shall include rail track, signaling and control systems, transport hubs development, etc. In addition to that RR contribution to the project shall be made in the form of land sites and warehousing infrastructure ownership rights, engineering, personnel allocation, etc.

The present Concept shall form the basics for the RR terminals and warehousing infrastructure development Program.

The major effects of the project implementation are expected as follows.

- The state – improvement of the national transport effectiveness, logistics services market development;
- The RR – rail transport volumes increase (core DP network is expected to attract additional 100 – 120 mil tons of cargoes), net costs reduction, more effective payback of the investments, optimization of the management of infrastructure.

Major project risks assessment has revealed strong dependence on considerable investments attracted from various sources. Such dependence may be mitigated by effective project management, which brings setting up of effective management company to the project top priorities.

Establishment of DP network based on the RR infrastructure in fact shall mean launch of a national project of innovative development of terminals and logistics infrastructure.

1. THE OBJECTIVES

The Concept development pursues the next main objectives:

- Competitive growth of rail transport freightage by means of modern terminal and logistics infrastructure forming;
- Additional revenue getting at the cost of intensive growing of JSC “RZD” haulage activities, bringing high-yield freight traffic in railroad transport, increase of effectiveness of the assets and facilities usage;
- Attracting investments to the terminal and warehouse complex development.

The Concept interconnects with national, regional, sectorial and corporate strategic documents of various levels on a number of counts. The most important are:

- The Transport Strategy of the Russian Federation till 2030;
- The Strategy of the Russian Federation on the rail transport development till 2030;
- The Concept of customs check and clearance in sites in the vicinity of Russian Federation State border;
- “RZD” holding company development Strategy till 2030 and top priorities of its evolution for medium-term period till 2015 (a project);
- JSC “RZD” terminal and warehouse activities development Concept;
- Comprehensive development framework of “RZD” holding company container business;
- Russian Federation regions’ development Strategies;
- Development Strategies of JSC “RZD” subsidiaries and affiliates (JSC “TransContainer”, LLC “RZD-Logistics”, LLC “Bely Rast DP”, CJSC “Russian Troika” and others);

The Concept position in the interconnect system of various rated policy papers is diagrammatically showed in Fig. 1.1.

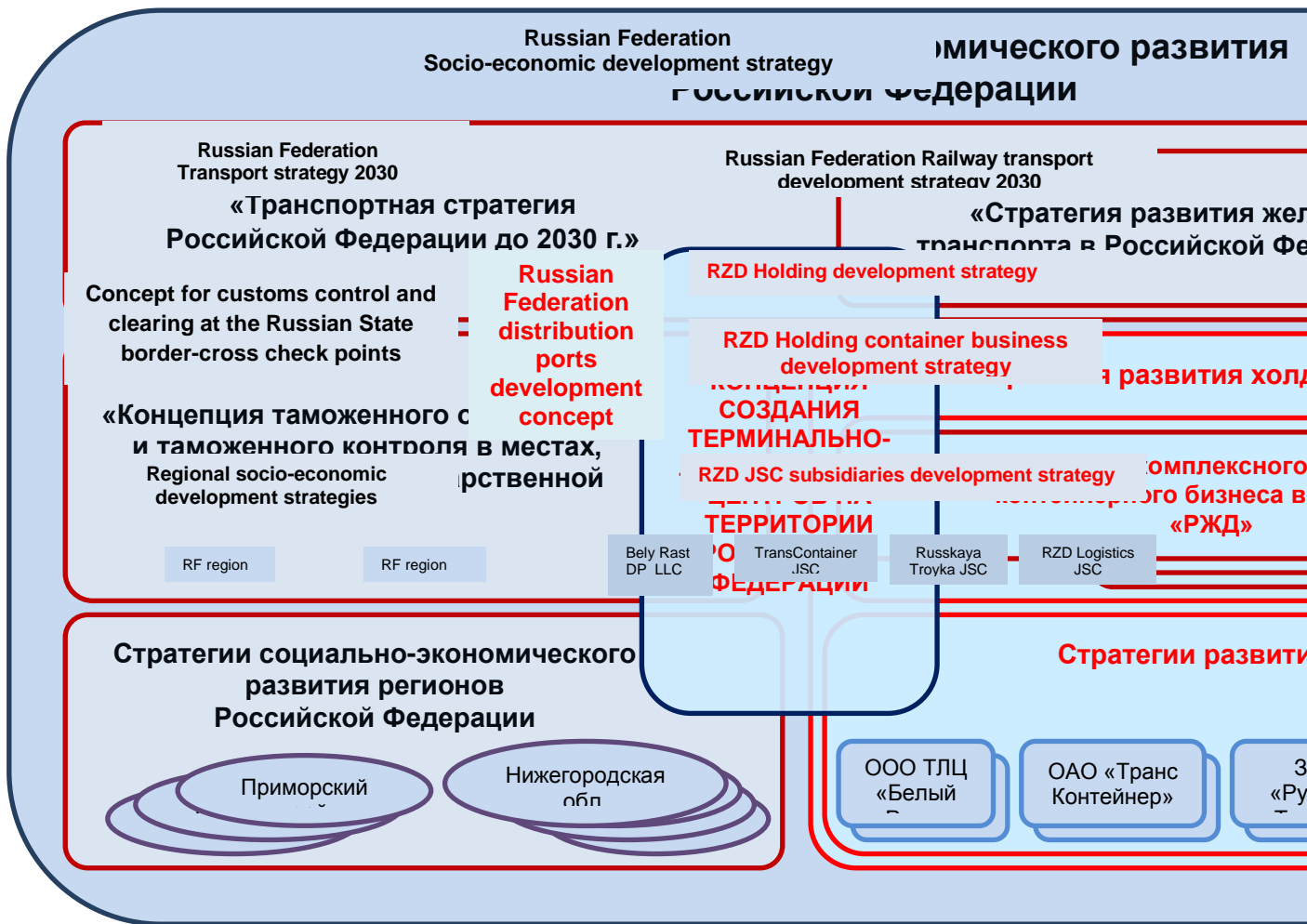


Fig. 1.1. Strategies interconnection diagram.

2. SITUATIONAL ANALYSIS

At present the RR operates terminals and warehouses at more than 545 railway stations. Most of the above assets have been constructed under the national economy planning programs with a view to secure free access of a client to the rail infrastructure (civil construction and warehousing, national security needs, civil transport services, industrial enterprises, municipalities etc.).

As the result of drastic socio-economic changes most of the above facilities are almost non-operational, since they don't meet current demands for the service level. On the other hand some of the facilities retain their strategic position for maintaining national security and regional distribution.

Because of high facilities deterioration and lack of qualified logistic services many clients have preferred to switch to more flexible road transport.

In addition to that many logistics operators managed to create their own logistic complexes, such as Eurosib (St. Petersburg, Novosibirsk), Logoprom (Nizhny Novgorod), National Container Co. (St. Petersburg, Ust-Luga), FESCO, etc.

The above factors have contributed to the cargo outflow from the RR warehousing yards.

According to the Federal Statistics Authority (Rosstat) the total volume of cargo transport (except pipelines and private rail transport) in 2010 amounted to 8365,4 mil tons, cargo turnover – to 2480,5 bil tons/km. Road transport and rail transport constitute the major part of commercial cargo transport (68% and 26,5% respectively). Along with that rail transport share demonstrates decline trend (in 2008 road transport constituted 58,3%, while rail transport – 36,5%).

In connection with the above the following strategic tasks are considered among top priorities of the transport sector:

- Increase of the RR share in the international transport market (with priority in Eurasia);
- Increase of the RR competitiveness as to alternative transports;
- Attraction of additional transit cargo flows to the RR network;
- Additional income gain;
- Modernization of the infrastructure through investments.

Existing cargo flows at the RR warehousing yards shall be assessed first of all. The cargo flows structure, dynamics and disproportions shall indicate the key services, required by the clients.

Warehousing yards cargo flows analysis for the years 2007 – 2010 demonstrated general positive dynamics. Along with that, because of the world/Russian economic crisis the cargo turnover demonstrated sharp decrease starting from Q IV 2008 and throughout the year 2009 (30% decrease in 2009 comparing to 2008). The RR warehousing yards, servicing the needs of preparing to 2014 Olympics in Sochi were the only exception.

In the year 2010 the cargo turnover almost reached the pre-crisis level.

Oil, bulk and construction materials along with containerized cargoes constitute the major part of the turnover. Within that volume non-ISO and ISO containers have been handled in proportion 1:1.

Average cargo storage period is not a long one, which reveals the lack of storage facilities. Along with that warehousing yards located in the vicinity of sea ports demonstrated a longer storage period, caused by necessity to accumulate shiploads.

Analysis of cargo lifting/handling equipment demonstrates average 85% wear/run out. Most of the wear falls to gantry cranes, the lowest wear has been demonstrated by fork lift trucks.

Summarized data on cargo handling are shown in the table below.

Table 2.1. Cargo handling by the RR warehousing directorate, 2010

| Railroad | Containers, TEU | Non-containerized cargoes, tons |
|-----------------|-----------------|---------------------------------|
| East Siberian | 106 818 | 859 440 |
| West Siberian | 843 | 2 423 930 |
| Krasnoyarsk | 48 430 | 91 910 |
| Zabaikalsk | 17 720 | 2 623 160 |
| Kaliningrad | 86 290 | 1 572 100 |
| Moscow | 597 550 | 2 436 260 |
| North Caucasian | 433 690 | 4 360 730 |
| Privolzhskaya | 46 400 | 4 940 |
| Northern | 176 180 | 2 516 800 |
| Gor'kovskaya | 13 350 | 872 240 |
| Kuybyshevskaya | 91 300 | 296 660 |

| | | |
|----------------|------------------|-------------------|
| Sverdlovsk | 163 350 | 186 190 |
| South-East | 61 370 | 1 792 750 |
| Southern Urals | 150 280 | 3 690 120 |
| Oktyabrskaya | 394 310 | 5 930 |
| Far East | 85 350 | 1 311 560 |
| TOTAL: | 2 366 406 | 24 185 228 |

The above figures demonstrate a considerable unbalance of the facilities usage.

Apart from obsolescence and physical wear-out of the lifting equipment (around 85 % of the total park) it doesn't match modern requirements, which prevents the warehousing yards from handling geographically immanent target cargoes. A 80% wear-out of commercial warehousing facilities contribute in addition to that negative impact.

Limited range of services provided by the RR warehousing yards (lack of “door-to-door”, “just-in-time” and other value added services) in combination with non-transparent pricing (comparing to road transport) and complicated documentary procedures are also constrain factors for further development.

Pic. 2.1. demonstrates that for the last 25 years crude mineral cargoes share has increased from 1/3 to 2/3 within the RR cargo turnover. Apparently, this trend is caused not only by raw materials emphasis of the national economy, but testifies to the weakness of terminals and logistics infrastructure.

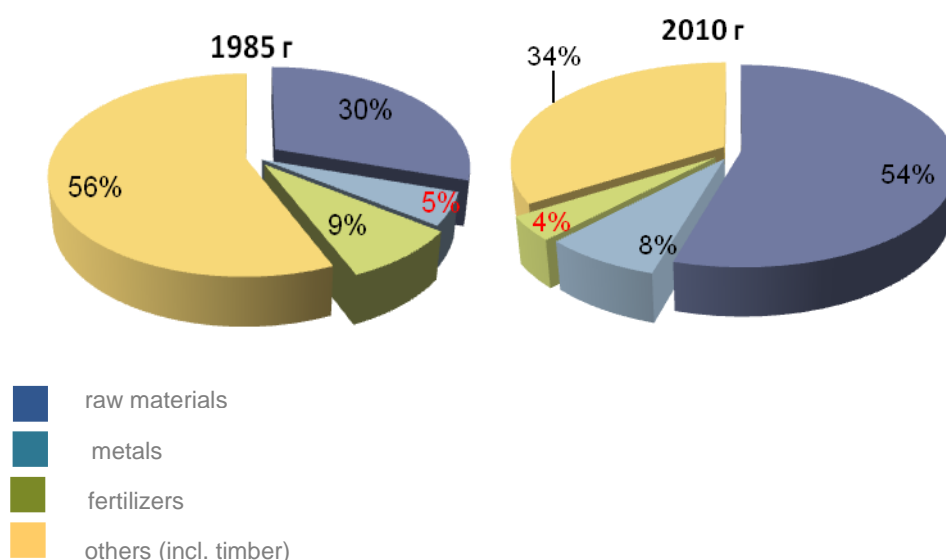


Fig. 2.1. Rail transport cargo turnover breakdown 1985 & 2010.

“Others” section at the diagram above represents the major cargo base of the RR warehousing yards.

Cargoes handling dynamics at the RR warehousing yards is shown below:

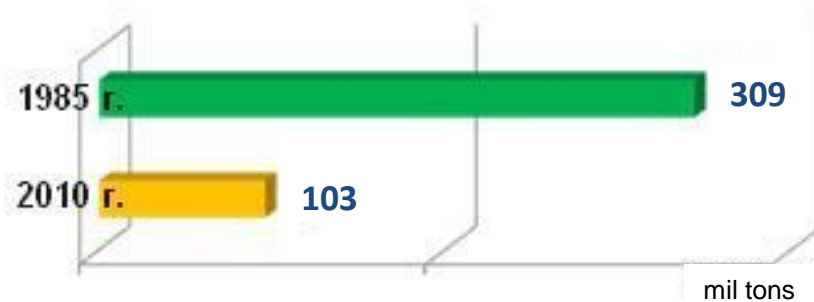


Fig. 2.2. Cargo handling dynamics at the RR warehousing yards.

Thus, the current status of the RR warehousing yards is the major restricting factor for rail transport competitiveness, resulting in increase of the cargo flows switch to the road transport by the clients, demanding punctuality and flexibility of deliveries.

Conclusions:

- High wear-out of the major assets (buildings, communications, lifting equipment, etc.) of the RR warehousing and terminals division;
- Obsolete terminal, warehousing and transport technologies, lack of automatic handling;
- “Unfriendly interface” in clients communication;
- Decrease of the rail transport competitiveness (first of all in general cargoes segment).

3. KEY MARKET TRENDS.

Key trends affecting the cargo rail transport market are as follows.

- Industrial output and per capita income increase;
- RF membership WTO as well as integration of the national economic/transport system into the global market;
- Establishment of the Economic Unity of Russia, Kazakhstan and Belorussia, setting up of the Customs Union by these three countries;
- National logistic services market development including competitive intra-sectoral segments (road and water transport), growth of container cargoes and retailers' share (FMCG) in the national market;
- National financial market development;
- Customs procedures reform.

Industrial sector output growth (1.5 times within last 10 years) is the major factor for generating new cargo flows immanent for the RR warehousing yards.

Population per capita income growth is considered as major influencing factor for general cargoes turnover, since it stimulates the general consumption index.

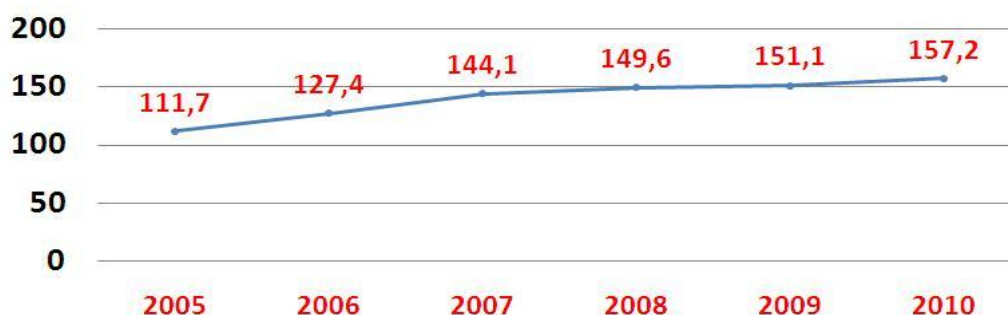


Fig. 3.2. Per capita income growth in the RF (source: Rosstat).

For the last 6 years per capita income has increased 1.5 times, which had positive effect on retail networks distribution in terms of cargo flows generation/consumption.

The retailers, whose cargo flows are regarded as the target for DP (see 3.3.) constitute a considerable part of the market. As per experts' assessments, FMCG retailers networks in Russia amounts to 50 % of retail turnover. This share is much higher in large cities, reaching 60 – 80 % in the segments of household appliances and mobile equipment.

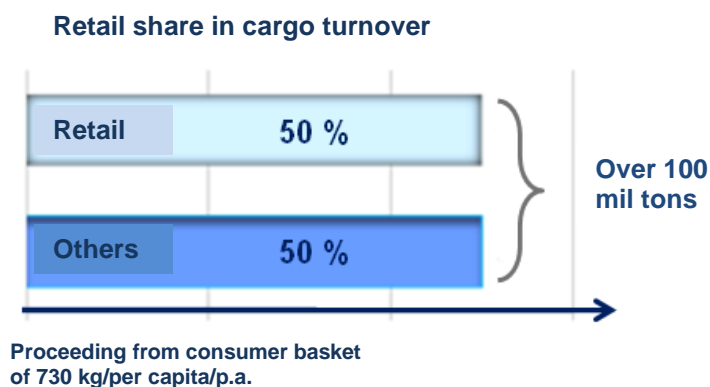


Fig. 3.3.

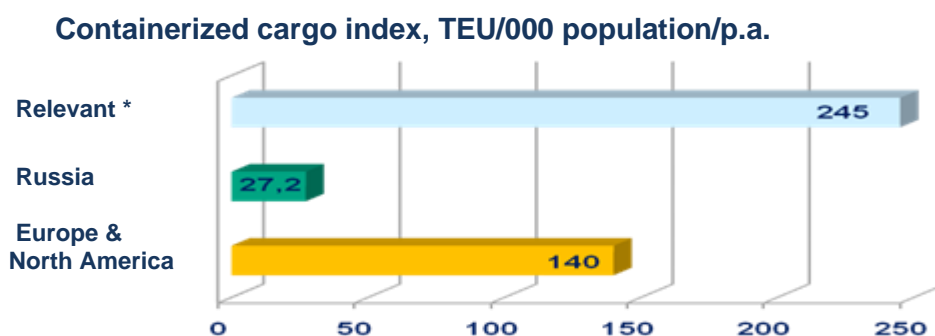
Retail networks share of business volume, source: RBC Agency.

Taking into account the fact that FMCG networks require network logistics solution, this factor may contribute a lot to the RR warehousing yards cargo turnover.

Container cargoes potential growth in Russia is considered as the major factor for logistics services market growth.

AS per DTZ Consulting co., container cargoes index in the EC and North America amounts to 140 TEU/1 000 pers./p.a. The said index hardly reaches 30 TEU/ 1 000 pers./p.a. in Russia. At the same time, data, revealed by “Volgaenergoproekt-Samara”, relevant to Samara region, the level of container cargoes here amounts to 245 TEU (see 3.4. below).

The difference in the above indexes demonstrates container cargoes potential, depending on duly formed, equipped and adequate infrastructure.



* Source: Volgaenergoproekt-Samara JSC (calculated for Samara region)

Fig. 3.4. Containerization level growth potential.

The above trend has been confirmed by assessments of key macroeconomic indexes dynamics within 2005 – 2008, reflecting the trends of active growth of the national logistics markets, commencing new container terminals and other commercial facilities in the field of cargo transport. Cargoes flows analysis reveals 26% growth of container transport (incl. 12 % growth rail transport) at the relevant growth of 7% GDP and 1.8% growth of general cargo turnover (see 3.5.).

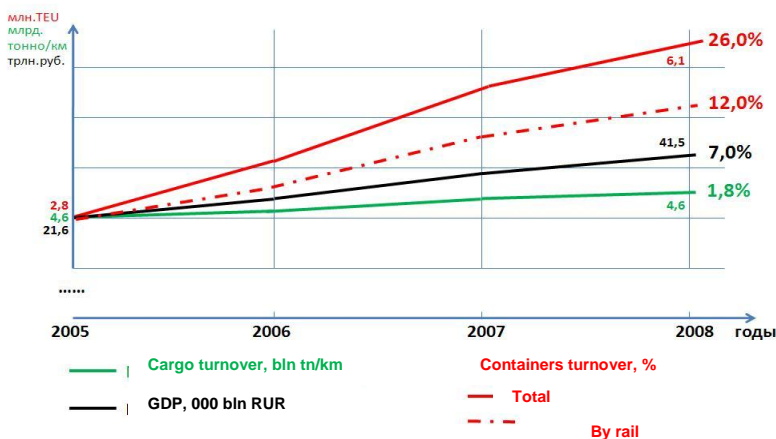


Fig. 3.5. Growth rates of some national indexes in Russian Federation, source: Rosstat.

International transport corridors (ITC) development stipulates harmonization of the national transport legislation with international transport services standards, which shall result in deliveries speed and accuracy, interaction with clients, transparency of cost formation, customs clearance improvement etc. Current lack of high standards in this regard results in outflow of cargoes with high added value, requiring short delivery time and high predictability. Full scale integration of terminals and warehousing network into existing ITCs shall optimize supply chains and has strong potential for reduction of transport costs.

Water transport (sea and inland waterways).

The major trends of water transport development include, first of all, growth of vessels deadweight and expansion of liner services.

Terminal (on-shore) servicing of large sea vessels (ex. 14.000 TEU capacity) requires not only modern and high-capacity lifting equipment, but as well demands effective transport technologies, which may secure quick cargoes inflow/outflow to/from the sea port premises. In this connection improvement of delivery accuracy and usage of back-up logistic terminals are widely applied.

Stable sea lines services (including container, RO-RO and ferries) contribute a lot to maintaining high standards of supply chain management. In addition to that low cost of sea transport secures its high competitiveness at transcontinental transport routes.

Competitive advantages of the national inland water transport shall be affected in the mid-term by the following.

- Poor condition of inland waters vessels (more than 50 % are older 25 years) and waterside engineering structure (75 % were built 50 – 180 years ago);
- Limited shipping points (Nizhne-Swirsky sluice at Volga-Baltic channel, Gorodetsky waterworks facility at Volga river, Kochetovsky wareworks facility at Don river etc.);

- Lack of financing of shipping waterways maintenance (incl. small rivers);
- Road network development competing inland waterways;
- Seasonal nature of inland water transport affects cargoes storage technologies and prevents stable supply chains formation;
- Local nature of inland waterways, long delivery time etc.

Thus, inland water transport shall not compete to rail transport, including the segment of cargoes handled at warehousing rail yards.

Road transport development.

National road transport development is characterized by the following.

On one hand:

- Transport access is increasing with improvement of public roads length and quality;
- Increase in road transport cargo carriage capacity (up to 40 tons), upgrade of operational parameters;

On the other hand:

- Advanced rate of road transport fleet increase over the road network extension rate. For example, in Moscow region road transport fleet demonstrates growth of 7 – 12 % p.a., while road network growth is less than 1 % p.a. Within the implementation period of Federal program “Modernization of the Russian transport system (2002 – 2010)” the road network has been extended for 15%, while road transport fleet has grown more than three times;
- Increase of road transport axial loads leads to intensive wearing out of the road pavement;
- Complicated climatic conditions for road pavement maintenance;
- Great length of the road transport routes (1500 - 2000 km average);
- Seasonal limitations on road cargo transport traffic (most of the regions impose limits on heavy-load trucks from end of April till beginning of June);
- Road safety regulations stiffening related to driver’s work time, environment (Euro-3 and Euro-4 fuel standards, limitations on old commercial trucks access to the national network, noise reduction etc).
- Excessive load of some federal roads and related infrastructure (bridges, border-cross points etc.) has reached 25-28 % of the total network (over 60% in Moscow region), toll roads development just started;

- Insufficient condition of the roads and related infrastructure (62% of the total network) and low level of related services.

Thus, the above factors shall in the short term perspective result in increase of the commercial road transport costs within the range of 15 – 25% , as well as in increase of delivery time up to 15%.

National logistics services market development.

The US logistic market is the most developed in the world (€806 bin turnover in 2008). European market is the next one with €683 bin turnover in 2008.

Global trade dynamics, globalization of cargo flows and complication of logistics and distribution technologies are the main factors of increased demand for complex terminal and warehousing services.

The global trade has lately demonstrated radical changes, caused by trade regimes liberalization on one hand and dynamic development of export oriented sectors in the Asia-Pacific on the other hand. Thus, the global logistics market development was stimulated by shift of manufacturing facilities from the US/Europe to the Asia-Pacific region and increase of the finished goods flows in back direction.

Apart from China the South-East Asia and India are actively involved into the said trend. Pre-crisis global trade volumes between Asia and Europe demonstrated growth of 20% p.a.

3.1. Offer/demand influence factors.

| Demand factors | Offer factors |
|--|---|
| Economy/trade globalization; Cargo flows globalization, extension of world trade routes, complicated delivery schemes; Growing demand for integrated transport communication solutions; Services development and personification, growing demand for quick response to the client's needs, competition growth; Needs for shortening technological/production cycles, changes in the global cargo flows structure; Logistic chains extension/complication environmental aspects for the global transport, producers' strive to waste-free manufacturing. | Privatization of state owned transport and communication facilities; Orientation for complex supply chains management (just-in-time) in order to meet the clients production cycles demands; Merge of new players at logistic market, offering new services packages, new forms of competition; Concentration on profile business with parallel outsourcing of non-profile business processes; New forms of interaction between "majors" and "juniors", multilevel subcontract manufacturing. |

The global logistic market is highly fragmented one. There are more that 50.000 players operating in the market, with 95% of them being small scale companies, restricted in their material and financial capabilities. 30 global players control over 35% of the market share.

Russian logistic market dynamics are shown below.

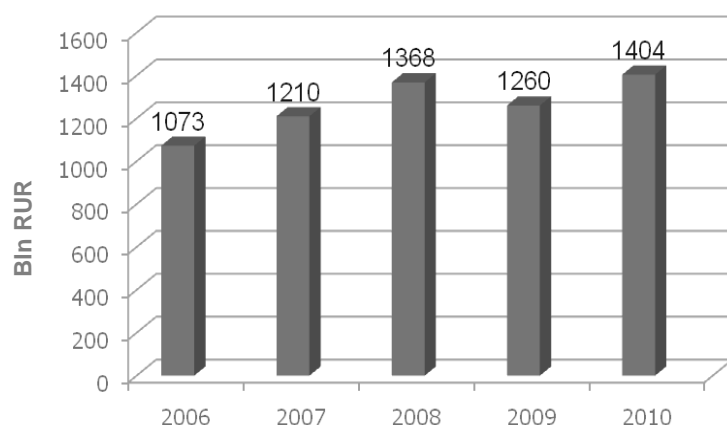


Fig. 3.6.
Growth dynamics of national logistics market, (source: RBC Agency).

To assess the current status and potential of the national transport and logistics market (approx. €35 bin in the years 2008 and 2010), basic parameters of some European markets are stated below for comparison.

According to Armstrong & Associates Inc. Germany is the largest European logistics market (€184 bin. turnover in 2008).

3.2. European transport and logistics markets, 2008 , € bln., %

| Country | Market turnover, € bin. | European market share, % |
|---------------------------|-------------------------|--------------------------|
| Germany | 184 | 27 |
| UK | 116 | 17 |
| France | 109 | 16 |
| Italy | 96 | 14 |
| Spain | 55 | 8 |
| Norway | 55 | 8 |
| Russian Federation | 35 | |
| The Netherlands | 27 | 4 |
| Other | 41 | 6 |
| TOTAL: | 683 | 100 |

National transport and logistics market structure is shown below.

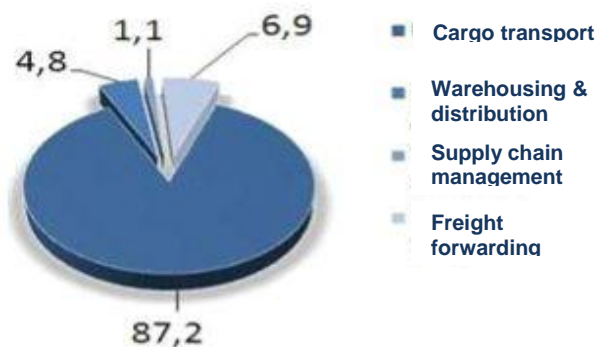


Fig. 3.7.

National market of transport and logistics services structure, % (source: RBCAgency).

As per European classification the major transport and logistics segments are defined as follows.

- Cargo transport and forwarding;
- Complex logistic services including storage and distribution;
- Logistics management including business processes optimization.

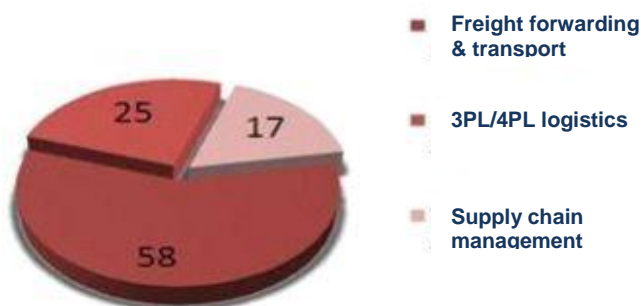


Fig. 3.8.

World market of transport and logistics services structure, % (source: RBC Agency).

Comparison of Russian and global transport and logistics markets reveals certain disproportion of the national market toward cargo transport and forwarding, while global market demonstrates larger share of complex logistic services (door-to-door, supply chain management etc.).

Taking into account globalization trends in the Russian economy, national transport/logistics market development shall be dominated, first of all, by development of complex logistic services. Therefore global 3PL market players consider Russia as their strategic market for expansion. One can see the switch of the global players from international transport to domestic operations in Russia, offering new logistic services and storage facilities of high quality.

Lately the market has been demonstrating trends for alliances between international and Russian providers of logistic services. In such alliances Russian partners are in charge of operational and technical processes, while foreign partners provide technological and IT solutions, as well as management and investment processes.

RBC (Russian Business Consult) Agency experts identify the following major trends in national transport/logistics market within the last post-crisis years:

- The global crisis has boosted the market consolidation, a number of mergers are expected, which will bring new players into the market with considerable capabilities and reputation;
- The clients are expected to tend to the services offered by big and medium logistic providers, which will lead to upgrade of the services and reduction of small/ineffective companies in the market;
- Players with developed regional networks shall dominate the market, providing their services within the whole territory of Russia;
- As competition grows, manufacturers are expected to switch logistic services to outsourcing along with increasing their demands for the quality of services provided by outsourcers. This may result in merge of forwarders and terminal operators in order to improve their services;
- Modern business requires intensive supplies turnover to meet clients' demands. That will require more flexible logistics, which may result in emerging associations/partnerships of terminal operators with a view to offer complex services to their clients.

As per World Bank 2010 Logistics performance index (LPI), Russia's position in the list demonstrated 5 points growth (No. 94 out of 155 countries). At the same time logistics infrastructure was rated at position No. 83, while customs procedures were rated at position No. 115.

Customs procedures upgrade.

At present the RF Customs Authority (RFCA) implements the Concept of customs clearance / customs control in the vicinity of the RF state borders (the Concept was adopted by the State Border Committee on July 9, 2009).

The purpose of the above Concept is to upgrade customs clearance/control procedures through introduction of preliminary customs declaration, application of full-scale customs risks management system in accordance with the global market environment for the goods imported, electronic documents exchange etc. It also focuses on the following:

- Infrastructure development of the regions along the Russian state borders;
- Reduction of excessive pressure on transport networks of big cities/hubs, caused by intensive international trade;
- Securing full payments of the customs fees and duties.

Concept implementation envisages that customs clearance of imported goods shall be effected not at the border-cross checkpoints, but at the customs/logistic terminals, located within the 30-km zone of the Russian state border.

New customs technologies introduction is scheduled as follows.

- Road transport – since 2015;
- Rail transport – since 2020.

Within the Concept implementation frameworks on October 19, 2011 RFCA and Russian Railways agreed on the plan of major steps toward electronic documents exchange, setting up and joint testing of the necessary technological system.

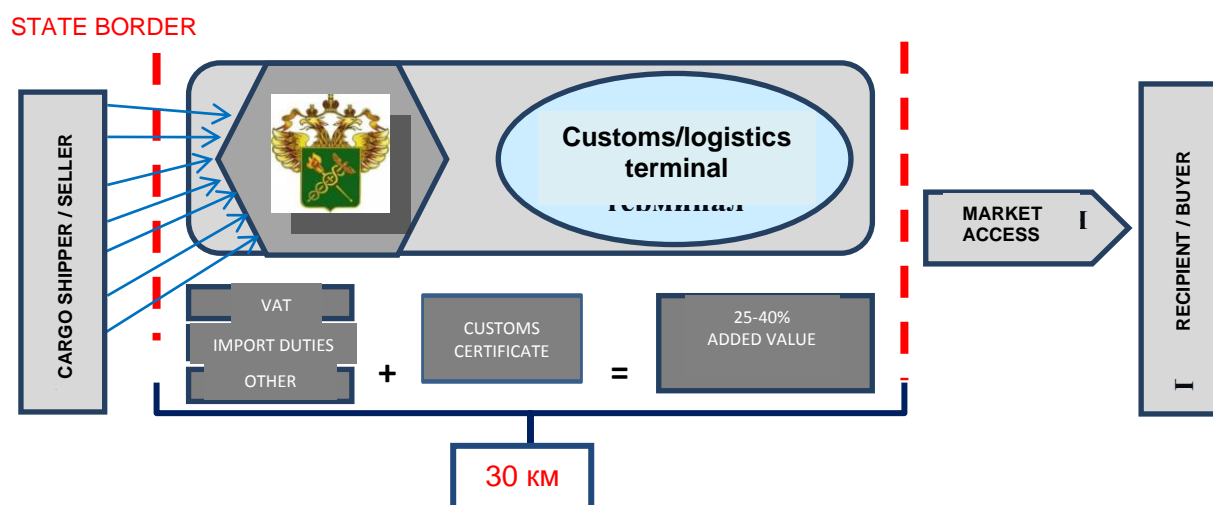


Fig. 3.9. Customs clearance/control scheme stipulated by RFCA Concept for import/export cargoes..

The planned changes may lead to potential risks of cargoes switch from rail to road transport. Such assumption is based on existing regulation by the Customs Code, stipulating that goods/cargoes shall be the subject for customs inspection at the places of the most convenience for the customs (RFCA decree 470 of 08.05.2002). Thus, it may require that rail transport cargoes shall be unloaded for inspection at the customs/logistic terminal next to the state border. Taking into account unpredictability of the time period of customs inspection (correction of the declared customs value, etc.), one may assume that freight forwarders may prefer road transport as more flexible part of their supply chain.

National finance market opportunities.

Taking into account that the project in general demands high volumes of investments, along with the fact that terminals/logistic infrastructure is not among the top priorities of the Russian Railways, investments attraction into the project is regarded as

the most important task. With regard to the above said national finance market opportunities shall be assessed below.

There is a number of Russian and international financial institutions capable of providing infrastructure investments. The most active and effective institutions, operating in Russia, are as follows.

- State corporation “Bank for development and foreign economic affairs” (Vnesheconombank, VEB). VEB actively participates in PPP investments projects;
- VTB banking group (over 20 banks and financial institutions in 19 countries all over the world);
- Sberbank of Russia.

The above institutions have accumulated considerable experience in financing infrastructure projects, such as Ust-Luga sea port (Sberbank), Pulkovo airport reconstruction (VTB), etc.

Apart from domestic bankers international financial institutions are also represented in the Russian Federation.

It should be mentioned that Russian transport sector is of interest for international investors. For example, in the course of “TransContainer” JSC IPO (October 2010), held at RTS and LSE, \$388 mil. were attracted, while demand considerably exceeded the offer.

Conclusions:

- Key trends of the current economic development in the sectors, related to logistics, are favorable for implementation of a wide-scale project of terminals/logistic centers network formation on the basis of the RR infrastructure;
- Delay in project implementation may lead to the loss of relevant market share, decrease of competitiveness and reduction of rail transport income.

4. MARKETING ANALYSIS

Rail cargo transport structure is shown below.

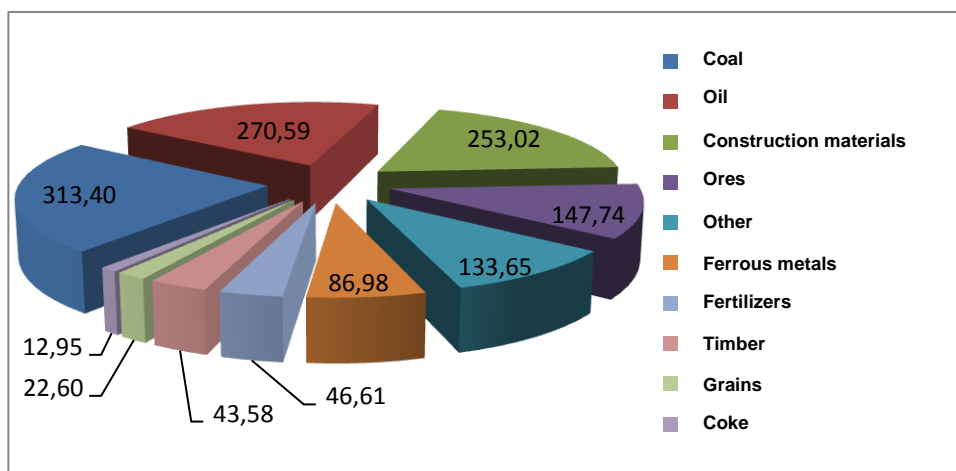


Fig. 4.1. Railway freight cargoes structure, 2010, mln. tons.

Rail transport freight nomenclature, regarded as target segment for DP, is quite wide one. First of all, these are general cargoes, containers, construction materials, cement, steel and non-ferrous metals.

Due to wide range of services, reasonable pricing and, sometimes, unique nature of services, offered by DP, considerable part of freight forwarders and cargo owners is expected to use DP network in their supply chains.

Experts' assessments estimate market share of DP cargo target flows as follows:

- 17 – 20% (43 – 50,6 mil tons) – mineral and construction materials in bulk;
- 10% (4,4 mil tons) – wood;
- 7% (3,3 mil tons) – fertilizers;
- 5% (1,1 mil tons) – grains;
- 5% (10,5 mil tons) – metals;
- 5% (13,5 mil tons) – oil and oil products;
- 20 – 25% (26,7 – 33,4 mil tons) – other cargoes.

Thus, DP target market is estimated in total at 104 – 117 mil tons of cargoes.

Considerable part of DP target cargoes at present is forwarded by road transport.

Road transport cargo flows structure is shown below.

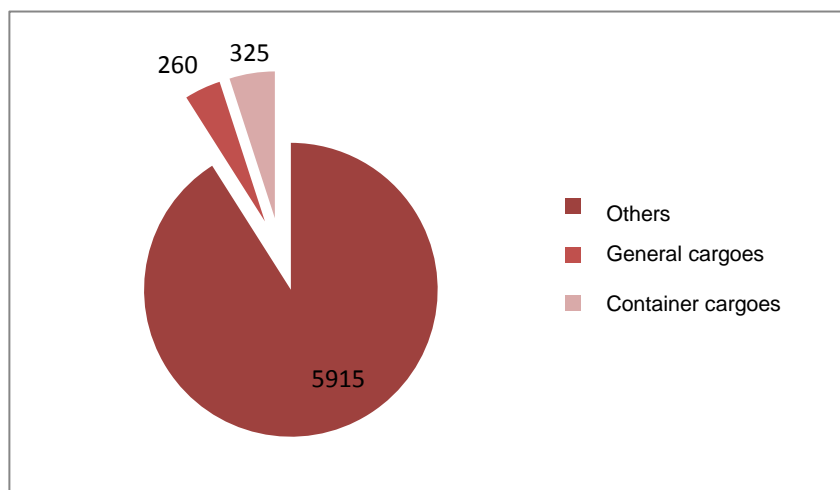


Рис. 4.2. Road transportation market structure, 2010, million tons, Rosstat.

As per experts assessment, DP target market of the road transport cargo flows in terms of relevant market shares is estimated as follows:

7 – 10% (414 – 592 mil tons) – other types of cargo;

30% (78 mil tons) – general cargoes;

50% (163 mil tons) – container cargoes. DP high potential in this segment is estimated, first of all, because of long delivery distances (mileage).

Current DP road transport cargo market is estimated at 655 – 833 mil tons.

The above assessments bring the total DP rail/road cargoes transport target market up to 750 – 950 mil tons p.a. (as per 2010). Along with that the real market share shall not exceed 25 – 30% of the total market share (approx. 250 – 300 mil tons). Taking into account 200 mil tons decrease of cargo turnover at the RR warehousing rail yards within the period of 1985 – 2010 such assumption seems quite realistic.

Export/import cargo flows constitute considerable part of DP target market. For example, the said target market covers around 50% of “TransContainer” cargo flows. DP services, offered to the rail transport clients, together with the customs services, needed by clients in their particular region, constitute major factor of international trade servicing within the particular region.

Considerable changes in supply chains management in favor of freight forwarders and logistics services outsourcing should be mentioned (see below assessment by TransCare). These market trends should be considered properly in the course of identification of DP target market.



Fig. 4.3. Market segmentation and clients' potential.

Thus, meeting the exact demands of the above segment clients shall be the basis to transport and logistics infrastructure project success.

As per experts' assessments the next 5 years shall demonstrate national economy growth (in particular machinery and construction), which may lead to increase of cargo flows, especially high-added-value cargoes.

Picture 4.4. below demonstrates national logistics market dynamic trends (optimistic scenario). The trend envisages growth of rail transport in the supply chains, while terminals infrastructure modernization is regarded as the most substantial factor of such competitiveness.

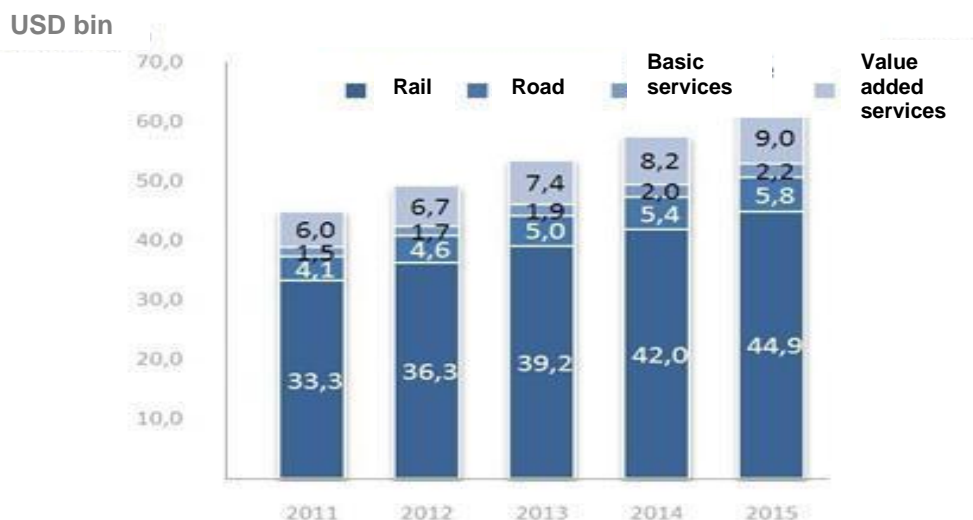


Fig. 4.4. Forecast of national logistics service market growth dynamics, RBC.

Russian market of mail delivery potential is also important for DPs network. In 2010 citizens of the Russian Federation posted 27 million parcels and printed matters. In the short term it would amount to one million tons of postal matters per year.

A supporting potential for mail growth is produced by Internet-trading development and Russia's WTO accession.

Considering insufficient maturity of air transportation for interregional routes, the railway transport, including new types of services providing by DPs network, can become the base for post operators' business development (Russian Post, UPS, DHL, Pony Express, EMS and others).

Cargoes delivery routes comparison.

Taking into account considerable consumption of China-born products by the Russian Federation the alternative delivery routes (sea + rail + road) have been considered below, such as Shanghai – Moscow and Shanghai – St. Petersburg.

The calculations below are made for a single unite of notebook with market value of RUR 30.000.

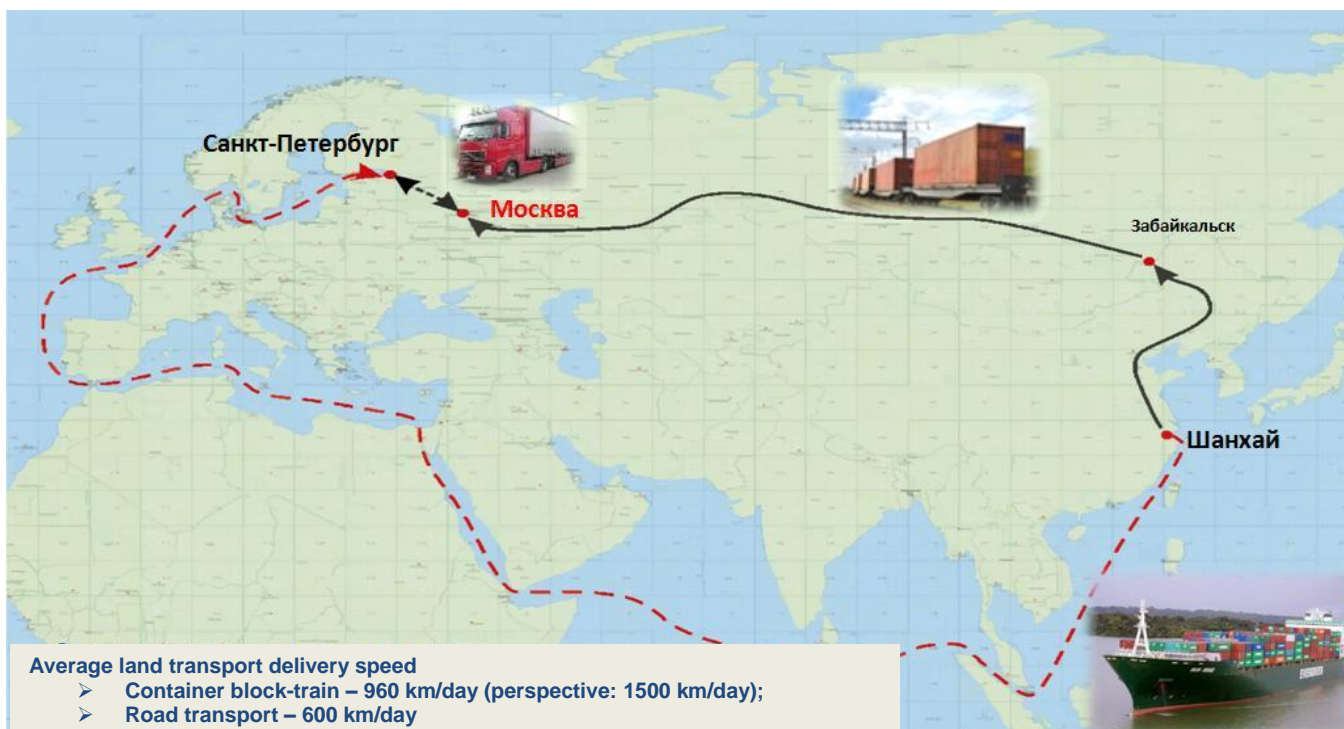


Fig. 4.5. Freight delivery alternative routes.

The cargo routes analysis (see 4.1.) has revealed that goods with high added value are of great potential for rail transport in comparison with the sea routes. Delivery cost increase (0,02% – 0,1% of the original product cost) is less crucial to a cargo owner comparing to delivery time reduction, allowing quicker capital turnover and product marketing capabilities.

4.1. Alternative cargo routes delivery index.

| Delivery routes | | Delivery time, days | Delivery costs breakdown | | |
|--------------------------|------|---------------------|--------------------------|---------------------|--------------------|
| | | | RUR/40F | Cost per unit, RUR. | % of the unit cost |
| Shanghai –St. Petersburg | Land | 26 | 158 700 | 147 | 0,4 |
| | Sea | 45 | 95 600 | 89 | 0,3 |
| Shanghai – Moscow | Land | 25 | 155 600 | 144 | 0,48 |
| | Sea | 48 | 149 700 | 139 | 0,46 |

Apart from that, seasonal goods and goods requiring temperature regimes should be considered as the target market.

Delivery time was calculated at daily average speed of 960 km/h. The container business development Concept’s realization, implementation of “Transsib in 7 days” transportation product and others will bring this index to 1500 km/h, thus, increasing competitive advantage of this transport service.

Optimizing of cargoes delivery time and transportation costs reduction is vital task for the Russian Federation. Considering country’s size, the transportation distances along the Russian Federation territory are much longer, than in any other country worldwide (according to JSC “TransContainer”, average transportation range of TEU is about 4000 km), which determines specificity of transportation problems and necessity of logistics network development.

Lack of linear service determines lower routing level of container shipping, which, for example, on Ussuriysk – Khabarovsk segment equals to 20% (see Tab. 4.2.). Remaining traffic volume on route is held by road transport.

Tab 4.2. Containers flow routing level.

| Block name | Daily station-to-station containerized flow, TEU | | | |
|------------------------|--|------|-------|------|
| | Total | | Route | |
| | 2008 | 2009 | 2008 | 2009 |
| Ussuriysk – Khabarovsk | 1 096 | 712 | 228 | 114 |
| Khabarovsk - Ussuriysk | 821 | 534 | 137 | 68 |

At the same time, the rail route from Ussuriysk to Khabarovsk (635 km) delivers not more than 15% of containers, which confirms potential of container block trains.

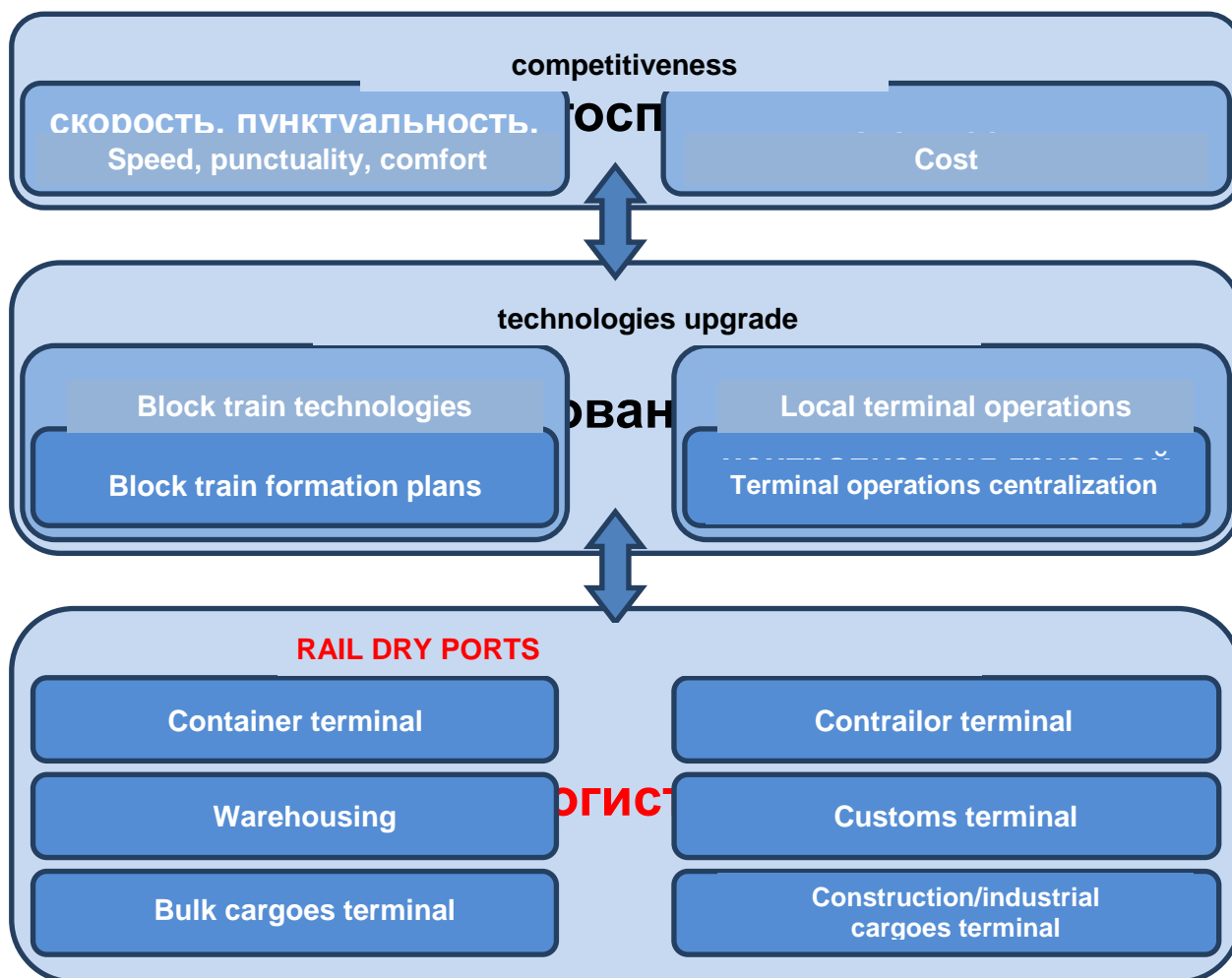
Conclusions:

- DP network services are quite attractive for relatively expensive hi-tech cargoes, spare parts, everyday goods and others (particularly for international cargo flows);
- Logistics companies share increase in supply chain management characterizes demand for up-to-date technological solutions and qualitative infrastructure;
- Real total market volume of railway and motorway traffic, relevant to DP network, comes out to 250 – 300 million tons.

5. COMPREHENSIVE SOLUTIONS.

Competition is the most important driver of economy, resulting in production and distribution enhancement.

Competitiveness is quite important under the current circumstances – effectiveness of transport services should have a major appeal for customer through combination of their qualitative and monetary characteristics.



DP network development is a comprehensive decision. By means of infrastructure modernization, as well as transport service technological advancement both at the level of local activity and trains formation, it allows considerable increase of railway transport competitive advantage.

Special purpose glossary of some terms appliance has been used in the present Concept (such as ‘logistics center’, ‘dry port’, ‘terminal’ and others). There is also a standardization necessity of methodical support for project implementation.

Rail port – core multimodal technological complex, constituting group of special and general purpose terminals, necessary engineering, transport and administrative infrastructure for handling capacity of sea freight handling regions (including unpacking, storage, consolidation, freight distribution and other activities, constituting non-core

business of a sea port), overland border crossings and also, network of terminal and warehouse complexes, aimed at transport processes optimization.

Rail Dry Port (DP) – network multimodal technological complex, involving group of special and general purpose terminals, as well as necessary engineering, transport and administrative facilities for handling transit and regional traffic flows. The complex provides traffic partners with value added service package on basis of up-to-date logistics technologies realization.

Satellite – terminal (group of terminals), connected with DP by integrated handling solution. Actually, satellite is a DP remote object, or special terminal for certain type of cargoes, which processing is impossible or impractical at mother DP territory.

System approach to DP network development in Russian Federation envisages appliance of the next basic solutions:

- **Multilevel functional objects structure (rail port, DP, satellite).**

Network formation of modern terminal and logistics center assumes hierarchy and functional area specificity for every type of network elements, titled in glossary above.

- Organization of **container and piggyback block train service similar to the passenger transport** (linear service) stipulates:

- Setting up an operating domain for regular block trains;
- Service timetable (including terminal handling) by dedicated train paths, regardless of the actual/confirmed shipment orders;
- Substitution of train wagons sorting by terminal freight handling;
- Freight train handling at terminal without breaking within fixed time interval;
- Free customers access to services by means of public information systems.

- **Integrated customs infrastructure** envisages existence of cargo customs clearance centers (customs post, bonded warehouse and others) as part of functional DP infrastructure. This will centralize export/import freight flows at transport hubs and concentrate all types of customs activities in customer-friendly place.

- Implementation of **integrated technical, technological, tariff and investment policy**, in the course of project implementation appears to be an important condition of efficient logistics system development. It also allows to unify technological processes, services and facilities, to provide pricing transparency, including through fares calculation, to apply modern investment mechanisms (public private partnership etc.).

- **Integrated data system** – introduction of united information support system is an important factor of DP network operation, not only as a unitary process system, but also all its parts in terms of operational dispatch management, interprocess communication, effective supply chains management, providing customers with maximum possible volume of information and consulting services.

- Availability of **distributive capacities** as parts of DP infrastructure allows creating conditions for significant extension of provided services, including value added services in the section of cargoes storage and distribution. Taking into account notable lack of efficient commercial real estate properties (particularly in Russian Federation regions) with access to relevant motorway and railway infrastructure, such a factor will increase project attractiveness.
- Location of **industrial capacities** and development of industrial and logistics parks on the basis of DP infrastructure shall induce mutual interest of manufacturers and logistics operators for effective performance purposes. Manufacturers may benefit from cost-savings on the base of optimization of transport technologies, supply chains, stock, assets structure and others. Logistics operators may benefit from scale economy through traffic flows concentration at sites of its massive generation and consumption, multifold possibilities for provision of value added services.

Summation and intercommunication of the said solutions, concentrated within DP network, generating positive environment for organizing numbers of logistics business processes and provides **synergetic effect**.

DP location selection criteria

In order to develop the present Concept of DP, the analysis of logistics market development trends, region socio-economic development strategies, master plans of road junctions extension, development policies of JSC “RZD” affiliates (“TransContainer”, “Russian troika”, “RailTransAuto” and others), terminal and warehouse infrastructure competitive development projects has been made.

In the course of defining DP location, the following factors have been considered:

Basic (determinative):

- maximum use of JSC “RZD” land site ownership rights and other assets. Considering high cost of land recourses and its significant preparative terms for construction (especially within the boundaries of cities), usage of freight yards area and other sources, located in railway right-of-way or in immediate neighborhood, become the priority criteria.
- sufficient rail tracks capacity at the connecting station (or increasing its working capacity in the long view) should enable launch of at least start-up stage of DP complex;
- maximum closeness to main road junction and center of massive cargo flows generation / consumption;
- availability of sufficient utilities capacities (electric power, heat and water supply, etc.) in the area of supposed DP location;
- maximum closeness to main (federal, regional) motorways;

- maximum closeness to urban agglomeration. The factor is important both for DP distribution operations and personnel access to the premises;
- sufficient trains pass capacities of the rail infrastructure in DP vicinity.

Additional:

- Development of DP neighboring territories:
 - A possibility to arrange industrial parks, etc. at land plots in immediate proximity (particularly with high effects on production cost or logistics expenses) creates additional cargo base for DP;
 - Distributive capacities (wood processing, scrap metal recycling plants, storage and trade centers and other). By means of container and customs services DP will accumulate regional FMCG flows, as well as considerable part of industrial cargoes. DP generated incentives (economy scale, reduced logistic costs etc.) shall create favorable environment for distributional functions realization, including modern trade formats.
- Possibility to set up additional facilities:
 - housing area for DP staff (manpower qualitative factor);
 - comfortable and immediate DP and customs personnel delivery to DP premises, including light rail (suburban traffic). Transportation convenience is an important factor of competitiveness under conditions of cities automobile traffic obstructivity.

Tab. 5.1. represents basic **structural and planning requirements** for DP infrastructure, elaborated in accordance with the above said operation principles. These requirements have been applied in the course of pre-feasibility studies for a number of DP projects (rail ports, “Bely Rast”, Nizhny Novgorod, Kaliningrad, Novosibirsk, Kaluga and others).

Tab 5.1. Structural and planning requirements upon DP infrastructure forming.

| № Sr. No. | Objects structure | Minimal parameters | | | |
|-----------------|-------------------|--------------------|-----------|----------|---------|
| | | railway front | number of | property | square, |
| | | | | | |

| | | length, m | railway trucks | extension, m | Ha |
|--------------------------------|---|-----------|----------------|--------------|------------|
| 1 | Customs center – as a part of rail port – as a part of DP | 1 050 | 2 | 1400x160 | 22,4 |
| | | 525 | 3 | 850x200 | 17,0 |
| 2 | Container terminal 20 / 40 / 45 F (linear service) | 1 050 | 2 | 1400x160 | 22,4 |
| 3 | Terminal for industrial cargoes | 850 | 2 | 1200x160 | 19,2 |
| | | 525 | 3 | 850x200 | 17,0 |
| 4 | Con trailer terminal: – transit – end | 1 050 | 2 | 1400x120 | 16,8 |
| | | 525 | 2 | 850x200 | 17,0 |
| 5 | Container service center, business centre, motel, parking lots, trucking company, administration unit | * | * | | 30 |
| Basic facilities, TOTAL | | | | | 100 |
| * | Bulk cargoes terminal | 300 | 4 | 400x150 | 6 |
| * | Multi-purpose warehouse complex | * | * | 600x150 | 9 |
| * | Industrial parks, distributing zone and others | * | * | * | 300** |
| TOTAL | | | | | 415 |

* if needed; ** I. Z. “Vorsino” in the Kaluga region;

In order to provide up-to-date service package, DP should come with next functional zones:

- Logistics infrastructure:
 - Container terminal, handling container block trains of 71 nominal wagons without train splitting;
 - Con trailer terminal;
 - Multi-purpose terminal for industrial cargoes;
 - Multi-purpose warehouse complex;
 - OOG cargoes terminal;
 - Bulk cargoes terminal;
 - Hazardous cargoes terminal;
 - Customs center;
 - Container maintenance service center.
- Transportation facilities:
 - Railway lay-out of tracks (internal/ external), passenger platform;
 - Motorway system (internal and external), including parking slots for cars and commercial freight vehicles.

- Administrative complex buildings (administration building, motor transport maintenance workshop, etc.);
- Business centre (offices, trade and exhibition spaces, catering services, financial and information support and others);
- Utilities infrastructure (power distribution station, lighting systems, water supply and sewerage, telecommunications etc.);
- DP security system items (checkpoints, video control and fire-protection systems, fencing and others);
- Industrial zone.

Functional model of DP network in correspondence with rail ports and satellites is represented in Fig. 5.1.

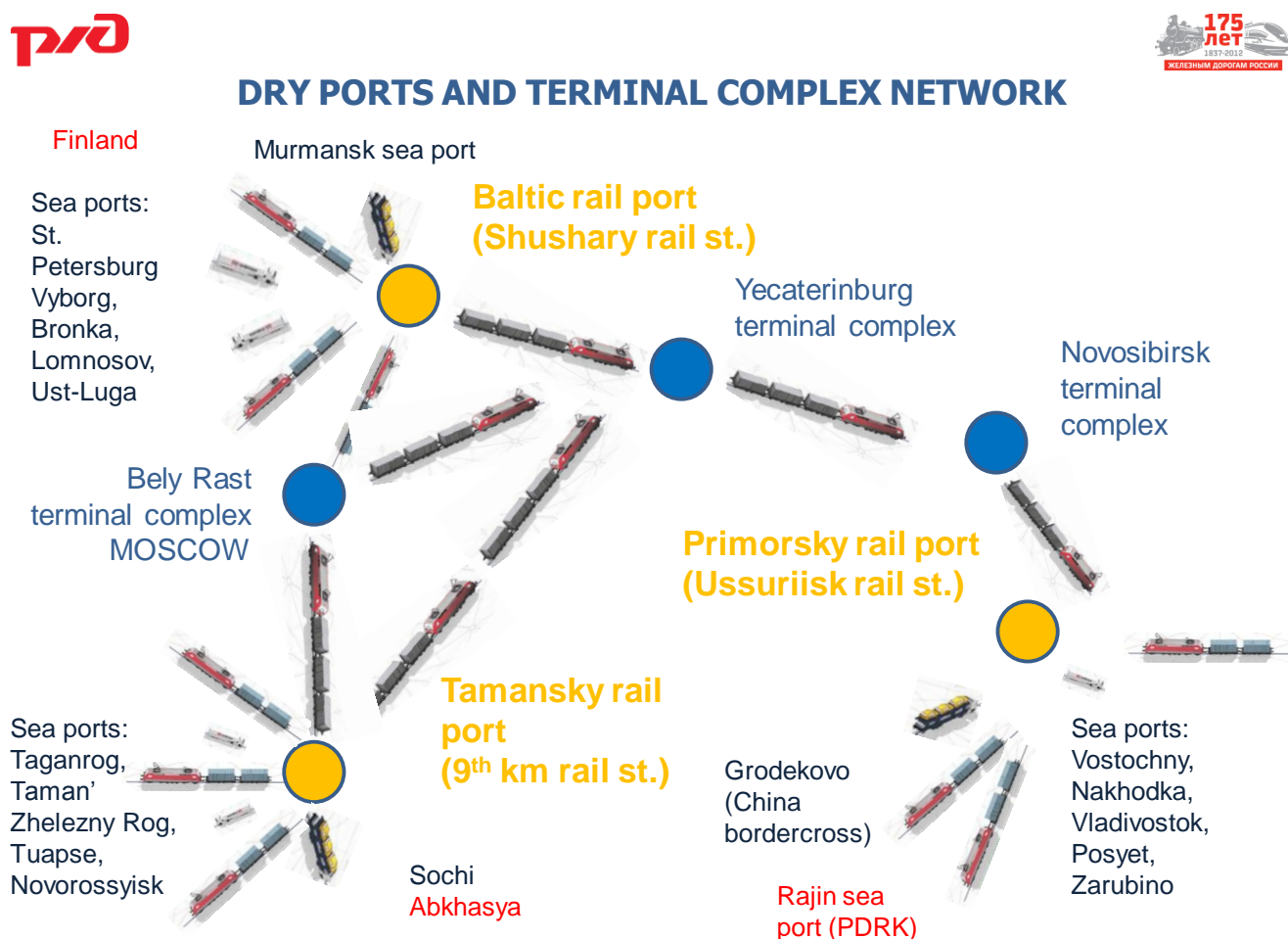


Fig. 5.1. Functional model of DPs network.

Topology of DPs network location on **container block trains services area** is represented in Fig. 5.2.



Fig. 5.2. Full-scale DPs network at 1520 mm rail gauge area.

The Concept accepts the following container trains classification:

- linear (71 nominal wagons length, along a separate direction, for example Baltic states – 57 nominal wagons, by passenger principle for directions “rail port – DP”, “DP – large transport hub” and others);
- route (57 – 71 nominal wagons, “departure station – arrival station”);
- block-train.

Rail ports.

The most important strategic role of DP network development goes to rail ports, which should be constructed in in-land vicinity of sea basins, servicing sea freight and cargo flows on Baltic, in Azov-Black seas region and in the Russian Far East.



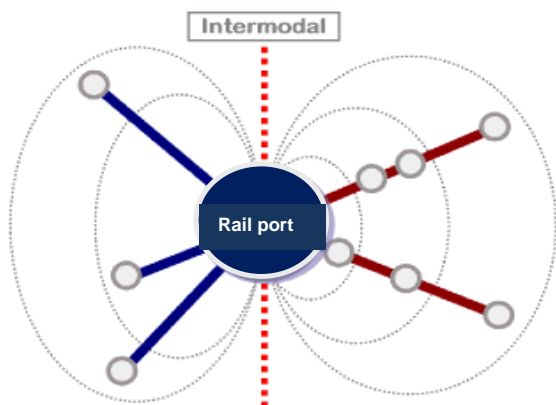


Fig. 5.4.
Technical plan of rail port activity arrangement.

Rail port plays the role of so-called “interface” between various transport systems (sea transport / railway transport / motor transport), as well as “system integrator” in the logistics scheme, providing infrastructural and technological conditions for effective supply chains forming.

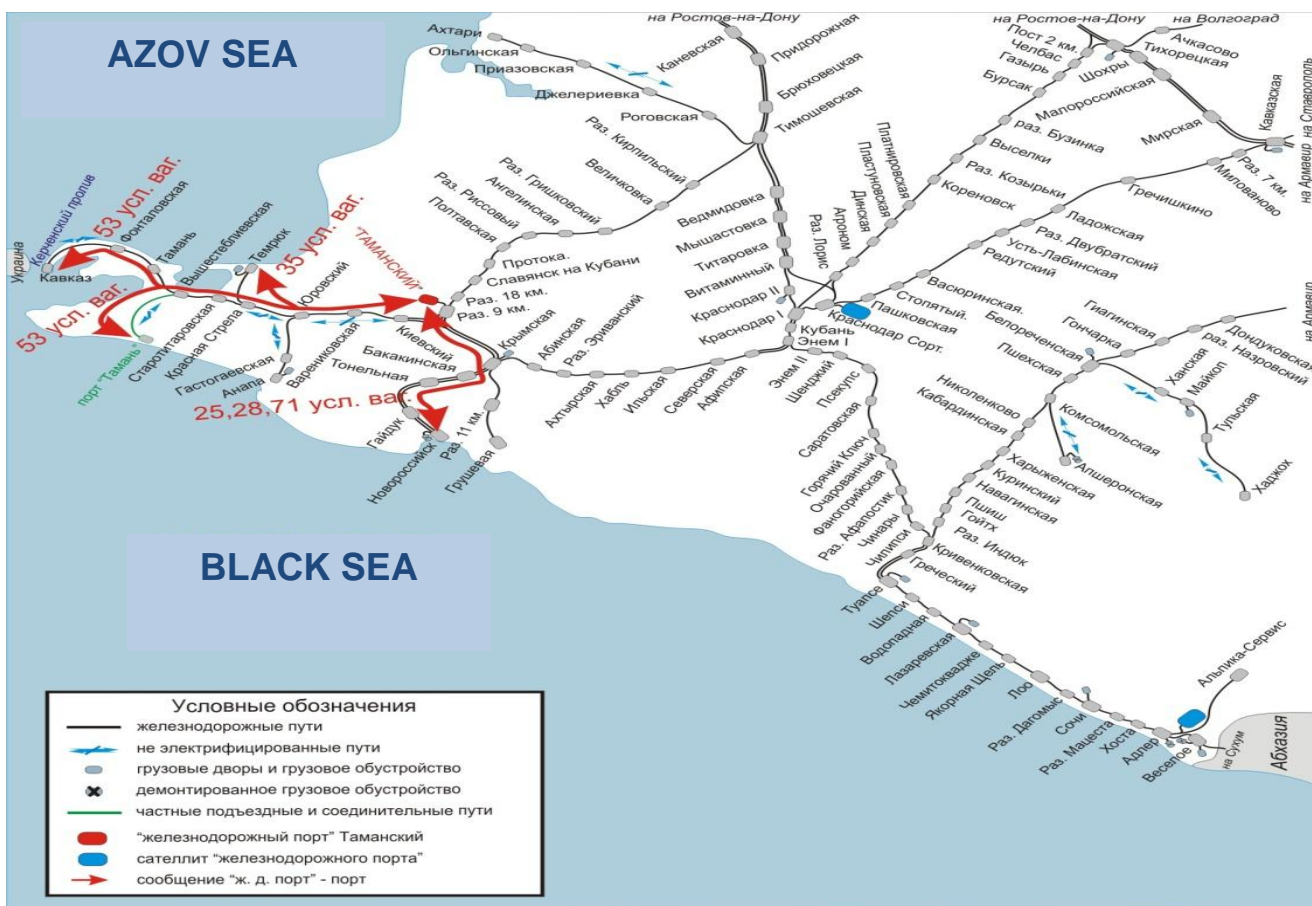


Fig. 5.5. Interaction pattern of rail port “Taman” with rail transport infrastructure of Azov-Black sea basin.

Interaction arrangement charts of rail ports with transport infrastructure of Azov-Black sea region (rail port “Taman”, connecting station - 9km of North Caucasian Railroad) and in South Primorski Krai Region (rail port “Primorsky”, connecting station - Ussuriysk of Far East Railroad) are represented in Fig. 5.5. and Fig. 5.6.



Fig. 5.6. Interaction pattern of rail port “Primorsky” with rail transport infrastructure of South Primorye region.

Freight sea ports Vostochny, Nakhodka, Vladivostok, Zarubino, Posyet, Radjin (Democratic People's Republic of Korea), border-crossings Grodekovo and Kraskino (China), Hasan (PDRK), satellites, based on freight yards of Pervaya Rechka (Vladivostok), Artem-Primorsky rail stations and other logistic infrastructure elements in the Russian Far East tend to rail port “Primorsky” in terms of in-land services.

Master plan of rail port “Primorsky” project (connecting station – Ussuriysk) is represented in Fig 5.7.

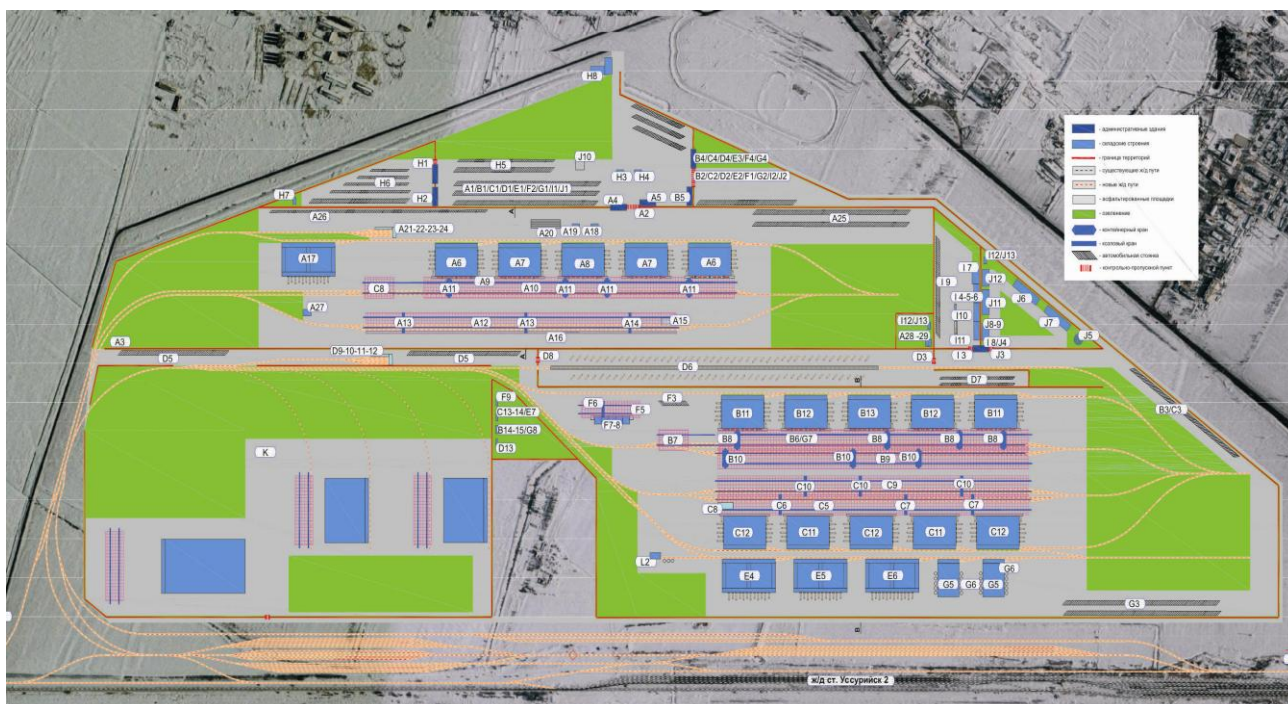


Рис. 5.7. Master plan of rail port “Primorsky” project.

Essential condition of rail ports technologies efficiency is its integration process system with sea ports.

Traditionally dry ports (rearward infrastructure of sea ports) are arranged by stevedoring companies in order to increase handling capacities. Along with that dry ports turn to be an element of joint technological process with sea port, while sea port is responsible just for loading/unloading of sea vessels. All other cargo handling operations (storage, customs clearance, shiploads accumulation, distribution and others) are performed by rearward terminals.

In this case shipping company develops rearward infrastructure for servicing sea freight in-land region (groups of sea ports) taking into account optimization of:

- current port technologies;
- own-design transport technologies;
- intercommunication within the “railway transport – sea ports” system.

Rail ports main functions are as follows:

- withdrawal of non-core operations (storage, repacking and so on) from seaport yards;
- consolidation (shipload lots, train loads etc.);
- distribution (port, region, transit etc.);
- storage (including local commodities exchange trade);
- providing value added services.

Transport technologies realization using rail ports allows to:

- increase sea ports estimated capacity;
- ensure higher traffic efficiency;
- reduce transportation costs;
- reduce investment burden required for port infrastructure development, provide faster port facilities commencement;
- receding “dropped-off trains” environment;
- decrease environmental impact and automobile roads network overloading;

Rail Dry Port

In terms of importance DP appears to be next infrastructure component in hierarchy of terminal and logistic infrastructure development.

At the moment, pilot project of DP construction is being implemented by “Bely Rast” LLC (100% JSC “RZD” daughter company) in Dmitrovsky district of Moscow region, with connecting rail station Bely Rast of Moscow Railroad. Project pre-feasibility study was executed in 2009 by Deutsche Bahn International.

3D visualization of DP “Bely Rast” site plan is represented in Fig. 5.9. and may be regarded as typical in terms of composition and technological zones interaction.

BELY RAST TLC 3D MODEL AS THE NETWORK MATRIX



Fig. 5.9. 3D visualization of DP “Bely Rast” plot plan.

Con trailer transportation

Con trailer transport constitutes important part of DP network service portfolio.

Development of combined transportation (including trailers) is regarded as one of state transport policy priorities in many countries (European Union in particular). The key factors, which determine the regulatory support for that type of transport are reduction of environmental impact, reduction of road network load, increased level of traffic safety etc.

Adverse climatic conditions, improper state and overload of significant portion of road network, long mileage of transport routes, seasonal traffic constraints and other factors create preconditions for this type of transport development in Russia.

Establishment of a Customs Union with Republic of Kazakhstan and Republic of Belarus, active Russia's participation in Eurasian Economic Community, APEC and other communities, evolving the system of international transport corridors provide additional impetus for development of combined transport services, including trailer. Fig. 5.10 represents operational scale of trailer block trains, proceeding from prospects of 1520 mm rail gauge area transit potential.



Fig. 5.10. Full-scale range of trailer block-trains.

Table 6.1. represents basic performance of trailer block-trains planned routes at 1520 mm rail gauge area.

Tab 6.1. Piggyback routes characteristics.

| Route | Length, km | Stops |
|------------------------------------|---------------|--|
| I stage | | |
| Moscow – Helsinki (FIN) | 1 069 | Bely Rast – Buslovskaya – Kouvola (FIN) |
| Saint-Petersburg – Krasnodar | 2 717 | Shushary – Velikie Luki – Bely Rast – Voronezh – Likhaya – Enem |
| Khorgos (KZ) – Grodno(BY) | 5 440 | Khorgos (KZ) – Almaty (KZ) – Astana (KZ) – Ufa – Samara – Nizhny Novgorod – Bely Rast – Velikie Luki – Molodechno (BY) – Grodno (BY) |
| Moscow – Slavkov (PL) | 1 913 | Vorsino – Bryansk – Suzemka – Kiev (UA) – Slavkov(PL) |
| Moscow – Kaliningrad | 1 374 | Bely Rast – Velikie Luki – Sebez h – Elgava (LT) – Dzerzhinskaya – Novaya. |
| Saint-Petersburg – Irkutsk | 5 460 | Shushary – Velikie Luki – Bely Rast – Nizhny Novgorod – Kazan – Yekaterinburg – Tyumen – Omsk – Novosibirsk – Krasnoyarsk – Irkutsk |
| Yekaterinburg – Nikolaev (UA) | 3 232 | Yekaterinburg – Ufa – Samara – Saratov – Volgograd – Likhaya - Ufa – Gukovo – Donetsk (UA) – Nikolaev (UA) |
| Elektrogorsk – Drovino | 244 | express route |
| Vorsino – Kievskaya term. (Moscow) | 80 | express route |
| II stage | | |
| Novosibirsk – Vladivostok | 5 956 | Kleschikha – Irkutsk – Ulan-Ude – Chita – Skovorodino – Khabarovsk – Ussuryisk – Vladivostok |
| Moscow – Vienna (AUS) | 2 323 | Vorsino – Bryansk - Suzemka – Kiev (UA) – Mukachevo (UA) – Bratislava (SK) – Vienna (AUS) |
| Slavkov (PL) – Khorgos(KZ) | 6 939 | Slavkov (PL) – Kiev (UA) – Kharkov (UA) – Gukovo – Likhaya – Volgograd – Astrakhan – Chimkent (KZ) – Kandagach (KZ) – Kyzylorda (KZ) – Almaty (KZ) – Khorgos (KZ) |
| Yekaterinburg – Zabaikalsk | 4 848 | Yekaterinburg – Tyumen – Omsk – Novosibirsk – Irkutsk – Ulan-Ude – Chita – Zabaikalsk |
| Murmansk – Astara (AZ) | 4 873 | Murmansk – Shushary – Velikie Luki – Bely Rast – Likhaya – Volgograd – Astrakhan – Ardzhan – Derbent – Baku (AZ) – Astara (AZ) |
| Moscow - Tyumen | 2 175 | Bely Rast – Yaroslavl – Kirov – Perm – Yekaterinburg – Tyumen |
| Tyumen – Surgut | 705 | express route |
| Saint-Petersburg – Moscow | 650 | express route |
| Bely Rast – Ryazan | 198 | express route |

-- border crossings.

In order to integrate container transport into DP network technological process “rolling-stock – terminal” system specific requirements were determined.

The rolling stock requirements include, but not restricted with the following:

- train length – 71 nominal platforms (train length of 1050m), actual platforms number – 48;
- platform breadth – 3200 mm;
- engineering speed – up to 120 km/h;
- carrying capacity – not less 48,4 tons;
- length of platform – not less 20 m;
- straight deck of platform and train lengthwise secures moving in and out with minimal impediments for vehicles;
- provisions are made for transportation of large containers (20, 40, 45 foot), as well as power supply connection to the wagon.

The terminal requirements are as follows:

- loading/unloading rail track front: 1 050 m (transit) or 525 m (end terminals);
- dib hole width – up to 3350 mm;
- provision of clearance between board of platform and terminal platform edge – 75 mm at each side;
- same level of loading/unloading surface for terminal and platform deck;
- dib hole width should provide free passenger car's passage.

Fig 5.11. represents cross section of contrailer terminal with deepened railway track.

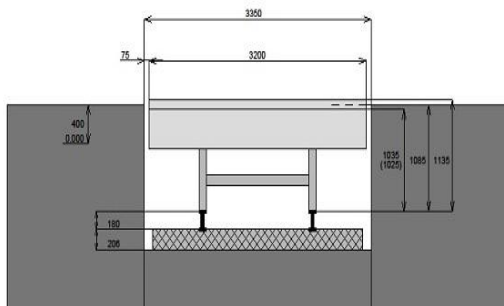


Fig. 5.11.

Cross section of terminal for container transport servicing.

Container terminal construction provides loading/unloading of any type of wheel and caterpillar vehicles, gondola wagons, or direct rail car – auto vehicle reload opportunity.

Integrated customs infrastructure.

Availability of rail cargoes customs clearance opportunity shall become one of the most attractive factors for DP network operation, taking into account development of external trade and import-oriented nature of the national economy.

As of today Russian Federal Customs Authority and JSC “Russian Railways” have agreed on railway customs infrastructure development scheme within the Russian territory (letter by Mr. Belyaninov - Chief of the Federal Customs Authority dated 12.04.2010 №01-15/17799). In December 2011 the RR First Vice-President Mr. Morozov approved Program of the rail cargoes customs clearance centers location at the

Russian Railways network, envisaging development of bonded warehouses network. The Program includes the following:

- topology of customs clearance centers for the RR network;
- standard technologies for customs clearance of rail cargoes;
- Review of “Bonded warehouses network development for the RR” Program.

The program implementation will allow to integrate rail cargoes customs clearance centers into the united DP technological complex, thus, eliminating requirement for customs clearance of rail cargoes in the vicinity of the state borders. Instead, the customs controls shall be shifted into the areas of rail cargoes logistics infrastructure, located in the areas of logistic services to clients (for example, this kind of customs technology allows retailers to minimize financial resources in realizing customs formalities). In contrary to the road transport, non-delivery risk of rail cargo under “customs transit regime” is minimal. Besides, “authorized customs carrier” status of the RR can also guarantee proper customs duties payments prior to the goods delivery.

Rail cargoes customs clearance center is designed as an isolated area of DP territory (see Fig. 5.12. “Bely Rast”), equipped according to the Customs Code demands. It serves to customs storage, clearance and handling of cargoes, imported to the Russian Federation. Customs clearance center includes customs authority (personnel, checkpoint, and so on), fulfilling the whole spectrum of customs formalities (delivery formalities, declarations admission, declared customs value monitoring etc.), and also necessary cargo handling operations at terminals (storage facilities, carrying and lifting equipment etc.). The customs clearance center territory possesses its own protective fence.

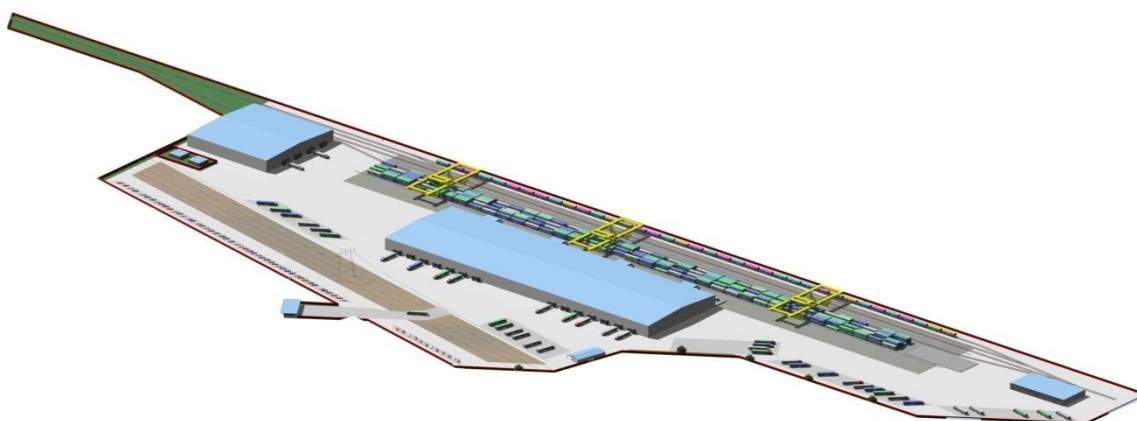


Fig. 5.12. 3D model of “Bely Rast” DP customs clearance center.

Customs clearance center operation at DP would provide competitive advantages for DP network clients, using railroad transportation services, through availability of domestic freight delivery under customs control.

Standard technology concept.

The important feature of DP is integrated cooperation of different types of transports. Standard technology concept, reflecting interaction of different types of transport effective coordination is represented in Fig. 5.13.

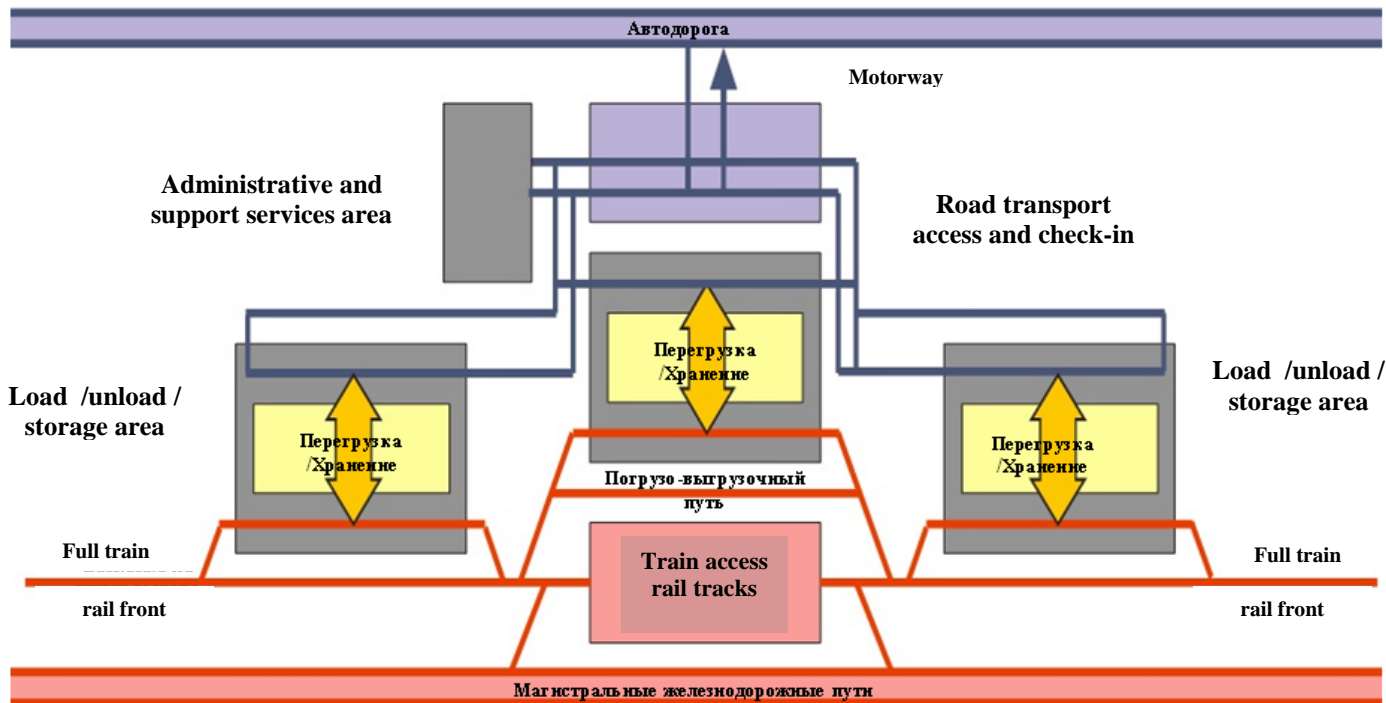


Fig. 5.13. Interaction of different types of transport coordination at DP.

This conclusion must be born in mind at the stage of DP site selection, as well as engineering design studies, including development of DP layout.

Taking into account a considerable DP cargo turnover (for instance, an estimated turnover for “Bely Rast” will be approximately 18 million of tones p.a., which includes road transport – about 30% or 5,5 million tones or 1,5 thousand vehicles of various carrying capacity per day), the adherence of technology concepts, determining the effectiveness of different types of transport’s coordination, turns out as the most important factor of DP operation success.

“Rolling stock – terminals” system

Marine transport demonstrates the most efficient adjustment of “rolling stock – terminals” system to the market demands.

Technological solutions, applicable to DP network, should be aimed at resolving strategic tasks of the Russian transport sector with due consideration of railway transport peculiarities and its development trends.

For instance, comparison of TEU handling parameters at shipyards and rail yards (load per area unit) demonstrate radical difference, which requires application of relevant technologies and equipment.

Table 5.5.
Comparison of container rolling stock characteristics for sea and railroad transport.

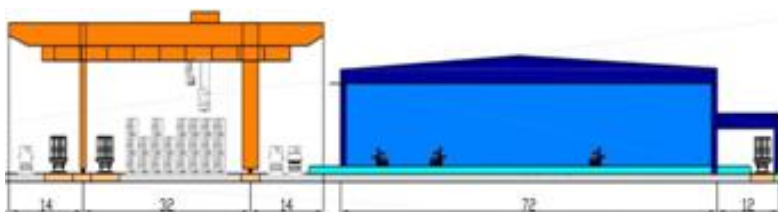
| Rolling stock | Length, m | Capacity, TEU | Specific front loading, TEU / m |
|-------------------------------------|--------------|------------------|------------------------------------|
| CKH–1500 Atlantic Lady | 174 | 1 472 | 9,1 |
| Panamax Wan Hai 501 | 269 | 4 252 | 16,9 |
| MSC Daniela | 367 | 14 000 | 40,8 |
| Container train (71 nominal wagons) | 1 050 | 142 | 0,14 |

Thus, use of rail-mounted gantry cranes for containers loading/unloading to/from container block-trains at DP is most effective, as their technological capabilities and operation peculiarities are most suitable for usage in combination with railway transport. Depending on the terminal’s estimated capacity, several cranes can be adjusted at the same crane runways. Ideal operating space for one crane is 200 – 250 m.

In the course of DP infrastructure forming the next standard technological solutions were considered:

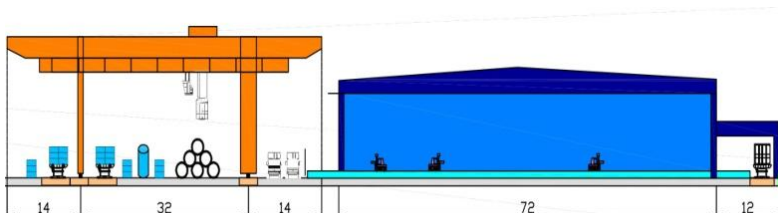
Container terminal with the warehouse complex.

- 1) The rail-mounted gantry cranes are used at container terminals as lifting equipment.
- 2) Multipurpose terminal warehouses should have road vehicles and elevated railway approaches.
- 3) One elevated approach of warehouse complex should be set under the crane’s console for container’s position subject to unloading.



Terminal for industrial-purpose cargoes handling.

- 1) The rail-mounted gantry cranes are used at terminal as lifting equipment.
- 2) Multipurpose terminal warehouses should have road vehicle and elevated railway approaches.
- 3) One elevated approach of warehouse should be set under the crane's console for cargoes delivery to roof-cover storage (warehouse).



The technological concept combined with terminal geometrics, allowing trains handling up to 57 nominal wagons, serves as an important factor of non-container cargoes attraction.

Bulk cargoes terminal.

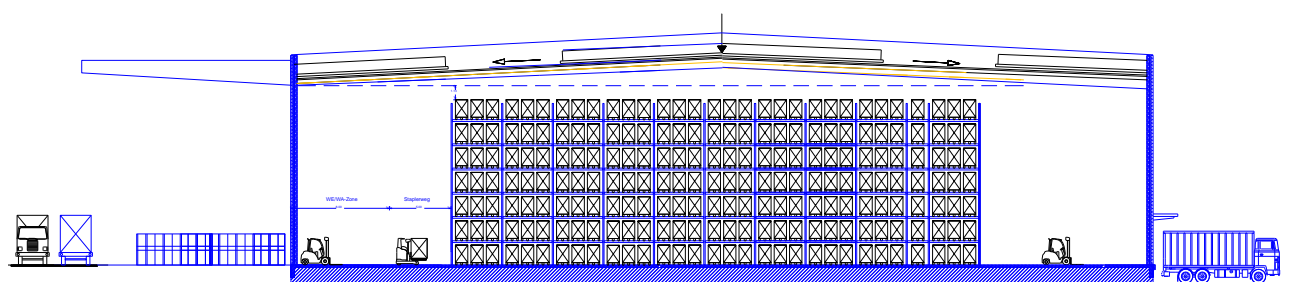
- 1) The terminal has to be settled down separately from other DP objects and possess a separate check point;
- 2) Facilities for unloading and storage of wide nomenclature of cargoes (sand, rubble of various fractions, cement, etc.) should be provided as a part of the terminal;
- 3) As a part of the terminal (or in close proximity to it) it is efficient to provide possibility of manufacturing facilities for construction materials, such as concrete unit, asphalt plant, etc. (industrial part of DP).



Fig. 5.14.

3D model of terminal for mineral and construction cargoes processing.

Warehouse complex.



Utilities and administrative infrastructure, provided for the whole DP premises, allows not only to optimize capital and operating expenditures, but also creates convenient business environment.

At the same time some types of cargoes at terminal processing are difficult in combining (for example, the terminal for mineral and construction cargoes and the class A warehouse complex, which requires stable temperature conditions and dust exclusion, some categories of dangerous cargoes etc.). In this case it is efficient to separate the problematic facilities from other DP terminals, that assumes availability of necessary territory, separate entrances and so on. Thus, in Bely Rast DP masterplan the safety zone of the high voltage power line is used as a natural separation barrier for warehouse complex objects.

This problem may be also resolved by organization of **satellites** – i.e. terminals providing support of DP service portfolio.

The satellites are envisaged mainly on the basis of the freight yards of the RR Central Directorate for terminal and warehouse complex management, and shall form a local support network for a regional DP service portfolio by means of:

- infrastructure specializations and providing "unique" services taking into account prevailing cargoes types in the domicile region, for example facilities,

focused on terminal and warehouse processing and storage of bulk, dangerous, heavy, out-of-gauge cargoes and so on;

- development of the additional service packages focused on local logistic market requirements;
- ensuring the remote service for DP.

Thus, the satellite can be regarded as a specialized terminal (in some cases the management of its activity can be run from DP office), as well as multi-purpose terminal and warehouse complex (for example Surgut freight yard, being the Tyumen’s DP satellite). Capacity, facilities structure, process parameters and the principles of interaction with DP shall be developed in each specific case depending on local conditions.

The organization chart of DP and satellite interaction in multimodal transport is represented in Figure 5.16.

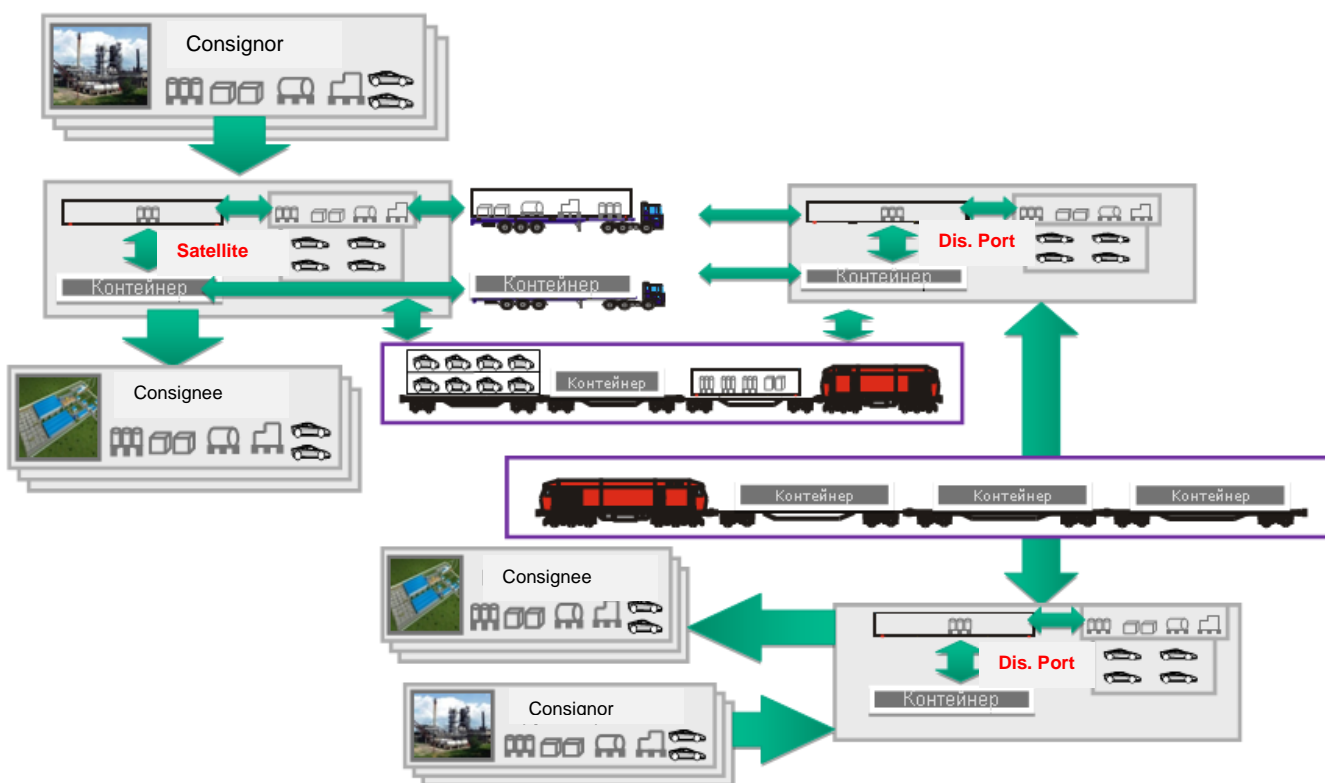


Fig. 5.16. Organization chart of DP and satellite interaction.

Satellites and enterprises of local significance development will provide attraction of new and steady progression of existing freight traffics of regional DP, the fullest and comprehensive service portfolio of the DP and supporting network of local infrastructure significant elements.

First stage of DP network formation.

DP network formation is expected to be in a staged manner. The main choice criteria (except backbone facilities, see fig. 5.1.) for the first stage of DP network formation are:

- Location of priority DPs:
 - along traditional cargo transport routes, in places of the international transport corridors crossing;
 - in large multimodal transport hubs;
 - at the places of generation / consumption of considerable cargo flows, taking into account running preparation activities for the FIFA World Cup of 2018 arrangement;
- High degree of infrastructure readiness for the project implementation (land plots, utilities and transport communications with possibilities for extension), investors, state and municipal executive authorities support, etc.

Results of the first-staged objects definition of the DP network according to the specified criteria with an assessment on a 10-mark scale (the highest point means the greatest loyalty degree of this factor to the project) are presented in Tab. 5.6., the second stage terminals are represented in tab. 5.7.

Among the high priority targets is simultaneous commitment of DP **basic network** – necessary and sufficient number of the terminals, put into operation at the same time, providing infrastructure possibility of unified business process organization and, respectively, achievement of "network effect".

In that case, the basic DP network make:

- rail port “Baltic”;
 - rail port “Taman”;
 - rail port “Primorsky”;
 - “Bely Rast” DP (Moscow region);
 - DP in Yekaterinburg;
 - “Kleshchikha” DP (Novosibirsk);
 - DPs in Kaliningrad, Nizhny Novgorod, Kazan and Volgograd transport hubs.
- } backbone facilities

In the course of design, engineering and construction works it is necessary to consider the expedience of sequence for the terminal capacity commission input, constructions of the DP separate modules, as well as neighboring land reservations for industrial enterprises construction.


| No Item number | DP | International transport corridor | Multimodal hubs | Relevant market volumes | Infrastructure readiness | Total points | Note |
|----------------|-----------------------|----------------------------------|-----------------|-------------------------|--------------------------|--------------|---|
| 1 | “Baltic” rail port | 10 | 10 | 10 | 9 | 39 | Backbone objects Basic network |
| 2 | Moscow (Bely Rast) | 10 | 10 | 9 | 9 | 38 | |
| 3 | “Taman” rail port | 10 | 10 | 9 | 8 | 37 | |
| 4 | “Primorsky” rail port | 10 | 9 | 9 | 8 | 36 | |
| 5 | Novosibirsk | 9 | 9 | 7 | 9 | 34 | |
| 6 | Nizhny Nivgorod | 10 | 8 | 7 | 9 | 34 | |
| 7 | Kazan | 10 | 9 | 7 | 8 | 34 | |
| 8 | Kaliningrad | 10 | 8 | 6 | 9 | 33 | |
| 9 | Yekaterinburg | 9 | 9 | 8 | 7 | 33 | |
| 10 | Volgograd | 10 | 8 | 7 | 7 | 32 | |
| 11 | Khabarovsk | 10 | 7 | 7 | 7 | 31 | |
| 12 | Samara | 10 | 8 | 6 | 7 | 31 | |
| 13 | Voronezh | 9 | 7 | 8 | 7 | 31 | |
| 14 | Bryansk | 9 | 8 | 6 | 7 | 30 | |
| 15 | Kirov | 9 | 7 | 6 | 8 | 30 | |
| 16 | Ufa | 9 | 8 | 6 | 7 | 30 | |
| 17 | Ulan-Ude | 10 | 7 | 6 | 7 | 30 | |
| 18 | Krasnoyarsk | 10 | 7 | 6 | 7 | 30 | |

| № item number | DP | International transport corridors | Multimodal hubs | Relevant market volumes | Infrastructure readiness | Total points |
|---------------------|-----------------|--------------------------------------|-----------------|----------------------------|-----------------------------|--------------|
| 1 | Rostov | 10 | 9 | 7 | 3 | 29 |
| 2 | Kaluga | 8 | 5 | 8 | 8 | 29 |
| 3 | Murmansk | 10 | 7 | 7 | 5 | 29 |
| 4 | Saratov | 9 | 8 | 6 | 6 | 29 |
| 5 | Irkutsk | 9 | 7 | 6 | 7 | 29 |
| 6 | Omsk | 9 | 7 | 6 | 7 | 29 |
| 7 | Arkhangelsk | 10 | 7 | 6 | 5 | 28 |
| 8 | Tyumen | 8 | 7 | 7 | 6 | 28 |
| 9 | Chita | 8 | 8 | 6 | 6 | 28 |
| 10 | Smolensk | 8 | 6 | 7 | 7 | 28 |
| 11 | Astrakhan | 9 | 8 | 7 | 3 | 27 |
| 12 | Orenburg | 8 | 7 | 6 | 6 | 27 |
| 13 | Chelyabinsk | 8 | 7 | 6 | 6 | 27 |
| 14 | Yaroslavl | 9 | 7 | 6 | 5 | 27 |
| 15 | Zabaikalsk | 9 | 5 | 6 | 7 | 27 |
| 16 | Perm | 9 | 8 | 6 | 3 | 26 |
| 17 | Ulyanovsk | 7 | 6 | 6 | 7 | 26 |
| 18 | Makhachkala | 10 | 7 | 6 | 2 | 25 |
| 19 | Kursk | 7 | 7 | 6 | 5 | 25 |
| 20 | Belgorod | 7 | 5 | 7 | 6 | 25 |
| 21 | Penza | 6 | 6 | 6 | 6 | 24 |
| 22 | Mineralnye Vody | 7 | 6 | 6 | 5 | 24 |
| 23 | Vanino | 9 | 5 | 4 | 5 | 23 |
| 24 | Novokusnetsk | 8 | 7 | 5 | 3 | 23 |
| 25 | Lipetsk | 7 | 6 | 6 | 3 | 22 |
| 26 | Tambov | 6 | 6 | 6 | 4 | 22 |
| 27 | Izhevsk | 6 | 5 | 6 | 4 | 21 |
| 28 | Ryazan | 7 | 5 | 6 | 3 | 21 |





Fig. 5.17. Topology of the first-stage objects placement of the DPs network.

All first-stage elements of the DP network and the projects current status are presented in Table 5.8.

Red color focuses the basic network elements, the  badge marks the cities which plan to host the FIFA World Cup in 2018.

Last years experience of preparations for winter Olympic Games in Sochi 2014 shows an important role of regional railway terminal and warehouse infrastructure for servicing cargo flows, increasing in such periods (first of all, construction materials).

Tab 5.8. First-stage objects for DPs network formation.

| No item number | DP | Location* | Maturity / status | Satellites stations loation | Redesigned freight yards |
|----------------|---|--|------------------------------------|---|---|
| 1 | Bely Rast  | Bely Rast station | Management company has been set up | Khovrino, Kuntsevo-II, Moscow-Butyrskaya, Moscow-tovarnaya.-Kurskaya | Dmitrov, Moscow-tovarnaya-Yaroslavskaya, Smolenskaya, Kievskaya, Moscow - Rizhskaya |
| 2 | Nizhny Novgorod  | Doskino station on the base of the freight yard | Business plan | Mokhovye Gory, Arzamas, Vladimir | Kostarikha, Pochinki, Dzershinsk, Balakhna |
| 3 | Yekaterinburg  | Kosulino station | Technological concept | Pervouralsk, Nizhny Tagil, Egorshino, Bogdanovich | Sverdlovsk-Tovarny, Revda |
| 4 | Kazan  | Vakhitovo station on the base of the freight yard | Technological concept | Volzhsk, Kanash, Sviyazhsk | Lagernaya, Yudino |
| 5 | Volgograd  | Maxim Gorky station | Technological concept | Volzhsky, Akhtuba | Sarepta, Volgograd 2, Maxim Gorky |
| 6 | Kaliningrad  | Dzershinskaya-Novaya station on the base of the freight yard | Business plan | Chernyakhovsk, Sovetsk, Baltiisk | Kaliningrad-Sortirovochnaya |
| 7 | Baltic (rail port)  | Shushary station, including the freight yard | Technological concept | Vyborg, Novgorod on Volkhov, Saint-Petersburg-Moskovsky, Saint-Petersburg-Finlyandsky, Gatchina-tovarnaya, Baltic | Saint-Petersburg - tovarnaya - Vitebsky |
| 8 | Taman (rail port)  | siding 9 km | Technological concept | Krasnodar-Sortirovochnaya | Krymskaya |
| 9 | Primorsky (rail port) | Ussuriisk | Technological concept | Pervaya Rechka, Artem-Primorsky I | Ussuriisk, Partizansk |
| 10 | Novosibirsk | Kleschikha station on the | Business plan | Iskitim, Kargat, Novosibirsk- | Inya-Vostochnaya, Mashkovo, |

| | | | | | |
|----|-------------|--------------------------|-----------------------|--|---|
| | | base of the freight yard | | Yuzhny | Novosibirsk-Glavnaya |
| 11 | Kirov | Chukhlominsky | Technological concept | Kotelnich-II | Kirov, Kirov-Kotlassky, Orichi, Kotelnich-I |
| 12 | Khabarovsk | Volochaevka | Technological concept | Komsomolsk on Amur, Vanino | Khabarovsk-2 |
| 13 | Samara | Rail station 1066 km. | Technological concept | Bezmyanka, Kryazh, Zhigulevskoe More, Syzran | Novokuibyshevskaya, Samara, Kinel |
| 14 | Ufa | Dyoma | Technological concept | Sterlitamak, Salavat | Urshak, Dyoma, Chernikovka |
| 15 | Bryansk | Bryansk-Lgovsky | Technological concept | | Bryansk-Lgovsky |
| 16 | Ulan-Ude | Taltzy | Technological concept | Naushki | Ulan-Ude, Sayantui |
| 17 | Voronezh | Maslovka | Technological concept | Liski | Pridacha |
| 18 | Krasnoyarsk | Krasnoyarsk-Severnaya | Technological concept | Kansk 2, Achinsk-Eniseisky | Bugach, Krasnoyarsk, Bazaikha |

* it is defined on the basis of the groups of factors accounting (see p. 41) and is preliminary, changes at the subsequent stages of projects' development are possible.

As of today all the first-stage objects of the DP network have technological concepts – layout decisions are developed, the assessment of possibility connection to external transport infrastructure is carried out, needs for land plots and others are defined.

The Moscow transport hub is one of the strategic points in DP network formation.

The number of permanent residents in Moscow and the Moscow region exceeds 17 million people, which means large volumes' consumption of not only everyday goods (Moscow consumes more than 30 thousand tons of foodstuffs per day), but also cargoes necessary for large-scale construction works. Besides, the Moscow hub traditionally plays a role of a national distribution center.

In 2008 Moscow City Government approved the General scheme of Moscow transport hub development, which is currently under review not only in terms of transport communications, but cargo handling facilities rearrangement as well. The document demands updating, taking into account the realization of "Concept of customs clearance and customs goods control on sites in the vicinity of the Russian Federation border" and, with regard to it, customs infrastructure withdrawal from Moscow city area, extension of Moscow city borders, as well as perspective plan for contrailer service organization,

In the course of present Concept development, the proposals for Moscow transport hub terminal and warehouse infrastructure modernization were drafted and grouped as follows:

- New terminals and logistic infrastructure elements (Tab. 5.9);
- Freight yards subject to reconstruction (Tab. 5.10);
- Freight yards subject to closure and redesign (to Tab. 5.11.).

Key criteria of sites selection for contrailer terminals within the borders of Moscow railway transport hub are as follows:

- possibility of easy passage (by rail transport) of the most intense traffic sectors of federal motorways at the approaches to Moscow and the Moscow Ring Road (MKAD);
- traffic minimization (change of traffic direction) within Moscow railway junction;
- convenient location and possibility of round-the-clock transport service organization, taking into account development of the road network and plans for architectural expansion;
- matching site parameters to the approved parameters of "rolling stock – terminals" system.

Areas of DP influence (including satellites) were defined proceeding from the following key factors:

- Transport accessibility of the terminal complex;
- Competition level on the regional logistic market;
- Population density, structure, placement and production level of the region, generating relevant cargo flows;
- Export-import potential and so on.

Areas of proposed DP network influence are represented in Fig. 5.18.

The areas of DP network impact shall be characterized by increase of the regional logistic market volume, its structural changes in favor of growth of complex service package and SCM. The proper infrastructure will attract global players (large international operator companies), possessing up-to-date transport, logistic and information technologies. Transport costs reduction will be achieved due to their activity, that will lead to increase of competitive capacity of real economy enterprises, intensive growth of their performance and, as a result, intensive growth of logistic services.

Table 5.9. New objects construction.

| № Item number | Cargo terminals | Cargo turnover, thousand tons | | Activity type | | | | | | Correspondence | Note |
|---------------------|--|----------------------------------|---------------|---------------|-------|----------|------|------------|-----------------|--|--|
| | | Fact 2010 | Capacity | Containers | Heavy | Unitized | Bulk | Piggybacks | Export / import | | |
| 1 | “Bely Rast” DP | | 18 000 | + | + | + | + | + | + | All directions, Transit | |
| 2 | Khovrino | | 5 800 | + | | + | | + | + | Saint-Petersburg, Riga, Murmansk, Helsinki | |
| 3 | Moscow – Sortirovochnaya - Kievskaya | | 4 200 | | | | | + | | Bryansk, Kiev, Odessa, Ilichevsk | Within the boundaries of the sorting station |
| 4 | “Vorsino” DP | | 15 000 | + | + | + | + | + | + | All directions, Transit | As part of “Vorsino” industrial park objects (initiative of the Kaluga region), taking into consideration Moscow borders’ expansion |
| 5 | “North Domodedovo” DP | | 12 000 | + | + | + | + | | + | Lipetsk, Tambov, Volgograd, Saratov, Astrakhan, Makhachkala, Baku | As part of “North Domodedovo” logistic park objects, taking into consideration Moscow borders’ expansion |
| TOTAL: | | | 55 000 | | | | | | | | |

Table 5.10. Reconstruction objects.

| № Item number | Cargo terminals | Cargo turnover, thousand tons | | Activity type | | | | | | Correspondence | Note |
|---------------------|--|----------------------------------|-----------------------------|---------------|-------|----------|------|------------|-----------------|---|------------------------------|
| | | Fact 2010 | Capacity exist/potential | Containers | Heavy | Unitized | Bulk | Piggybacks | Export / import | | |
| 1 | Moscow –Tovarnaya - Kurskaya (including JSC “TransContainer”) | 154,8 | 430 / 500 | + | | | | | | Nizhny Novgorod, Vladimir, Kazan, Ufa | Integrated reconstruction |
| 2 | Moscow – Tovarnaya – Ryazanskaya | 143,5 | 700 / 2 000 | + | + | + | | | | Ryazan, Tambov, Voronezh | Integrated reconstruction |
| 3 | Moasco – Butyrskaya | 192,7 | 700 / 2 500 | + | + | + | | | | Saint-Petersburg, Murmansk, Vologda, Cherepovets | Integrated reconstruction |
| 4 | Moscow –Tovarnaya – Paveletskaya (including JSC “TransContainer”) | 1 386,4 | 2 000 / 3 000 | + | + | + | | + | + | Voronezh, Rostov on Don, Novorossiysk, Krasnodar, Astrakhan, Tambov | Integrated reconstruction |
| 5 | Kuntsevo-2 | 630,1 | 1 000 / 2 500 | + | + | + | | + | + | Smolensk, Minsk, Riga, Warsaw, Berlin | Integrated reconstruction |
| TOTAL: | | 2 507,5 | 4 830 / 10 500 | | | | | | | | |

Table 5.11. Redesigned objects.

| № Item number | Cargo terminals | Cargo turnover, thousand tons | | Activity type | | | | | | Note |
|---------------------|---|----------------------------------|------------------------------|------------------------|-------|----------|------|------------|------------------|--|
| | | Fact 2010 | Capacity exist /potential | Containers | Heavy | Unitized | Bulk | piggybacks | Экспорт / импорт | |
| 1 | Moscow – Rizhskaya | 0 | 900 | Freight yard is closed | | | | | | Subject to closure according to the General scheme of Moscow railway hub development |
| 2 | Moscow – Tovarnaya – Yaroslavkaya | 30,4 | 680 | | | + | | | + | |
| 3 | Moscow – Tovarnaya - Kievskaya | 88,0 | 600 | + | + | | | | + | |
| 4 | Moscow – Tovarnaya - Smolenskaya | 188,7 | 600 | + | | + | | | + | |
| 5 | Moscow – Tovarnaya (JSC “TransContainer”) | 570,0 | 1050 | + | | + | | | + | |
| 6 | Moscow-II Mitkovo | 76,7 | 400 | + | + | + | | | + | Coordination Council proposal |
| TOTAL: | | 953,8 | 4 230 | | | | | | | |

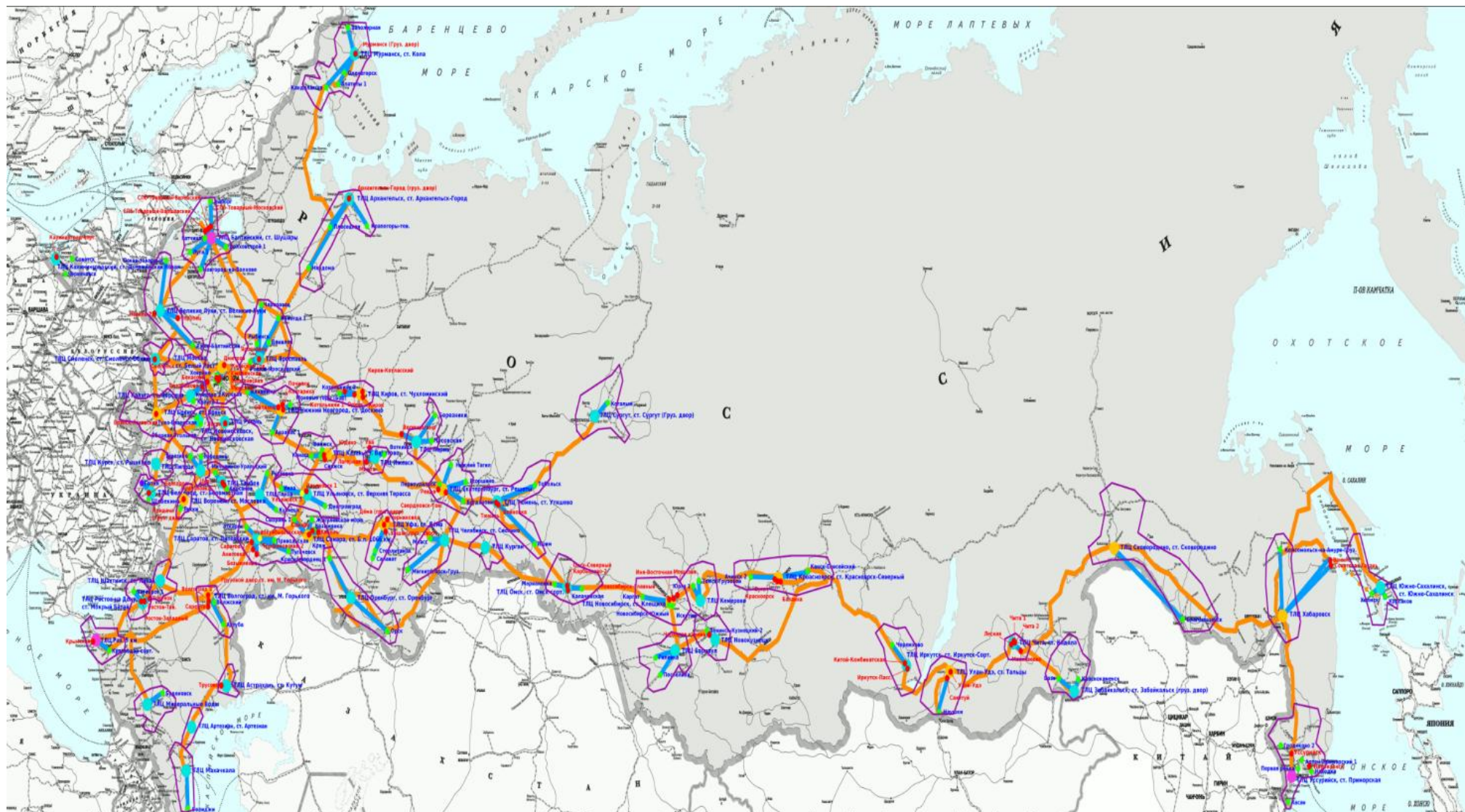


Fig. 5.18. Areas of DP network influence.

Corporate integrated system of IT support.

Availability of specialized corporate integrated IT system (CIS) is one of the most important ensuring conditions of logistic activities in modern multipurpose DP. For effective DP operation it is necessary that CIS structure and its functionality comply with the international standards, including the following:

- forms of data input/output;
- databases access conditions;
- friendly user interface;
- compatibility with widespread operation IT systems, systems of corporate administration (ERP), logistics processes control systems (SCM, WMS, CMS, TMS), etc;
- opportunities of modern Internet- and WAP-technologies.

A CIS, providing management and processes control of the DP network, shall include the following functional modules:

- Warehouse automatic control system (ACS) of high level (including WMS – warehouse management system);
- Container terminal ACS (CMS);
- Container trains ACS;
- Terminal activity ACS (dispatching control of transport, carrying and lifting equipment, loading optimization of storage areas, processing facilities, staff etc.);
- Automated control and accounting of the electric power system (ASKUE);
- Customs clearance of cargoes ACS;
- DBMS – the structured multipurpose database;
- Interactive, multilingual Internet-site with virtual DP functions, allowing calculation of service costs, registrations of orders, fees, cargoes tracking etc.;
- Data exchange interfaces with other corporate and management IT systems of the RR, including: "ETRAN", "The cargo express", "Dispark", "Diskon", ASOUP, etc.

- Systems and means of electronic identification of cargoes, packing and transport units (including RFID).

Standard DP service portfolio includes the following services (see Tab. 5.12.):

Table 5.12. Standard DP service portfolio.

| Services | Groups of services | Service description | Typo of cargo |
|-------------|--|--|--|
| Basic | <ul style="list-style-type: none"> - Loading and unloading - Storage | Load/Unload/Reload from/to railway transport, road transport, secure storage | General cargoes, perishable goods, post items, containerized cargo, bulk, OOG, hazardous goods, vehicles |
| Value-added | <ul style="list-style-type: none"> - Storage - Packing - Shipment | Selection, sorting and consolidation of cargoes, post items, palletizing, marking, packing/ repacking, "last mile" delivery services | General cargoes, perishable goods, post items, containerized cargo, bulk, OOG, hazardous goods, vehicles |
| | <ul style="list-style-type: none"> - Customs clearance | Storage at bonded warehouses, customs clearance, certification | |
| | <ul style="list-style-type: none"> - Service & maintenance - Support - Others | Containers repair/cleaning/desinfection, preparing and execution of cargoes and accompanying documentation, consultancy | |

Besides, business center services, vehicles servicing, petrol station and maintenance of vehicles, forwarders services, insurance and financing agencies, staff recruitment, advertizing activities, cleaning services, developers etc. are regarded as DP business residents, creating additional business environment.



6. PROJECT MANAGEMENT

The RR logistic strategy includes two main directions:

- Operators activity development;
- Infrastructure development.

Specifics of **operators activity development** in the sphere of rendering logistic services assume rather narrow profile of the company operator – key competence. Thus, rendering *specialized* services (transportation by a certain type of transport, certain cargoes, secure storage, terminal processing, etc.) is, as a rule, connected with the relations of the company operator to means of production (tangible assets).

Most frequently used forms are rent or leasing. Rendering *complex* logistic services (combined transportation, supply chains managements, etc.) consists of "system integration" of different services and is built mainly on the basis of "asset light" model (without assets, or assets are non-financial). Tangible assets are created only in key segments for this business. Development strategy of such operators is aimed at improvement of own key competences.

Nowadays the following specialized operators (including the RR subsidiaries) work in various segments of the logistic market:

- JSC "TransContainer";
- JSC "Refservice";
- JSC "RailTransAuto";
- LLC "Customs and Broker Center";
- LLC "TransLes";
- JSC "Rusagrotrans";
- JSC "Russian troika";
- LLC "RZD-Logistics".

According to the "Concept of terminal and warehouse complex management reform" the Central Directorate of terminal and warehouse complex (CM) has to become terminals and warehousing operator upon completion of its reform.

Proceeding from the necessity of ensuring non-discriminatory access to the DP network infrastructure it is expedient that the terminal operator, who is carrying out, mainly, functions of loading/unloading, is independent in his activity from other logistic companies. Besides, formation of effective logistic system on the base of DP network demands implementation of unified technological and tariff

policy, allowing to provide transparency of pricing and punctuality of cargoes transport. In this case it is expedient that these functions are carried out by the united network terminal operator.

In terms of experience, competences, process equipment, personnel, business infrastructure in regions CM seems to be the best option for the RR for the said purposes. Thus, creation of the united terminal operator of the DP network on the base of CM shall make one of priorities of the RR logistic strategy realization as a part of operator activity development.

Unlike operator activity development, assuming concentration on key competences, **network terminal and logistic infrastructure formation** shall demonstrate integrated approach, embracing not only of the needs of each specialized DP operators, but also ensuring effective DP functioning as a part of the common technological complex.

Infrastructure assets possession in non- developed market often defines a monopoly position of the owner in the relevant segment, therefore business interests of specialized operators in the field of terminal and logistic infrastructure development often contradict each other.

One of main goals of modern terminal and logistic network formation is cargo flows attraction on the railway transport, and consequently – the maximum number of infrastructure users (operators). In that case, network design (definition of objects structure, technologies, service portfolio, etc.) and its operation (provision of equal access and convenience of using) solutions shall take into account the most wide range of potential clients. Considering also that formation of the DP network demands massive investments and development skills, none of the operator companies is capable of creating infrastructure on the above said conditions alone.

Thus, for effective management of DP network operation it is expedient to create a relevant center of competences which could turn into a managing company in the future (see Fig. 6.1), possessing the significant investment resources, which structure shall correspond to the basic functional purpose – land owners rights, real estate etc.

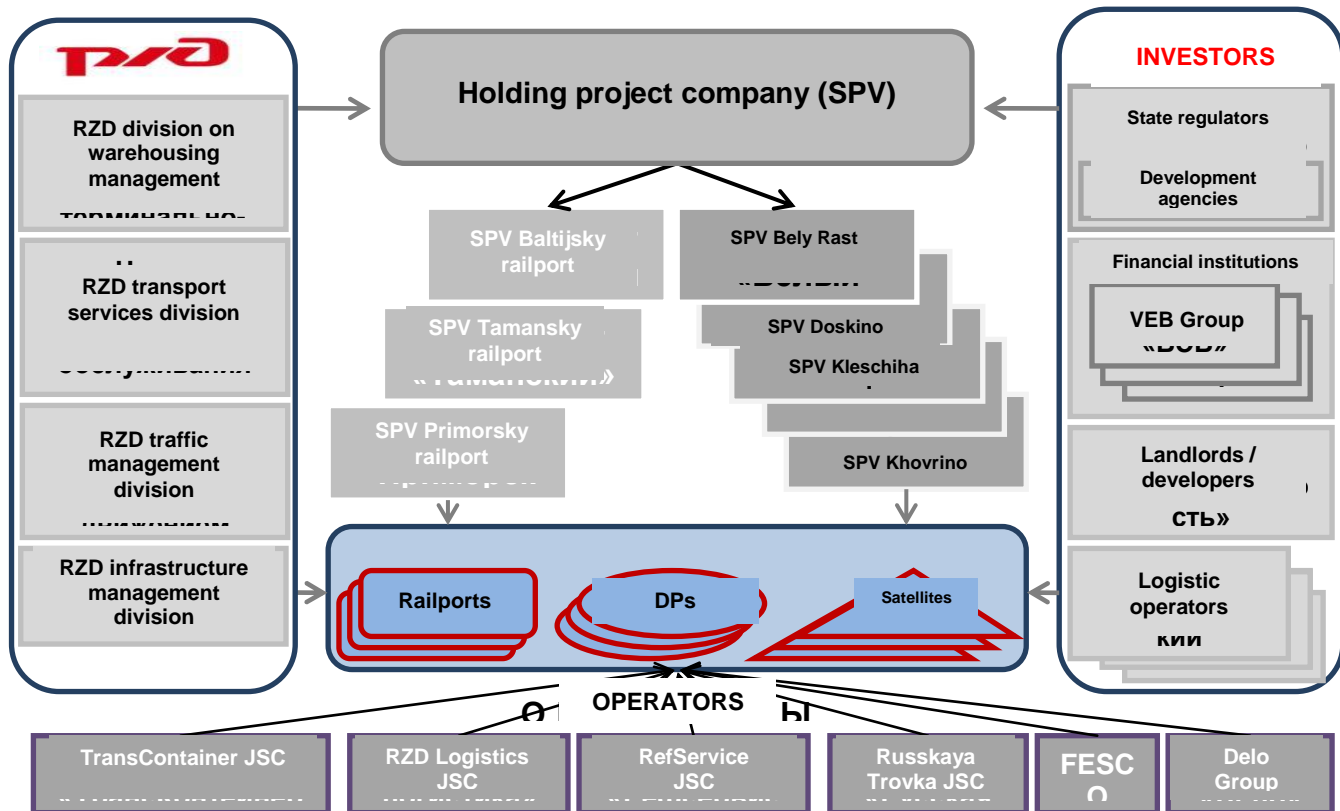


Fig. 6.1. Proposed interaction scheme of the projects' participants.

The main functions of the competence center at various stages of the project's implementation are:

- Sites selection for DP location;
- Interaction with specialized government authorities for preparation of land plots, connection to external utilities networks and transport communications, coordination of development strategies of industrial and logistic infrastructure;
- Interaction with the RR divisions on coordination of railway traffic development programs, strategies of operators development (subsidiaries and affiliates) etc.;
- Definition of optimum investment mechanisms, organization of investment processes (including public private partnership);
- Functioning as owner and developer;
- Maintenance of property assets (buildings, constructions, utility networks, supply lines etc.), including provision of integrated safety, security and utilities services;
- Organization of operators interaction;
- Development management.

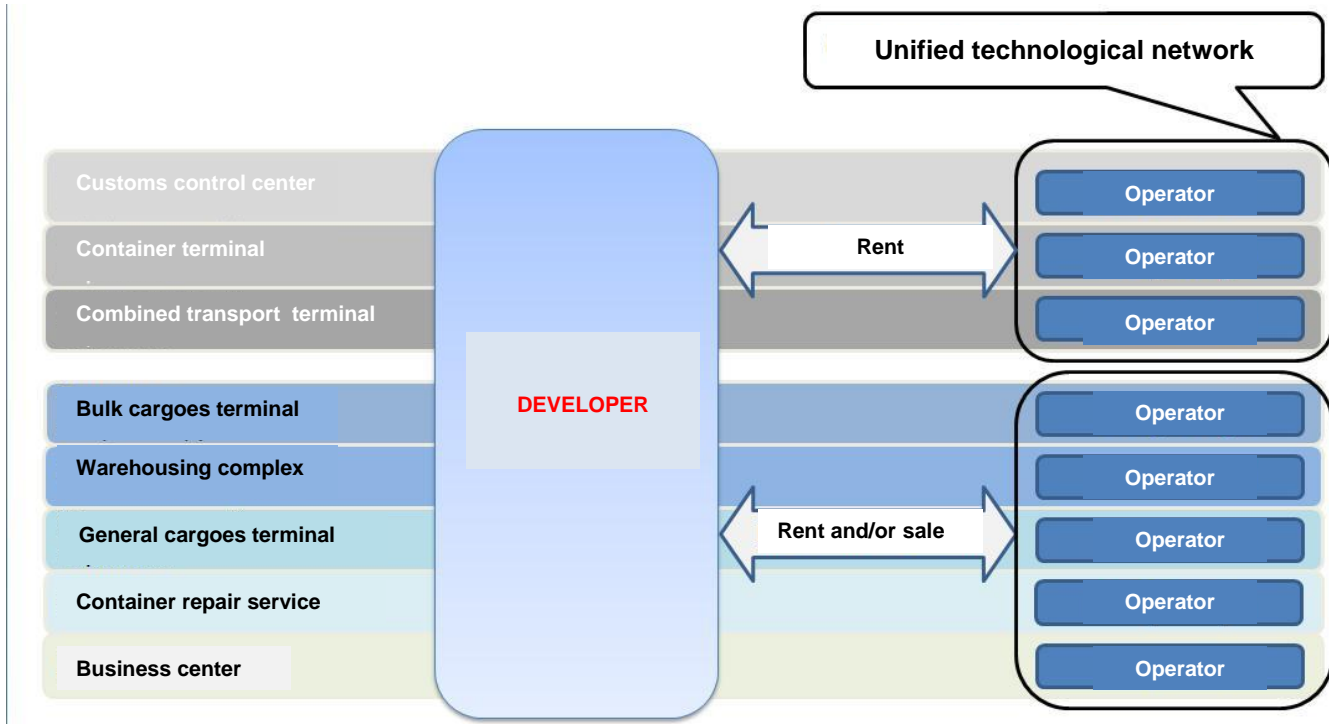


Fig. 6.2. Standard business model of DP project implementation.

Standard business model of separate DP project implementation (see Fig. 6.2.) assumes activities of a developer, supervised by the Managing company (may be done in cooperation with strategic investors, or regional structures, interested in the project implementation, including regional Governments, operators of the logistic services market, financial structures etc.), who would create a property complex for use and/or lease by operators. Along with that, assets (sections of objects, land plots, commercial real estate areas, etc.), which don't constitute network technological complex, may be allowed for sale.

The financial and economic model of the project implementation of DP network formation assumes the following:

- creation of basic network including 3 rail ports, 7 DPs and 29 satellites;
- the RR investment disbursement:
 - railway approaches to DP;
 - authorized capital of managing company (SPV) at the expense of granting relevant land owners rights, property assets, and also part of funds for engineering team support and realization of design and exploration works (before obtaining the construction permits and licenses);
- investors partnership in working capital financing of management company (SPV) and assets construction;

- DP network managing company (SPV) income generation through rent of DP assets at market price.

Realization of the major project demands attraction of massive investment resources from various sources of financing by use of modern investment instruments:

- budgetary investments on the base of public private partnership (land plots, off-site utilities and transport communications);
- direct investments (contribution to SPV charter capital);
- mortgage crediting;
- project crediting;
- development (for example, built-to-suit schemes);
- supply of carrying and lifting equipment by specialized export agencies (for example, Japan, Germany, China, etc.);
- leasing of the load-lifting, warehouse and transport equipment, information products and so on, real estate leasing;
- private investments – utilities infrastructure, fuel station and the CNG filling station, food courts, trade offices, maintenance and car repair, terminal and warehouse activity, commercial real estate and so on;
- complex financing schemes;
- IPO at the stages of SPV further development.

It is important to consider that one of the main beneficiaries from the DP project implementation is the region of domicile, represented by the Government of relevant federal subject. Development of effective industrial and logistic infrastructure brings increase of investment attractiveness, competitive growth of the real economy enterprises, new job places, generation of new business processes and as the result – acceleration of social and economic development of the region. At the same time, a number of key aspects of the DP projects implementation lays in the competence of regional government authorities. Therefore an important factor of successful projects promotion and efficiency is the provision of mutually beneficial cooperation at a regional level according to the following algorithm:

- initiation (put forward by the RR or its subsidiaries, structural divisions, government authorities, business structures and so forth);
- creation of joint working group;
- land plot selection;
- development of provisional specifications for connection to external utilities and transport communications;

- pre-feasibility studies in accordance with structural and planning requirements to the objects of DP network;
- definition of effective project control mechanisms;
- creation of SPV;
- government support provision for priority projects realizations according to the valid regional legislation.

Subjects of interaction at realization of public-private partnership (PPP) mechanisms within the DP construction projects are presented in Table 6.1.

Table 6.1. Interaction within public-private partnership.

| Interaction questions | Departments |
|---|--|
| Correcting of Federal Target Programs | Regional Government, Ministry of regional development, Ministry of Economic Development , Ministry of Transport |
| Development of customs infrastructure | Federal Customs Authority, Regional Government, Federal agency for Russian state border infrastructure development, Ministry of Economic Development |
| State support provision | Regional Government, Ministry of regional development |
| Correcting of transport and logistics infrastructure development programs | Ministry of Transport, Regional Government, municipal authorities |
| Provision of necessary land plots | Regional Government, municipalities |
| Optimizing connection to external utilities and transport communications | Regional Government, municipalities |
| Creation of industrial and logistic parks, technical and economic development zones | Regional Government |



7. IMPLEMENTATION RESULTS

World practice accumulated the vast experience of infrastructure projects implementation results, similar in their parameters and ideology to:

- Logistic villages (Germany – more than 30, Italy, France, the Netherlands, etc.). Most relevant example – Bremenshafen;
- Industrial and logistic parks (Great Britain, USA, Germany, France, China, etc.);
- Technical and Economic Development Zones, areas of export processing, special economic zones, open cities, etc. (China).

Experience of People's Republic of China (PRC) in this regards deserves special attention. For example, during the years 1984 – 1988, the PRC government created 14 zones of technical and economic development, a priority of sites selection (sometimes more than one thousand hectares) was given to the *logistic advantages*, largely providing competitiveness of products. That is why almost all these areas were settled down on the Pacific coast in dock-side zones. Financial resources, equivalent 275 million US dollars were allocated for providing infrastructure preparation (utilities and transportation network, and so on). For management projects efficiency achievement each of Technical and Economic Development Zones had state management company.

In a short period planning schemes of territories were executed, according to which utilities networks and transport lines with necessary capacities and outputs were brought in. Upon completion of that, the state invited industrial residents and investors.

As of today 54 Technical and Economic Development Zones are in function in People's Republic of China, one of the most successful of them being Tientsin. Its performance during 1992 - 2006 demonstrated the following growth:

- gross domestic product – by 51 times;
- industrial output – by 72 times (38,9 billion US dollars in 2006);
- tax collected – by 62 times (2,3 billion US dollars in 2006).

One of the most important factors of Technical and Economic Development Zones success is the fact that the state assumed a role of the strategic investor at the most difficult and risky starting stage of projects development, without

burdening potential investors, but creating favorable conditions for their activities start-up.

The most important factor of DP network success is to **focus on customer**, i.e. the maximum adjustment of infrastructure to modern logistic market requirements and to clients' needs in terms of variety, quality and cost of rendered services (see Fig. 7.1.).

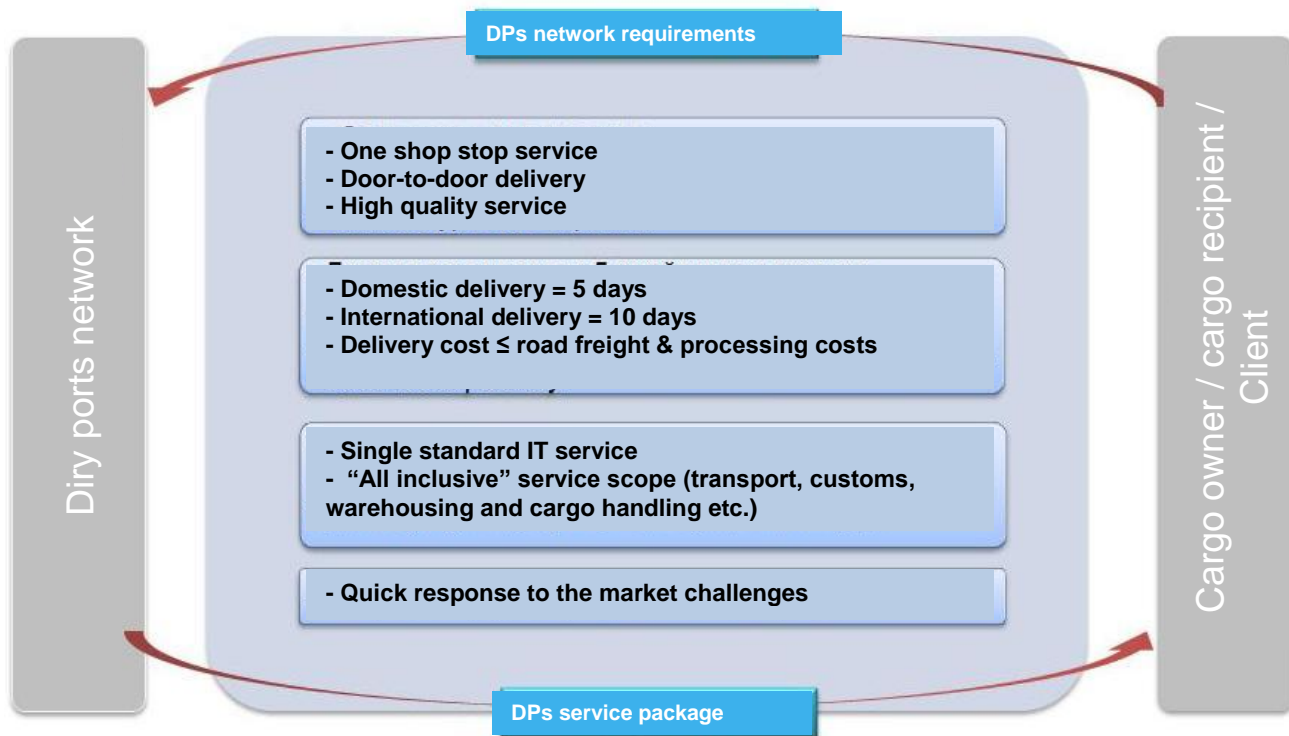


Fig. 7.1. Success factors of DPs network.

DP network has to meet the logistic services market requirements of the following key characteristics:

- Single consignment bill/note for all the route;
- Internet and WAP service for placing orders, service payment and tracking their actual status;
- Friendly data exchange interface between operators and users of DP network services;

- Unified tariffs and free automated sales systems for such services as transport forwarding, terminal processing, storage, etc.

Throughput of the first stage DP, as well as volumes of relevant cargo flows in their respective influence zones are presented in Table 7.1.

Table 7.1. Potential throughput of first stage DP network.

| Name | Throughput, million tons per annum | | Relevant cargo flows for target year, million tons |
|-----------------------|------------------------------------|---------------------|--|
| | Calculated | First stage | |
| Rail port "Taman" | 20,4 | 10,2 | 39,6 |
| Rail port "Baltic" | 20,4 | 10,2 | 70,3 |
| Rail port "Primorsky" | 15,1 | 10,2 | 35,3 |
| DP "Bely Rast" | 18,5 | 9,2 | 39,5 |
| DP Bryansk | 8,9 | 4,4 | 19,5 |
| DP Volgograd | 10,2 | 5,1 | 14,3 |
| DP Voronezh | 10,2 | 5,1 | 26,5 |
| DP Nizhny Novgorod | 10,2 | 5,1 | 14,3 |
| DP Yekaterinburg | 10,2 | 5,1 | 17,8 |
| DP Kazan | 10,2 | 5,1 | 14,3 |
| DP Kirov | 8,9 | 4,4 | 14,3 |
| DP Krasnoyarsk | 10,2 | 5,1 | 14,3 |
| DP Novosibirsk | 10,2 | 5,1 | 14,3 |
| DP Samara | 10,2 | 5,1 | 14,3 |
| DP Kaliningrad | 8,6 | 6,8 | 17,8 |
| DP Ulan-Ude | 8,9 | 4,4 | 14,3 |
| DP Ufa | 10,2 | 5,1 | 14,3 |
| DP Khabarovsk | 8,9 | 4,4 | 25,3 |
| TOTAL: | 210,4 / 134 | 110,1 / 72,1 | 420,3 / 263,2 |

It is significant, that DP throughput (cargo turnover) involves 30-35% of road transport flows, and at determining total network capacity a possibility of “double counting” must be borne in mind – freights loading at one DP and unloading at another. Taking into account volumes which carried out now by public railway transport and from private railways (25 – 35 million tons), implementation of first-stage DP network will allow to attract on railway transport about 100 - 120 million tons of cargoes in addition to existing volumes.

It is expected, that DP network formation is introduced stepwise. The initial estimate shows that the volume of necessary investments for the first stage DP construction amounts to 560,8 billion rubles, including basic network assets – 366,5 billion rubles.

The structure of investments is represented in Table 7.2.

Table 7.2. Investments breakdown of first stage DP construction.

| № | Cost item | Railway port | DP | Satellite |
|---|---|-----------------|--------------|--------------|
| 1 | Acquisition of land ownership, design and survey works, billion rubles | 2,0 | 1,2 | 0,3 |
| 2 | New construction, billion rubles | 15,6 | 13,4 | 3,0 |
| 3 | Railway infrastructure (connecting station and approaches), billion rubles | 20,0 | 2,4 | 0,1 |
| 4 | Motorway access upgrade, billion rubles. | 1,0 | 0,8 | - |
| 5 | Utilities, billion rubles | 3,0 | 1,4 | 0,3 |
| 6 | Expected volume of investment for average site construction, billion rubles | 41,6 | 19,2 | 3,7 |
| 7 | Number of first-stage terminals | 3 | 15 | 40 |
| | – including basic network | 3 | 7 | 29 |
| 8 | TOTAL , billion rubles | 124,8 | 288,0 | 148,0 |
| | – including basic network | 124,8 | 134,4 | 107,3 |
| 9 | Total investments volume, billion rubles | 560,8 / 366,5 * | | |
| | – including railway infrastructure | 100,0 / 79,7 * | | |

* (first stage / basic network)

It is supposed that the RR investments within the DP projects will be generally allocated for necessary railway track lay-out. Along with that, it must be borne in mind that considerable part of these investments will have "dual purpose" – i.e. approaches capacity enhancement, transport hubs development, stations extension for the perspective train length of 71 nominal wagons, modernization of signal and interlocking systems, etc.

The RR investments to the authorized capital of the managing company (SPV) is supposed to be formed at the expense of granting land ownership rights, real estate assets of freight yards' property complex (subject for modernization under DP construction).

In the course of updating "Program of the RR's terminal and warehouse activity development" it is expedient carrying out assets restructuring of RZD terminal and warehouse complex for the purpose of assignment and estimation of relevant "investment fund" for DP network.

DPs network formation essentially represents the national project of transport infrastructure development and is important for social and economic development of the country.

The project implementation will provide:

Improvement of national transport system efficiency by means of:

- transport costs reduction;
- cargoes transit speed increase;
- general transport system stability enhancement.

Creation of infrastructure basis for:

- competitive recovery of the real economy enterprises, increase in volume of industrial outputs, modernizations of technical capacities, increase of workplaces number, decrease of environmental impact, etc.;
- national logistics market development:
 - generating new business processes;
 - logistics services' quality and variety improvement;
 - optimization of supply chains and distribution networks;
 - realization of Russian transit potential, freight services export development;
- modern solutions to town-planning:

- industrial and logistic parks, relocation of obsolete manufacturing facilities to cities' suburbs;
- organization of modern residential agglomerations.

As a result of the Concept implementation, achievement of following fundamental results for the RR is planned:

Scaling-up of haulage activity (2020 target year):

- in domestic transport, as a result of implementation of first stage network – by 100 – 120 million tons per annum;
- on transit railway route South-East Asia countries – Transsib – Europe not less than 8 million tons per annum;
- on railway route " South-East Asia countries – regions of Russia" not less than 5 million tons per annum;

Cost saving by means of:

- cargoes processing work centralization at transport hubs – increase of average tonnage rating of one wagon not less than for 30%;
- increase of routing degree (including container cargoes – more than twice), substitution of train sorting out work by terminal processing;
- decrease in number of "drop-off trains" by 2 – 3%;

Intensification of investment activity:

- Dividends from:
 - project companies (SPV);
 - operator companies (acceleration of rolling stock turnover – cutting time of wagons idle stay with local cargoes at railway junctions by 10 – 15%, increase in speed of fitting platforms turnover not less than by 15%, containers turnover speed-up by 10 – 15%, growth of the variety, quality and volume of rendered services);
- the RR capitalization growth, particularly due to shift of low-used RR assets into SPV authorized capitals at their market value;

Besides, it is necessary to note critical results of the Concept implementation - the change of cargo turnover structure in favor of high added volume cargoes, and also optimization of rail transport routing schemes.



8. PROJECT RISKS

For the purpose of this Concept “project risks” stand for: risk of partial assets losses, decrease of expected income, high contingency expenses.

Considerable volume of necessary investment resources, great labor intensity of administrative work, wide range and complexity of project issues, variety of commercial interests of project participants, etc., which may occur in the course of DP network formation and operation, demand a detailed estimation of basic realization risks, as well as effective ways of their localization (hedging). The Concept carried out a review on the following main risks categories:

- Regulatory;
- Political;
- Economic;
- Financial;
- Technological

The results are represented in Table 8.1.

Table 8.1. Main project risks.

| Basic realization risks | | Hedging methods |
|-------------------------|--|--|
| Regulatory | <ul style="list-style-type: none"> - limitation of terminal and warehouse complex objects' turnover; - absence of Federal Law “On transit”; - absence of Federal Law “On combined transport”. | <ul style="list-style-type: none"> - realization of relevant legislative initiatives; |
| Political | <ul style="list-style-type: none"> - customs activity reforming; - project implementation in the territories of various federal subjects; - improper public private partnership mechanisms. | <ul style="list-style-type: none"> - validation of concept for customs clearance of cargo at special purpose railway centers; - interaction with governmental authorities; |
| Economic | - crisis in the world and national economies | - creation of effective project's control mechanisms; |
| Financial | - considerable volumes of | |

| | | |
|----------------------|--|--|
| | <ul style="list-style-type: none"> investments; - variety of finance sources. | |
| Technological | <ul style="list-style-type: none"> - staging of container and pcontainer block-trains organization; - IT support arrangement; - unified technological policy realization. | <ul style="list-style-type: none"> - coordination of development strategies of subsidiaries and affiliates. |

— —acceptable risks

— — high risks



9. KEY ACTIVITIES

The Concept implementation will require development of the RR relevant policy documents, the comprehensive activity plan for its realization, as well as coordination with executive authorities at federal and municipal levels (including correction of the Federal Target Program "Russian Federation Transportation System Development", etc.).

Within the Concept framework the major priority activities have been identified:

- Removal of restrictions on market turnover of terminal and warehouse assets, subject to modernization or integrated reconstruction;
- Development and implementation of public-private partnership mechanisms;
- Development and reconciliation with regulating authorities (Ministry of Transport, Ministry of Economic Development, Federal Customs Authority, etc.) Concept of customs control and customs clearance at sites in the vicinity of the Russian Federation state border in terms of railway transport regulation;
- Development and reconciliation of Concepts for the container transportation, DP integrated safety and security, IT support of logistic activity, etc. in co-operation with involved executive authorities and business community;
- Adaptation, reconciliation and validation of "The RR Development Program of terminal and warehouse activity";
- Investment methods development in the course of the pilot project implementation – "Bely Rast" DP;
- Creation of specialized competence center and SPV.