Public private partnership in management of ports of the world

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Abstract. The identifying feature of the developed countries is the active participation of public private partnership (PPP) in all spheres of financing and operating activities. In Russia this form of cooperation between the state and the business is underutilized. Thus, the share of the state in the ten biggest companies of Russia is 81%, exceeded only by China where it is 96%, but, for example, in Germany it is 11%. Of particular interest is the involvement of PPP in the investment and management of Russian ports as Russia is considered as a sea power. That is why it is important to analyze and generalize the positive world experience connecting with participation of PPP in the development of ports which should be used in Russia.

1. Materials and methods
Modern ports have many aims. For example, they can be centers of the marine, industrial activity or distribution. In general, they are «growth poles» for local, regional and even national economies as is the case with the port of Antwerp (Belgium) or Rotterdam (the Netherlands); moreover, ports are «functional elements» in global logistic systems and value chains of international maritime liner companies and also multimodal transnational logistic corporations.

Aforementioned companies are finding ways in order to combine transportations by different modes of transport and offer their clients «door-to-door» service. These organizations can be international maritime liner companies or their subsidiaries (for example, Maersk-Sealand-APM Terminals), global terminal operators, such as Hutchison Port Holdings and PSA International, forwarding agents and trucking companies (for example, Kuhne Nageland Transplace), rail operators Stinnes-Railion and ABX or integrators such as UPS and FedEx. All these companies have the great intention to decrease port dues in maximum manner, to provide higher productivity and quality service from the side of the biggest world ports in order to provide customer the product of highest quality and minimum price. In order to achieve this aim they are ready to invest big amounts of money in the infrastructure of corresponding ports.

2. Objects and methods of the study
The object of the study is the PPP in port management.
Methods of the study are the analysis and generalization.
The aims of the PPP are:
the increase of the efficiency (increase of productivity / reduction of expenses) and innovation in port services,

- the decrease of the financial burden on the budget of the government,
- the limitation of political influence in port management and operations.

Nowadays one of the most common models of the port organization and administration is «landlord model». The central idea of the model is following. The port being the owner of the area and infrastructure gives these objects in rent while all port operations are accomplished by private companies. These private companies maintain in a proper condition the infrastructure that belongs to the port; they build their own buildings, warehouses, workshops, have the opportunity to install gantry cranes on the berths [16].

The usage of this model is recommended by the World Bank, UNCTAD and such organizations as the Southern African Development Community and the Port Management Association of Eastern and Southern Africa. In the Table №1 the «landlord model» is presented in comparison with alternative models namely: state and private service model and port-instrument model. The port-instrument model means that port administrations own, develop and maintain infrastructure of the port; equipment and buildings belong to the port [16]. In this model buildings, installations and equipment construction by means of private investors is not performed.

Table 1. Models of distribution of public-private roles in port management (S-state,P-private) [6]

| The name                          | State model | Private model | Port-instrument model | Landlord model |
|-----------------------------------|-------------|---------------|-----------------------|----------------|
| Port administration               | S           | P             | S                     | S              |
| Navigational management / infrastructure | S           | P             | S                     | S              |
| Port infrastructure               | S           | P             | S                     | S, P           |
| Installations (equipment and buildings) | S           | P             | S                     | P              |
| Handling operations               | S           | P             | P                     | P              |
| Pilotage                          | S,P         | P,S           | S,P                   | S,P            |
| Tugboat services                  | S,P         | P             | S,P                   | S,P            |
| Service of mooring and unmooring  | S,P         | P             | S,P                   | S,P            |
| Dredging operations               | S,P         | P,S           | S,P                   | S,P            |

As it was already mentioned today the dominating model is «landlord model». For example, it is used in the organization of management of such ports as Rotterdam, Hamburg, Pusan [5]. This model is the most popular as modern port management is more and more targeted on final consumer and maximum port efficiency. The «landlord model» is based on different types of the PPP.

Sizes of investments that private sector is ready to inject in port systems are obvious indicator of interest to the institute of the PPP within the framework of the port development. Over the last 20 years in nearly 60 developing countries more than 350 projects with the participation of private funds were realized in worldwide known ports. The largest quantity of projects with PPP were realized through the model of concession agreements (48%) and greenfield investments (40%). Less popular models were rent agreements (7%) and share sales in equity share capital (6%). Usually, the representatives of the private capital are global terminal operators, regional operators, stevedoring companies, shippers, industrial conglomerates and financial institutions.

Let’s regard the experience of positive influence of the PPP on the development of ports by usage the example of port of Cartagena (Columbia). Port of Cartagena (Columbia) is situated on the Atlantic
coast of Columbia. In November 2013 the port has celebrated 20 years from the day of its privatization.

In the late 1980s Columbia understood the value of «economic liberalization» and began active movement in this direction. Resources of infrastructure in particular the ports with low productivity, with lack of security and extremely high prices were chosen as main targets of new reform. Let’s regard the process of this liberalization more closely.

Thus, in 1950 the ports of Columbia were very ineffective. There were several attempts to increase their productivity. In early 1960 management and functioning of the main ports were passed to new organization-monopolist that was called Colpuertos. But the absence of literate legal framework and incentives for investment leaded to the absence of necessary quantity of investments. Since 1970 the government has given the permission to private companies for operation of terminals and berths in main port areas. At these berths there was handling of liquid and solid cargoes. Share of these cargoes in all volume of trade in the country (64 million tons in 1996) was 70-80%. But in spite of the success of the private sector in handling of solid cargoes Colpuertos continued to establish a monopoly over movement of general cargoes. In 1980 Colpuertos was overtaken with financial crisis due to increased expenses. This crisis leaded to the increase of tariffs on the poor quality services. In 1990 it became obvious that this sector of economy needed to be reformed. The law which entered into force in 1991 determined private regional port organizations as concessionaires who are responsible for administration and management of ports which are specialized on handling of general cargoes. Moreover, the institution of General Port Superintedant was created. The main aim of this institution was to guarantee free and fair competition among port organizations and port operators. Concessionaires has the right to set dues but with the guidance of institution of General Port Superintedant.

In 1993 the private operator (Sociedad Portuaria Regional de Cartagena (SPRC)) based on concession agreement that was concluded on the period of 40 years took over the management of container terminal (container is a type of general cargo). Thus, modernization of the port began. It meant investments in infrastructure and human resources, purchase of new equipment. From this moment the flow of container cargoes has increased from 93 000 to 2 749 723 TEU in a year (Figure 1).

**Figure 1.** The dynamics of container cargoes arrival in the port for last 10 years

| Год | TEU* |
|-----|------|
| 2008 | 1 002 267 |
| 2009 | 1 141 873 |
| 2010 | 1 433 143 |
| 2011 | 1 691 341 |
| 2012 | 2 024 721 |
| 2013 | 1 865 233 |
| 2014 | 2 211 471 |
| 2015 | 2 439 307 |
| 2016 | 2 345 132 |
| 2017 | 2 560 750 |
| 2018 | 2 749 723 |

*TEU (Twenty foot Equivalent Unit) - Unit of measure of the cargo that is equal to the volume of one 20-foot container.
In general, from 1993 to the early 2000s it was invested more than $150 million in port of Cartagena. The cost of vessels handling declined significantly, effectiveness increased more than at 7 times, tariffs on usage of berths have decreased, the time of berths waiting for handling reached 0 (Table №2).

**Table 2.** The results of PPP existence in Cartagena from 1994 to 2003

| Indicator                                      | Before the reform of 1994 | After the reform of 2003 |
|------------------------------------------------|---------------------------|--------------------------|
| Time of waiting of handling in port for container ships | 10 days                   | 0                        |
| Time of handling of container ship             | 72 hours                  | 7 hours                  |
| Total productivity in one hour                  | 7 handled vessels in one hour | 52 handled vessels in one hour |
| Busyness of berths                             | 90%                       | 50%                      |
| The cost of one handling                       | 984 $                     | 224 $                    |
| The productivity of handling of one dry cargo vessel| 500 tones in a day       | 3900-4500 tones in a day |
| Working time                                   | 16 hours a day            | 24 hours                 |
| Time of cargo waiting                          | More than 30 days         | 2 days                   |

As for sources of investments from 1993 to 2000 they were both public and private. Public investments were aimed at performance of dredging. Allocation and composition were following. From 1993 to 1996 private investors put $199 million, public investments were $17 million, in the period from 1997 to 2000 private investors put $270 million, public investments were $12 million. In general, sources of private investments were port organizations, operators of terminals and stevedoring companies. However, the share of their investments in different periods of time was different. Thus, in the period from 1993 to 1996 regional port organizations invested $59 million, operators of berths invested $90 million, stevedoring companies invested $50 million. In the period from 1997 to 2000 regional port organizations invested $240 million, operators of berths invested $30 million, stevedoring companies share was not significant in comparison with other investors.

In 2005 Cartagena had declared as the best container terminal of the Caribbean. Later it accepted with this title also in 2006, 2007, 2009, 2010, 2011.

In 2007 after starting of working of Royal Caribbean Line’s Radiance of the Seas in Cartagena this port became the port of final destination of many shipping lines that are specialized on the transportation of passengers. Today passenger terminal of Cartagena provides services to more than 30 such lines, moreover, cruise passenger traffic is 500 000 persons in a year. The terminal can provide services to 5 cruise vessels simultaneously that is equal to nearly 10 000 persons in a day.

In 2008 container terminal Contecar was opened.

For the moment the terminal is specialized on handling of container ships. However, other types of vessels also enter to the port. The dynamics of vessels that are not container vessels for last 10 years is presented below (figure 2). As it can be seen cruise vessel are on the 2nd place for highest number of calls in the port in 2018.
Figure 2. The dynamics of calls of vessels of different types arrived in port of Cartagena in the period from 1998 to 2018 (red line - ro-ro vessels, green line – tourist vessels, blue line - cargo vessels, multipurpose vessels, violet line - others (barge, fishing vessels etc.))

The total quantity of vessels of different types arrived in port of Cartagena in the period from 2000 to 2018 is presented in Table 3.

Table 3. The total quantity of vessels of different types arrived in port of Cartagena in the period from 2000 to 2018

| Container vessel | Cargo vessels, multipurpose vessels | Ro-ro vessels | Tourist vessels | Others (barge, fishing vessels etc.) |
|------------------|-------------------------------------|---------------|----------------|-------------------------------------|
| 44 449           | 2 474                               | 1 708         | 2 717          | 394                                 |

Nowadays port of Cartagena is very attractive for investments, it continues development and modernization. One of the last projects is the project connecting with performance of dredging works of the access channel. The main aim of this project is to provide access of container vessels till 16 000 TEU. Works were completed recently. The results of works are following. The depth of canal is 20.5 meters, breadth is 140-200 meters. During the works 1 452 000 cub.m of ground were reached up from the bottom. The works were performed by JandeNul that within 60 years has been engaged in these works. The total volume of investments in this project is near 115 684 964 000 Columbian peso that is equal to 36 833 147.96 USD. The shares of private and public investments are 50%.

Now, let’s regard the example of arctic port infrastructure. One of the tricky situations with port infrastructure takes place in Canada. The only one arctic deep-water port of Canada is port of Churchill. In spite of the fact that geographically the port is situated to the south of the Polar Circle (on the coast of Hudson Bay), the legislation of Canada considers it as arctic one as well as areas including among others the coast of Hudson Bay and James Bay. It provides the approach to the inner part of Canada in particular and North America in general through railway adjacent to the port.

There are 4 berths in the port for loading and unloading grain, general cargo, fuel; also there is an area for partly closed storage covering 7 600 sq.m. and open storage area covering 23 000 sq.m. [10]. It the port there is a possibility of loading Panamax type vessels.

The history of this port is really interesting. This port was put into operation in 1931 and till 1997 belongs to the Canadian authorities [11]. The specialization of port was the grain carriage. In 1932 the
4- belt conveyor was built for loading 4 vessels with grain simultaneously. The productivity of this conveyor was 20,000 bushel per hour that is equal to 544.4 tones per hour [12]. In 1997 the port was sold to the American company OmniTrax together with part of Hudson Bay Railway covering 1000 km. Thus strategic objects had fallen into the hands of foreign state.

In 2016, referring to the liquidation of the Canadian Wheat Board that is only one seller and buyer of grain in Canada from 1935 to 2012 [13], American OmniTrax closed the port of Churchill. In 2017 spring flood destroyed railway line and OmniTrax stated that it did not have opportunities for it repairing. As the result there was a substantial increase in food and fuel prices which in turn was the severe blow for companies provided catering services for tourists, who visited Churchill in order to see polar bears, belugas and aurora borealis.

Thus, the history of port of Churchill is an example of the case how the privatization of one port can become the threat for strategic and economic safety of arctic region of whole country.

On 31 August 2018 Arctic Gateway Group Limited Partnership and Omni TRAX Inc. signed the Share Purchase and Transfer Agreement in accordance with which Arctic Gateway Group Limited Partnership assumed control of Hudson Bay Rail Company, Hudson Bay Port Company and Churchill Marine Tank Farm [15]. That was the beginning of repairing of railway affected by flood. As for Arctic Gateway Group Limited Partnership itself, it is the PPP consisting of following companies: Missipppi Rail Limited Partnership and Fairfax Financial Holdings& AGT Limited Partnership. State sector is presented by Missipppi Rail Limited Partnership, which units 30 indigenous peoples of Canada, 11 other communities of northern Manitoba and 7 communities of Kivalliq in western Nunavut. Private sector is presented by Fairfax Financial Holdings and AGT Food and Ingredients. Fairfax Financial Holdings is one of the leading investments trusts of Canada. AGT Food and Ingredients is one of the major suppliers of grain legumes, food staples and food ingredients in the world. The share of public and private sector is 50%.

Moreover, it should be mentioned that the government of Canada plans to invest $74 million on purchasing and repair of the railway and port assets (financing for 3 years – from 2018 – 2019 to 2020-2021) and also $43 million on operation and increase of commercial viability of railway, port assets and tank farm (financing for 10 years – from 2018 – 2019 to 2027-2028). Additionally the government of Canada allocates $10 million for Arctic Gateway Group that, then, have to be returned, but giving an opportunity to Arctic Gateway Group to attract own loans on commercial conditions [15].

Remarkably, the port infrastructure of Churchill namely the availability of long deep-water berths (till 600 meters) is very suitable for development of arctic tourism in Canada.

According to the authors the potential of port of Churchill is enormous. The location of port elements is very wisely and compactly, the composition of the port infrastructure meets the requirements of the region in which it is situated. Under professional management this port can become one of the central ports of the Arctic.

3. Conclusion

In Russia there is a positive experience of PPP participation in the development of port of Murmansk. Marine port in Murmansk is a basic arctic port providing transportation of cargo in regions of the Extreme North and far abroad; the only one deep-water ice free port with year-round navigation. At the present moment the project of Murmansk transportation hub (MTH project) is realized. This project is performed on the base of PPP and directed on the development of marine, railway and highway transport, coal and oil terminals on the western coat of the Kola Bay, container terminal on the eastern coast. The total volume of financing is 140 bln rubles (57% are from extrabudgetary sources; 43% are means from the federal budget).

The biggest participants of project are PAO Novatek (the center of construction of large tonnage marine facilities in rural locality Belokamenka), PJSC Rosneft Oil Company (high-technology shore base for installation and further maintenance of offshore production platform and supply vessels; industrial cluster of oilfield industries of shelf projects; onshore supply base «Lavna») and PJSC Gazprom (2 onshore supply bases in port of Murmansk) the project involves modernization of industrial
giants of Murmansk region: JSC Kola Mining and Metallurgical Company, JSC Kovdor MPP, JSC Apatit, JSC North-Western Phosphorous Company, and production of new types of products: chrome alloys, titanium dioxide and rare metals. As at April 2018 one-third of all volume of works that are planned within the framework of MTH development was performed, 15 billion rubles were utilized. In March 2018 new object of MTH, the coal terminal «Lavna» was established. As the result Murmansk should become an international marine port-hub.

World experience of attraction of investments of the PPP and their participation in port management can be used in Russian practice especially for development of marine ports of the Arctic.

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