

# DEA방식을 활용한 한국과 러시아 컨테이너 항만의 효율성에 대한 실증연구

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## An Empirical Study on the Efficiency of Container Terminals in Russian and Korean Ports using DEA model

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**Abstract** : Steady growth of seaborne trade has resulted in development of container ships, ports, and container terminals. Operating efficiency of a container terminal is a critical element for its competitiveness in the international market. The aim of this research is to evaluate the relative efficiency of Russian and South Korean largest container terminals. For this purpose,

**Key words** : seaports, container terminals, efficiency, data envelopment analysis, DEA,

### 1. Introduction

With rapid expansion of global business and international trade, many container ports must frequently review their capacity in order to ensure that they can provide satisfactory services to port users and maintain their competitive edge [17]. Sometimes, the necessity to build a new terminal or increase the existing capacity is inevitable. However, before a port implements such a plan, it is of great importance to .....(중략).....

### 2. Theoretical Review

#### 2.1 The Concept of Efficiency

The concept of efficiency is very similar to productivity. .... (중략) .....According to the classic definition, productivity is the ratio between an output and factors that made it possible. In the same way, Lovell (1993) defines the productivity of a production unit as the ratio of its output to its input. Alternatively, efficiency can be described as a

distance between the quantity of input and output, and the quantity of input and output that defines a frontier, the best possible frontier for a firm in its cluster ..... (중략) .....

#### 2.2 General Concept of DEA

Data Envelopment Analysis (DEA) is a mathematical programming technique that enables the determination of a unit's efficiency based on its inputs and outputs, and compares it to other units involved in the analysis. The DEA can be described as data-oriented as it effects performance evaluations and other inferences directly from the observed data ..... (중략) .....

### 3. Characteristics and Analysis of Ports and Container Terminals

#### 3.1 Distinctive Features of Ports and Container Terminals in Russia

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The State Register of Seaports holds 63 seaports in five marine basins, located on the shores of 13 seas: Azov & Black sea basins - 12 ports; Baltic basin - 7 ports; Caspian basin - 3 ports; Far East basin - 22 ports; Arctic basin - 19 ports. .... (중략) .....

### 3.2 Distinctive Features of Ports and Container Terminals in South Korea

In South Korea 30 seaports are located on the shores of two seas and Korea Strait. The main share of cargo throughput goes through Busan port - 24% of the total volume in 2014, Gwangyang Port accounts for 18%, Ulsan Port - 14%, Incheon Port - 11%, Pyeongtaek-Dangjin Port 8%. .... (중략) .....

## 4. DEA Empirical Analysis

In this paper, we assume seven inputs and one output. Output: Annual container throughput. Inputs: Total terminal area; Total quay length .... (중략) .....

We selected 12 container terminals in Russia and 19 container terminals in South Korea, Table 1.

Table 1 Decision making units selected for the analysis

Port	Container terminal	DMU
Saint Petersburg	First Container Terminal (FCT)	DMU 1
	Petrolsport (PLP)	DMU 2
	Container Terminal St. Petersburg (CTSP)	DMU 3
	Moby Dik	DMU 4
Kaliningrad	Kaliningrad Sea Commercial Port (KSCP)	DMU 5
	Baltic Stevedore Company (BSC)	DMU 6

..... (중략) .....

All the data were collected from annual reports of 2012-2014, Port-MIS, and ports' official web sites. Input and output variables summary is shown in Table 2.

Table 2 Summary statistics for variables

Description	Unit	Average	Min	Max	SD
Annual container throughput	TEU	840902	136138	3895202	812334
Total terminal area	m2	445268	7691	1202000	343068

..... (중략) .....

## 5. Summary and Conclusions

Data Envelopment Analysis does not make accommodation for statistical noise effects such as measurement error, Force majeure and other events, which are beyond control

of ports. However, DEA provides a suitable method for measurement of container terminal operating efficiency. ....(중략).....

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