Research Paper Economics

Port Spaces and their Effects in Port Performance

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ABSTRACT

In the conditions of globalization and increasing competition, and the conditions of global crisis it is not easy for Albanian Ports to be part of regional market.

If we were to take a look at the way the Albanian ports have been developed so far and in particular the Port of Durrës which is the main gateway to Albania, it is obvious that their development has been focused more on a closed mentality causing these ports to fall under the risk of being circumvented both in regional and global aspect. That, due to the fact that Albania's port development strategies are mainly based in internal/local perspectives.

Based on both literature and direct data collected by the author in the field, this paper addresses the way how the Albanian port sector needs to be developed focusing on the development of the free zones as powerful incentives for the development of this sector. Through analyzing the economic zones, their connection to the port sector, we will analyze current situation in the Albanian port sector.

The paper suggests that the port sector should be more focused on the regional and global market, and one of the best strategies to survive competition is the establishment of the free economic zones/logistic centers, as well as the transition to the free port concept, which leads to the expansion of the port hinterland to the regional and global markets. Even on the bases of the data collected and analyses (there are 33 ports taken into consideration for the purpose of this paper), it is proved to exist a significant correlation between free zones and their effect on the port performance with a correlation coefficient Cr ≤ 0.6

Keywords : performance, competition, free zones, container port, analyzes of factors

Introduction

The Albanian ports during the recent years have undergone a series of reforms and investments. However, due to the increase of the container cargoes, ports have become more important nodes of intermodal transport. Apart of that, ports still suffer from lack of economies of scale in some load centers and that has to do with lack of space for expansion as well as limited access for hinterland and foreland as it was mentioned by Noterboom (1997. P. 100). Therefore, the efficient management of the pperipheral areas of the port is important for ports itself.

To deal appropriately with these problems as well as to advance their competitiveness, performance or/and efficiency are considered as important elements (Togzon1995& 2001; Song et al, 2001; Song et al 2005). The impact of port performance is not limited in its competitiveness, but goes beyond the port's industry; it has effects on the overall performance of the country. Port performance is particularly connected with container handling capacities and is the most important factor to maintain and further develop the competitiveness of the port. In this context, Port of Durrës is a port of limited spaces vailable in order to increase the container handling capacity and increase the regional competiotion in order to enlarge its hinterland.

The aim of this paper is to evaluate port performance related to their backup areas like distant container yards, free zones, etc., and suggest appropriate ways in order to plan and designate and develop free zones in those areas where competition is strong and container volume is increasing rapidly. This is the case of Durres Port which during the recent years has known a rapid increase of container traffic.

2 Identifying the problem

Although the concept of port performance is widely used, it is still unclear because it includes general concepts as port productivity, port efficiency, port effectiveness and port economy. Port performance is used as a common definition of efficiency and effectiveness. In this paper, performance is addressed to the volume of containers handled in the container's terminal. Performance of the containers terminal is the ability to produce the maximum productivity (output) in TEU for a particular input (terminal infrastructure including logistic parks/free zones located within or outside port premises) or the use of minimal inputs to produce a certain level of output.

Therefore, the measurement of the port performance variables has changed from operational and functional factors to the functional and space factors of the containers terminal and city. (Noteboom and Rodrigue, 2005). Especially space limitation of a port itself becomes the main obstacle for the development, and this is notable in Durres Port as well as in other ports of the country. Figure 1 below shows that the port is surrounded by the city, and there is no more room for the port to be expanded.

Furthermore, space limitations of a port within the city where the port is located might cause significant traffic congestion, consequently, harmonization between port functions and urban functions becomes of a great importance. (Lee & Song, 2005)

Figure 1. Durres Port

2.1 Port performance variables

For the purpose of this paper we have take into consideration a total of 33 ports of the region. First of all, a dependent variable has been selected, which is is the volume of containers handled for the year 2010 for the ports taken into consideration for this paper. Apart of selecting the dependent variable, this paper separates the independent variables into two groups: the factors of the terminal and the factors of backup area or of the free zones in terms of spatial view.

Table 1. Port and backup area factors

FACTOR	DESCRIPTION	SYMBOL
Port output (dependent variable)	Number of TEU handled	Y
F1- terminal factors	Number of quay cranes	f11
	Quay length	f12
	Total ground slots	f13
F2-factors of back up area	Number of gate laes of termial or other flors	f21
	Total flor size of the areas available to port	f22
	Numb er of floors	f23

3. Data collection

We have gathered data from differet ports of Mediterranean region. These data were collected from direct contacts with port authorities or when this was not possible we have consulted the official web page of these ports. Main data we have collected included:

- number of quay cranes
- quay length
- numri total ground slots TGS
- number of gate lanes of terminal or other floors available to ports
- flor size of terminal or terminals
- number of areas available

We collected data for 33 ports (table 2) 16 of which where relatively big ports with an anual output over 500.000 TEU/ year. Other 17 ports are relatively small ports with an annual conteiner output of less than 500.000 TEY/year. The analyeses of the existing corralelation that exists between port output and each of the variables mentioned above is done by the means of simple regression and is give in the below table 2.

Table 2. Factors affecting port performance

Nr	Faktori		Vellimi	F1- faktorët e terminalit		F2-faktorët e zones mbështetëse		
1	Durrës	70500	1	174	700	2	34000	1
2	Koper	700000	4	596	24000	4	270000	1
3	Selanik	273282	4	890	4996	6	254000	2
4	Gioia Tauro	2900000	24	4646	35000	12	780000	8
5	Rijeka	250000	4	464	3500	4	245000	2
6	Trieste	220000	7	1370	4000	6	400000	2
7	Pireu	1403408	18	2774	22000	8	776000	4
8	Antalia	36620	2	150	600	2	150000	2
9	Izmir	847927	18	1050	7500	8	152000	2
10	Mersin	643749	4	1020	10000	8	251350	3
11	Marsakloks	1623000	20	2025	15000	10	615000	4
12	Venecia	275600	4	1500	4230	6	221000	3
13	Hajdarpasha	140000	4	900	6000	6	103600	2
14	Cagliari	690392	12	5800	25000	8	895000	4
15	Genoa	1657154	16	5385	23500	8	590000	10
16	La specia	1470000	10	1403	18500	8	430000	6
17	Livorno	648500	4	550	14000	6	90000	3
18	Napoli	445870	4	850	12000	6	650000	4
19	Taranto	892435	6	2050	28550	8	785000	6
20	Salerno	432400	5	1120	5700	6	225000	3
21	Varna	135000	3	838	2100	4	105000	2
22	Konstanca	1535000	6	1074	21500	6	550000	2
23	Hajdarpasha	900000	4	650	16700	4	314500	2
24	Ambarli	330000	2	500	15000	4	300000	2
25	Marseille	302000	3	952	22000	4	300000	2
26	Le havre	2350000	22	3450	42000	8	800000	6
27	Algericas	2305000	19	4117	40000	6	1150000	5
28	Barcelona	2150000	23	3200	39500	8	980000	5
29	Cartagena	170000	1	385	4500	2	128000	2
30	Cadiz	143000	1	500	4000	2	90000	1
31	Algiers	135000	2	1088	4300	2	150000	2
32	Skika	633000	3	1600	5500	4	560000	3
33	Alexandria	195000	2	1279	3570	2	220000	2

The effect of these factors on the performance of the port is of great significance for the work of this paper because it proves the effect that these backup areas have in improving port performance, therefore in increasing commercial effects of ports. Number of gate lanes is an important infrastructural factor, because the bigger the number of gate lanes, the faster the transshipment of the containers from the yard to the backup area will be. Increasing the speed of container move will result in the increase of the containers handled therefore it has a direct impact on port performance.

The area of the backup area or the free zone complementing and serving the terminal is another very important variable affecting port performance. The bigger the area serving the terminal, the higher the handling capacity of the terminal will be. The values of this variable are of great importance for the purpose of this paper, because a strong correlation of this variable and the dependent variable Y, composes the bases of this paper and certifies our hypotheses of the effect of the free zones over the port performance as well as the effect that the free zones have in expanding the commercial effects of the ports, therefore, increasing port hinterland.

4 The analyses of factors

All data given in table 3 are processed and the results of the correlation between different variables are shown in table 2. This table shows all main factors and variables and their correlation with the dependent variable Y which represents the port output. As it can be observed form the table, the correlation that exists between port output and the terminal factors (variables f_{11}, f_{12}, f_{13}) have a correlation coefficient ≥ 0.5 and respectively that the quay length and number of the quay cranes have approximately the same statistical significance. The number of the ground slots shows a high significant correlation. The higher the number of the ground slots, the better terminal and port performance will be. This will result in a higher storing capacity for the terminal.

The results of the calculation show a high correlation of all backup area variables (independent variables) with port output (dependant variable). The correlation coefficient of the number of gate lines (NGL) is Cr=0.830 showing a high statistical correlation between port performance and the ability of the backup area to transfer the cargo. The number of gate lanes is important to avoid traffic congestions in the access points of the free zones or other backup areas of the terminal.

Table 2. Correlation results among dependent and independant variables

Dependent variable Y	R^2	Coovarianca	Student's error	T	p-value	CR
F_{11}	0.752	4262230.034	0	1.704	<0.0001	0.867
F_{12}	0.426	774389613.713	76.383	3.655	0.0018	0.653
F_{13}	0.636	5793955965.6	9.933	5.609	<0.0001	0.798
F_{21}	0.689	1440518.305	38447.28	6.311	<0.0001	0.830
F_{22}	0.502	132234312920.658	0.452	4.257	0.0005	0.708
F_{23}	0.610	1293706.411	45107.315	5.301	<0.0001	0.781

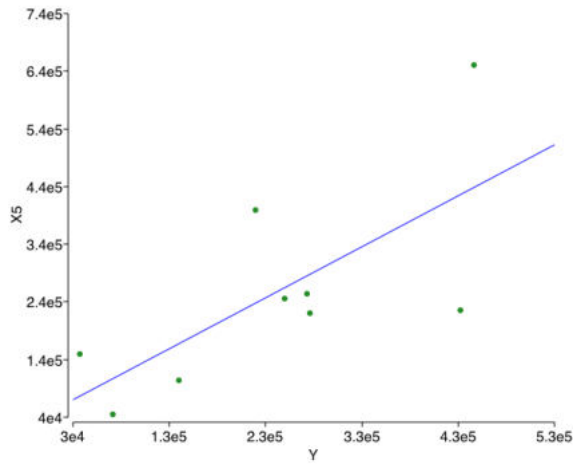
Number of average floors per terminal is another variable which show strong correlation with a Cr = 0.781. If there are more than one free zone or backup areas serving the port, this will increase the chances that this port will have higher handling capacity, and if this is well combined with other terminal factors, like quay cranes, and transport facilities, the performance of the port and the handling capacity, will be higher.

Another very important variable is the floor size of the backup area or the free zone. The correlating coefficient for this variable is Cr = 0.708, thus showing a strong correlation between dependant and independent variable of floor size of the supporting area or the free zone. If we have to refer to the case of Durres port where the port is «surrounded» by the city and there is no more room in the existing port for any further expansion, as well as taking into consideration current city port constraints in terms of capacity, and coordination, the only solution for this port is to develop supportive areas, logistic centers or distribution centers in order to make it possible for the port to tackle the increasing trend of the cargoes as well as to attract the regional markets on order to use port of Durres.

Chart 1 shows the correlation that exists between variable Y and variable X_5 which is the floor size of the backup area or the free zone serving the containers terminal or the port.

Without overcoming this constraint of limited terminal area, Durres port risks to remain out of regional markets, therefore remaining a port serving only domestic market.

Chart 1. Correlation between dependent variable Y and independent variable f_{22} (simple linear regression method)



There exists a significant correlation between port output which can be considered as one of the main port performance indicators and the existence of the back-up areas of a port. In our paper the correlation coefficient resulted to be Cr=0,708 which is >than 0,5, therefore shows a strong correlation between port performance and back-up areas.

Based on the analysis of this paper, Port of Durrës is a port with physical contraints especially regarding navigational limitations (max draft allowed 8m) and space available for further port expansion. Therefore the port should develop supportive factor such as free zones, logistics centers or distribution centers, where value added activities can be carried out.

Improving further the road and railway connections is of crucial importance for Albanian Port sector.

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