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Investigating the Effect of Commercial and Operational Factors on Competitiveness Improvement of Shahid Beheshti Port in Chabahar in Attracting Shipping Lines

Mohammad Saeid Arbabi
Department of Business Management,
Science and Research Branch,
Islamic Azad University, Tehran, Iran

Hossein Vazifehdoust
Department of Business Management,
Science and Research Branch,
Islamic Azad University, Tehran, Iran
(Corresponding Author)
h-vazifehdoust@srbiau.ac.ir

Karim Hamdi
Department of Business Management,
Science and Research Branch,
Islamic Azad University, Tehran, Iran

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Abstract. The present study was performed to investigate the effect of commercial and operational factors on competitiveness improvement of Shahid Beheshti Port (SBP) in Chabahar in attracting shipping lines. The research method is applied in terms of purpose. Initially, the researcher conducted the qualitative phase to identify important variables, create a typology, or make new theories. To reach the saturation stage, 15 people were interviewed. Then, after identifying emerging classifications using qualitative data, a questionnaire was developed through the Delphi technique,

and thus, the quantitative phase began. To test its items, patterning of the structural equation model was used via Lisrel software. Findings showed that commercial factors affecting SBP competitiveness improvement included financial capital and customer capital, port costs and tax burden, market efficiency and market performance. In addition, technical-developmental infrastructures, technological infrastructures, warehousing activities, loading and unloading operations, customs activities and services, communication and distribution networks, trust and safety in port activities, and port logistics features were the operational factors affecting this competitiveness. It was discovered that existence of abundant capacities and potentials in various transportation departments of SBP, quantitative and qualitative increase of equipment, as well as the development of new capacities in infrastructure and fleet of railways, roads, offshore and port loading/unloading equipment have relatively improved levels of loading/unloading in SBP, which can be attributed to successful execution of measures taken to develop competitiveness in SBP.

Keywords: Commercial Factors, Operational Factors, Competitiveness, Shahid Beheshti Port in Chabahar.

1. Introduction

A comprehensive and scientific understanding of the pros and cons of using efficient academic methods to reduce traffic congestion is vital for port and terminal managers to make strategic decisions for increasing competitiveness. Today, international container ports also compete and play a pivotal role in the multimodal transportation system in the global distribution network. This change has increased port operational efficiency and reduced costs of loading and unloading operations, while it has integrated port services to other elements of the global transportation network (Sheikholeslami, 2012). The three-dimensional relationship among "trade", "marine transport" and "ports", as an intrinsic "principle" plays a significant role in economic behaviors of all countries that directly or indirectly run through the sea. The efficiency of the exchange (trade) economy is linked to "transportation patterns" and "markets". Although these components matter, it should not be forgotten that their productive and economic role depends on the

integrity of raw material to the consumer market (industrial factories or final consumers). Anyway, markets are institutions that mainly operate both within and outside the economy (Shahriari and Ardest, 2011). Shahid Beheshti Port in Chabahar, as the only Iranian oceanic port, is one of the key areas on the Persian Gulf and Oman, which performs greatly in the north-south corridor. Proper tent to facilitate the load shifting process leads to many opportunities (Heydari et al., 2014).

2. Background

Basti (2014) investigated the barriers of domestic investment in Khorramshahr port with an emphasis on the development of maritime transport. After perusing the most important barriers to investment in ports including the economic stability, lack of using a comprehensive port system to integrate port processes and the necessity of enhancing coordination of the involved organizations, he pointed to the necessity of Arvand River dredging, as well as of investors' financial support as important factors to eliminate existing barriers and improve current investment status in Khorramshahr Port. Mokhtari's study (2013) on factors affecting the attraction of ocean-going ships in Chabahar and Shahid Rajaee (Hormozgan) ports revealed deficits in costs and communication with major centers of production and consumption, weakness of capacity and loading/unloading operations, as well as poor port facilities as the main weaknesses of Chabahar port compared to other southern ports. However, this scholar mentioned specific characteristics of Chabahar port as its greatest strength against Shahid Rajaee port. Jalilian (2013) ranked the quality of marine and port services to attract customers in commercial ports (Case study: Khorramshahr Port). He reported a gap among all five aspects of customer expected and offered services at Khorramshahr Port. In other words, all dimensions of SERVQUAL model including tangibles, reliability, responsiveness, assurance, and empathy were significantly different, and the favorable situation was higher than the existing level of service provision. In addition, the assurance dimension was recognized as the most important dimension, followed by tangibles, empathy, and reliability. The responsiveness dimension was also recognized as the least important by the customers. The current status of privatization in

Shahid Rajaee port was investigated by Diwandari (2011). Findings from questionnaires and interviews of this study showed that the privatization of Shahid Rajaee port decreased its efficiency and could not meet the satisfaction of all of its involved sectors. The researcher finally offered suggestions to improve the situation. Brady et al. (2011) explored the role of Anzali port in the city development. They reported that three factors were significant in attracting immigrants to this city: job search, job transfer and hope to find a better job, education and military service. The city has also started to grow around the port in terms of its physical form. High job diversification due to the activities of the port has attracted many immigrants, which increased and changed the city scale. In a study titled "An Approach Integrating Simulation and Q-learning Algorithm for Operation Scheduling in Container Terminals", Zeng and Young (2010) concluded that the integration method improved not only computing productivity but also enhanced adaption to scheduling for container terminals. Nishimura et al. (2009) optimized the structure and design of the container enclosure. Their goal was to examine the optimal mode of container operation at the terminal using the Lagrange method. They concluded that reducing the time of container operations inside a terminal was a key way to save on port costs. Kim et al. (2008) proposed a model for designing a container yard, in which the optimal number and traffic areas of the truck were calculated. Since the optimization of operations at container terminals has always been a challenge for port and terminal managers, Murty et al. (2005) examined the optimization of Hong Kong container terminal operations using computer-based decision making. The researchers attempted to reduce waiting times of lorries, trucks stand, and traffic on inside paths in terminals. Gambardla et al. (2001) examined the problem of the optimal use of sources and equipment in container terminals. Using modeling, they also scheduled the movement of coastal and area cranes. According to research literature the research hypotheses are as follows:

- Commercial factors improve SBP competitiveness in attracting shipping lines.
- Operational factors improve SBP competitiveness in attracting shipping lines

3. Methodology

In this applicable-exploratory mixed study, first, the qualitative data were gathered to identify various aspects of the phenomenon and to develop a conceptual pattern. Then, given findings of the qualitative data - gathered through the field method with the interview - and by applying the Delphi method, a questionnaire was constructed to compile the quantitative data and to make generalizability possible. Descriptive and inferential statistics were used to analyze the data. In the descriptive statistics section, the mean and standard deviation, the smallest and largest, and in the inferential statistics, the first and second order confirmatory factor analyses were performed via Liserl and SPSS 21 software.

4. Findings

Table 1 manifests findings of commercial factors affecting competitiveness improvement of SBP.

Table 1. Findings of commercial factors affecting competitiveness improvement of SBP

Variable	Descriptive statistics					Content validity		
	Answer distribution							
Items of the commercial aspect	very much	much	normal	little	very little	Mean	I-CVI	CVR
Market performance	4	58	79	29	-	3.16	0.71	0.78
Market efficiency	6	56	69	36	3	3.10	0.73	0.85
reduction of port costs and tax	7	63	81	17	2	3.27	0.68	0.81
financial capital and customer capital	7	61	79	21	2	3.23	0.74	0.82
Total score	6	59	77	26	2	3.19	0.71	0.81

Note: $C = \frac{n - n/2}{n/2}$ I-CVI: Item-level Content Validity Index CVR: Content Validity Ratio

These means indicate that the status of all of the four variables is higher than the average. In other words, these commercial factors are

contributing to the competitive advantage of SBP. The highest (3.27) and lowest (3.10) means to belong to a reduction of port costs and tax, and market efficiency, respectively. It should be noted that the overall mean of the commercial dimension is 3.19 which confirms its desirable status in improving competitiveness in SBP. Table 2 manifests findings of operational factors affecting competitiveness improvement of SBP.

Table 2. Findings of commercial factors affecting competitiveness improvement of SBP

Variable	Descriptive statistics					Content validity		
	Answer distribution							
Items of the operational aspect	very much	much	normal	little	very little	Mean	I-CVI	CVR
technical-developmental infrastructures	11	58	79	29	-	3.16	0.71	0.78
technological infrastructures	3	61	81	23	2	3.20	0.64	0.81
warehousing , and loading/unloading activities	-	62	84	22	2	3.21	0.66	0.75
customs activities and services	12	58	73	24	3	3.18	0.75	0.79
communication and distribution networks	9	51	75	32	3	3.07	0.69	0.74
trust and safety in port activities	9	85	62	11	3	3.44	0.69	0.74
port logistics features	8	57	71	30	4	3.10	0.73	0.76
Total score	8	64	73	22	3	3.22	0.70	0.77

Note: $C = \frac{n - n/2}{n/2}$ I-CVI: Item-level Content Validity Index CVR: Content Validity Ratio

These means indicate that the statuses of all of the seven variables are higher than the average. In other words, these operational factors are contributing to the competitive advantage of SBP. The highest (3.44) and lowest (3.07) mean belongs to communication and distribution networks, and port logistics features, respectively. It should be noted that the overall mean of the operational dimension is 3.22 which confirms its desirable status in improving competitiveness in SBP.

The confirmatory factor analysis was used to confirm the obtained factor structure and the power and significance test of the share of each observed variable in measuring the latent endogenous variable of financial capital and client capital. The most important parameters for measuring the latent endogenous variable of financial capital and customer capital are reported in Table 3.

Table 3. Validation of commercial factors affecting the competitiveness

	Statistical indices	β	t	b	SE	R^2	Fit indices
Variables	The aspect of "financial capital and customer capital"	0.73	10.36*	0.47	0.06	0.54	Chi-square (0.02); freedom degree (2); chi-square on freedom degree (0.89); comparison fit (0.99); goodness of fit (0.99); adoptive goodness of fit (0.96); root mean square error approximation (0.01)
	The aspect of "port charges and tax burden"	0.25	3.05*	0.34	0.06	0.06	
	The aspect of "market efficiency"	0.80	11.80*	0.35	0.06	0.64	
	The aspect of "market performance"	0.82	11.80*	0.35	0.06	0,64	

The confirmatory factor analysis of variables related to the commercial factors affecting the competitiveness of Shahid Beheshti port of Chabahar is reported in Table 4. The obtained standardized loads (β) show the high power of observed variables on the exogenous latent variable of commercial factors. Also, the results of non-standardized factor load (b) show that the factor loads of all indicators of commercial aspect are significant. The strongest load factor is the "level of financial market development of the region" indicator and the weakest factor load relates to the variable of "foreign currency exchange systems".

Pattern 1. Competitiveness measurement model in the commercial aspect

Chi-square (χ^2) indices, root mean square approximation, and factor loadings in the standard state and in the state of measurement pattern, are appropriate and significant. In addition to the significance of these factor loadings, the calculated R^2 values for commercial aspect markers indicate that all markers have high R^2 and these aspects have acceptable fit in the pattern. Also, t values greater than 2 and low standard error coefficients of each indicator of commercial aspects indicate that all of them are significant. Therefore, these five markers have been able to measure the endogenous latent variables of the commercial aspect significantly with high power and low error. Factor analysis of indicators related to the operational factors affecting the competitiveness increase of Shahid Beheshti port of Chabahar is presented in Table 5. All standardized loadings (β) and t values are statistically appropriate and significant. Also, the goodness of fit indicators is in a desirable and acceptable situation. Accordingly, the factors related to the operational aspect are appropriate.

Table 4. Validation of the overall model of operational factors affecting the competitiveness increase

	Statistical indices	**β**	**t**	**b**	**SE**	**R^2**	**Fit indices**
Variables	Technical-constructive infrastructure	0.76	10.53*	0.42	0.04	0.57	Chi-square (478.98); freedom degree (248); chi-square on freedom degree (1.96); comparison fit (0.98); goodness of fit (0.97); adoptive goodness of fit (0.99); root mean square error approximation (0.03)
	Technological infrastructure	0.80	11.16*	0.36	0.04	0.64	
	Loading and unloading	0.67	9.04*	0.55	0.04	0.44	
	Custom services	0.97	14.07*	0.06	0.01	0.66	
	Connection networks	0.46	5.95*	0.80	0.04	0.65	
	Trust and safety	0.73	17.26*	0.27	0.06	0.53	
	Logistic advantage	0.67	19.19*	0.55	0.06	0.44	

Chi square: 30.52; df=43; RMSES=0.02; GFI=0.95; AGFI=0.96; CFI=0.94

Pattern 2. Patterns of Measuring the Effective Operational Factors Affecting the Competitiveness Increase of Shahid Beheshti Port

The factor structure of the operational aspect in second-order factor analysis is as follows. The results obtained from the drawn patterns indicate that all beta values, t values and goodness of fit indicators are suitable.

Pattern 3. Second-order Factor Analysis of Operational Factors Affecting the Increasing Competitiveness of Shahid Beheshti Port

5. Conclusions

The results of this study showed that the main factors have a significant role in increasing the competitiveness of Shahid Beheshti port of Chabahar in attracting shipping lines. Paying attention to them and developing different features of each aspect should be placed on the agenda of planners and policymakers of ports management and sailing. Dual factors affecting the competitiveness of Shahid Beheshti port of Chabahar include commercial factors and operational factors.

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