

The Researches on Evaluating Model
for the Core Competence of Harbor Enterprises

Lu Jing¹

Zhang Wei²

Abstract Core competence of enterprises became the focus of many researches recently. This essay summarizes the situation of Chinese harbor enterprises and establishes an evaluating model which makes use of factor-analysis.

Key words Core competence, Evaluating model, Factor analysis, Harbor enterprises

1. Introduction

Competence means the advantages and ability of winning over rivals in the competition. It is important to the enterprises which determines the future. It is also vital to our enterprises after entering WTO. Competence of enterprises is displayed by that of their products and service, which are related to the price, quality and technical level, etc. It is also shown by some deciding factors including the creative ability of rules, techniques, management and the culture of enterprises.

As for the capital-intensive harbor enterprises, competitions among harbors run up with reform of port system. Many ports have same hinterland and penetrate into territory of other ports. Under the circumstances, harbor enterprises must prevail both in the level and planning of ports through capital operating, which means strengthening the traditional business including loading, storage and adding new ones such as distributing, packing in relation with the logistics supply chain.

In order to enhance the competence, besides improving the outer market, it is key to increase the core competence which includes that of concept, choice, creation, conformity and market. Since first advanced in 1990, many researchers and entrepreneurs have done a lot in this field. As for the evaluation work, competence of cities is the focus which uses factor-analysis and relating models. This essay makes use of this analyzing model and establishes a series of guidelines fit for the port industry.

¹ Professor, Transportation Management College, Dalian Maritime University, Dalian 116026, P.R. China.

² Postgraduates, Transportation Management College, Dalian Maritime University, Dalian 116026, P.R. China.

2. *Competitive situation of Chinese harbor enterprises*

Competence of harbor enterprises includes their locations, scales, conditions and managing level, etc. Shanghai is the hinge containers terminal and ranked first in freight quantity in China which is now used as a type to state the competitive situation in China.

2.1 Disadvantages

2.1.1 Distant from the international main shipping lines

There are three main container shipping lines: Far-east to North America(west and east coast), Far-east to Europe(West Europe, Mediterranean), East coast of North America to Europe.

2.1.2 Small scale

Table 1 Container amounts of four main ports

Port	1999		2000	
	Container amount	Global rank	Container amount	Global rank
Kaohsiung	6985000 TEU	3	7425000 TEU	4
Pusan	6439000 TEU	4	7540000 TEU	3
Shanghai	4210000 TEU	7	5613000 TEU	6
Tokyo	2695000 TEU	15	2960000 TEU	16

From the table, in 1999 the container amounts of Kaohsiung and Pusan are 66% and 53% more than that of Shanghai respectively. In 2000, the numbers are 32% and 34%. It is the result of their large-scale and timely construction of berths and hinge terminals.

2.1.3 Shallow fairways and insufficient berths

Fairway depths in Kaohsiung, Pusan and Kobe are -16m, -13.5m and -14m while that of Shanghai is -8.5m and will be deepened to -12.5m in 2007. In 1998, there were 25 container berths, three of which are as deep as -15m in Kaohsiung; in Pusan now there are 7 container berths whose depth is from -12.5m to -14m. However in Shanghai, in 1999, there were 25 container berths, most of which located aside the Yangtze River with average depth of -9m and old machinery.

2.1.4 Poor hardware and software installment

A scholar in Taiwan once investigated on the operating effectiveness of main ports in Asia and gave marks in some aspects with max 10 pts and min -10 pts. General comparison record is the average of all aspects. From the following table, Shanghai lies behind the other three ports.

Table 2 Investigation on installments

Aspect	Kaohsiung	Pusan	Kobe	Shanghai
Jam of port	-2.83	-6.5	-2.0	-5.0
Machinery	5.03	5.46	7.43	3.28
Capacity of vessels	5.38	5.2	6.8	2.67
Transportation system	5.0	5.0	8.25	4.33
Operating effectiveness	4.92	5.67	7.8	4.5
Ability of employees	4.92	6.6	7.6	4.0
Usage of computer	4.7	5.0	7.25	2.33
Freight rate	-5.7	-5.4	-9.2	-4.0
Overall grade	2.38	2.34	3.77	1.35

2.2 Advantages

2.2.1 Abundant freight resources

With the rapid growth and wider opening of the market, China has become one of the economic centers in the world. Based on the cheap labors and large market, foreign trade developed dramatically in recent years which brought tremendous amount of goods for shipping and harbor enterprises.

2.2.2 Rapid growth of container amount

By the development of industrial economy, high-value products, which are suitable for container shipping will increase greatly. That has boosted the rapid growth of container amount.

Table 3 Growth of freight and container amount in Shanghai

	1980	1985	1990	1995	1998	1999	2000
Freight (thousand tons)	84830	112910	139590	165670	163880	186410	204400
Container (thousand TEU)		202	456	1527	3066	4216	5612

2.2.3 Relatively low freight rate

Compared with the ports in developed regions, freight rates and ports fees are low in China. However, port conditions need further improvement. Some deep fairways and berths should be built to meet the requirement of large vessels. Moreover, logistics and managing level are still under construction.

3. Evaluating model

3.1 Choice of guidelines

Competence and the process of evaluating are both complex systems. Based on the research conclusions and relevant theories, this essay divides the competence guideline system into five aspects, i.e. national conditions, hinterland economy, transportation system, service level and development potential. Each aspect is further discussed by some specific factors which shows below.

Guidelines system of single figures is faraway from comprehensive comparison of the competence of ports. Some quantitative methods and models are needed to deal with those figures relevantly. Factor analysis method and model are used in this essay. In this way, we get the evaluation grades for each port by computing the factors matrix.

Evaluating factors are named as $U = U_1, U_2, U_3 \dots U_n$, each of which includes sub-factors such as U_{11}, U_{12} of U_1 . Evaluating levels are named as $V = V_1, V_2, V_3 \dots V_m$. Weight of each factor is named as $A = a_1, a_2, a_3 \dots a_i, \sum a_i = 1$. During the course of evaluating we use following factors:

U_1 = Natural conditions

U_{11} =Depth of fairway U_{12} =Number of berths U_{13} =Loading capacity

U_{14} =Freight amount

U_2 =Economy of hinterland

U_{21} =Area of hinterland U_{22} =Amount of cargo U_{23} =GDP U_{24} =Amount of im&export

U_3 =Transportation system

U_{31} =feeders U_{32} =railway U_{33} =highway

U_4 =Level of service

U_{41} =EDI U_{42} =Managing level U_{43} =fiber of employees

U_5 =Development potential

U_{51} =Potential development of hinterland U_{52} =Development planning

3.2 Application of the model

We use the three main ports around the Bohai sea area (Tianjin, Dalian and Qingdao) as examples. After reviewing of files and evaluation scores of some experts, we get the following

Table 4 Dalian

i \ j	1	2	3	4
1	94.8	84.5	88.3	71.5
2	92.4	80.8	83.0	84.9
3	80.3	85.7	84.5	
4	77.1	86.0	89.1	
5	91.9	91.7		

Table 5 Tianjin

i \ j	1	2	3	4
1	62.8	88.7	87.3	83.0
2	90.5	88.9	90.9	89.0
3	76.5	78.9	81.6	
4	83.8	83.5	83.1	
5	80.3	78.5		

Table 6 Qingdao

i \ j	1	2	3	4
1	81.6	81.7	86.4	89.1
2	83.0	80.2	79.4	81.7
3	79.8	78.4	77.5	
4	83.5	85.8	86.2	
5	81.2	85.3		

We can get the relating function between above scores and evaluating levels through trapezium distributing. Join the scores into the function and we can get the evaluating matrix R_i . Overall evaluating matrix $B_i = A_i \circ R_i, i=1,2,3 \dots 7$

Table 7 Weight of each factor (same among the three ports)

i \ j	1	2	3	4
A1	0.4	0.2	0.15	0.25
A2	0.4	0.2	0.2	0.2
A3	0.3	0.3	0.4	
A4	0.35	0.3	0.35	
A5	0.6	0.4		

Dalian: $B = (0.2500, 0.2500, 0.2500, 0)$

Numerate the evaluating levels V_1, V_2, V_3, V_4 as 1 (Excellent), 2 (good), 3 (fair), 4 (bad)

$$V = (0.25 \cdot 1 + 0.25 \cdot 2 + 0.25 \cdot 3) / (0.25 + 0.25 + 0.25) = 2$$

In the same way Qingdao $B = (0.2500, 0.2500, 0.2267, 0)$ $V = 1.9679$

Tianjin $B = (0.2500, 0.2500, 0.2500, 0.2500)$ $V = 2.5$

From the process of evaluating we can conclude the limited development of Tianjin by natural conditions, the rapid growth of Qingdao and the hot prospect of Dalian.

4. *Tactics to be taken by harbor enterprises*

Core competence is the basic factor for the development of harbor enterprises which determines their prospects. Main tactics which should be taken by them lie in improving the creativity of technology, management and culture of enterprises. In terms of harbor enterprises in China, they should strengthen technical cooperation with foreign counterparts and research institutes to realize the modernization of technology. Furthermore, they must also establish effective managing teams and patterns together with advanced management concept and strategy. At last, more attention should be paid to the cultural construction which lie in the initial process of technology and management and give support to enhancing the core competence of enterprises.

5. *Conclusion*

This essay mainly discusses the core competence of harbor enterprises. Following research works have been done. Firstly, it gives a brief definition of core competence and summarizes the competitive situation of harbor enterprises in China. Secondly, it establishes a series of guidelines and evaluating model to analyze the core competence of harbor enterprises with Tianjin, Qingdao and Dalian as examples. Finally it forwards the tactics that to be taken by harbor enterprises to improve the core competence of them.

However there are still some issues to be further researched which includes the revision of the evaluating model, choice and importance of evaluating guidelines in the model and scoring system of each factor in the evaluating process.

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