Comparative Study in the Competitiveness of Ship Manufacturing Industry in Shandong Province

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Abstract: The shipbuilding industry is both a highly integrated market-oriented and an export-oriented industry. At the same time, it is the national strategic industry which has an important role in the national defense. The Sustained and sound development of shipbuilding industry are of great significance to the promotion of both local economy and national economy. As the research object, the competitiveness of ship manufacturing industry in Shandong Province is presented in this paper, and some Suggestions are proposed to improve the competitiveness of shipbuilding industry in Shandong Province.

Keywords: ship manufacturing, competitiveness, Suggestions

1 The Definition of the Competitiveness of the Ship Manufacturing Industry and Its Influential Factors

1.1 The Definition of the Competitiveness of the Ship Manufacturing industry

The Industry Competitiveness refer to the capacity which, compared with others, a country or region- specific industries have, and due to this capacity, they can have more productiveness, and offer more consumer goods in demand to the market, and gain the profits sustainably under free trade conditions, therefore, the ship manufacturing industry's competitiveness can be defined as: the comprehensive capacity which the shipbuilding industry in a country or region own, in the fierce marketplace, relaying on it they can cover the market both at home and abroad, and continued access to appropriate profits or survive in the deteriorating con- ditions. This capability can be reflected from the several aspects such as product, sales and profits and so on.

1.2 Influential Factors of the Competitiveness of the Ship Manufacturing Industry

The influential factors in the shipbuilding industry almost involve all respects, both internal and external. among this factors, here are the key factors in five respects as the following.

First, the scale and capability of the Shipbuilding enterprises. The Shipbuilding industry demand efficiency of economies of scale. Especially in the highly integrated and monopolistic competitive shipping market, the war mainly broke out among the large enterprises and groups. In order to gain the efficiency of economies of scale, and to enhance competitiveness, this giant of shipbuilding enterprises never stop to expand.

Second, the technical level. The Technical level is the key factor in the manufacturing competitiveness. as a huge capital-required and technology intensive industries, Ship manufacturing industry needs to enhance the R & D investment, to strengthen the capacity of ship design and to develop the ability of self-innovation of critical technology, in order to build an effective system of independent innovation capability of ships, which have became the powerful weapon of the rival in this game to maintain its competitiveness in shipbuilding industry

Third, the shipbuilding cost and production efficiency. The confirmation of the final price depends on the cost of the shipbuilding. On one hand, the cost, to a large extent, determines the final profit of enterprises; on the other hand, it also directly affects the competitiveness of production against others'. As one of the main indicators, The productivity costs have a direct effect on both the product cost and the delivery schedules.

Fourth, ability to provide the auxiliary item. Shipbuilding industry has been hailed as the Equipment industry for the marine, embodying the nation or region's comprehensive strength. The construction of a big ship requires the close cooperation with more than 200 supporting companies. Marine equipment manufacturing industry is an important part of the shipbuilding industry. The ability of the self-product of the Major marine equipment is the base of cost- reducing, of overall competitiveness- enhancing, and of the healthy and stable development of the ship industry.

Fifth, the government support. In the increasingly fierce market competition, as a important factor to enhance the industrial competitiveness, the government policy is playing a huge role in shaping the region's competitive advantages. Therefore, the government policy is necessary for this industry to establish clear development strategy and to give the policy support.

2 The Assessment of Competitiveness of

Shipbuilding Industry in Shandong Province

2.1 Assessment Method

Competitiveness is a dynamic and static comparative concepts, therefore, in the case of analyzing shipbuilding industry competitiveness in Shan Dong province, analysis research ideas is showing Shandong shipbuilding industry's competitive level by the comparison of the relevant indicators between various region. According to Shandong Province shipbuilding competitiveness evaluation index, we can use the evaluation index system in theory and the available data, to analyze competitive strength, existing and potential, by using factor analysis.

Factor analysis is the statistical models and methods used to analyze the factors behind the appearance, its purpose is to study how to use a small number of factors to explain the large number of the original variables, the same time, to avoid information loss as far as possible. In the course of the practical problems of analysis, common factor analysis can remove duplication of information, and combine lots of original index into a relatively fewer factor variables to analyze, therefore, the factor analysis is taken to analyze the Shandong Province's competitive shipping industry force.

2.2 The construction of the system of the Assessment indicator

First, the data indicators relative to the shipbuilding industry are need to be selected to build the assessment indicator system. According to the characteristics and laws of the development of Ship manufacturing industry, combined with the targets to be achieved in this research and data availability, we get the main selection of the following indicators: the number of business units, industrial output value, industrial added value, export delivery value, the main business income, the average number of employees, overall labor productivity, the regional handheld shipbuilding orders, shipbuilding capacity of all regions, all new ship orders regions to undertake, the total profits of enterprises, regional shipbuilding berth, the shipbuilding dry dock area, 13 specific indicators, using factor analysis to a comprehensively evaluate the competitiveness of shipbuilding industry in Shandong Province. The reason why select these indicators is to find the position of shipbuilding industry in Shandong Province in this industry nationwide, since this indicators can present the competitiveness of the shipbuilding industry, the current and the future, namely, potential competitiveness and Industry adaptability.

2.3 Analysis

2.3.1 Data Selection and processing

According to the indicator system of Shandong Province shipbuilding industry competitiveness evaluation model, we get the raw data (the original 13 variables, sample size 18, calculate.) from the data in the Statistical Yearbook of China, Shandong Statistical Yearbook and the China Shipbuilding Industrial Statistics Yearbook, combined with various indicators model processing and comprehensive comparison, the Chinese shipbuilding industry competitive evaluation of raw data (Table 1) come from standardizing out come of the first step of the evaluation mode by the SPSS statistical analysis software.（table1）。

Table 1 the raw observation data of the competitiveness of China's shipbuilding industry in 2007

Region (Province)	Number of Enterprises	Overall Industrial output （Million）	Industrial added value （Million）	Export delivery value （Million）	Main business income （Million）	The average number of employees （person）	Overall Labor Productivity （yuan/person·year）
Tianjin	11	293778	78359	211962	296296	4610	138836
Hebei	4	5301	896	146413	5696	308	3629
Liaoning	67	2830976	588849	1953757	2847544	39687	104241
Heilongjiang	2	5788	1459	0	4902	502	29064
Shanghai	73	3078168	894565	2446559	3154133	24768	229540
Jiangshu	224	5137073	1434263	3694160	4905439	57665	210621
zhejiang	149	3068931	678168	1645421	2578702	34463	144503
Anhui	18	203179	74150	95330	189228	4948	148300
Fujian	26	530196	137739	407208	451176	8894	86114
Jiangxi	19	261016	78077	89951	248553	9801	79662
Shangdong	108	1862445	620958	532018	1651736	32063	187431
Henan	7	136316	71275	0	89547	6498	109688
Hubei	37	1136461	321406	373663	939790	20567	144810

Hunan	9	59939	15934	13496	59821	1888	81797
Guangdong	53	1126450	299849	995360	1155084	15715	90417
Guangxi	18	213070	54898	34984	189999	3801	141453
Chongqing	27	317442	105111	10548	289809	11774	88806
Sichuang	5	21980	9480	0	20723	581	163167

Table 1 the raw observation data of the competitiveness of China's shipbuilding industry in 2007

Region (Province)	Total profits （Million）	Shipbuilding capacity of Region （ton）	The new orders undertaken by Regions （ton）	Regional handheld shipbuilding orders （ton）	Regional handheld shipbuilding orders	Regional shipbuilding dry dock
Tianjin	15243	235354	247046	710177	16	3
Hebei	304	95000	440000	560000	0	1
Liaoning	126569	3798027	15193026	24586743	23	7
Heilongjiang	65	420	2534	2114	3	0
Shanghai	362814	5206900	18129000	38627600	12	7
Jiangshu	484779	5400177	43039864	61916215	110	15
zhejiang	179741	3696358	12420231	18083860	698	49
Anhui	11368	57243	298730	379242	15	0
Fujian	13390	189186	677288	1179346	14	2
Jiangxi	13992	109590	562965	863078	23	3
Shangdong	113880	826981	6144274	6652069	47	8
Henan	12796	152100	143700	0	31	1
Hubei	54959	441028	3436888	3739003	106	12
Hunan	950	38970	44347	30096	21	0
Guangdong	128210	1046618	6213834	10233831	152	18
Guangxi	7489	58483	52033	62279	76	1
Chongqing	10226	275585	467102	355320	115	0
Sichuang	362	4775	3040	320	0	0

Table2 the outcome by SPSS data processing

	Communalities		**Component Matrix[a]**		**Rotated Component Matrix[a]**	
	Initial	Extraction	1	2	1	2
the number of business units	1.000	0.915	0.944	0.153	0.837	0.463
industrial output value	1.000	0.991	0.995	-0.005	0.938	0.331
industrial added value	1.000	0.984	0.988	-0.092	0.961	0.246
export delivery valu	1.000	0.962	0.973	-0.126	0.958	0.210
the main business income	1.000	0.989	0.992	-0.071	0.958	0.268
the average number of employees	1.000	0.885	0.940	0.033	0.874	0.348
overall labor productivity	1.000	0.451	0.647	-0.182	0.670	0.047
the total profits of enterprises	1.000	0.952	0.961	-0.171	0.962	0.163
shipbuilding capacity of all regions	1.000	0.905	0.950	-0.053	0.912	0.271
all new ship orders regions to undertake	1.000	0.953	0.959	-0.186	0.965	0.149
the regional handheld shipbuilding orders,	1.000	0.969	0.957	-0.231	0.979	0.105
regional shipbuilding berth	1.000	0.976	0.416	0.896	0.089	0.984
the shipbuilding dry dock area	1.000	0.976	0.606	0.780	0.307	0.939

Table2 the outcome by SPSS data processing

Component Score Coefficient Matrix					
	Component			Component	
index	1	2	index		
the number of business units	0.054	0.120	the total profits of enterprises	0.124	-0.068
industrial output value	0.092	0.030	shipbuilding capacity of all regions	0.098	0.001
industrial added value	0.110	-0.021	all new ship orders regions to undertake	0.126	-0.076
export delivery valu	0.115	-0.041	the regional handheld shipbuilding orders,	0.136	-0.103
the main business income	0.106	-0.009	regional shipbuilding berth	-0.149	0.535
the average number of employees	0.079	0.050	the shipbuilding dry dock area	-0.107	0.473
overall labor productivity	0.097	-0.085			

2.3.2 The scores of shipbuilding industry competitiveness

The above table gives us the factor score coefficient matrix, the factor model represented variables as a linear combination of public factors, while the common factors can be naturally expressed as a linear combination of original variables, by the common factor's variable coefficients of a linear regression, from it the least squares estimation is the so-called factor score coefficient, by which we get two new variables fac1, fac2, and they are factor score.

Table3 the scores of shipbuilding industry competitiveness

Region	fac1	fac2	score	rank	region	fac1	fac2	score	Rank
Tianjin	-0.43440	-0.36526	-5.06	9	Jiangxi	-0.52882	-0.22182	-5.805	13
Hebei	-0.74258	-0.31899	-8.16	17	Shangdong	0.41596	0.00197	4.285	5
Liaoning	1.01847	-0.27608	10.036	3	Henan	-0.53708	-0.34216	-6.085	15
Heilongjiang	-0.72529	-0.78521	-8.736	18	Hubei	-0.19404	0.31946	-1.48	7
Shanghai	1.78160	-0.37724	17.726	2	Hunan	-0.62431	-0.37728	-7.03	16
Jiangshu	3.02712	-0.13051	30.94	1	Guangdong	-0.13121	0.68891	-0.23	6
zhejiang	0.07482	3.78457	6.90	4	Guangxi	-0.52745	-0.22147	-5.79	12
Anhui	-0.42481	-0.47994	-5.15	10	Chongqing	-0.54918	-0.01869	-5.68	11
Fujian	-0.40811	-0.30356	-4.695	8	Sichuang	-0.49068	-0.57660	-5.98	14

2.3.3 The Assessment of the Shandong' shipbuilding industry's competitiveness

Evaluation results show that: Jiangsu, Shanghai, Liaoning, Zhejiang, Shandong and Guangdong provinces (cities) take the leading position in shipbuilding industry nationwide. These provinces (municipalities) gain the irreplaceable advantages in the traffic, location, resources, market, size, enterprise, opening up, infrastructure and others, which objectively endow ship industry with strength and competitive advantages, as well as monopoly. The ship integrated manufacturing competitiveness in Hubei, Fujian, Tianjin, Anhui, Chongqing and Guangxi provinces (municipalities) ranking in the middle nationwide. Among these Provinces, there are lots of areas with good location and convenient transportation, as well as the higher the level of economic development. Against the background of the clear difference of the supply and demand between the factory location and the market, the common problem they are facing is insufficient market development, which constrained their competitiveness, and led their position in the list relatively down. Jiangxi, Sichuan, Henan, Hunan, Hebei and Heilongjiang provinces are in the weak position. In the respect of resources, compared with Product Development model of other provinces in the top of the list, there are something unreasonable in both the intensity and the way they to develop product. And most of them are with relatively weak economic strength, without the advantages of location and openness, worse still, they are far away from the primary trading market.

3 Enhance the competitiveness of shipbuilding industry in Shandong Province Suggestions

3.1 Identify developmental priorities of the industry

First, put the focus on the cluster development of marine power equipments. Through new construction or technical renovation, some core enterprises are supposed to be

the prop power to vigorously improve the capabilities and technical skills to research and produce diesel engines for ships as well as some key parts of the ships, in which way clusters of marine power equipments are created. Second, put the focus on promoting the secondary key marine auxiliary equipment. In order to create secondary auxiliary equipment and enlarge the industry chain, it is necessary to conform to the adjustment of industrial structure in Shandong Province, and to adapt to the requirements that mechanical and electrical equipment for marine and ocean engineering should develop. Third, the promotion of social coordination of the products of ship Intermediate products should be stressed. in accordance with the development idea of "diversification and production specialization, social coordination, supporting localization ", we should build up the system of R & D and production of Intermediate products and promote the scale of it, to meet the development requirements of modern shipbuilding. Fourth, we should focus on promoting the production of the ship supporting R & D gaps. Relaying on the key ship supporting projects, we should integrate advantageous resources of enterprises and research institutes to build a R & D platform for the gaps accessory products, and organize the joint research to make a number of breakthroughs in crucial technologies, eventually speed up the localization process of the key products.

3.2 Adhere to Ship Industrial Clusters

Shandong Peninsula should break the boundaries of administrative areas, and make the plan of the section of the peninsula ship manufacturing economy from a higher level. In accordance with the requirement of the more correlation, more rational layout of the division of labor, more overall competitiveness, we should plan and construct the existing shipbuilding industry system at the larger, higher level, adhere to the principle of intension, scale, market-oriented. By combining industry talent, resources, information, and others, we can improve the quality, upgrade technology, improve efficiency, and get a bigger and stronger shipbuilding industry. According to the principle of "layout concentration, land-intensive, industry concentration, well-function", we build up a shipping industry cluster.

3.3Promotion of Construction of the Ship Brand

Ship Brand is not only a symbol of region’s and corporation’s image, but also the sign of the comprehensive competitiveness and markets credibility of enterprises. With the ship market competition going fiercely, brand competition will necessary being. We should put more efforts to increase the implementation of brand strategy, and strive to foster the development of the brand of ship and supporting ship. First, make the brand development plan. Second, the implementation of brand-building assistance measures. Third, do a good job of branding. Both government and enterprises should give full play to branding the famous enterprises and famous product through the mainstream media and information network, and should organize the enterprises to actively participate in industry-based, international exhibitions and forums, to seek greater development of the famous enterprise.

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