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A study on China Shipbuilding Industry's National Competitiveness Change

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【Abstract】

This paper has used literature research method to study China shipbuilding industry's n ational competitiveness change. Based on Porter's Diamond Model, it has analyzed key fac tors pertaining to China shipbuilding industry such as factor conditions, demand condition s, related and supporting industries and firm strategy, structure and rivalry. Also it has a nalyzed China government's supportive strategies and policies' characteristics on shipbuildi ng. China is carrying forward a 'choose and concentrate' strategy to support excellent shi pbuilders and reject insolvent ones. Government's support played an important role in ship building's national competitiveness. By proclaiming government's supportive policy on ship building industry adjustment, China can induce not only competitive relations among rival companies, but also vitalizations among front and rear industries. This will lead to shipbu

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ilding industry's advance in quality and build a sustainable industrial structure.

【Key words】 Shipbuilding, National Competitiveness, China, National Competitiveness Advantage, Government's Supportive Policy

1. Introduction

Shipbuilding is classified as a country's basic and major industry since it is related to various rear industries and related industries. UK took the lead in shipbuilding industry since world war Ⅱ, Japan caught up later, then Korea took the lead from 2000. Korea was recorded to be world's first place in the major 3 indexes of received orders, shipbuilding completions and holding orders during the period of 2000-2008. However China's major shipbuilding index has taken the lead since 2013. From January to June in 2016, the DWT (Dead Weight Tonnage) rankings of shipbuilding completions are China 74.7%, Korea 13.3% and Japan 8.3%. The holding orders are China 44.3%, Korea 23.8% and Japan 23.8%.[1] World's shipbuilders all share the only one world market, which means this industry has the characters of easily being sensitively affected by macro economy, shipping industries, price and need of international raw materials etc. In 2000s, for example, shipbuilding industry has enjoyed the best booming period, but soon the received orders declined, and made the shipbuilding industry's capabilities exceed and rush into drastic challenges. Since 2011, as global economy continued to fall, new order contracts need huge sum of money, shipbuilding industry thus was speculated to be a long period of stagnation.

Under such situation, Korea, China and Japan had tried to find the way out. Korea's most shipbuilders, which used to building tankers, LNG carriers and container ships, were trying to enter high value added ships and offshore plant industry. Japan focused on low cost and light weight bulk carriers and strategic co-operations among companies. However as America developed shale gas extraction, oil price declined, then offshore plant industry encountered a crisis and started to expose structural problems. Korea's shipbuilding and shipping enterprises' structural adjustment necessities were referred by media, which made these enterprises' problems to be actively exposed. In July 2015, DSME (Daewu Chosun) announced a 300 billion won financial deficit, thus made its creditor-KDB bank investigate and additionally support 420 billion won.[2] Then should we conclude that Korea shipbuilding industry has lost its competitiveness to China according to the industry life cycle? Should Korea and Japan consider shipbuilding industry to be a sunset industry and set

1) CANSI, "world's shipbuilding major 3 index in first half of 2016" (http://www.cansi.org.cn/index.php/Information/detail?id=441) [2016.08.08].
2) JTBC, "3000 billion loss report of DSME"(http://news.jtbc.joins.com/html/522/NB11288522.html) [2016.08.09].

up plans for retreating? This paper has used Porter's Diamond Model to measure shipbuil ding industry's national competitiveness. In other words, this paper has analyzed China sh ipbuilding industry's competitiveness by investigating factor conditions, demand conditions, related and supportive industries and then firm strategies, structure and rivalry conditions, and supportive strategies of China government characteristics. Especially compared to Kor ea and Japan, China government's implemented 'Choose and Focus' strategy which is a n ational competitiveness strategy according to Porter's theory. Shipbuilders have been tryin g to get as much support as they can from governments, then governments are manipula ting exchange rate and implementing various supportive policies to enhance shipbuilders' c ompetitiveness. However such kind of strategies will not only weaken industry's competiti veness in a long term, but also lead to a medium and long term crisis by even a small v ariation. Korea, China and Japan's Shipbuilding industries rely largely on government's int ervention, but now such kind of back-scratching alliance of government and businesses h as gone to its limit. Porter pointed out 'productivity' as a meaningful and unique competiti veness concept in a national level. What's more he emphasized the industry's self-improvi ng abilities for continuous productivity growth (Porter 2001, 197). This paper has analyze d China shipbuilding industry national competitiveness about government policy's directivit y for inducing national firms' competition or inter-generation, also for maintaining its pro ductivity and continuity. China now has noticed that its shipbuilding industry's capacity h as exceeded world's demand, thus set up a 'White List' for firms. 'White List' qualifies fir ms with internal stabilities, and this list has become the reference of the country and loc al government's policy support. Social resource will be gathered in excellent shipbuilders, bank advances and governmental assistances will be concentrated in state-owned firms a nd famous private firms which are in the white list.[3] In this paper Chinese natural resou rces, factor conditions, related·supported industry formation and how government's nationa l competitiveness strategy changes shipbuilding industry's competitiveness will be analyze d.

Therefore this paper will generalize shipbuilding industry's current situation, national co mpetitiveness formation and strengthen direction (Chapter 2). Then it will analyze China shipbuilding industry's current situation and competitiveness advantage through diamond model (Chapter 3). It also will investigate China government's training policy and detail c ases (Chapter 4). By analyzing one specific industry's national competitiveness formation l ed by national policies, and factor conditions, demand conditions, related and supporting in dustries and firm strategies, structure and rivalry, this paper will suggest the conditions a nd policy focus's direction to promote the industry.

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3) Eworldship, "The newly issued white list will increase the survival of the fittest"(http://www.ew orldship.com/html/2014/ship_market_observation_0905/92052.html) [2016.06.21].

2. Shipbuilding industry's national competitiveness

1) Shipbuilding industry current situation

Shipbuilding industry is a policy supportive industry not only in Korea, China and Japan, but also in USA, UK, Indonesia, Brazil etc. Since 20th century, shipbuilding industry has developed after UK's rivet method, Japanese welding and block method, Korea's dock technology, and it was influenced by various factors such as technology progress, global economy's ups and downs, and national policy support etc.

<Table 1> shows Korea·China·Japan's major index from 2013 to first half of 2016. China, which first time showed its emerging trend after 2008, had taken up the first place in all indexes. In 2013, China's completion occupancy was 40.3%, Korea 31.0%, China's holding order index was 47.6%, Korea 30.5%. In 2014 China's completion index was 39.9%, Korea 28.5%, China's received order index was 46.5%, with Korea 28.0%, China's holding order index was 47.2% high, with Korea 26.1%. In 2016 first year half, China's shipbuilding completion index 33.0%, received order 74.7%, holding order 44.3%, these indexes are all world first place.

After the global economy crisis in 2008, world's economy has overcome the stagnation, shipbuilders' orders have increased, and orders had another addition in 2013. But because of this increase, overcapacity phenomena arose and caused various problems. America's shale gas and oil's mass production caused energy industry structural changes. After 2014, oil price drastically declined, Korea suffered shipbuilding completion's 95% decline in 2015, major 3 shipbuilders had a offshore plant market loss of 640 billion won which due to world's ship oversupply and oil price decline (Lee Enchang, 2016.1).

The external reasons for shipbuilding industry's fluctuations as mentioned are: first, an offshore plant market stagnation caused by oil price decline, second, Japan shipbuilders' renaissance due to the low exchange rate of yen and structural adjustment. Global stagnations declined the energy demand, shale gas's production and export increased, so oil price decreased and oil makers' revenue declined, all these caused offshore plant market's stagnation, also shale gas makers suffered the impact (KIET, 2015.6). Such changes had a drastic impact on related firms in countries like Korea who had concentrated to high added value shipbuilding and offshore industries. Japan, however, recovered its industry and expanded the production facilities with the help of lowering exchange rate of yen. In 2015, Japanese ultra-large type container shipbuilders received a large number of orders, and this was the world's largest monthly orders in the past 7 years.[4] In April 2014, UN's International Maritime Organization announced to strengthen the regulations for nitrogen oxides d

<Table 1> Korea·China·Japan's shipbuilding industry major index

Index/Country		World	China	Korea	Japan
2013	Million DWT	107.57	43.35	33.36	24.68
shipbuilding completions	percentage(%)	100	40.3	31	22.9
	Revised Million DWT	36.57	12.88	12.52	6.84
	percentage(%)	100	35.2	34.2	18.7
2013	Million DWT	144.77	68.84	44.19	22.6
received orders	percentage(%)	100	47.6	30.5	15.6
	Revised Million DWT	48.66	19.91	16.08	7.19
	percentage(%)	100	40.9	33	14.8
	billion dollars	10.38	3.27	4.11	1.06
	percentage(%)	100	31.5	39.6	10.2
2013	Million DWT	284.3	130.1	76.41	54.43
holding orders	percentage(%)	100	45.8	26.9	19.1
	Revised Million DWT	103.87	39.95	32.03	15.99
	percentage(%)	100	38.5	30.8	15.4
2014.1-12	Million DWT	90.86	36.29	25.91	22.64
shipbuilding completions	percentage(%)	100	39.9	28.5	24.9
	Revised Million DWT	34.74	11.53	12.03	6.57
	percentage(%)	100	33.2	34.6	18.9
2014.1-12	Million DWT	109.75	51.02	30.78	22.55
received orders	percentage(%)	100	46.5	28	20.5
	Revised Million DWT	39.69	15.31	11.78	7.84
	percentage(%)	100	38.6	29.7	19.7
2014.1-12	Million DWT	316.88	149.72	82.74	59.57
holding orders	percentage(%)	100	47.2	26.1	18.8
	Revised Million DWT	115.12	45.65	33.28	19.69
	percentage(%)	100	39.7	28.9	17.1
2015	Million DWT	96.24	39.22	29.36	21.09
shipbuilding completions	percentage(%)	100	40.8	30.5	21.9
	Revised Million DWT	36.65	12.86	12.7	6.62
	percentage(%)	100	35.1	34.6	18.1
2015	Million DWT	96.46	29.16	32.46	28.87
received orders	percentage(%)	100	30.2	33.7	29.9
	Revised Million DWT	33.77	10.25	10.15	9.14
	percentage(%)	100	30.3	30	27.1
2015.12.	Million DWT	303.15	127.37	82.71	69.34
holding orders	percentage(%)	100	42	27.3	22.9
	Revised Million DWT	109.29	39.87	30.52	23.14
	percentage(%)	100	36.5	27.9	21.2
2016.1-6.	Million DWT	54.31	17.94	20.17	12.93
shipbuilding completions	percentage(%)	100	33	37.1	23.8
	Revised Million DWT	18.76	5.71	6.53	4.15
	percentage(%)	100	30.5	34.8	22.1
2016.1-6.	Million DWT	17.68	13.21	2.35	1.47
received orders	percentage(%)	100	74.7	13.3	8.3
	Revised Million DWT	6.32	2.42	0.826	0.52
	percentage(%)	100	38.3	13.1	8.2
2016.6.	Million DWT	274.2	121.6	65.31	65.18
holding orders	percentage(%)	100	44.3	23.8	23.8
	Revised Million DWT	100.19	36.73	25.08	22.06
	percentage(%)	100	36.7	25	22

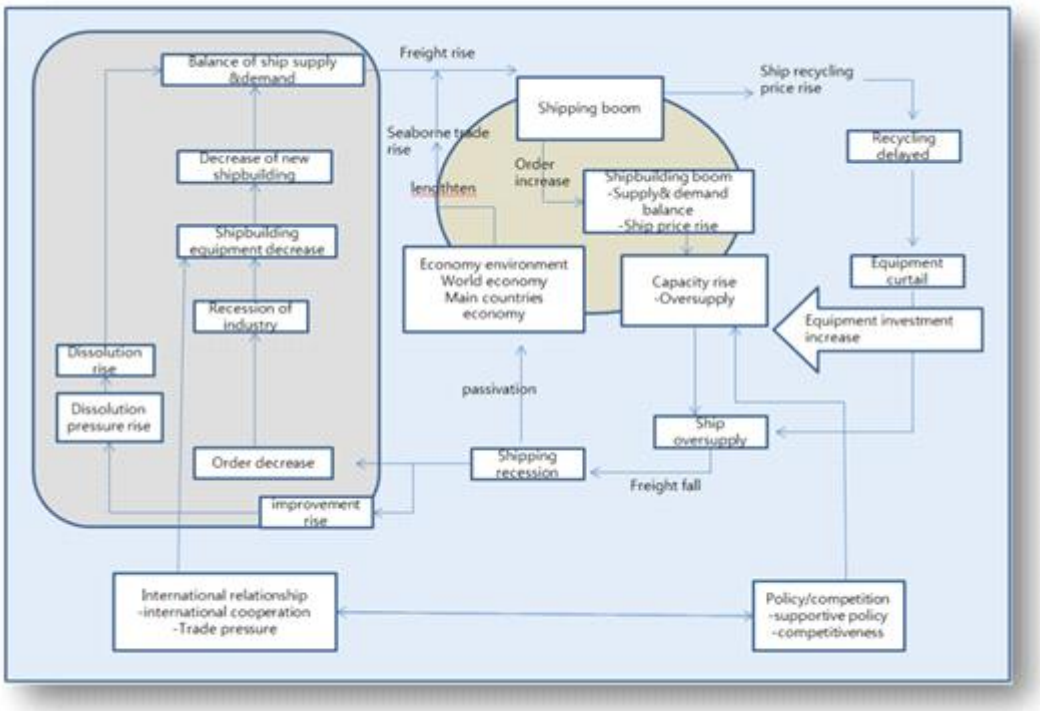
Sources: CANSI, 'World shipbuilding major index 2013', 'World shipbuilding major index 2014', 'World shipbuilding major index 2015', 'World shipbuilding major index 2016', rearranged by authors.

4) KITA Tokyo center, "The recent trend of Japan's shipbuilding industry"(http://koba.or.jp/bbs/download.php?bo_table=trade&wr_id=3051&no=0&page=6) [2016.06.21].

ischarging which is the main cause of acid rain, and regulations for water ballast.[5] By t his good news Japan's shipbuilding industry had a look up, people had various analysis about whether this phenomenon can continue or not. However, if erase these special situa tion mentioned above, Japan might outbreak overproduction again. As for last, shipbuildin g industry's structural adjustment problem is serious. In shipbuilding industry, technology and proficiency are two important characteristics, so outflow of talents are fatal problems. Nowadays Korea shipbuilding industry is under the similar situation. The structural adjus tment problems are as follows: is the shipbuilder ready for the sudden new orders, is the technician's reconfiguration properly done, do firms have countermeasures if key technical staffs job-hop to rival company, and do they get appropriate safety net if encounter struc tural adjustment?

Under the environmental change, outer shock and inner factor changes, the world shipb uilding market's business cycle and influence factors are as <figure 1>:

<Figure 1> World shipbuilding market's business cycle and influence factors



Source: KIET, 2007, 28.

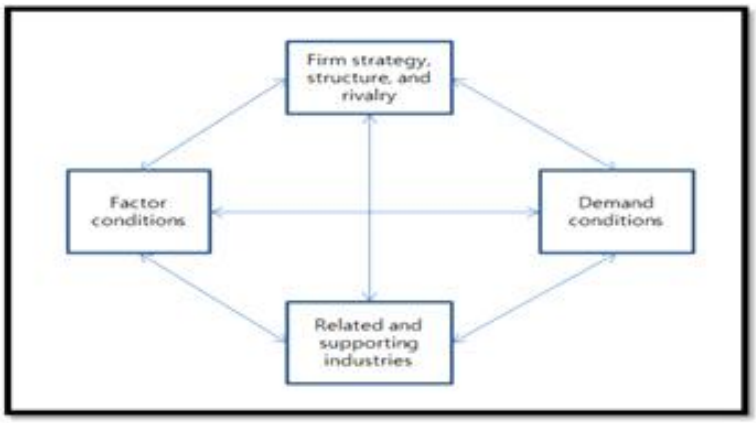
5) Ha Jeonga 2015, "Japan shipbuilding industry's current situation," KOTRA Global Window(http://www.globalwindow.org/gw/overmarket/GWOMAL020M.html?BBS_ID=10&MENU_CD=M10103&UPPER_MENU_CD=M10102&MENU_STEP=3&ARTICLE_ID=5027659&ARTICLE_SE=20302) [2016.06.21].

As <figure 1> described, after the global recession, world economy slowly recovered a nd met its boom after 2013(as the circle in figure 1 showed), shipbuilders' capacity rose a nd led to oversupply. Meanwhile, oil price decreased, the economy got passivated and shi pping recession came as well (as the left rectangle in figure 1 showed). As soon as ship building industry's new orders decreased, the equipment curtailed, structural adjustment pr essure followed. To prepare for such economy cycle problem, this paper will consider ship building industry's national competitiveness's structural analysis and necessity in next sec tion.

2) What is national competitiveness?

Porter's competitiveness related discussions started with classic market liberalism theori sts' argument about natural resources and element's absolute advantage or comparative ad vantage. The natural resource is one of the determinants of competitiveness advantage, d emand conditions, related industries, supporting industries and firm strategies, structure, c ompetitive relation's formation should keep the balance (refer to <Figure 2>).

<Figure 2> Determinants of national competitive advantage



Source: Porter 1990, 70.

This paper uses the diamond model to analyze what kind of policies the government ca n execute in the part of strategy and structure, rivalry. Firm strategies, structure, and riv alry are the conditions in the nation governing how companies are created, organized, and managed, as well as the nature of domestic rivalry (Porter 1990, 73-74).[6]Thesegeneralsup

6) Without doubt that tax promotion and government's interference to bank loan are restrictive in t he international society.

portivepolicies,whichfocusonspecificindustryandarerelatedtotrainingpolicyandstructureadjustmentaboutRandDinvestmentsupport,taxincentives,orloansupport,haveclearlyinfluencedtheshipbuildingindustry.Howeversuchkindofgovernmentalsupportcan't ensure shipbuilding industry's long term boom.

<Table 2> Shipbuilding industry's determinants of national competitiveness

Determinants	Shipbuilding industry's corresponding determinants
factor conditions	manpower resources (personnel expenses, supplement scale, proficiency level), construction efficiency, investment concentration, specialization level, AS and quality guarantee, etc.
related and supporting industries	Thick plate (price, supply quantity), material (price, supply quantity)
demand conditions	Shipping industry, ocean industry and other national firms which need ships
Governmental support	Firm support about factor conditions, related industry's support, rivalry formation, innovation induction, needs industry's support, shipbuilding industry's world economy related strategies

Source: these determinants are chosen according to diamond model's description on determinants of national competitiveness.

As can be seen in <Table 2>, shipbuilding industry's national competitiveness determinants are as follows: factions are about manpower resources (personnel expenses, supplement scale, proficiency level), construction efficiency, investment concentration, specialization level, AS and quality guarantee, etc. Related and supporting industries are about thick plate (price, supply quantity), material (price, supply quantity). Demand conditions are about Shipping industry, ocean industry and other national firms which need ships. Governmental support is about the firm support of factor conditions, related industry's support, rivalry formation, innovation induction, demand industry's support and industry's world economy related strategies. The governmental support must be entrusted with policy direction to form national similar firms' competitive relations, and it should bring vigor by strategies of the front and behind industries.

For now, there are various explanations about the world's biggest China market. As these explanations evaluated China shipbuilding industry took the first place by overwhelming factor conditions and demand conditions and government's full support, some firms (not only privates firms but also state-owned firms) stated to bankrupt which began with the first state-owned firm bankrupted in the first half of 2016. There are still observations about low-quality ships made by conducting cutthroat competition and discount, which will lead to crisis of the China market. According to Clarkson research, only 171 of 667 shi

pping firms in China were in normal operation, and there used to be 292 firms but declined to 152 in 2015, also there were only 69 firms which received more than 1 order in 2015.[7] We can diagnose China shipbuilding industry is in crisis by analyzing its competitiveness determinants as above, however by analyzing China government support's direction and reform efforts, we can see China is proceeding a long term reform, and the government is adopting supportive strategies to induct competitiveness policies under shipbuilding industry's recession conditions pointed out by <figure 1>. As Porter(1990) referred, governmental support should meet 2 conditions. First, it can predict the whole industry's great change and conditions, then improve and innovate before foreign competitors. Second, it can from the environment which multiplies influences the determinants the diamond model indicates.

There are a few research conducted about China shipbuilding industry competitiveness, for example KITF(2006) has analyzed China's industry·technology, Hong(2006) researched China Shipbuilding's globalization and Korea's counter strategy, Kae Wea(2011) studied China shipbuilding industry's global competitiveness, as well as Lee Jaeyong(2014) compared China shipbuilding industry to Korea to explore Korea shipbuilding industry's competitiveness enhancing strategy, etc. However, these papers failed to find the proper thesis to apply the analysis and seldom used the comparative method to analyze the difference among countries' shipbuilding industry. This paper will improve above insufficiencies of current literature. by using diamond model into comparison among China, Korea and Japan's shipbuilding industries.

In the next chapter, this paper analyzes China government shipbuilding industry, support policy's choosing and concentrating strategy, and then analyses demand conditions, related and supportive industries and firm strategies, structure, rivalry formations.

3. Focus on China shipbuilding industry's competitiveness and supportive policies

1) China shipbuilding industry's competitiveness: factor conditions, demand conditions, related and supportive industries and rivalry

By executing government led market economy, Asian countries especially Korea·China·J

7) Chosunbiz, "China shipbuilding is sinking"(http://biz.chosun.com/site/data/html_dir/2016/05/13/2016051301638.html) [2016.06.27].

apan not only support specific industries, but also train firms by designating strategic ind ustries and firms' types. Such kind of supportive policies are objects of sanctions accordin g to WTO and FTA regulations, especially shipbuilding industry which is country's basic industry and relies largely on government's support on ways of R&D support and structu re adjustment.

<Table 3> Korea·China·Japan shipbuilding industry's competition resources comparison (2014)

		Korea	Japan	China
manpower	Personnel expense	100	100	40
	Supply scale	insufficient Supply → sufficient	graying, insufficient supply	Sufficient supply
Thick plate	price($/ton)	565	565	559
	Supply quantity	Partly import/export	Partly export	Partly export
materials	Price index	95	100	domestic 80, import 110
	Supply quantity	Self-sufficient 80%	Self-sufficient 90%	Self-sufficient 55%
		engine/components export to China	Partly export	
Building efficiency index		98	100	50~60
Delivery index		98	100	75~85
AS and quality assurance		Partly built (flexible use of technical cooperation network)	global AS net built	global AS net built
Ship's performance and quality		100	100	90
Capital investment	R&D	Small R&D scale	static R&D scale	Policy investment increase (low efficiency)
		(low increase)	(supported by Nippon foundation)	
	Facilities use ratio	78.2(under adjustment)	75.6(static)	61.6(under structural adjustment)
Shipping finance	Scale index	80	95	90
	interest	CIRR	CIRR	Libor+4%
Domestic demand proportion		Less than 10%	About 40%	About 20%
Governmental support		R&D support, structural adjustment	R&D support	Positive promoting and structural adjustment

Source: KIET, 2015,5

KIET(2015) compared Korea·China·Japan's competitiveness resources and indicated that China's factor conditions are more advanced than Korea and Japan. China's personnel exp ense is only 40% of Korea and Japan, also its manpower supply scale is sufficient to co mpare to Korea's graying and Japan's insufficient. China's construction department's probl em is said to have low labor productivity and production personnel, which are puts 3 to 4 times than Korea. Even some China shipbuilders are nation-owned firms, 70-80% perso nnel are from outsourcing firms in which 20-30% have less than 1 year experience. That' s why China shipbuilders' productivity is low (Young Jeongso 2014, 27-28). Korea and Ja

pan's thick plate price is about 565 dollars per ton while it's 559 dollars in China. Korea's thick plate partly needs import while China and Japanese thick plate partly export. In the part of a material price index, Korea is 95, China is 93.5 (domestic80, 55% and oversea 1 10, 45%) compare to Japan's 100. However when talking about the index of building effici ency, with Japan 100, Korea is 98%. China is only 50-60%, which means China needs to develop it. In terms of delivery, with Japan's 100, Korea is 98, while China is only 75-85. In terms of ship's performance and quality, China has improved to 90 compare to Korea a nd China's 100. After China shipbuilding industry was specified as the major growing ind ustry, it was improved with the help of governmental support for a period, but recently u nder "choose and focus" policy. Shipbuilding industry, which is specified as major countri es' concentrated support, has its characteristics as Lee Jeongmook·Park Seng yob(2013) re gulated:

① It has a big ripple effect in not only front industries such as shipping, aquaculture, but also rear industries such as steel making, machinery, electronic, chemical and so on.

② As a labor intensive industry, it has about 50 related industries and needs deliveries of various materials, components' machinery, assembling etc.

③ As a capital intensive industry, it needs huge equipment capital to install docks, buil ding slips and cranes, also it needs long term working capital as the foundation.

④ As a low money recovery industry, it has a long building cycle, so the capital's ave rage balance is lower and sales proportion is lower compared to other industries in a spe cified period.

⑤ As an order production industry, ship types differ as the routes, cargos and ship ow ner's requests are different. So it is difficult to the mass product.

⑥ It has to follow many regulations, in other words, it has to follow regulations of shi p's safety and prevention of marine pollution, regulations of ship crews' work environment improvement and equipment and hygienic conditions.

⑦ It sells ships to the worldwide and uses high credit currency- dollars to pay, financi al conditions such as foreign exchange's influence is big and its foreign exchange risk is high.

⑧ It has the characteristic of the defense industry, so it will support marine military f orce if strong.

⑨ Since the demand variability is massive, orders' variation, which varies as world eco nomy change directly affects shipping industry, has an enormous impact on shipbuilding i ndustry.[8)]

So without governmental support, shipbuilding industry can't survive, and even with th e full support but without a complete strategy for economy prediction and demand chang

8) Shipbuilding's characteristics are quoted from Lee Keyongmuk·Park Sengyob(2013), pp.2-4.

e, the shipbuilding industry might become insolvent. Considering the massive ripple effect, the government should minutely observe thick plate and other materials' price, widen policy management, maintain proper domestic order proportion, bundle up front and rear industries and contain shipbuilding industry's management scope. Also, understand the characteristics of labor intensive and capital intensive satisfaction, then execute policies and regulations to deal with the recession.

In the next section China's shipbuilding industry management strategy of "choose and focus" will be analyzed.

2) Focus of Chinese shipbuilding industry supportive policy

China shipbuilding industry has improved rapidly with the help of its huge market and governmental support after it was specified as the major rising industry in the 1990s. China occupied 10% of world market share in 2000, however, it took the first place in most of the ranking indexes since 2013. China started this industry with Jiang Nan(江南) Shipbuilding yard the in middle of 19th century, and it belonged to national defense but managed modernized its industry foundation as it positively received orders from not only domestic but also overseas (Hong Songin 2012, 35). In 1997, China government disbanded CSSC (China State Shipbuilding Corporation,中国船舶工业总公司) isolated north China's CSIC (China Shipbuilding Industry Corporation, 中国船舶重工业团公司) and south China's CSSC (China State Shipbuilding Corporation in south area of China, 中国船舶工业集团公司), reorganized 25 small and medium sized affiliated shipbuilding yards into CSIC and CSSC 2 groups, then distributed orders from ship owners, and gave theses shipbuilding yards permission to receive orders, shipyards' investment and property and expense management (Lee Keyongaook·Park Sengyob 2013, 215) . China government promulgated "2006 Shipbuilding Industry' middle and long term Development Project 2006~2015" to choose 3 central shipbuilding clusters which are Huanbohai (環勃海, the center is Dalian(大連)), Changjiang (長江, the center is Shanghai (上海)), Zhujiang(珠江), the center is Guangzhou(廣州)) to strengthen dispersive shipbuilding yards to be more systematically reorganized, efficient and internal stable(Yang Jeongso 2014, 21).

Although many regulations are taken in the beginning, shipbuilding industry faced problems such as excessive competition and payment imbalance. According to Clarkson research in May 2016, only 171 of 667 shipyards were running, and most of the orders are national. If count out of 30 ships of 400 thousand ultra-large VLOCs, China shipbuilding's orders were just as the same level of Korea and Japan.[9] In such China shipbuilding industr

9) Chosunbiz, "China shipbuilding is sinking"(http://biz.chosun.com/site/data/html_dir/2016/05/13/2016051301638.html) [2016.06.27].

y's critical moment, China government has improved various supportive policies as follow s:

<Table 4> China's shipbuilding industry supportive policies

Time	Policy	Period
2006	Shipbuilding Medium and long term Development Project	2006-2015
2009	Shipbuilding Adjustment and Promoting Project	2009-2011
2011	Industrial Transformation and Upgrading Plan	2011-2015
2012	Shipping Industry "12. 5"Development Project	2011-2015
2013	Shipping Industry Structural Adjustment Promoting and Transformation Upgrading Embodiment	2013-2015
2013	White List (Shipping's Standard Conditions) Policy	Since 2013
2015	Made In China 2025	2015-2025
2015	Ship Building "13. 5" Plan Draft	2016-2020

Source: data collected from various websites and organized by authors.

China's Shipbuilding Medium and long term Development Project (船舶工业调整和振兴规划) in 2009 was as follows: firstly, strengthen production management's credit loan suppor t. Secondly, enlarge "buyer credit loan (买方信贷投放)" for export ships. Thirdly, encourag e purchasing core transportation firms second-hand ocean vessels. Fourthly, positively exp loit the domestic market. Fifthly, induct old and broken ships' recycling. Sixthly, control f oundation of new shipbuilding yards. Seventhly, combine firms and induct improvement m easures. Eighthly, strengthen relating science technology and execute technique innovatio n.[10] In 2011, "Industrial transformation and upgrading plan" explained the upgrade of all i ndustries' guidelines, including shipbuilding, ocean project equipment and so on. This polic y aims to put forward new international shipbuilding standard and regulation, optimize pr oduct structure and execute a brand strategy to upgrade major ships like bulk carriers, ta nkers (chemical ship included) and container ships.[11] In 2012, Shipping Industry"12. 5" De velopment Project's (船舶工业十二五发展规划) main target is to promote technological deve lopment and innovation, industry organization structure adjustment, brand, and quality imp roving strategy, train high-efficiency production system and optimize industrial configurati on.[12]InJulyof2013,"Shipping industry Structural Adjustment Promoting and Transformation Upgrading Embodiment" had more detailed supportive policies. This plan was to promote

10) CPGPRC, "hipbuilding industry and revitalization plan"(http://www.gov.cn/zwgk/2009-06/09/conte nt_1335839.htm) [2016.08.03].

11) CPGRPRC, "the inform of Industrial Transformation and Upgrading Plan"(http://www.gov.cn/xx gk/pub/govpublic/mrlm/201201/t20120119_64732.html) [2016.08.10].

12) sina, "Shipping Industry "12. 5" Development Project"(http://finance.sina.com.cn/roll/20120312/123 511567155.shtml) [2016.08.10].

old ships, broken ships to be inducted to recycling, support administrative execution, stren gthen new finance loan policies and technology improvement, control new production capa city, support industry structure adjustment etc.[13)]

In December of 2013, China announced "white list" which put forward the industry's st andard conditions and executed "choose and focus" policy. The white list proposed to sup port minority shipbuilding firms and induct competitions in the field, and the white list's selection criterions are as follows: firstly, inspect the basic condition; secondly, production facility, equipment and measurement inspection; thirdly, building technology ability; fourthl y, technology innovation and product improvement, fifthly, technical personnel and product assurance system; sixthly, producing safety, efficiency; seventhly, healthy work environme nt and social responsibility.[14)] In September of 2014, the first 51 firms were chosen to be qualified into the white list, in December of 2014, the second 9 firms qualified, and the thi rd time 11 firms. In these 71 firms, nation owned firms are 52.1%, private 38.0% and join t venture firms 9.9%.[15)] Since then the white list became China and local government's re ference frame of policy support, this list inducted social resources gather into excellent sh ipbuilders, meanwhile, bank loans and government subsidies tended to these shipbuilders who are on the list as well.[16)] Contrarily those shipbuilders who were disqualified would have difficulties to get bankloans, governmental support, also would have to face different treatment in electric charge, water charge etc.[17)] Under such policy, most of the small an d medium private shipbuilders were excluded and would have more difficulties, which wo uld lead to a structural adjustment in a medium and long term.

In May of 2015, "Made IN China 2025" policy was promulgated, and shipbuilding indust ry was classified as priority field. This policy aimed to promote policy support for "ocean engineering equipment and high technology ship's deep sea exploration, resource exploitati on and utilization and critical system and equipment. This policy also aimed to from ocea n engineering equipment comprehensive test, increase ocean development and utilization, i ncrease technology- based ships' international competitiveness, increase main components' centralization, Intellectualization, modularization and increase core technology of design pro duction.

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13) CPGPRC, "the inform of Shipping industry Structural Adjustment Promoting and Transformatio n Upgrading Embodiment"(http://www.gov.cn/zwgk/2013-08/04/content_2460962.htm) [2016.08.11].

14) CPGPRC, "the inform of China shipbuilding regulation conditions"(http://www.gov.cn/zwgk/2013 -11/13/content_2526496.htm) [2016.08.05].

15) eworldship, "the thrid time white list was announced"(http://www.eworldship.com/html/2016/ship _inside_and_outside_0104/110585.html) [2016.08.10].

16) eworldship, "The newly issued white list will increase the survival of the fittest"(http://www.e worldship.com/html/2014/ship_market_observation_0905/92052.html) [2016.08.10].

17) eworldship, "What if the shipbuilders didn't get the white list?"(http://www.eworldship.com/ht ml/2014/ship_inside_and_outside_0911/92240.html) [2016.08.10].

<Table 5> China Shipbuilding Industry's Top Ten Firms (based on shipbuilding completion index)

Ranking	Shipbuilders	Completion	DWT	type	status
1	Wai Gao Qiao (上海外高桥造船)	29	4,997,500	State owned	normal
2	Hua Dong Zhong Hua (沪东中华造船集团)	19	2,473,000	State owned	normal
3	Da Lian Chuan Bo (大连船舶重工集团)	24	2,114,700	State owned	normal
4	Yang Zi Jiang (扬子江船业控股有限公司)	31	2,064,800	private	normal
5	Rong Sheng Zhong Gong (江苏熔盛重工)	7	1,747,000	private	transition
6	Bo Hai Chuan Bo (渤海船舶重工)	7	1,538,400	State owned	normal
7	Guang Chuan Guo Ji (广州广船国际)	17	1,337,500	State owned	normal
8	Nan Tong (南通中远川崎船舶工程)	13	1,175,000	compound	normal
9	Bei Hai Chuan Bo (青岛北海船舶重工)	6	1,150,000	State owned	normal
10	Zhou Shan (常石集团舟山造船)	18	1,141,000	foreign	normal

Source: China shipping industry yearbook 2015, China major shipbuilders' completions, p265.

The white list has become China shipbuilders' development direction in a long term vie w. Its implementation has made firms to follow the white list's regulations voluntarily. W hite list policy became China market's management method. China government wanted to increase shipbuilding industry's productivity's national competitiveness by causing competit ion. By implementing R&D investment, related industries' front and rear industry support, and firms' structural adjustment bankrupted firms and unemployed are proceeding under g overnment's intervention.

4. China's governmental policy for strengthening shipbuilding industry national competitiveness

1) China state owned shipbuilders' bankruptcy case

China has run into medium speed growth after a long time high speed growth since re form and opening policies in 1978. As economy stagnation continued, manufacturing indus try investment got passivated, some resource industry and heavy industry's capacity exce eded, and enterprises' debt ran into insolvency. To deal with these problems, China gover nment carried forward "Supply Side's Structural Reform" (Lee Cheolyeong 2016.3). In orde r to overcome manufacturing industry's gloom, China is aiming to construct advanced ma nufacturing industry structure. Recently, China's second industry growth rate had a big d ecline, which came with the 3rd industry' relative increase of proportion (Lee Jangkyu, e

t al. 2015.157). This may cause industry structure's "premature growth", which means ind ustry structure is adjusted to be service industry- centered, and the manufacture industr y's continuous development and technology upgrade delays, then the economy loses power and fails to run into high-income countries.[18] To prevent this, China assigns over capacit y industries and implements structural adjustment.

In the past 10 years, shipbuilding industry has dragged Chinese high speed growth, but it consumes massive resources and causes environmental problems. So there is some nee d to adjust the structure in order to maintain sustainable growth, that's why China gover nment has chosen petro chemistry, steel making industry and shipbuilding industry as str uctural adjustment objects (Lee Manyong 2010. 2). China government's 2016 excessive pro duction reduction policy is as follows: ①environment protection, strict standards for energ y consumption, safety and technology; ②strengthen the control of production capacity exp ansion; ③implement strict finance and credit regulations; ④adjustment with firms on busi ness combination, debt adjustment, bankruptcy; ⑤overcome and upgrade crisis of steel m aking, mining and other industries by fiscal, tax system, financial land policies (Lim Oyol et al. 2016, 7). The object industries' structural adjustment promotion plans are ①cutting equipment, ②adjusting employment, ③dealing with weak firms (Lee Cheolyeong 2016, 8). By these measures, China is aiming to construct advanced manufacturing industry, econo my's safe growth and sustainable development. And this can be evaluated as China's stra tegy for the sustainable shipbuilding industry.

China government promoted 'Shipbuilding Adjustment and Promoting Project' in 2009, white list policy in 2013, and 'supply side reform' in 2016. In 2013 the 'shipbuilding regula tion ordinance' was established to deal with excessive production and structural adjustme nt to eliminate backward firms, and chose 71 shipbuilders to be support objects (Park Jeo ngsik 2016. 13). In January of 2015, China people's bank and other 8 departments promulg ated <Instructions about financial shipbuilding industry's structural adjustment promotion, transition, upgrade support>, 'financial product and service method's reform promotion', 'fi nancing methods' diversification', 'policy support and related service system innovation' an d some other finance industry's structural adjustment support (KITA, Shanghai branch 20 16. 6). In August of 2015, China national development and reform commission promulgate d <Inform of manufacturing industry's core competitiveness, great engineering package tri al implementation>, which promoted high tech shipbuilding and ocean engineering equipm ent and other 4 major fields as 'core facility and system industrialization', 'smart factory construction', 'important products development and experiment platform construction' (KIT A Shanghai branch 2016. 7). Shipbuilders' technology development, industry's diversity an

18) xinhua, "Developing third industry doesn't mean ignoring manufacturing industry"(http://news.xi nhuanet.com/politics/2015-05/11/c_127785708.htm) [2016.08.10].; Lee Jeongkyu et al. 2015, p157.

d high added value, outstanding firms' merger, firms' transparency strengthening are supp orted and structural adjustment is carrying on. As a result, the number of bankrupted fir ms is increasing. <Table 6> is the list of Chinese bankrupted firms.

<Table 6> Chinese shipbuilding industry's bankrupted firms

date	Name	type	area	WL*	Cause of bankruptcy
2014,6	Da Lian STX STX大连造船	Foreign capital	Dalian	N	- 2008년 economy crisis, world shipbuilding industry recession - capital problem:with 86 holding orders in 2016, production suspension due to discontinuance of loan, - ship price drastically declined caused orders to be cancelled, - Korea head quarter's excessive loan
2015,3	Dong Fang 东方重工	private	Jiangsu	N	- world shipbuilding industry recession - production management miss, late delivery fine and order canceled, - discontinuation of loan,
2015,4	Zhuang Ji Chunan Ye 庄吉船业	private	Zhejiang	N	- economy crisis - order cancelled due to ship owners' management problem - capital problem: debt crisis, discontinuance of loan and lawsuit,
2015,4	Rong Sheng 荣盛重工	private	Jiangsu	Y	- managers' illegal transaction and investigation - corruption - late delivery crisis - discontinuation of loan,
2015,7	Ming De 明德重工	private	Jiangsu	Y	- world shipbuilding industry recession - order declined and capital problem
2015,9	Zheng He 正和造船	private	Zhejiang	Y	- world shipbuilding industry recession - the bulk carrier orders decline - earning decline, weak revenue generation capacity - the serious capital problem
2015,1	Dong Xin 东鑫船舶重工	private	Jiangsu	N	- order declined and capital problem
2015,11	Wu Zhou 五洲船舶	State owned	Zhejiang	N	- only build bulk carrier , bulk carrier price 50% decline in 2015 - order declined and capital problem occurred in 2014 - funding support didn't work,
2015,12	Shun Tian 舜天船舶	State owned	Jiangsu	Y	- world shipbuilding industry recession - Ming De bankruptcy's impact - Low-quality product caused an international lawsuit, - excessive loan and manager's corruption
2016,4	Zhechuan 浙船公司	private	Zhejiang	Y	- world shipbuilding industry recession, - mainly build a bulk carrier - order declined

* WL: Whether be chosen in White list or not.

Source: collected in China web sites[19] and re-arranged by authors.

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19) "Shipbuilder's bankrupt period has come"(http://mt.sohu.com/20150906/n420497816.shtml), "Where is the way?- the story of STX bankruptcy"(http://www.shipinall.cn/content/topic/zhti-2013-06-02 new.html), "Wu Zhou went bankrupt and became the first state owned shipbuilder that went ban krupt"(http://finance.sina.com.cn/chanjing/cyxw/2016-01-03/doc-ifxncyar6214075.shtml), "China's s hipbuilding industry comes to the adjustment, Nan Tong has announced its bankruptcy"(http://bu siness.sohu.com/20150804/n418160999.shtml), "China's first listed shipbuilder- Shun Tian went ba nkruptcy"(http://www.96369.net/news/201602/columnid-1-355649.html), "Shun Tian shipbuilding's property will be auctioned"(http://www.mycoal.cn/news/19/92846.html), "Da Lian Zhong Gong will take over STXA(Da Lian)"(http://www.zgsyb.com/html/content/2016-05/18/content_495736.shtml), "Zhe Chuan went bankruptcy, official telephone has stopped service"(http://finance.sina.com.cn/ch anjing/gsnews/2016-04-19/doc-ifxriqri6858440.shtml), "Zhuang JI shipbuilder bankrupted again"(ht tp://www.cnss.com.cn/html/2015/shipbuilding_0413/173377.html), "Rong Sheng Zhong Gong ha a h eavy debt of 20 billion yuan, flagship fell from the pinnacle of own"(http://finance.qq.com/a/2015

Most of these shipbuilders bankrupted because they could not overcome the world econ omy crisis and shipbuilding's recession. Except for Da Lian STX as a foreign capital fir m, other shipbuilders are state owned or private firms. There is a necessity to keep a wa tchful eye on Rong Sheng, Wu Zhou, Shun Tian's bankruptcy. Rong Sheng held the most holding orders of China in 2006, and it was listed in Hong Kong stock market in 2010, it s holding orders was China's first, world's 3rd in 2011. But it went to bankruptcy becaus e of its managers' illegal transaction and corruption. Wu Zhou, as the first bankrupted sta te owned firm, it only built bulk carriers and couldn't invest other fields and led to bankr uptcy in November of 2015. Shun Tian, which was Jiang Su province's biggest firm and was listed in China stock market, put insufficient investment into quality development and the managers had corruption such as used the loan in order to invest other fields to obtai n benefits without repaying the loan etc. It bankrupted in December of 2015. Zhechuan, w hich was one of the excellent firms in China and only built bulk carriers, went into bankr uptcy in March of 2016.

Just as mentioned above, these bankrupted cases' characteristics are financial matter m ade by corruption, insufficient R&D and weak structure, thus had low resistance to exter nal crisis. This can be seen as results of China government's structure policy promotion f or shipbuilding industry's advancement.

2) China government's shipbuilding structural adjustment and coping policy

As mentioned in the last section, firm combination and bankruptcy cases were increasin g recently which due to China government's shipbuilding industry structural adjustment. Thus stuff reduction and the unemployed increase can be predicted in the shipbuilding in dustry. To deal with structural matters, excessive equipment resettlement, weak firm liqui dation, and other structural reform should be promoted other than short term encouragem ent. But during this process, investment passivation and employment condition deterioratio n will be inevitable (Lim Hoyeol et al. 2016. 10). China promoted the first industry struct ural adjustment in 1997 to overcome the economy crisis and maintain continuous growth. At that time, the structural adjustment had a large scale, and it focused on Chinese majo r industry- textile industry and mining, construction resources, sugar, nonferrous metals a

0317/010770.htm), "Dong Xin Chuan Bo went bankruptcy"(http://www.yunquna.com/news/50352.ht ml), "Rong Sheng Zhong Gong transforms Hua Rong Neng Yuan, flagship makes turns"(http://n ews.sina.com.cn/o/2015-05-08/104831809035.shtml?_t=t), "Shun Tian Chuan Bo's transformation,: How a state owned shipbuilder realizes delist and retreat"(http://business.sohu.com/20160502/n447 187092.shtml) [2016.08-01～12]

nd military industry, and the purpose was to weed out the backward small firms meanwh ile cut equipment and stuff (Lee Choelyong 2016. 13). Conversely, this second structural a djustment focuses on manufacturing industry (especially heavy industry). Although its cut ting scale is smaller than before, there also are some worries about mass unemployment. The period of the first adjustment was the time China had a continuous development, the trade above other countries was active, China also entered WTO and the whole economic conditions were good. But in this second adjustment period, China is facing medium spee d growth, a decrease of trade scale etc. Also, the re-employment conditions are not that good.

<Table 7> Comparison of the first and second Structural Adjustment

	1st adjustment (1998-2000)	2nd adjustment (2016-)
Equipment excessive	-labor intensive light industry	-resource industry and heavy industry
Industry	-state owned heavy industry	
Production usage rate	-textile industry (40%)('98)	-steel making industry70%, mining industry65%(2015)
Deficit firm rate	- 40% state owned firms (1998)	-steel making industry50%, mining industry80%(2015)
Insolvent loan	-41% of state owned business bank insolvent loan, processing size 2580 billion yuan (2000GDP's25%) -mostly bank loan	-business bank's insolvent loan's 1.75%, processing size 1430 billion yuan, (GDP's2%) - Insolvent loan rate is2.15%, processing size 200 billion yuan -bank loan, bond, off- balance financing and so on,
Employee cut	-27.14 million(60% re- employed)	-mining industry, steel making industry 1.8 million
Inside and outside conditions	-real estate marketization reform(1998)	- global trade growth passivation
	-WTO entrance(2001)	- China new normal time, capital market open
Power composition	-Jiang Zeming and Zhu Rongji government	-conflicts among factions of leadership

Source: China's second industry structural adjustment, condition problem rather than oversupply, ins olvent scale, Seoul: LGERI. (2016).

Following the first and second industry structural adjustment, employment reduction wil l continue as a structural unemployment matter since the industry structure reorganizes. So the counter plans for unemployment should be established if the adjustment policy pro motes. China government has set a 10 billion yuan subsidy project for these unemployed people's re- employment, in which 50 billion yuan would be executed in 2016 (Lim Hoyeo l et al. 2016. 7). Anxiety on employment will trigger violent protest, consumption reductio n and other social issues, these issues may be factors which threaten structural adjustme nt's policy promotion. Although there are many critical viewpoints about the structural adj ustment's impact on employment and economic growth (Lee Cheolyong 2016. 16), and vie wpoints about state-owned shipbuilding enterprises' critical disadvantages, China's active

unemployed people's re- employment policy and financial support counterplan, led by gove rnment, will play a positive role in promoting manufacturing industry (shipbuilding industr y included)'s structural adjustment policy and strengthening China shipbuilding industry's national competitiveness.

5. Conclusion

After a fast growth from 2000, Chinese shipbuilding industry has become world's first place in 2016. The shift of shipbuilding industry's hegemonic position from UK, Japan, Ko rea, then to China will give China shipbuilding industry a nice implication to establish its growth strategy. As shipbuilding industry faces the single world market, it easily gets inf luenced by the macro economy. Also, it sensitively gets influenced by the shipping indust ry, international materials' price, demand etc. Japan and Korea had their own ways to cop e with the crisis in their hegemonic position. Japan lightened the weight of production co st and equipment, concentrated on building bulk carriers, combine strategic cooperation to increase competitiveness. Korea had tried to concentrate on high added value products su ch as tankers, LNG carriers, container ships, and offshore industry to overcome crisis. Ja pan and Korea's overcoming processes can be a good lesson to China. Meanwhile, China had its own method in 1997 and 2008's economic crisis. China is executing structural adju stment to cut the equipment, adjust employment, and deal with insolvent to build continu ous industry structure, to insure domestic market and oversea crisis, and to maintain stro ng competitiveness.

Korea·China·Japan's efforts to overcome crisis were all from the governments. As can be seen from the view of shipbuilding industry's characteristic, government's support play s a very important role on this industry's national competitiveness. Nowadays China ship building industry is under structural adjustment, and this is triggers insolvent firms to ba nkrupt. Although there are viewpoints about China is under recession, this paper consider s this structural adjustment to be forming familiar firms' competition, promoting supportiv e strategies to induct front and rear industry's activation. Thus this papers judges China government's structural adjustment policy will strengthen shipbuilding industry's national competitiveness.

China's structural adjustment is promoted by suspending support or combining these fir ms which have serious corruption, low R&D investment or other problems. This means t he structural adjustment is promoting qualitative advanced shipbuilding industry. R&D inv estment and support are enlarging. What's more, the unemployment which occurred in the structural adjustment is receiving financial support from the government. By its vast nati

onal market and government's active support and structural adjustment policy promotion, there is low chance for China shipbuilding industry to weaken its competitiveness.

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【논문초록】

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	영문	Shipbuilding, National Competitiveness, China, National Competitiveness Advantage, Government's Supportive Policy

중국 조선산업의 경쟁력 강화를 위한 산업정책변화 고찰

中国造船业产业政策变化考察—以强化产业竞争力为目的

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본 논문은 포터(Porter)가 제시한 요소조건, 수요조건, 연관·지원 산업 실태 및 기업 전략, 구조 및 경쟁관계를 토대로 중국 조선산업에 관련한 현황을 고찰하였다. 또한 중국 정부의 조선산업에 대한 지원전략과 정책 특성을 분석하였다. 일본과 한국의 사례와 비교하면 중국은 부실기업을 정리하고 우수기업을 더욱 지원하는 '선택과 집중' 이라는 전략으로 조선산업 지원정책을 추진하고 있다. 조선산업에 대한 한·중·일의 위기 극복 노력은 모두 정부주도로 추진되어왔으며, 조선산업의 특징을 고려하여 볼 때 정부의 지원은 산업의 국가경쟁력을 강화하는 데에 매우 중요한 역할을 한다. 중국은 조선산업의 구조조정 지원정책을 통해 동종기업 간 경쟁관계를 형성하고 전.후방 산업간 연계된 지원전략을 통한 산업의 활성화를 유도하였다. 이는 조선산업의 질적 선진화와 지속가능한 산업구조 구축으로 이어져 외부 위기에 강한 경쟁력을 갖출 수 있는 산업으로 발전할 수 있게 할 것이다.

本文运用了波特的钻石模型里的要素条件、需要条件和关联产业及企业战略、构造和竞争关系等来考察中国造船业的现状。同时还分析了中国政府对造船业的支援战略和政策特性。通过比较分析日本和韩国的造船业，得出了中国政府在对造船业进行优胜劣汰，即淘汰掉落后的企业并"选择和集中"于优秀的企业。从中韩日在克服行业危机而做出的努力可以看出，三国的造船业都是在政府的主导下进行的，政府的支援对于产业的国家竞争力强化有着重要的作用。通过对造船业的构造性调整和政策支援，中国的同类企业间竞争关系正在加强，前后方产业的支援战略也激发了产业的活性。通过在质量上的提高并构筑持续可能的产业构造，中国将可能对国外的造船业产生强烈的竞争力并促进国内造船业的发展。

[关键词] 造船业；国家竞争力；中国；国家竞争优势；政府支援政策。

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