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Optimal Korea's Government Organization of Shipping and Shipbuilding*

Taylor Tae Hwee LEE^a, Jong Khil HAN^b

^a Assistant Professor, Gyeongnam National University of Science and Technology, Korea, e-mail: taylor@gntech.ac.kr (First Author)

^b Professor, Sungkyul University, Korea, e-mail: ha025@sungkyul.ac.kr (Corresponding Author)

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ABSTRACT

This study aims to explore the optimal model for the Korean government's organization (KGO) of the maritime industry using the analytical hierarchy process (AHP). The result of the AHP analysis revealed that most respondents of the survey firstly weighted realistic possibility (0.473), and goal orientation (0.316) and institutional stability (0.221) were secondly and thirdly evaluated. The sub-criteria were systematically classified as suitability (0.279), competency (0.139), reliability (0.125), efficiency (0.115), political coordination (0.098), feasibility (0.095), equity (0.076), independence (0.044), and cooperation (0.041). Finally, shipbuilding and offshore plants under the unification with the Ministry of Ocean and Fisheries should be considered as the optimal KGO of the maritime industry in terms of the evaluation of AHP alternatives.

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1. Introduction

We first provide an overview of the history of the collapse of Hanjin Shipping (HJS). The so-called China effect, influenced by China's special procurement demand to cope with several constructions for the 2008 Beijing Olympic Games, brought not only a boom in the construction economy but also a boom in the shipping economy (BSE). The Baltic Dry Index (BDI) rose to 10,844 points in May 2008. Most Korean ship owners (KSO) chartered vessels during the irrational boom from 2007 to mid-2008 at higher prices than normal. However, since May 2008, the shipping market situation has worsened, due to the global financial crisis. There has been an oversupply vessels stage ever since. The BDI fell to

747 in December 2008. This dramatic change in the shipping economy occurred in only 7 months. In addition, the BDI reached its lowest ever level in February 2016.

If we look back to 1997, we can understand why KSO had to charter vessels at higher prices. In 1997, most KSO sold their vessels because the Korean government asked them to decrease their debt by 200% in response to the IMF financial crisis (Ha, 2012; Ha and Chung, 2003; Lee, 1999). Unfortunately, after the Korean Chaebol group restructuring was complete, the shipping boom began. Korea's shipping lines therefore had to charter vessels at higher prices.

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In 2011, Maersk Line ordered a mega containership of about 18,000 twenty-foot equivalent unit (TEU). At this point, the problem of administrative organizational structure could be raised. The Korean government wanted to show their export performance and so the export-import bank of Korea (KOREAEXIM) provided a loan to Maersk Line. Daewoo Shipbuilding & Marine Engineering (DSME) subsequently won many megaship contracts from Maersk Line and delivered the newly constructed megaships to Maersk Line.

Because of the trend of big ships and vessel oversupply and the chicken game, the mega shipping lines such as Maersk Line and Hapag-Lloyd increased their company size and their vessel size in order to occupy a greater share of the global container market. However, conditions in the container market worsened. Due to the rapid structural changes and severe market conditions, HJS could not continue to sustain the liquidity risks. HJS, the 7th biggest shipping line in the world, finally collapsed on 17th February 2017.

This study focuses on the structural causes of the HJS tragedy in terms of the Korean government's organization (KGO) of the maritime industry, in particular, the shipping and shipbuilding industry. In terms of the shipping cycle, a BSE should be followed by the depression of the shipbuilding economy. This is because the BSE triggers the oversupply of vessels (OV) and the OV subsequently decreases freight rates and vessel prices. Maritime industry and its policy should therefore be carefully managed with an integrated perspective. This paper aims to analyse the structural problems of the KGO of maritime industry and to find the optimal KGO of the maritime industry using the analytical hierarchy process (AHP).

The remainder of this paper is organized as follows. Section 2 revisits the structural problems of the KGO of maritime industry and its impact on the shipping industry. Section 3 designs an AHP structure and extracts the structural components of the AHP. Section 4 finds the optimal KGO of maritime industry and suggests several implications. Finally, section 5 concludes this paper with brief research results and policy implications.

2. Government organization of Korea's shipping and shipbuilding

There are two government organizations, the Ministry of Ocean and Fisheries (MOF) and the Ministry of Trade, Industry, and Energy (MOTIE). The Korean shipping industry and related policy is handled by the MOF and the Korean shipbuilding industry and related policy, by the MOTIE. Korea's shipping policy (KSP) and related affairs are mainly controlled by the shipping and logistics bureau, the MOF. The Maritime Affairs and Safety Policy Bureau, the Marine Policy Office, and the Port and Harbors Bureau are partially involved in the KSP decision-making process. According to Korea's shipbuilding policy (KSB), the KSB is only framed by the MOTIE Director General for System Industry.

This section outlines the problem triggered by separate organizations. Originally, the shipbuilding industry was one of the export-centric industries in Korea which include the semiconductor, automobile, cellular phone, and oil production industries. However, the MOTIE—which governs the maritime industry and was established to expand Korea's exports and industry—only considers the shipbuilding industry as an export industry. This led KOREAEXIM to finance Maersk Line's order of mega containerships from DSME in 2011. This unintended "reciprocal circle" (Calder, 1993), KOREAEXIM – Maersk Line – DSME, rapidly accelerated the trend of big ships, which has continued to date. This trend caused the severe OV and subsequently triggered a disturbance in the

container market ecosystem.

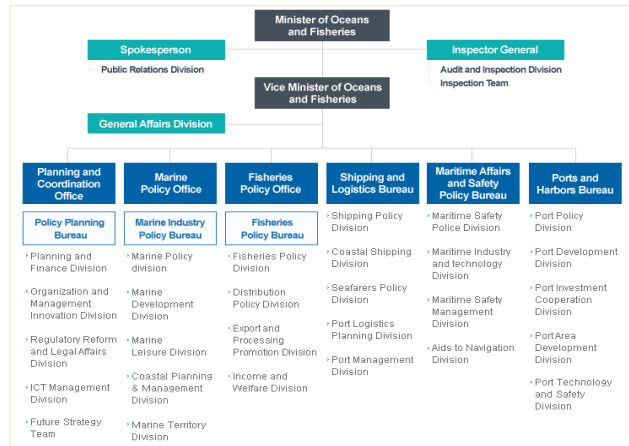


Fig. 1. Organizational Structure of MOF

Source: www.mof.go.kr (accessed December 3, 2017)

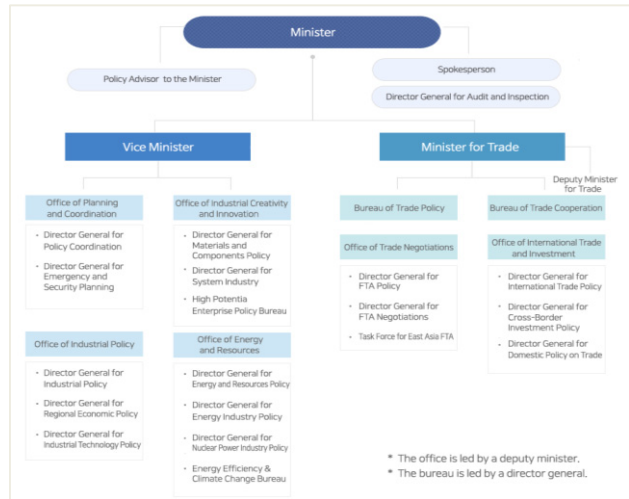


Fig. 2. Organizational Structure of MOTIE

Source: www.mof.go.kr (accessed December 3, 2017)

As a result, the separate KGO of maritime industry increased the size of the Danish shipping line and partially as well as indirectly caused the bankruptcy of HJS. If there had been a cooperative task force (TF) dealing with maritime industry policies, such as those related to the KOREAEXIM – Maersk Line – DSME case, and if the MOF and the MOTIE's public officials had frequently coordinated with each other on the conflict of KSP and KSB, HJS would not have gone bankrupt.

3. Research design

3.1. AHP method

AHP was first devised by Saaty (1980). As one of the most widely applied multi-criteria decision method (MCDM) analysis methodologies, AHP can be used to evaluate criteria importance and alternatives. AHP employs the pairwise comparisons to increase efficiency by synthesizing qualitative and quantitative approaches. It includes alternatives and

criteria for measuring several options. AHP allows decision makers to represent their intention or opinions by comparing two alternatives. It also allows respondents to accelerate the decision-making process on critical issues (Qu et al., 2017).

3.2. Criteria and alternatives

This paper referred to relevant papers, such as that of Lee (2012), to design the AHP attributes and alternatives. To complement the questionnaire, an interview with a shipping expert was conducted over three days, October 24–26, 2017. This paper considers AHP structural criteria and sub-criteria as follows.

- (1) Goal orientation - Appropriateness for realizing the policy goal of the powerful maritime nation.
- (2) Institutional stability - Possibility of institutionalization so that the system and organization can be established and then stably maintained.
- (3) Realistic possibility - Even if the system is well designed, in order to become a powerful maritime nation, it may be realistic that it leads to the reorganization of the government.

Table 1
AHP's Criteria and Sub-Criteria

Criterion	Sub-criteria and definition
Goal orientation	Equity - To sustainably and equitably provide the supply public goods related to maritime industry for policy consumer
	Reliability - Strengthening the confidence of the policy about maritime industry's sustainable development
	Efficiency - The effect of carrying out improved work at low cost includes restructuring, process innovation, joint use of information, and improvement of public officials' productivity
Institutional stability	Independence - Provide responsibility for objectivity and responsibility by carrying out the affairs of maritime industry inter-relatedly
	Competency - Ability to respond to new changes in the environment and to be capable of planning, executing and evaluating comprehensive and systematic public affairs related to maritime industry from a comprehensive perspective
	Cooperation - Establishment of a cooperative system of conflict resolution and settlement to prevent duplication of function and blind spot in the promotion of the maritime industry related public project
Realistic possibility	Suitability - Whether it can accommodate the diversity of the functions of each departments, citizens, or enterprise demand in the maritime industry related public affairs
	Feasibility - Due to the economic burden of establishing a new organization, it is related to reorganization and manpower's relocation.
	Political coordination - Ease of deriving consensus among stakeholders through organizational restructuring

The alternatives are as follows.

- (1) Establishment of "National Maritime Future Strategy Committee" under the President.
- (2) Establishment of "Shipbuilding and offshore plant office" under unification with the MOF

- (3) Establishment of a shipping and logistics policy office under unification with the MOTIE.
- (4) Establishment of a "Planning and Coordination Committee" under the Prime Minister.
- (5) Establishment of a "Shipping and Shipbuilding Policy Coordination Advisory Committee" under the Minister of the MOF.

3.3. Survey

The survey was conducted over 60 days, from November 1 to December 31, 2017. The sample consists of public officials from the Korean maritime industry and members of the Korea Association of Shipping and Logistics (KASL) who worked as professors, researchers, and consultants. A total of 1,345 questionnaires were distributed, but only 36 questionnaires were returned. The response rate was 2.6%. Figures 3 and 4 and Table 2 show the brief profile of respondents.

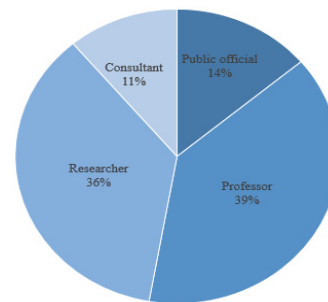


Fig. 3. The occupations of respondents

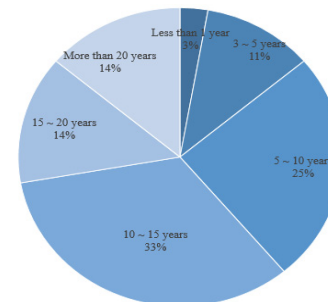


Fig. 4. Number of years in current employment

Source: www.mof.go.kr (accessed December 3, 2017)

Table 2
Cross-Tabulation Analysis between Respondents' Occupation and Years of Employment

	Less than 1 year	3 ~ 5 years	5 ~ 10 years	10 ~ 15 years	15 ~ 20 years	More than 20 years
Public official	1	3	1	0	0	0
Professor	0	1	2	5	3	3
Researcher	0	0	5	6	1	1
Consultant	0	0	1	1	1	1

Note: Chi-squared statistics = 27.058 with p-value = 0.028

4. AHP analysis

AHP analysis shows an inconsistency index of 0.0061, which is an inconsistency of less than 0.1. This indicates that the index was required to show the fitness and consistency (Saaty, 1977; Saaty, 1983). The weights of the criteria and sub-criteria are shown in Table 3. The majority of respondents preferred realistic possibility (0.473) followed by goal orientation (0.316) and institutional stability (0.221). The weights of sub-criteria were also evaluated in Table 3. Using Weights (A) * Weights (B), the weights of suitability (0.279), competency (0.139), reliability (0.125), efficiency (0.115), political coordination (0.098), feasibility (0.095), equity (0.076), independence (0.044), and cooperation (0.041) were calculated.

Table 3
AHP Results of the Criteria and Sub-Criteria Weights

Criteria	Weights(A)	Sub-criteria	Weights(B)	A*B
Goal orientation	0.316	Equity	0.239	0.076
		Reliability	0.396	0.125
		Efficiency	0.365	0.115
Institutional stability	0.221	Independence	0.200	0.044
		Competency	0.631	0.139
		Cooperation	0.187	0.041
Realistic possibility	0.473	Suitability	0.590	0.279
		Feasibility	0.201	0.095
		Political coordination	0.208	0.098

Following Tables 4, 5, and 6, the alternatives were evaluated based on each sub-criteria measure. With regard to equity, "shipbuilding and offshore plant office under the unification with the MOF" (0.024) was chosen as the most important. With respect to reliability, "national maritime future strategy committee" (0.043) was considered important. In terms of efficiency, "shipbuilding and offshore plant office under the unification with the MOF" (0.045) was also considered important.

Table 4
Evaluation of alternatives (1)

A	Alternative	Evaluation (B)	A*B
Equity (0.076)	National Maritime Future Strategy Committee	0.279	0.021
	Shipbuilding and offshore plant office under the unification with the MOF	0.318	0.024
	Shipping and logistics policy office under the unification with the MOTIE	0.13	0.010
	Planning and Coordination Committee under Prime minister	0.189	0.014
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.084	0.006

Reliability (0.125)	National Maritime Future Strategy Committee	0.344	0.043
	Shipbuilding and offshore plant office under the unification with the MOF	0.253	0.032
	Shipping and logistics policy office under the unification with the MOTIE	0.114	0.014
	Planning and Coordination Committee under Prime minister	0.207	0.026
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.083	0.010
Efficiency (0.115)	National Maritime Future Strategy Committee	0.166	0.019
	Shipbuilding and offshore plant office under the unification with the MOF	0.393	0.045
	Shipping and logistics policy office under the unification with the MOTIE	0.145	0.017
	Planning and Coordination Committee under Prime minister	0.196	0.023
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.101	0.012

In terms of independence and competency, "shipbuilding and offshore plant office under the unification with the MOF" (0.015, 0.062, respectively) were also evaluated as important. With regard to cooperation, "national maritime future strategy committee" (0.016) was chosen as the most important alternative.

Table 5
Evaluation of Alternatives (2)

A	Alternative	Evaluation (B)	A*B
Independence (0.044)	National Maritime Future Strategy Committee	0.244	0.011
	Shipbuilding and offshore plant office under the unification with the MOF	0.345	0.015
	Shipping and logistics policy office under the unification with the MOTIE	0.146	0.006
	Planning and Coordination Committee under Prime minister	0.174	0.008
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.091	0.004
Competency (0.139)	National Maritime Future Strategy Committee	0.169	0.023
	Shipbuilding and offshore plant office under the unification with the MOF	0.448	0.062
	Shipping and logistics policy office under the unification with the MOTIE	0.141	0.020
	Planning and Coordination Committee under Prime minister	0.123	0.017
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.119	0.017
Cooperation (0.041)	National Maritime Future Strategy Committee	0.389	0.016
	Shipbuilding and offshore plant office under the unification with the MOF	0.191	0.008
	Shipping and logistics policy office under the unification with the MOTIE	0.126	0.005
	Planning and Coordination Committee under Prime minister	0.211	0.009
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.084	0.003

In terms of suitability and feasibility, “shipbuilding and offshore plant office under the unification with the MOF” (0.110, 0.027, respectively) was also evaluated as the most important alternative. Finally, “national maritime future strategy committee” (0.041) was chosen as the most important alternative in terms of political coordination.

Table 6
Evaluation of Alternatives (3)

A	Alternative	Evaluation (B)	A*B
Suitability (0.279)	National Maritime Future Strategy Committee	0.207	0.058
	Shipbuilding and offshore plant office under the unification with the MOF	0.394	0.110
	Shipping and logistics policy office under the unification with the MOTIE	0.139	0.039
	Planning and Coordination Committee under the Prime Minister	0.153	0.043
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.108	0.030
Feasibility (0.095)	National Maritime Future Strategy Committee	0.211	0.020
	Shipbuilding and offshore plant office under the unification with the MOF	0.283	0.027
	Shipping and logistics policy office under the unification with the MOTIE	0.164	0.016
	Planning and Coordination Committee under Prime minister	0.209	0.020
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.134	0.013
Political coordination (0.098)	National Maritime Future Strategy Committee	0.415	0.041
	Shipbuilding and offshore plant office under the unification with the MOF	0.189	0.019
	Shipping and logistics policy office under the unification with the MOTIE	0.123	0.012
	Planning and Coordination Committee under Prime minister	0.183	0.018
	Shipping and Shipbuilding Policy Coordination Advisory Committee	0.090	0.009

“Shipbuilding and offshore plant under the unification with the MOF” should be considered as the optimal KGO of maritime industry.

Table 7
Final Results of Evaluated Alternatives

Alternative	Result	Rank
National Maritime Future Strategy Committee	0.252	2
Shipbuilding and offshore plant office under the unification with the MOF	0.342	1
Shipping and logistics policy office under the unification with the MOTIE	0.138	4
Planning and Coordination Committee under Prime minister	0.177	3
Shipping and Shipbuilding Policy Coordination Advisory Committee	0.104	5

5. Conclusion

This paper aimed to revisit more structural causes of the HJS tragedy in terms of the KGO of maritime industry using AHP analysis. As a result of the AHP analysis, realistic possibility (0.473) was identified by most respondents as the most important factor, followed by goal orientation (0.316) and institutional stability (0.221). The sub-criteria were weighted as suitability (0.279), competency (0.139), reliability (0.125), efficiency (0.115), political coordination (0.098), feasibility (0.095), equity (0.076), independence (0.044), and cooperation (0.041). In terms of the alternative evaluation, “shipbuilding and offshore plant under the unification with the MOF” should be considered as the optimal KGO of maritime industry.

In the case of Korea, maritime industry is divided into the MOF (shipping) and the MOTIE (shipbuilding). The supply and demand control of the maritime industry has not done properly due to overlap and interruption of the maritime related government organizations. In the case of the MOTIE, they are fostering several industries related to shipbuilding such as offshore and onshore plants, cruise ships, shipbuilding trade businesses and international cooperation, shipbuilding technology, and offshore plant investment. However, cooperation with domestic ship owners and development of vessels that meet domestic demand has not been thoroughly explored by the MOTIE.

Looking at the case of Japan's maritime industry and the related government organizations, related industry such as shipping, shipbuilding, crew, and sea safety are solely controlled by the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT). The MLIT is working on several aspects: 1) “pre-coordination of the needs of stakeholders in related fields through the maritime rationalization council,” 2) “promoting the development of the entire Japanese maritime cluster by ordering Japanese shipping companies in the Japanese shipyard,” 3) “reciprocal circles that can be adjusted by stakeholders in advance,” 4) “predict the future of marine industry through national research institutes,” and 5) “smoothing supply and demand between shipping and shipbuilding industry through Japanese Register, ClassNK.”

Therefore, the Korean maritime industry needs a cooperative administrative structure to overcome the conflicts triggered by the divided government organizations related to maritime industry.

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