Strategic Analysis of the Indonesian Shipyards to Sustain in New Building Business

by

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Abstract

As a job-order industry and compete in regional/global market, shipbuilding industry must have long-term strategic plan to create sustainable competitive advantage, particularly in new building business. This paper presents a strategic business analysis of the Indonesian (national) medium-sized shipyards, by using Shipyard Business matrix that resulted from the shipyard's internal and external strategic factors. The result shows that, the national shipyards are less competitive compared to their potential competitors in the region. This is particularly due to limitation of intangible resources and availability of local competitive supporting industries. To create sustainable competitiveness, therefore, they are recommended to implement intensive and integrative strategies. The intensive strategy is mainly aggressive marketing to the existing customers through improving internal processes to improve company reputation in product quality and delivery time. The integrative strategy mainly relies on building strategic alliance with steel manufacturers, main engine vendor, and suppliers of fast moving materials.

Keywords: Shipbuilding, Competitiveness, Environment Analysis, Strategy

1. Introduction

Rapid shipyard development in Asia Pacific region, including foreign shipyards in Batam (Indonesia), will be a serious threat of the Indonesian (the national) shipyards if no strategic decisions are taken. Among 240 national shipyards with total capacity of 225,000 GT, only one shipyard is categorized as big shipyard that capable to build up to 50,000 DWT, and less than ten shipyards are medium-sized with the capacity of 5,000 to 30,000 DWT. The others are small and mostly operated only in ship repair. Since many years, their annual market share is accounted only 0.35 percent to 0.50 percent. Huge numbers of ships required particularly to replace foreign ships in domestic shipping, due to the implementation of Presidential Decree No.5/2005 (INPRES 5/2005), is the opportunity of the domestic shipyards. However, these demands will be also the advantage of foreign shipyards since the domestic market is a part of the global market.

Low competitiveness of the national shipyards is not only the issue of strategy in functional level (such as productivity or departmental performance), but also the issue of strategy in business and corporate levels. The SWOT analysis that mostly used in strategy formulation is considered very general (Ma'ruf, et al, 2005a), and this is the historical deficiency of SWOT analysis (Pearce and Robinson, 2000). The use of intuitive subjective judgment in this analysis is academically difficult to be accepted (Suriasumantri, 1998).

Since the nature of shipbuilding industry differs from general industry, a specific strategy formulation model is certainly needed based on its own characteristics. The best way to formulate strategy always depends on the nature and needs of the businesses in the company's portfolio (Harvard Business Review, 1991). Due to the shipyard's specific characteristics (slow yielding, capital intensive, and labour intensive) and its complex business environment (Bruce and Garrard, 1999), their corporate and business strategies should be formulated based on its own business environment conditions. In medium-sized shipyards that characterized as functional structure, both strategies are not separated.

The main objective in this particular study is to identify competitive position of the Indonesian medium-sized shipyards, compared to their potential competitors in regional market. From this strategic position, best strategy options will be recommended and discussed to create their sustainable competitiveness in the region. Furthermore, this study will be limited in new building business, since this particular business competes in regional/global market. The market of ship repair business is mostly domestic and it depends on shipping activity around the shipyards (Ma'ruf, et al, 2006).

2. Strategic Management in Shipbuilding

Strategic management is the art and science of formulating, implementing and evaluating cross functional decisions that enable an organization to achieve its objectives (David, 2005). In formulation stage, many strategy formulation methods or matrices are well-known and applied in many leading companies in the world, such as: internal external (IE) matrix, threat-opportunity-weakness-strength (TOWS) matrix, Boston consultative group (BCG) matrix, strategic position and action evaluation (SPACE) matrix, and grand strategy (GS) matrix. However, these models are commonly used in general industry.

In hierarchical, strategy consists of corporate level, business level, and functional level. Corporate level focuses on overall company's direction, business level emphasizes on competitive position of a product or service, and functional level emphasizes on functional departmental performance (Wheelen and Hunger 1994). In recent shipbuilding business, corporate and business strategies have become key success to sustain in the global market (Bruce and Garrard, 1999). In middle-sized firm, strategy in corporate and business level is the same, because its structure is characterized as functional structure (Wheelen and Hunger, 1994). Competitiveness can be defined as the ability to win and execute shipbuilding orders in open competition and stay in business (Bruce and Garrard, 1999).

David (2005) describes fourteen generic strategies that commonly used in corporate and business levels. They are classified in four groups, including: three intensive strategies, four integration strategies, three diversification strategies, and four defensive strategies. Intensive strategies are used to increase revenue and strengthen its market position; integrative strategies are used to control suppliers, customers and competitors; diversification strategies are used when its current market is slowly growth and its products are not competitive; and defensive strategies tend to be applied in a company with a weak market position, revenue is decreasing, and/or its resources become inefficient.

Many kinds of strategies have been successfully implemented in many overseas leading shipyards, particularly the Asian triangle (Japan, Korea, and China) who dominates 70 percent of the annual world production (Drewry, 1999). As reported by Drewry (1999) and RINA (2005), some leading shipyards in Japan implement aggressive marketing, strategic alliance with suppliers and shipbuilders, diversification, and joint venture in Philippines and China. Most recently, an initial

agreement has been reached to explore the merger of IHI Marine United and Universal Shipbuilding Corp (Iwamoto, 2008). A joint venture company has been also established in China between Qingdao Qiyao shipyard and Wartsila MHI Linshan Marine Diesel Co Ltd to produce large low-speed two-stroke engines from April 2009.

South Korean shipyards that dominate 35 percent world production in 2007, implement intensive marketing to Europe and US; product development (container and LNG); collaboration with local ship owners and other shipbuilders; strategic alliance with Japan for technology transfer; joint venture in Vietnam, China, and Romania. Shipyards in China with about 15 percent market share, implement intensive strategies to Europe and US; integration with local suppliers and shipping; focus on less sophisticated vessels; joint venture in Cosco and Jurong Clavon for tank coating.

3. Research Framework

The framework of my research work is shown in Figure 1. My previous work was focused on developing an environmental model based on business characteristics of medium-sized shipyards that developed from questionnaires to the industry's stakeholders. The collecting data was analyzed using a multivariate statistical technique "Factor Analysis." Here, numbers of variable are reduced and grouped into Factors that consist of some variables (factors) and their weighting. Having considered the results, a continuing research as shown in the shaded area (Figure 1) was conducted that aiming at creating a specific business strategy formulation model for the shipyards. The model is called "Shipyard Business (SB) matrix." In the model, 14 strategy options commonly used in general industry are placed on nine cells of the matrix based on their attractiveness scores related to the results of the environment analysis and rating of the strategies (1 to 4).

The model is then applied to analyze strategic position of the national medium-sized shipyards to create sustainable competitiveness in the global/regional market. By using this matrix, five medium-sized national shipyards are evaluated and compared to two foreign shipyards located in Batam (Indonesia), based on their IFE and EFE scores. The scores are calculated according to company's rating value for each variable multiplied by the variable's weighting. The company's rating is taken from the average rating values given by members of the company's managerial levels. The IFE and EFE scores are then plotted on the matrix. Strategy options mentioned on the cell are considered as the business strategy alternatives for the company to sustain in the global/regional market. Finally, the results are evaluated compared to their existing model and strategies, through discussion with the management board in two shipyards, using 12 acceptance criteria. The criteria consist of suitability, feasibility, and acceptability (Johnson and Scholes, 1993) in Sasmito (2003), and the other were developed through expert discussion.



Figure 1 Research Framework Strategic Factors in Shipbuilding Industry

4. Strategic Factor Analysis

Shipbuilding industry is a job-order industry that has specific characteristics and complex business environment (Bruce and Garrard, 1999). In my previous study, a specific business environmental model for medium-sized shipyards has been developed, called "Shipyard Ten-boundary Environment Model" (Ma'ruf, et al, 2006). The model was developed based on internal and external strategic factors. Twenty internal factors (variables) and 20 external factors were included, explored from some environmental models and competitive advantages (Wheelen and Hunger, 1994; Amit and Schoemaker, 1993; Petreraf, 1993; Hall, 1992; Grant, 1991; Harvard Business Review, 1991). The internal factors consist of tangible resources and intangible resources, and the external factors consist of industry environment and national environment.

Their relative importance was identified by using questionnaire survey to selected respondents of the industry's stakeholders, including: shipyards, customers/shipping companies, suppliers and sub-contractors, academicians and researchers, experts, government and related associations. Among 190 questionnaires distributed, 112 were returned. The average of sample adequacy exceeds 0.80 (Hair, et al., 1998), the average reliability (alpha) also exceed 0.70 (Hair, et al., 1998), and data validity is accepted (r calc.> r table). The data was analyzed using a multivariate statistical technique (Factor Analysis).

The Factor Analysis is an interdependence technique in which all variables are simultaneously considered, each related to all others (Hair, et al, 1998). In the factor analysis, all factors are independent each other (Johnson and Wichern, 1999). Results of the Factor Analysis (using SPSS software), the numbers of variable are reduced and grouped into Factors (F) that consist of some variables (factors) and weighting, as given in Table 1.

Internal Factors & Variables	Weight	Weight External Factors & Variables	
Factor 1: Shipyard		Factor 1: Interim Supply	
Management	0.10	E 01 Quality of material	0.10
L 01 Commonly oulture	0.19	E-01 Quality of material	0.19
1-01 Company culture	0.18	E-02 Price of material	0.18
1-02 Organization and mgt	0.17	E-03 Supplier knownow	0.17
I-03 Business network			
Factor 2: Process		Factor 2: Shipbuilding	
<u>Technology</u>	0.10	Order	0.10
I-04 Engineering &	0.09	E-04 Domestic market	0.10
database		E-05 International market	
I-05 Facilities			
&equipments			
Factor 3: Product		Factor 3: Global	
Performance	0.08	Restrictions	0.07
I-06 Delivery time	0.07	E-06 Barrier in global	0.07
I-07 Quality assurance		market	
		E-07 Industry infrastructure	
Factor 4: Price Quotation		Factor 4: Maritime Policies	
I-08 Price level	0.12	E-08 Gov. support to	0.04
		shipyard	0.04
		E-09 Gov. support to	0.04
		shipping	
		E-10 Bank support	

 Table 1 External Strategic Factors in New Building

Each variable's weighting is then given based on the percentage of variance of the Factors and the factor loading of the variable. The total weighting of variables is equal to 1.00. The loadings are the correlation of each variable and the Factor, and indicate the degree of correspondence between the variable and the factor (Hair, et al, 1998).

The result shows, the weighting contribution of Factor "shipyard management" is the most dominant for sustainable competitive advantage, which account for 54 percent of the total weighting. The price quotation factor contributes only 12 percent of the total weighting. Interim supply is the most dominant external factor which account for 54 percent. This indicates that, the availability of local competitive supporting industries is the most important external factor for sustainable competitive advantage in shipbuilding industry, since the cost of materials is more than 70 percent of the total cost, and import content is more than 60 percent (Ma'ruf, 2004).

5. The Shipyard Business matrix

There are 14 strategy options commonly used in general industry, and they are divided into four groups (David, 2005), including: (i) intensive strategies: market penetration (MP), market development (MD), and product development (PD); (ii) integrative strategies: backward integration (BI), forward integration (FI), and horizontal integration (HI); (iii) diversification strategies: concentric diversification (CD), horizontal diversification (HD), conglomerate diversification (CtD), and joint venture (JV); and (iv) defensive strategies: merger (M), retrenchment (R), divestiture (D), and liquidation (L). In newly David's published book, CD is defined as related diversification, and HD and CtD are defined as unrelated diversification (David, 2007). Other terms of strategy may be found in different strategic management books, but they are principally the same.

The Shipyard Business (SB) matrix is designed based on the above strategies and attractiveness score of each strategy according to the company's rating value. Its attractiveness score is given from 1 (very weak) to 4 (very strong), determined by expert discussion. The strategy attractiveness score for internal factors is given in Figure 2, and the strategy attractiveness score for external factors is given in Figure 3.



Figure 2 Strategy Attractiveness Score for Internal Factors



Figure 3 Strategy Attractiveness Score for External Factors

The SB matrix as shown in Figure 4 consists of nine quadrants (cells) and strategies with the score of 2.00 to 4.00 for both categories (internal and external) are taken as strategy alternatives in each quadrant.



Figure 4 Shipyard Business (SB) Matrix

The Internal External (IE) matrix that commonly used in general industry (David, 2005) also consists of nine cells, but its strategy alternatives is only divided into three categories (grow and build, hold and maintain, and harvest or divest). Hold and maintain in the IE matrix that covering cell III, V, and VII (as in the SB matrix) for example, only consists of two strategies including: market penetration and product development. In the SB matrix, the three cells have some different strategies. In cell V for example, there are five strategy alternatives, including: market penetration, market development, product development, horizontal integration, and backward integration. This strategy combination may be implemented when the IFE and EFE scores are within 2.0 to 3.0.

The SB matrix is considered as industry-based model for medium-sized shipyards, since it is specifically developed based on their business environment conditions. By using the matrix, a company could simply determine its possible corporate/business strategy alternatives by plotting its IFE and EFE scores on the matrix.

6. Strategic Analysis of Indonesian Shipyards

6.1 The Factor's Rating

Strategic analysis of the national medium-sized shipyards is carried out by using the SB matrix. This study covers five national major shipyards (NS), located in Java island and Makassar. Four of them are state-own enterprises. Two foreign shipyards (FS) located in Batam (Indonesia) are included in the survey. Both shipyards are also middle-sized ones and considered as competitor's representatives in the regional market. These shipyards are belongs to Singaporean investors, and operated under support of their parent companies in Singapore, including: design, marketing, financial, management, and material supply, etc.

Company's rating of all variables was identified using questionnaires to those seven shipyards. Top-management and managers of each company were asked to indicate their company's rating for each factor from 1 (very low) to 4 (very high), by their individual judgment. The internal factors consist of strengths (rating 3 and 4) and weaknesses (rating 1 and 2). The external factors consist of opportunities (rating 3 and 4) and threat (rating 1 and 2). The judgment is guided by a given rating condition resulted from expert discussion. The average rating given in each company is shown in Table 2.

		Internal Factors					External Factors												
No.	Company	I-01	1-02	1-03	1-04	1-05	1-06	1-07	1-08	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09	E-10
1	NS-1	2.60	2.60	2.70	3.00	2.50	2.90	2.90	2.70	3.10	2.20	2.70	1.70	1.70	2.00	2.60	1.70	1.90	1.60
2	NS-2	2.60	2.70	2.50	2.90	2.30	2.60	2.70	2.70	3.20	2.00	2.10	2.30	1.80	1.90	2.40	2.00	2.30	2.20
3	NS-3	2.89	2.33	2.89	2.67	2.44	2.56	3.00	2.78	3.33	2.56	2.89	2.00	1.78	1.89	2.89	2.33	1.89	1.78
4	NS-4	2.50	2.00	2.75	2.60	2.25	2.75	2.50	2.75	3.00	2.75	2.25	2.25	1.75	2.00	3.00	3.00	2.75	1.00
5	NS-5	2.50	2.00	2.50	2.00	2.50	2.50	2.75	2.75	3.00	2.50	2.00	2.50	1.50	2.00	2.75	2.00	2.25	2.00
6	FS-1	3.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	4.00	4.00	4.00	3.00	2.00
7	FS-2	4.00	3.00	4.00	3.00	4.00	3.00	3.00	3.00	4.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00
Av. NS	(National Shipyards)	2.62	2.33	2.67	2.63	2.40	2.66	2.77	2.74	3.13	2.40	2.39	2.15	1.71	1.96	2.73	2.21	2.22	1.72
Av. FS	(Foreign Shipyards)	3.50	3.50	4.00	3.00	3.50	3.00	3.00	3.00	3.50	2.50	3.00	2.50	2.50	3.50	3.50	3.50	3.00	2.00

Table 2 Average	Factor's F	Rating in	Each C	ompany
0		<u> </u>		

The results show that, all companies have better conditions in the internal factors rather than those in the external factors. In general, average factor's ratings of the Indonesian medium-sized shipyards are much lower than those of their potential competitors. In the new building business, the national shipyards have low rating in Factor "shipyard management," including: company culture (I.01), organization and management (I.02), and business network (I.03). These factors are the key differences with the foreign shipyards, in which contributes 54 percent of the total weighting in the internal factors. For the external factors, Factor "global restrictions" that contributes 14 percent has also a big different between both groups.

6.2 Strategy Formulation

Corporate and business strategies are formulated based on IFE (internal factor evaluation) and EFE (external factor evaluation) score. The IFE score indicates competitive position of a company relative to their potential competitors, and the EFE score indicates the response of a company to its external business environment. Based on the rating values of the factors, IFE and EFE scores of each company are calculated, by multiplying the factor's weighting and the rating's value.

In this paper, strategic position of the national medium-sized shipyards (NS) compared to those of the foreign medium-sized shipyards (FS), particularly in new building. Based on the IFE and EFE scores, the strategic position of the national shipyards is shown in cell V, and the foreign shipyards in cell IV (close to cell I), as shown in Figure 5. This result shows, competitiveness of the foreign shipyards is much better than the national shipyards.



Figure 5 Company's Strategic Position

According to the SB matrix (Figure 4), therefore, five business strategies in cell V are recommended to the national shipyards to create sustainable competitive advantage in the regional market. These strategies are: market penetration (MP), market development (MD), product development (PD), horizontal integration (HI), and backward integration (BI). The first two strategies are intensive strategies, and the last three are integrative strategies.

As defined by David (2005), market penetration is seeking increased market share for present products or services in present markets through greater marketing efforts. Market development is introducing present products or services into new geographic area. Product development is seeking increased sales by improving present products or services or developing new ones. Horizontal integration is seeking ownership or increased control over competitors. Backward integration is seeking ownership or increased control of a firm's suppliers.

Implementation of these strategies may vary in one company with another. A company may only implement one or two types of strategy, or combine them, based on their resources, capabilities, and key implementers. In the implementation stage, these strategies must be deployed in functional level based on actual company's conditions. There are an infinite number of possible actions, therefore, a manageable set of the most attractive alternative strategies must be developed (David, 2005). No two organizations thought about strategy in the same way, and a generally accepted way to describe strategy did not exist (Kaplan and Norton, 2004).

7. Result Evaluation

The proposed model and case study's results were discussed and evaluated through management meeting in two national shipyards for evaluation, compared to those of the SWOT matrix that commonly used in the national shipyards. There are 12 evaluation criteria used in comparing the two models, the first nine criteria given by expert discussion, and the last three criteria given by Johnson and Scholes in Sasmito (2003) for strategy evaluation. The evaluation was given by their own-judgment with scoring from the scale 1 (very low) to 5 (very high). The average value of the SWOT analysis and the proposed model (PM) as given in Table 3 are resulted from 20 members of the meeting from both companies.

Table 3 The Evaluation Results

		Average Score			
No.	Evaluation Criteria	SWOT	PM		
1	Model application	2.52	4.21		
2	Level of strategy	2.74	4.33		
3	Formulation model	2.45	4.56		
4	Environmental analysis	2.37	4.16		
5	Factors/variables' weighting	2.01	4.22		
6	Guidance of company rating	2.48	4.42		
7	Strategy selection process	2.63	4.35		
8	Types of strategy	2.11	4.42		
9	Selection and rank of	2.57	4.31		
	strategies				
10	Suitability	2.34	4.21		
11	Feasibility	2.34	4.21		
12	Acceptability	2.58	4.53		

PM= proposed models; SWOT= strengths, weaknesses, opportunities, threats

The results show, the average value of each criteria of the existing model (SWOT analysis) is < 3, and the proposed models (PM) is > 4. The above results are then tested by using statistical analysis. With significant level 5 percent, the collected data is valid ($r_{calc} > r_{table}$) and reliable (alpha= 0.7035 > r_{table} = 0.468). The T-test of paired samples test shows $t_{calc} < -t\alpha$, 19 (t table: t 0.05;19 = 2.093).

8. Discussion and Conclusion

8.1 Discussion

The SB matrix can be used to determine best new building business strategies subject to the IFE and EFE scores. Since it is developed from the shipyard's environment (business entities) analysis, this matrix is considered as industry-based and generic models particularly for medium-sized shipyards in Indonesia, and any other countries with relatively similar business environments. The matrix may be used to formulate strategy in corporate level, since it is also applicable in ship repair business, except in cell II (without JV strategy) and cell III and IV (wirhout PD strategy) (Ma'ruf, et al, 2006).

The model may be used and valid for long time, if there is no significant changes in the business characteristics (Ma'ruf, et al, 2006). As a capital goods industry, the strategic factors (variables) are relatively steady. If there is a significant change occurred, however, it may be modified respectively based on current business environment conditions. As resulted from the Factor Analysis, intangible resources are more important and dominant than tangible resources. Therefore, the most effective way to create sustainable competitive advantage is to focus on improving the performance of intangible resources, such as: company culture, business network, management, delivery speed, and quality assurance. As also suggested by Chan Kim and Mauborgne (2006), a firm should focus on dominant factors that could create competition become irrelevant. Intangible assets are the ultimate source of sustainable value creation (Kaplan and Norton, 2004), and can not be easily duplicated by competitors (Hall, 1992).

As shown in Figure 5, the national medium-sized shipyards (cell V) are less competitive than foreign shipyards in Batam (cell I). Their lower IFE score is mainly caused by their low rating Factor "shipyard management", including company culture, management system, and business network. In the external factors, they have much lower rating in price of material, barrier in international market, and government support to shipyard. On the other hand, high rating of the foreign shipyards in these factors is mainly caused by full support of their parent companies in Singapore, and special support of the Indonesian government to enhance the industry's growth in Batam.

According to the SB matrix, intensive and integrative strategies are considered as best strategy options in corporate and business levels to create sustainable competitive advantage in the global (regional) market for the national medium shipyards. Intensive strategies include market penetration, market development, and product development. Integrative strategies or sometimes called strategic alliance or cooperative strategies are also applicable for ship repair business, because both new building and ship repair businesses in the middle-sized firm are characterized as functional structure (Wheelen and Hunger, 1994), and they are not in a separate business unit (Ma'ruf, et al, 2005b).

In intensive strategies, market penetration means aggressive marketing to the existing customers through improving internal processes leading to better product quality and delivery time for customer satisfaction. These factors are the most effective marketing approach to create loyal customers and repeat orders, since the customer's representative (owner surveyor) involves in the production process. This approach is also effective to create new market (market development), because new customers usually place order based on reference from the existing customers. Building a good company reputation and other competitive advantages of intangible assets are not easy and may be very costly for any shipyard. To be more effective development, some of the national shipyards may focus on certain types of ship, such as less sophisticated vessels, or focus on non-transport type (such as: tugboat, fishing, patrol boat, etc.). However, a comprehensive feasibility study is certainly needed with some other considerations that may affect their future businesses.

Horizontal integration to other shipyards (such as: joint marketing, design, procurement, facility, etc.) may improve capability and resource sharing to get international orders, and to build bigger ships and more ships with lower production costs. Integrative strategies may also increase company response to the external factors, such as: barrier in global market, financial support, etc. Backward integration strategy may be established with some main suppliers to control their supporting industries. Cooperation or strategic alliance with steel manufacturers, main engine vendor, and suppliers of fast moving goods, for examples, could make possible for the shipyards to build ships with lower costs and/or shorter delivery time. Nowadays, such cooperation will be a valuable competitive advantage, to control the price and quality of main materials as well as the procurement of main engine. It is sometimes implemented by having shares in material manufacturers/ suppliers (backward) to ensure the supplies, or to customers (forward) to maintain orders.

8.2 Conclusion

In this part, some important results from this particular study may be emphasized as follows:

a. The Indonesian medium-sized shipyards are less competitive compared to their potential competitors in the regional market, particularly in intangible resources and the response to the external environment conditions.

b. Factor "shipyard management" is intangible asset that considered as the most dominant internal factor which account for 54 percent of the total weighting, including: company culture, management system, and business network.

c. In the external factors, Factor "interim supply" is the most dominant which account for 54 percent, including: price and quality of materials, and supplier know-how.

d. To create sustainable competitiveness in the regional market, the national shipyards are recommended to implement intensive and integrative strategies.

e. In implementation stage, the proposed strategies have to be deployed into strategies in functional level based on actual company's resources and capabilities.

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