

Offshoring Decision Making in the Logistics of the Norwegian Shipbuilding Yards

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Abstract: - Outsourcing and insourcing are important elements of Norwegian shipbuilding yards' strategies. The large part of shipyards business processes is offshored to other countries. The paper presents different sourcing strategies that might be applied by the shipbuilding enterprises. The case study describes the process of country and branch analysis that precedes sourcing decision making. The branch analysis was made using Porter's Diamond Model.

Key-Words: - shipbuilding logistics, outsourcing, insourcing, offshoring, nearshoring, onshoring.

1 Introduction

The Norwegian maritime industry is a significant sector of the national economy where the country tries to keep a leading position. The national maritime cluster consists of a number of industries, such as shipping companies, shipping finance, maritime education, ship insurance, classification services, shipbrokers, and others (see [1] for details). This study does not allow considering offshoring challenges in all maritime businesses. We would like to concentrate on research of sourcing opportunities in the sphere of shipbuilding.

The Norwegian shipbuilding branch includes around 50 large and small shipyards situated along the country's Western coast. The industry employs 4 500 people [2]. Shipbuilding mainly specializes on production of advanced ships such as fishing, seismic, platform supply vessels and others that need high competence, as well as on offshore construction, such as floating platforms for the oil industry.

The general trend in the Norwegian shipbuilding, actually, as in the whole Western European shipbuilding industry, is a steadily growing preference of "buy" decisions rather than "make" in the traditional make-or-buy dilemma. The majority of small shipyards follow the total outsourcing strategy, that is over 80 % of works is performed by third-party firms, either foreign or domestic ones. In fact, it proved to be a rather successful and profitable approach. Having rather modest facilities and quay, administration up to ten persons and under hundred workers, small shipyards give a significant profit to their owners.

Some of the business processes, such as hull manufacture and ship design, are completely divested from the Norwegian shipbuilding enterprises, that is to say shipyards are not planning to reverse these activities. Ship design is either outsourced to third-party vendors or insourced to other entities inside the same organization (for example, Aker Design Florø AS makes design works for members of Aker Yards). The hull production is almost completely offshored due to high cost of this process in Norway.

Outsourcing is a vital part of the modern Norwegian shipbuilding business. It is hardly possible to find a Norwegian shipyard that does not offshore its activity in one form or another. The process was magnified in 2004 when ten new countries joined the European Union and the process of contracting personnel from Poland, Latvia, Lithuania, and Estonia has increased. Citizens of the EU member states do not need a permission to work in Norway. Fortunately, this process coincided with the boom in the world and country's shipbuilding. So the foreign subcontractors and personnel have not forced out local companies and workforce.

During the last 10-15 years Norwegian shipyards offshored non-core business processes primarily to shipyards and vendors in Poland and Baltic states. High migration of the labor force to the Western Europe that caused lack of shipbuilding workers in these new EU countries and wage rise, in combination with higher price level for ship production due to increased demand and increased expertise, made the traditional offshore destinations not that cost effective than before. The new circumstances force the Norwegian companies search for new offshoring

opportunities in order to compete and stay in this tough business.

The goal of this paper is to contribute to the offshoring knowledge relevant to the specificity of the shipbuilding. The case study helps to reveal factors important to offshoring decisions by the example of the Ukraine as a possible offshore sourcing target, to analyze country's shipbuilding market, to explore opportunities and threats to Norwegian maritime industries in the Ukrainian market, and to evaluate the present offshoring experience from collaboration between enterprises of both countries in the sphere of shipbuilding. We also hope that information presented in this article will be useful for interested businessmen. This study was carried out as a project in the area of maritime research at Stord/Haugesund University College.

The rest of this article is structured as follows. The next section will present a theoretical insight into offshoring theory. Then we describe research methods used in this study. After that we present results of the case study where the example of shipbuilding industry's analysis is shown for the purposes of offshoring decisions. The article is completed by a discussion and conclusions.

2 Theoretical Background

Though offshoring is a very important business strategy element of large and even some small and medium-sized companies, the area of offshoring research is considered as rather novel in the scientific literature [3], [4].

Let us first shed some light to the offshoring terminology. It seems that the term "offshoring" is widely used to specify carrying out production, services and activities from high-cost countries to low-cost locations abroad. Though some refined expressions are used to determine the nature of different strategies more precisely. S. Chakrabarty [5] has analyzed a literature and categorized different approaches and definitions in the sphere of offshoring. For example, the main sourcing strategies may be divided to *insourcing* (that is when the work is performed for the client by its own department or subsidiary) and *outsourcing* (the case when the job is done by a third-party vendor). From the geographical point of view, strategies are categorized to *onshoring* (the executor is situated inside the client's home country), *nearshoring* (the internal or external subcontractor is located abroad, but geographically close, often in the same or nearby time zone), and *offshoring* (the piece of work is done far away from the domestic territory).

Thus the combination of sourcing and shoring strategies gives six possible operational strategies: onshore insourcing, onshore outsourcing, nearshore insourcing, nearshore outsourcing, offshore insourcing, and offshore outsourcing. Let us illustrate these possible strategies on the real-life example of a Norwegian ship design group. This corporation, VS Group, has several subsidiaries in Norway and abroad, in Poland, Serbia, China, India, and Brazil. The main office is situated in Norway. VS Group optimally combines insourcing and outsourcing strategies. Such a policy is called "flexible sourcing" [5]. They redistribute works that should be done among the Group's subsidiaries. And in some cases use vendors for some kinds of job or attract third-party firms in order to complete the tasks on time.

The tendency of offshore outsourcing will continue in the future. Chakrabarty [6] has determined several reasons of this diffusion: (1) modular design of certain tasks; (2) modern technologies; (3) technical, managerial, and quality capabilities; (4) high cost saving; (5) skilled labor pool; (6) scalability; (7) fastest time to market; and (8) entry to large markets.

3 Materials and Methods

We have used an exploratory case study to illustrate analysis preceding offshoring decisions. There are two parts of the study. First, using Porter's Diamond Model [7], we had analyzed shipbuilding industry of Ukraine as a prospective offshoring destination. According to Porter, main elements of this model are: (1) factor conditions, (2) demand conditions, (3) firm strategy, structure and rivalry, (4) related and supporting industries together with (5) government, and (6) chance.

Second, we have investigated opportunities and threats that can face foreign firms coming to the Ukrainian shipbuilding market. This was made by the examination of offshore outsourcing experience in Ukraine of one Norwegian shipbuilding company in 2000-2003.

4 Case Study: the Ukraine

4.1 Macroeconomic Issues

Today, there is a growing interest from Norwegian businessmen in Ukrainian enterprises. Currently the volume of trade between Norway and Ukraine is not very high. In 2004 it equaled about USD 180 million [8].

There are relatively few Norwegian enterprises that have established themselves in the Ukraine. The most

successful is Aker Yards that in May 2006 has acquired a 50-% stake of the most advanced Ukrainian shipyard Okean from the Dutch Damen Group that still posses the rest of the yard.

Political stability and the general economic situation in a country substantially influence offshoring business decisions, especially those of a long-term nature. That is why it seems appropriate to briefly characterize the current state of affairs in the Ukraine in this paper, and to explore problems that have a direct impact on shipbuilding.

In general, during the last years, the Ukrainian economy has functioned increasingly better. The Ukraine's gross domestic product growth rate is rather high and the country had a positive current account balance of 11 percent in 2004.

Though macroeconomic indicators of the Ukraine's recent development are better than those of its neighbors, Bulgaria and Romania, foreign investors consider investments into the latter economies more secure. The only reason for this is the membership status of Bulgaria and Romania in the EU.

Financial markets directly influence maritime industries [1]. The currency rate has been rather stable during the last six years. The Ukrainian currency, hryvna, is de facto pegged to the U.S. dollar and remains undervalued. However, the stimulating effect of a favorable exchange rate policy is outweighed by high interest rates. Shipyards must pay banks around 15 percent per annum to get financing for newbuilds. Generally, the banking sector of the Ukraine is rather weak. Presently, banks are mainly domestically owned with an insignificant market share of foreign banks (11 percent of bank capital). As of June 2005, of the 162 Ukrainian banks, only 22 are foreign owned [9]. In comparison to western banks, Ukrainian banks are very small. The process of consolidation is in the very beginning stages, but the sector is definitely on the verge of a transformation. In 2005, Austrian Raiffeisen Bank purchased the Aval Bank, the second largest bank in the Ukraine. It is significant that the Aval Bank is a major creditor for shipbuilding in the Ukraine. Two other Ukrainian banks were bought by Italian Banka Intesa and BNP Paribas of France.

4.2 Overview of the Shipbuilding Industry in the Ukraine

The production volume of the Ukraine's shipyards equaled USD 88.5 million in 2004 [10]. Generally, the combined production facilities of all the Ukrainian shipyards are only partially utilized and employ significantly fewer people than they did in the Soviet era. In the same time, Polish yards produce more than they did during their best times before the political and

economic transformation. In terms of deadweight, the production from the Polish yards has risen from 408,900 DWT in 1985 to 781,700 DWT in 1999 [11]. Why do Ukrainian shipyards do much worse than their counterparts in neighboring states Poland, Romania, Russia, Bulgaria, and Croatia? So far, according to authors' estimation, construction only nine hulls have been outsourced from Norway to the Ukraine.

4.2.1. Factor Conditions

In this chapter we will consider factors' influence (such as labor, natural resources, land, capital, and infrastructure) on the Ukrainian shipbuilding industry. Ukraine is situated rather favorably for the shipbuilding purposes. The country has long coast line. It is washed by the Black Sea and the Sea of Azov. In addition, there are several big rivers (the Dnepr River, the Danube, and the South Bug) suitable for navigation and shipbuilding. The biggest shipbuilding and maintenance yards in the Ukraine are situated in the south along the coast of the Black Sea and on rivers that flows into the Black Sea (the Chernomorsky Shipyard, the 61 Communards Shipyard, the Damen-Aker Okean Shipyard, the Kherson Shipyard, Pallada, the Zaliv Shipyard, the Sebastopol Marine Plant, the Kiliya Shipbuilding and Ship Repair Yard, and etc.). Other yards are situated on the Sea of Azov (the Mariupol Ship Repair Yard) and in Kyiv (the Leninskaya Kuznya Shipyard, the Kyiv Shipbuilding and Ship Repair Yard).

Generally, the Ukraine has highly-qualified labor power. There is an educational system that provides training of various specialists specially for shipbuilding industry. It includes vocational schools, colleges, the National University of Shipbuilding, and the number of technical universities. The National University of Shipbuilding educates engineers, economists, lawyers, IT-specialists for shipyards and ship design offices. Many workers and engineers have acquired experience of work in foreign shipyards that also has a positive effect.

As we have described in the previous chapter, domestic capital is not yet so powerful. But there are first signs of capital's 'injection' into Ukrainian shipbuilding. In the end of 2005, Ukrainian industrial group Finance and Credit has bought 76 percent of shares for the Zaliv Shipyard in Kerch. The new owner controls a number of machine-building plants and the Kyiv Shipbuilding and Ship Repair Yard. Finance and Credit has ambitious plans in shipbuilding [12]. Similar Russian industrial group OMZ, having shipyards, design office and large heavy industry enterprises, functions rather successfully.

Geographically, Polish shipyards are located much closer to Norway than Ukrainian yards. Timing in

shipping is an important factor. From this point of view Polish shipyards have advantage, because it is faster and cheaper to tow a hull or vessel from Poland than from the Ukraine. However, the Ukraine's shipyards can benefit from lower prices.

Ukraine has good infrastructure of railroads, highways, and airports. All large shipyards have railroad access and loading equipment. Railroad transport is cheap and very well developed in Ukraine. Ukraine has deposits of iron ore and large steel mills. That is a positive factor for shipbuilding, as steel is one of the main components for the industry.

4.2.2 Demand Conditions and Chance

Michael Porter stresses on significance of domestic demand for industries. Domestic demand for production of the Ukrainian shipyards is low. Although in the past industry served mainly for domestic customers, the national demand presently has sharply dropped. Navy ships, one of the main specializations of the Ukrainian shipyards, are not necessary for the Ukrainian Navy at the moment. The State Black Sea Shipping Company, a big enterprise earlier, has only two vessels now. The Ukrainian companies order mainly small vessels (e.g. barges and harbor tug boats).

The Ukrainian shipbuilding industry is definitely export oriented. So far only one shipyard, Damen-Aker Okean, belongs to western investors. The demand for new ships over the world is high at present. So there is a very good chance now for the Norwegian shipyards to establish business relations with the offshoring purposes, either acquire a shipyard or outsource a part of building process to Ukraine. The Ukrainian shipyards have an opportunity to work up new markets, approve their production process, use free capacity, improve managerial processes, and restructure yards.

4.2.3 Related and Supporting Industries

Industries related to shipbuilding and supporting shipyards traditionally are very well developed in the Ukraine.

There are a number of ship design firms and various research institutions in Ukraine. They provide shipyards with classification and production drawings and design vessels for customers. The ship designers are highly qualified and have vast experience of work with foreign firms. The biggest actors are Chernomorsudoproekt, Torola Ltd, SRI Center, Zorya-Mashproekt, and others. The majority of large shipyards have own design departments that support yards production.

There are factories supplying shipyards with equipment, fittings, pipes, anchors, etc. in the Ukraine.

Production of Russian-based plants is used by Ukrainian shipyards, and representatives of world leading manufacturers of ship engines, equipment, paint, and so on, also have their offices in the Ukraine.

Det Norske Veritas has its site office in the Ukraine, in the city of Nikolaev. Other large classification societies also have their representatives which inspect ship construction and repair, certify workers, etc.

Vocational schools for shipbuilding are educating fewer production workers following decreased demand for them. However, institutions of higher education provide enough engineers and other specialists for shipbuilding.

4.2.4 Government

There are a number of external and internal reasons for the unsatisfactory situation in shipbuilding industry. Among the external reasons we could mention is, above all, the extremely slow privatization of shipyards. Some shipyards are still under state ownership, while others have only received approval for privatization within the last few years. The state does not provide proper control of the yards that were privatized. For example, Chernomorsky Shipyard, one of the biggest in Europe, was bought by Russian businessmen in 2003. Since then, the building of ships has stopped at this company. A number of shipowners (including Norwegians) have tried to place orders there, but this was impossible.

The privatization and division of the Ukrainian shipyards is not yet finished. A number of legal actions are in court now. One of them is between the Fund of State Property and the new owners of the Chernomorsky Shipyard. The Fund of State Property is trying to get back the Shipyard because the new owners did not fulfill their obligations and have essentially stopped ship construction. Another case is the struggle for the Kherson Shipyard. The Evroresource Company bought a controlling package of shares for this yard from the state in 2004. The Kyiv-based Leninskaya Kuznitsa Shipyard, which owns debts from the Kherson Shipyard worth USD 8 million, is trying to gain the ownership of the latter [13].

4.2.5 Strategy, Structure, and Rivalry

Though the Ukrainian shipyards compete with each other for orders, rivalry is not so strong. It seems that there are more customers willing to outsource the vessel production than shipyards are able presently to build. The shipyards compete with each other and foreign firms for qualified production workers.

Initially, all Ukrainian shipyards used common principles of organization because all of them functioned under the conditions of planned economy.

In the transformation period the shipyards management had chosen own ways of restructuring. According to experts, one of the best organizational structures is at Damen-Aker Okean Shipyard. The reorganization was carried out with the help of Dutch owners. Kherson Shipyard had also efficient organizational pattern in the transformation period. They have organized separate production units on the basis of former workshops. Workshops were members of the shipyard, but had also own business activity and worked both for the Kherson Shipyard and as subcontractors.

4.2.6 Lessons from the Previous Outsourcing Experience

The biggest Norwegian order placed in Ukrainian shipyards was the construction of five hulls at 61 Communards Shipyard for one Norwegian Shipbuilding Group (NSG). We would like to explore possible threats to and possibilities for Norwegian shipowners and shipyards willing to outsource their production processes to the Ukraine. This is based on an example of collaboration between enterprises in the Ukraine and Norway in the area of shipbuilding.

The 61 Communards Shipyard is situated in the city of Nikolaev, the center of the Ukraine's shipbuilding industry. The shipyard is state-owned, in part because it builds ships for the Ukrainian Navy. This is the oldest shipyard in the Ukraine. To date, the yard has had the majority of the country's shipyard projects for Norwegian customers. Between 2001-2006, three hulls for platform supply vessels, two hulls for artic stern trawlers, and two ice-breaker supply vessel hulls were constructed there. The hulls were towed to Norway and outfitted there at different shipyards belonging to the shipbuilding group. The ice-breakers were finished by Havyard Leirvik AS.

Technical characteristics for the shipyard include two slipways that allow the construction of ships up to 250 m in length, and 28 m in breadth, and one slipway for building vessels up to 256 m and 37 m, respectively. The shipyard's equipment is only somewhat new, and in part needs modernization. The yard employs around 6,000 workers. 3-4,000 employees are occupied by shipbuilding, though the construction of hulls only employs up to 1,000 of them [8].

At the time of the first contract with the NSG, the shipyard's financial situation was disastrous. It was on the verge of bankruptcy. Shipbuilding had stopped. The shipyard was engaged in some ship repair and the production of small parts for vessels. Some effort was necessary to re-start hull production.

The financial problem was also quite serious. The terms of the contract stipulated that the yard would

receive payment from the NSG the day the hull was launched. The 61 Communards Shipyard did not have enough turnover themselves to finance the building of the hull. The shipyard was in debt to the Ukrainian Prominvestbank. Not many banks were willing to take the risk to lend money to the yard. Finally, the shipyard received credit at the high interest rate of 15 percent per annum.

The next problem was an uneven distribution of personnel. The shipyard had employed too many administrative personnel, and had a lack of production workers. Many of the highly-qualified production workers and engineers had acquired work abroad, at shipyards in Poland, Latvia, Lithuania, Russia, Croatia, and in other countries where the demand for them was and still remains high. Furthermore, some employees were on paid leave. The problem with the personnel was solved by attracting subcontractors from other Ukrainian shipyards and from abroad. The salary of production personnel was raised. This caused complaints from other employees that were not engaged in the manufacture of the hulls.

During the early stages of the first hull construction, there were problems with the quality of paint work. The shipyard's own paint shop could not provide technologic quality in accordance with the specification requirements and Det Norske Veritas (DNV) standards. As a result, a Norwegian-Ukrainian joint venture company was created to carry out the paint work. Modern painting and metallization equipment was imported from Norway, together with up to date technology. The joint venture had Norwegian and Ukrainian management and employed qualified Ukrainian painters.

The biggest problem for the 61 Communards Shipyard and the NSG project was the delay in hull delivery. This was a real a disaster for both parties. The shipyard paid significant penalties for each day of delay. NSG also had financial losses because of the late delivery of the whole ship. This was named as the main problem by executives from both sides and by independent experts.

5 Conclusion

The Ukraine, with its potentially strong shipbuilding industry, skilled labor force, and reasonable wages, could be an advantageous offshoring destination for the Norwegian shipbuilders, either for outsourcing or insourcing purposes.

Late and unfair privatization of Ukrainian shipyards is one of the main reasons for the present crisis in the industry, as well as an outsider position for the country's shipyards on the world shipbuilding market. In 1998-2003, there were good opportunities to buy

large, modern shipyards in the Ukraine at a low price. For example, the Damen Group of Holland bought 78 percent of the shares of the Okean Shipyard in Nikolaev for approx. USD 5.2 million in 2000 [14].

The majority of the Ukraine's shipyards are still in a state of transformation. The old organizations that functioned more or less effectively during the Soviet era have been destroyed. The management at the shipyards should concentrate on changes in organizational structure.

From the example of the 61 Communards Shipyard, we can name the major threats for customers ordering ships in the Ukraine: (1) delays in delivery, (2) lack of a reliable system of guarantees for deliveries of the ship's equipment, and (3) financial problems for the Ukrainian yards. There were even several cases where a signed contract had to be canceled because the yard could not get a loan.

To some extent delays in hull delivery were caused by constant design alterations (partly because of changes in owners' preferences). But the major reasons were inadequate organization, a lack of efficient planning, and a shortage of qualified project managers responsible for construction of the separate hulls. The schedule of construction was constantly violated due to different problems occurring under ways, such as delays in the purchase and delivery of materials, poor logistics planning, the low productivity of workers, etc. The organizational structure was rigid and highly bureaucratic. Often even an insignificant decision required approval at several levels. Some modifications were made during the period of construction. But the shipyard's management felt resistance from the personnel towards the changes. Project managers, who were responsible for the construction of the whole hull, did not have real power to influence the shipyard's divisions. Moreover, they lacked real experience and knowledge to do this job.

In spite of the fact that the 61 Communards Shipyard had some problems, the quality of the produced hulls for NSG was very good. Low cost of hulls stipulated by cheap labor and inexpensive materials combined with high quality of production represents the major opportunities to Norwegian firms willing to go offshore. The activity in the Norwegian-Ukrainian joint venture for painting was successful. This is evidence that it is possible to organize an effective business entity embracing the whole cycle of hull production, from the early stages to the completed vessel.

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