



## FROM GLOBAL LEADERS TO THE EDGE OF SURVIVAL – CRUCIAL DECADE FOR CROATIAN SHIPYARDS

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Trends on the shipbuilding market indicate a rapid fall in market share and market position of European shipyards and shipbuilding groups in the overall shipbuilding market share. The consequences of those trends are seen in the closing down of shipbuilding industries in many EU states. Such scenario could be foreseen in Croatian shipyards too. They generate substantial losses which were covered by Government subsidies in past. This paper explores the causes of market failure of Croatian shipyards, but from an inner perspective. The focus of the empirical research is moved from the global or macro level (unfavorable market circumstances, political impact, corruption, recession and other “it-is-somebody-else’s-fault” reasons) towards effectiveness of the main business entities within the industry - shipyards. The research focuses on the awareness of the shipyard managements about the position of the Croatian shipyards within the global industry (and national economy). Moreover, in-depth analysis of the domestic shipbuilding industry is conducted to prove the insufficient attention of the authorities in the shipbuilding industry regarding the systematic organization development. The main conclusion of the research is that there is no sustainable and effective development of shipyard without an appropriate model of development of shipbuilding networks.

**Keywords:** Strategy, Operations, Complex business systems, Shipbuilding.

### INTRODUCTION

Organization development is still focused on the effectiveness of a single firm (or non-profit organization) (Church, Burke, Van Eynde, 1994, Cummings, Worley, 2005; Bradford, Burke, 2005). However, if an organization is observed in a broader context, devoid of boundaries of the firm, as an entity within the market continuum (Williamson, 1975) that freely communicates with other entities in a wider system, we encounter the issue of improving the performance (effectiveness) of the network of connected subjects. According to Powell, networks are the third form that exists parallel to firm and market (Powell, 1990). According to another widely accepted approach, a network is the extension of a firm, a strategically and organizationally interconnected organism formed around few coordination centers. These coordination centers are usually centers of power, e.g. big companies, banks. They tend to maintain asymmetry of power and hold less powerful firms in their business neighborhood (i.e. network) in submissive (dependent) relationship. This brings up the question whether a firm which is in the dependent position can independently achieve its own organization development. Consequently, if it is justifiable to observe the network of companies as an organization, than it is reasonable to investigate the possibilities for organization development of such organizations.

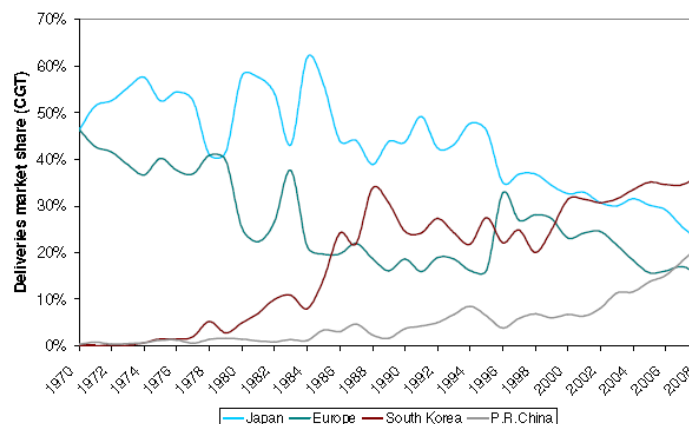
## METHODOLOGY

In order to prove the main hypothesis the analysis was conducted on all Croatian shipyards producing ships, vessels and other special objects for commercial use.<sup>1</sup> The analysis was carried out in two phases. The first phase consisted of a questionnaire sent to the management representatives of each shipyard. In the second phase, the gathered data was additionally enriched through in-depth interviews with relevant representatives from the industry.

Based on the results of the empirical research, a model of effective organization development of Croatian shipbuilding has been suggested.

## THE SITUATION IN THE INDUSTRY

The process of globalization has contributed to the free mobility of all production factors, from labor to capital and information. Furthermore, it contributed to a greater interdependence of the national economies, and finally to the increase in of the world trade. For these reasons there is a growing need for maritime transport and shipping space, as the cheapest form of transport resulting in an increased demand for ships. The largest manufacturers of commercial ships are the Far East countries (Figure 1), primarily South Korea, Japan and China. Nowadays, they hold 80% of the newbuildings market and over 80% of the total shipbuilding capacity is located there. They produce mostly low and medium complex commercial ships (oil tankers, tankers for chemical products, bulk carriers, container carriers, etc.).



**Figure 1.** Market shares in CGT\* completed and delivered by major shipbuilding regions (from 1970 to 2008).

\*CGT – Compensated Gross Ton

Source: Clarkson, 2009.<sup>2</sup>

Due to mass production of standardized ships, substantial government support and, in some cases price dumping (WT/DS301/R, 2005, [docsonline.wto.org](http://docsonline.wto.org)), the Chinese and South Korean

<sup>1</sup> Definition of Shipbuilding Sector, according to Annex of Communication Commission on the submission to individual notification of the application of all regional investment aid schemes to the shipbuilding sector and proposal of appropriate measures pursuant to Article 88 paragraph 1 of the EC Treaty, Official Journal of the European Union, 2003/C 263/02.

<sup>2</sup> Taken from: Study on Competitiveness of the European Shipbuilding Industry (for Directorate-General Enterprise & Industry, EC), ECORYS SCS Group, Rotterdam, Netherlands, 2009.

shipyards are more favorable than the rest of the world. They almost completely replaced the European shipyards in the low and medium complexity vessels market. In recent years they started to penetrate the complex ships market (LPG and LNG gas tankers, ro-ro ships, etc.). Their intention is to achieve supremacy in this market which has higher value added.

The common feature of Japanese, Chinese and South Korean shipbuilding companies is their clustering into wider networks called clusters, chaebols, keiretsu systems, etc. in order to achieve economies of scale and scope through large series production, strategy of low costs, and specialization. Moreover, the shipbuilding industry in these countries gets significant government support (as strategic national industry with an aim to employ large scope of resources – suppliers, R&D centers, universities, etc.) but in return they are submitted to strong state control. Achieving efficiency is based on a virtual business base and developed coordination mechanisms (taking into account simultaneous relations of cooperation and competition) between companies within the network (Hassink, Shin, 2005; Sungyoung, 2006).

## **THE CHAOS IN THE SYSTEM - THE SHIPYARD PERSPECTIVE**

Croatian shipbuilding has become a relevant rival in the world's shipbuilding industry since recently, which can be seen from the world's order books, in which Croatia production was placed fourth place in 2005 with 69 contracted vessels. In March 2006, Croatia fell to the sixth place according to the number of ships ordered and the total deadweight, with 68 ships contracted and the deadweight tonnage of approximately 2.8 million dwt, and with capacity full until 2010. Already in March 2007, Croatia ranked 10<sup>th</sup>, with 50 vessels contracted and only 2.2 million dwt, while some new shipbuilding countries like the Philippines and Vietnam entered the top positions. In December 2010, the Croatian shipbuilding industry is at the 14th place in the global order book with only 29 vessels contracted and the deadweight tonnage of approximately 0.8 million dwt (<http://www.hb.hr/Portals/0/docs/ob-web.pdf>, March 20, 2011) which is a rapid decline and an alarming situation in the industry. This suggests the need for drastic and rapid changes within the respective operating systems.

There are seven shipyards in Croatia. They are distributed along the Adriatic coast. They are primarily focused on the newbuildings, except for one that is specialized in repairs. Of the remaining six shipyards, all state-owned, 4 are oriented towards the segment of low to moderately complex ships, and 2 are primarily oriented to the segment of complex and specialized vessels. Most of them are part of a group that contains one engine manufacturing company, one company for manufacturing and/or maintenance of equipment, and several unrelated businesses.

Croatian shipyards have a long tradition of quality. The global recognition for quality has been confirmed with about 30 award-winning ships in the last 20 years. Moreover, Croatia has a world-respected personnel (Croatian engineers, craftsmen, sailors are very appreciated in the world).

However, the Croatian shipyards are faced with serious problems, resulting in unprofitable operations, accumulated debt, general and operating illiquidity, destroyed (ravaged) equity, low productivity, low motivation and the outflow of labor, obsolete technologies, etc (Sokolić, 2011).

In addition, the Croatian shipyards do not have a developed supporting industry which results in the absence of multiplier effect. Even more, due to high import rate, the subsidies often overflow in favor of foreign suppliers. Furthermore, Croatian shipyards rarely cooperate with each other.

Although operating inefficiently, the reasons for the maintenance of shipyards are numerous, from macroeconomic impact on exports and employment, to microeconomic reasons such as the fact that even in recession times they have full order books. Analyses also show that it is possible to produce more efficient, even with an increase in workers compensation (Balaj, McCullagh, Mrvelj, Plaz, Steiner, 2009). Therefore, the analysis was conducted on the perception that responsible persons in the shipyards have of the current state of the industry and shipyards, as well as on factors relevant to the success of the shipyard. The research results are presented further in the paper.

In the analysis, the shipyards are divided into the shipyards that produce low complex ships and those that produce complex ships because they operate on different markets, have different possibilities for strategic positioning and thus differ in the importance of factors that affect their operations. Shipyards which produce complex ships have a higher value added, better technology base, and a greater flexibility in choosing the product range. Diversified product portfolio and a higher level of technological equipment enable them to adjust more easily to the market trends and thus achieve greater business success. Accordingly, the shipyards that produce low complex ships have production processes adapted to a smaller range of vessels and thus are more susceptible to the impact of current market turbulence and less able to adapt to the crisis.

|                                            | Low complex ships | Complex ships | Average shipyards | Rank |
|--------------------------------------------|-------------------|---------------|-------------------|------|
| Market recognition                         | 1                 | 1             | 1.25              | 1    |
| Organizational knowledge                   | 2                 | 3             | 2.40              | 2    |
| Staff professionalism                      | 3                 | 1             | 2.40              | 2    |
| Financial strength                         | 4                 | 4             | 3.40              | 4    |
| New trends in the world market             | 4                 | 6             | 3.80              | 5    |
| Cost efficiency                            | 8                 | 5             | 4.80              | 6    |
| Lobbying/political influence               | 6                 | 7             | 4.80              | 6    |
| State bureaucracy                          | 7                 | 7             | 5.00              | 8    |
| Business networking/strategic partnerships | 9                 | 9             | 6.00              | 9    |

Note: (most important factor is numbered 1)

Source: author

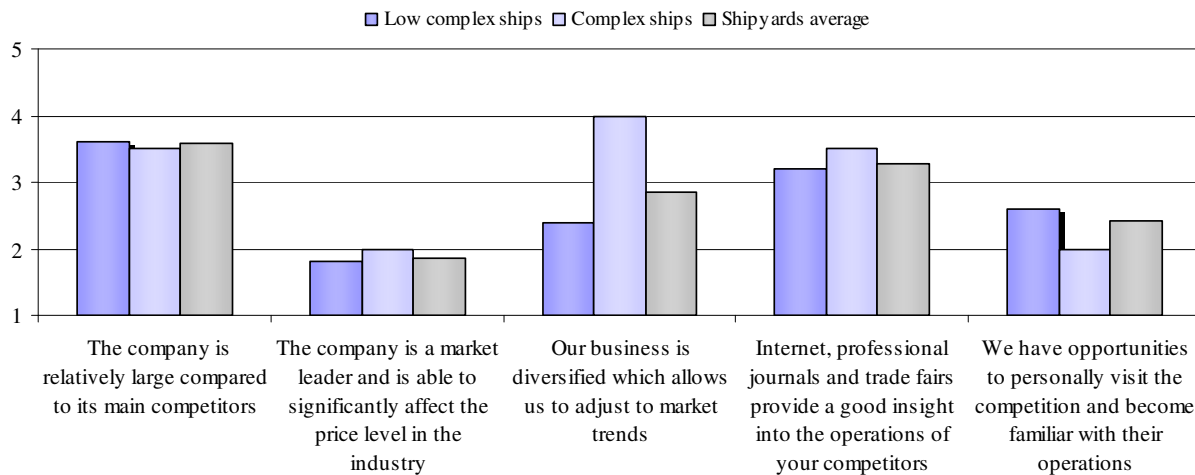
**Figure 2.** Factors determining the business success of large Croatian shipyards  
(Ranks by groups and overall rankings, 2009).

Shipyards which produce complex ships consider staff expertise and market recognition to be equally crucial for business success, while the shipyards that produce low complex ships the expertise of the staff position third on the list of priorities (Figure 2). The emphasis on the importance of investing in knowledge and expertise of the staff is a logical strategy in shipyards oriented towards high technology, innovation, research and development.

Although the liquidity and productivity of the shipyards that produce low complex ships is extremely low, according to the rank, they evaluate the cost effectiveness as a factor relatively unimportant for the business success of the shipyard (Figure 2).

Contrary to the expectations and international trends, the Croatian shipyards directed least attention towards business networking, strategic partnership and possible synergies that arise as a result of coordinated action of more subjects with common business interests. According to the rank, they consider networking rather irrelevant to the business success of the shipyard (Figure 2). This could be the consequence of the economic - political climate in Croatia, underdeveloped supporting industries and/or weak influence on the selection of partners.

Analysis shows that the Croatian shipyards are considered large in comparison to the competition (Figure 3). Such a perception in the shipyards that produce complex ships is somewhat justified because they compete in narrow market niches where, generally, products are not produced in large series. However, the main competitors of the Croatian shipyards in low complex vessel production are South Korean, Chinese and Japanese shipyards, which produce annual series of hundred ships, as well as Vietnamese, and Philippine shipyards which began to develop in the 21st century but are already taking advantage of mass production. Croatian production is based on single production and by doing so they do not achieve savings that are realized in the production in large series.



Note: 1-Fully disagree, 5 - Totally agree.

Source: author

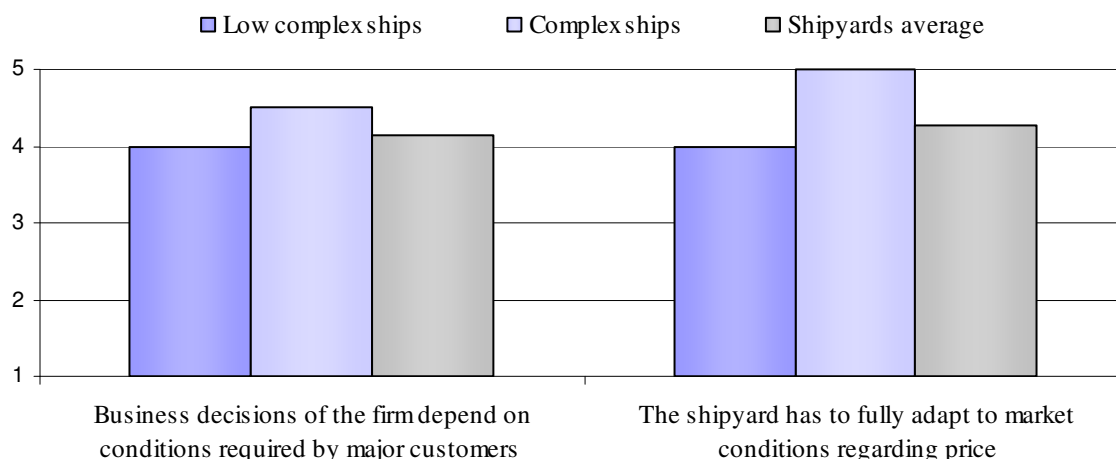
**Figure 3.** The competitive position of Croatian shipyards.

Just to illustrate, two shipbuilding groups in China spatially occupy two Chinese larger provinces, while South Korea, although twice as big as Croatia, has less than 10 shipyards (almost the same as Croatia), located in a single region. The S. Korean shipyards employ about 120,000 people and about 5 million more are employed in equipment manufacturing. This points to the Croatia's unawareness of the situation, and thus their inability for proper market positioning and competitiveness.

Contradictorily, although shipyards consider themselves big in comparison to major competitors, they do not consider themselves as market leaders. Their awareness of their inability to influence the ship prices points to the inconsistency in the perception, and the conclusion about the relatively weak position of Croatian shipyards on the world market (which is the only relevant for the products of this industry).

Croatian shipyards produce custom made products according to predetermined projects for known customers. So, the customers' demands have great impact on business decisions that are

made within the shipyard (Figure 4). In tailor-made production, it is common that the customer determines the quality level of finished product, while the price is formed depending on the complexity of the project.



Note: 1-Fully disagree, 5 - Totally agree.

Source: author

**Figure 4.** Market position of Croatian shipyards in relation to customers.

Paradoxically, the price of a particular type of vessel is mainly determined on the world market, but is relatively inelastic in regards to the price. So, higher level of quality slightly affects the price. In this way, the Croatian shipyards are forced to deliver ships of considerably higher quality than for example Chinese, without having influence on the price. The price can be set insignificantly higher than those set by the shipyards which produce standardized products in large quantities without the option of adapting to the customer's requirements.

On the other hand, one of the main factors that makes placement of the Croatian shipyard products on the market difficult is having higher prices than the competition (Figure 5).

|                                        | Low complex ships | Complex ships | Rank     |
|----------------------------------------|-------------------|---------------|----------|
| We are more expensive than competitors | 1                 | 1             | <b>1</b> |
| Inadequate distribution channels       | 3                 | 2             | <b>2</b> |
| Advertising costs                      | 2                 | 4             | <b>3</b> |
| Insufficient production capacity       | 4                 | 3             | <b>4</b> |

Note: (most important factor is numbered 1)

Source: author

**Figure 5.** Factors that impede the main Croatian shipyards products to access the global market (group ranks and overall ranking, 2009).

Weak bargaining power of shipyards in relation to customers and a relatively high perception of dependence on customers' changing requirements often result in a situation where the cost of subsequent modifications of the project spill over to the detriment of the shipyards, and thus ultimately causing unplanned losses for the shipyard.

Furthermore, the main factors associated with operational inefficiencies of Croatian shipyards were reviewed. The main reasons for the operational inefficiencies include financial problems and technological obsolescence, which are subsequently reflected on investments decisions.

According to the survey, the representatives of the shipyards see a relatively small dependence of the company business decisions on the conditions set by vendors. However, the in-depth analysis shows the opposite (Figure 6).

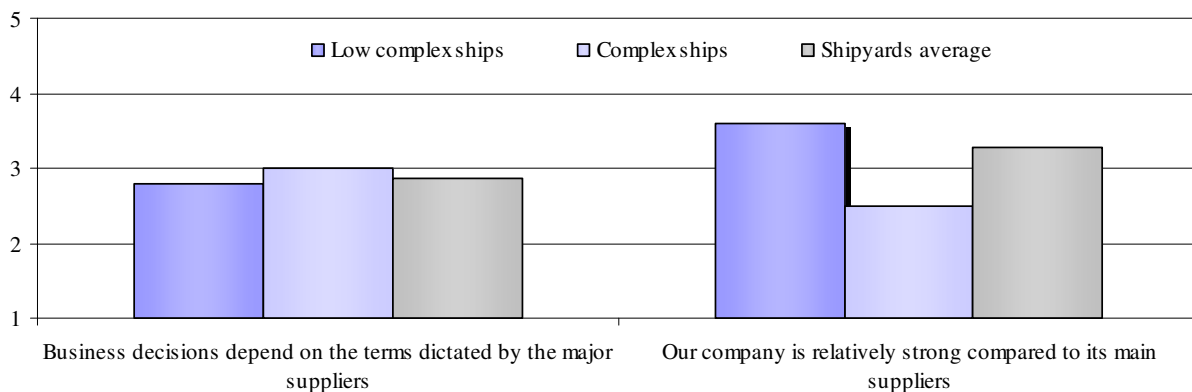
|                                     | Low complex ships | complex ships | Overall rank |
|-------------------------------------|-------------------|---------------|--------------|
| Suppliers dictate conditions/prices | 1                 | 1             | <b>1</b>     |
| Inability to change suppliers       | 1                 | 2             | <b>2</b>     |
| Exclusive contracts                 | 3                 | 3             | <b>3</b>     |
| Too small orders                    | 4                 | 4             | <b>4</b>     |
| Spatial distance                    | 5                 | 5             | <b>5</b>     |

Note: (most important factor is numbered 1)

Source: author

**Figure 6.** Suppliers related problems (Ranks by groups and overall rankings, 2009).

On average, shipyards consider themselves relatively strong in comparison to their suppliers (Figure 7). Meanwhile, they state their inability to affect conditions or prices set by suppliers and the impossibility to change them (partly because of the limited supply that in some cases can be corrected by favorable import and partly because of policies that are not primarily commercial in nature) as the biggest obstacles in their relations with suppliers.



Source: author

**Figure 7.** Market position of Croatian shipyards in relation to suppliers.

Market power of Croatian shipyards is insufficient to establish the asymmetry of power in favor of the shipyard as the final and major risk taking partner if compared to other partners involved in the production chain. The current general model of the organization of the shipbuilding industry indicates the existence of asymmetry in relationship between shipyards and suppliers,

but it is realized in an inverse form, the suppliers have stronger negotiation power than the shipyards.

|                                             | Low complex ships | Complex ships | Rank     |
|---------------------------------------------|-------------------|---------------|----------|
| Liquidity problems                          | 1                 | 1             | <b>1</b> |
| Technological obsolescence                  | 2                 | 2             | <b>2</b> |
| The absence of economies of scale and scope | 3                 | 4             | <b>3</b> |
| Lack of knowledge                           | 4                 | 3             | <b>4</b> |
| Inadequate supplies                         | 5                 | 5             | <b>5</b> |

Note: (most important factor is numbered 1)

Source: own research

**Figure 8.** Causes of the operational inefficiency of large Croatian shipyards (group ranks and overall rankings, 2009).

Shipyards have continuous problems with liquidity (Figure 8). The government subsidies are an important matter in the financing of Croatian shipyards current operations. However, subsidies belong to the sector support, and sector support is not in line with EU regulations. Moreover, since the Croatian shipyards operate with a loss, they fall into a special category of companies called *companies with difficulties*. According to the EC guidelines, as *a company in difficulty*, shipyards should not receive any state aid, including guarantees. No ship owner will sign a contract to build a ship without warranties. Moreover, shipyards can not get any guarantees from commercial banks, either because the Croatian commercial banks are in foreign ownership, so the venture capital interest is superior to national interest. According to the guidelines of the EC, only horizontal measures can be applied to shipyards (as well as other businesses). At the same time, the East is dumping prices.

## DISCUSSION

There are successful shipyards in the world, even though the profit margins are low in general. Considering the existence of profitable shipyards in Europe and worldwide, that are both in state and private ownership, it can be concluded that the shipyards and shipbuilding groups can operate successfully, regardless of ownership, but with clear and defined position in the national economy. The importance of the role of government in ensuring the prerequisites for the direction of development of the Croatian shipbuilding industry, thus, is greater inasmuch as the shipbuilding is defined as a strategic industry for the development of national economy (HIO-hrvatska izvozna ofenziva, 2006).

The study of the organization of S. Korean and Chinese shipyards, as currently the most successful competitors and their supporting business systems, identified the importance of economies of scope and scale for the shipbuilding groups on the global shipbuilding market. In comparison to major competitors, Croatian shipyards are small functionally complex business units. Because of their size, they can not achieve competitiveness through economies of scale and scope, so the savings otherwise achieved through economy of scale and scope can be compensated through the networking of firms. However, the analysis shows that the level of firm



cooperation in Croatian shipbuilding industry is very low, as well as the level of perception of the importance of cooperation and synergy potential for shipyards and related companies.

Moreover, the study conducted on Croatian shipyards shows a series of strategic problems, including a vague perception of the current market and competitive position of shipyards, and accordingly, the inability to make quality decisions. Operational problems are the result of an undefined strategy, and they affect the inertia of business systems, which, paradoxically, operate in a highly dynamic environment.

Since it is found that the world's successful shipyards derive their competitive advantages from an organized business model (virtual networks, chaebol, clusters, etc.), there is a need to develop a model of organization development of the Croatian shipbuilding network that will take into account the system constraints as well as the real possibilities of the Croatian shipyards, partners and related industries.

Therefore, the further research will be focused on designing effective shipyard organization development model which should be based both on the operational efficiency of the shipyard and the wider context of the industry.

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