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0439

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The Netherlands' Shipbuilding Industry: Own Solutions to Competitiveness

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ABSTRACT

shipyards in the Netherlands rely on a flexible infrastructure of subcontractors, colleague yards andmanpower pools temporarily increase their capacity. In addition, the industry has developed some unique concepts with respect to marketing, andtofacilitating enterprises fordesignand engineering, partial work preparation parts fabrication, hull election and outfitting.

Thepaper wil address the subject ofcompetitiveness in shipbuilding and the factors which determine the strategic competitive position of shipyards. The applicability of various simple models, which canbe used to describe shipyards'stmtegic market positions, will be disscussed. In particular, a model addressing a ship's life-cycle will be detailed. The paper will further focus on solutions, which were generated by the shipbuilding industry in the Netherlands, in its strive to achieve and maintain a competitive position in domestic and world markets.

INTRODUCTION

In general the market position of enterprises is determined by the factors. of price, delivery time and quality. After-sales services and often financing are additional factors. However, these factors do not determine adquately the market position of shipyards. This position must, in one way or another, address some cyclic process, related to the product of interest, the ship.

The overall competitiveness of shipyards can be associated with the following (ship] buying model (Peat Marwick, 1992):

1. Initial business case (feasibility study, concept design}
2. Selection of yards to_
3. Shortlisting (delivery time, acceptable specification price indication);
4. Negotiations with shortlisted companies;
5. Final shortlisting (product performance, cost to owner, delivery cycle);
6. Final design engineering and commercial evaluation; and
7. Decision.

Shipyard competitiveness is clearly determined by the-ability to satisfy the governing selection criteria at each stage of the buying model. Stages 3,4,5 and6relate withthefactors price and deliverytime, whereas the factor quality can be interpreted as the competitive edge obtained by offering an innovative ship design (Peat Marwick, 1992). The key issue is the consideration of being shortlisted and finally on the short list (stages 2 and3of the buying model). According tothe Peat Marwick report, the applicable criteria address, respectively, market access and marketing issues.

The access tomarkets is a rather complex issue, which involves matters of national industry " policies, home credit schemes and other forms of subsidies, financial links between ship owners, Shipyards and finance companies, etc. Marketing issues address the ability to be inconstant touch with shipowners in order to inform them about yard capabilities on product innovation, price and delivery time. According to Peat Marwick,...the advantages of regular contact are seen byshipowners as being:

1. helpful in building market knowledge,
2. helpful in shaping the design concepts the Owner isworking on and
3. helpful in making the decision of when to place the order".

Obtaining access to markets is obviously not included in the ship buying model, which means that this model has limited value for the strategic market positioning of shipyards.

STRATEGIC POSITIONING

A study on strategy determination and strategic positioning of shipyards in the Netherlands from the late eighties (Van den Tom & Bunigh, 1987) puts forward two elements, which can be used to identify basic strategies in shipbuilding; these are:

1. The performed activities or functions, and
2. The ship type.

Shipyards can choose to any out less or more activities in the process which leads from conceptual design to production.

These activities are:

L Concept development,
2. Preliminary design,
3. Final design,
4. Detail design (work drawings), and
5. Production. “

On the basis of these activities three principal strategic business positions are possible, see Figure L Position A implies the delivery of a complete solutionto the (ship)owner.. Position B implies the delivery of a product which is based on a concept solution provided by the (ship) owner. Position C implies the delivery of a product which is based on a complete (final) design solution provided by the (ship) owner.

The second strategic element is related to a ship’s complexity which gains importance when associated with the differences between shipyards regarding the following factors:

1. Product technology, including ship machinery, systems, etc.;
2. Know-how regarding performance criteria;
3. Price variations; and
4. Ship production technology.

A global distinction between ship types is:

1. Non-cargo ships incorporating advanced technologies (work vessels, drilling, naval, etc.);
2. Specialized cargo ships (LPG/LNG, refrigerated, chemical cargo, ete.); and
3. General cargo ships.

Following Van den Tom & Bunigh, four basic strategic market ,positions can be determined on the basis of principal market positions (shipyard activities, Figure 1) and Ship types, these are shown in Figure 2.

Several comments can be made with respect to Figure 2.

1. The factor quality dominates the upper half of Figure 2, whereas the factor price dominates the lower half.
2. Developing countries are located mainly in the lower half of the Figure; however, their position tends to move towards the upper half.
3. Strong market positions which are not easily overrun by the. competition are position (1) and (2), because these positions rely on proprietary knowledge.

positions:	A	B	c
. concept development	x		
. preliminary design	x		
. final design	x	?	
. detail design (engineering)	x	x	?
. production	x	x	x

x : performed activity ? : optional activity

Figure 1: Strategic positions on the basis of shipyard activities (Peat Manwick, 1992)

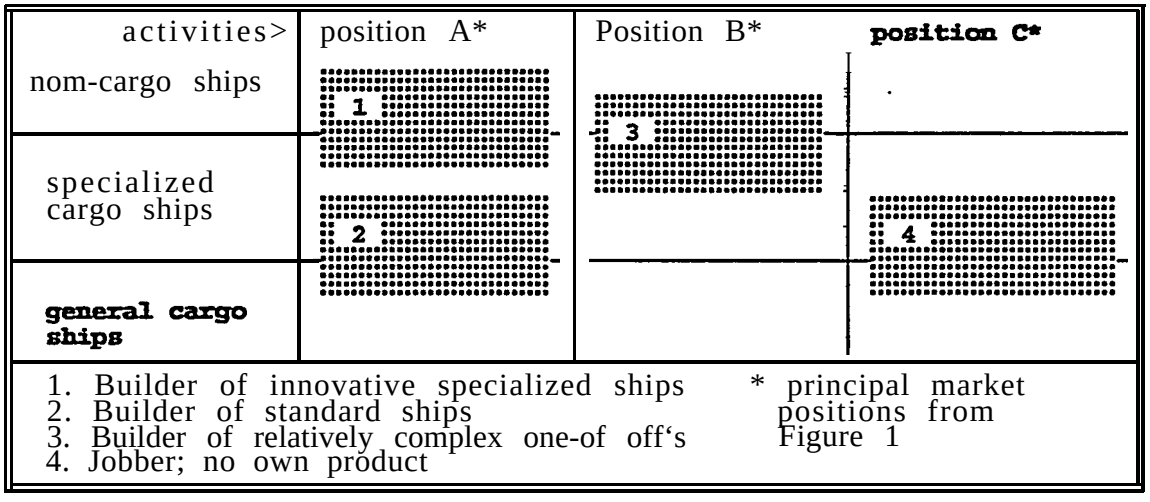

Figure 2: Basic strategic positions

Another model, which provides an even wider strategic framework: is the product (ship) life-cycle model, which consists of the following stages:

1. Definition of needs,
2. Definition of product or design,
3. Product realization or production,
4. Product exploitation, and
5. Product scrapping.

Ship life-cycle models link at several stages with other cycles or processes. For example, at the product definition and product realization stages it links with the industrial column, which contains all stages of value-adding; at the product exploitation stage it links with cycles such as the transport chain, the exploitation of offshore resources, defense, etc.

These links are shown in Figure 3, from which several possible strategic positions can be deduced. These positions address the role of shipyards with respect to ship life-cycle and with respect to other cycles which link with the latter. Three examples are given.

Jobber or prime contractor.

This position is located within the third stage of a ship's life-cycle and it is determined mainly by the factor price. The shipyard's role is limited to that of a prime contractor, without any value-adding contributions to ship's design and engineering (see Figure 4).

Maritime technology prime contractor.

This position is located within the second and third stage of ship's life-cycle and within the industrial column. The shipyard's role includes value-adding contributions in technology and hardware, usually in some form of co-operation with other enterprises. This position is strongly related to the factor quality.

Maritime technology prime contractor plus

This position which is similar to that of the maritime technology prime contractor, but includes knowledge on ship's exploitation and links with the corresponding cycle. This position addresses primarily industrial vessels, such as dredges, fish catching and fish processing VCSSeh, and many others. It is also strongly related to the factor quality.

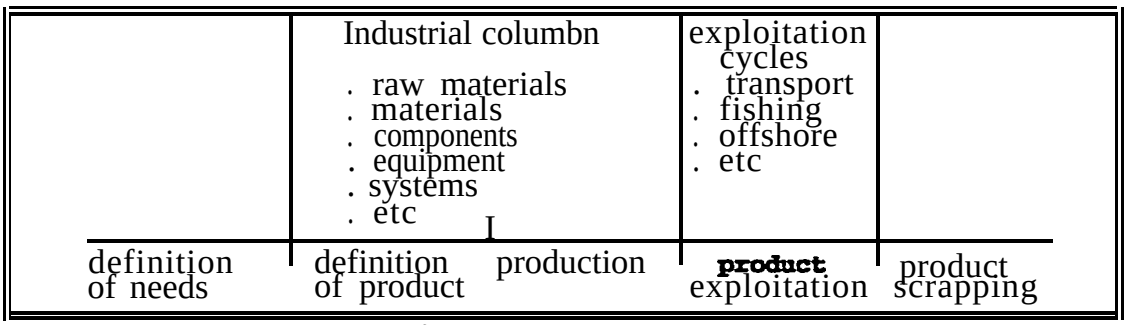

Figure 3: Ship's life-cycle stages, and the link with other cycles

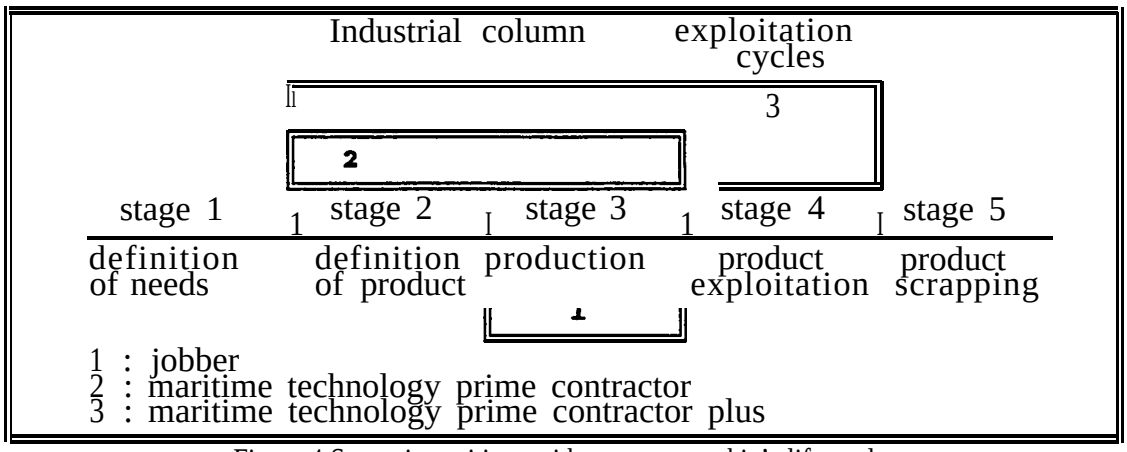

Figure 4 Strategic positions with respect to a ship's life-cycle

	ship's life-cycle stages				
	stage 1	stage 2	stage 3	stage 4	stage 5
. clear business strategy focusing on core product markets	▪			▪	
. marketing program, product development, after-sales services	▪	▪		▪	
. purchasing policy		▪	▪		
. human resources management		▪	▪		
. design and technical systems	▪	▪	▪		
. planning and production engineering		▪	▪		
. appropiate production facilities, technologies, automation			▪		

Figure 5 Strategic elements **according to Peat** Marwick and the relation with a ship's life-cycle

The possibilities for strategic positioning for shipyards are by no means limited to the above examples. Any combination of elements which strengthens or provides new edges to the factors price, delivery time and quality on a long-term basis results in a new strategic position within a ship's life-cycle and linked cycles.

Peat Marwick states seven elements which determine long-term competitiveness. These are presented in Figure 5, in combination with relevant stages of ship's life-cycle. From Figure 5 (combined with the two previous figures) it can be concluded that there is a strong emphasis on design and production, thereby addressing mainly the position of the maritime technology prime contractor. There is also reference to the exploitation stage, but without specifying the role of the shipyard within the link with the transport and other similar cycles.

CASES

The Netherlands' shipbuilding industry,: short review.

The shipbuilding industry in the Netherlands reached its post WW-II top capacity at the end of **the sixties, with** a workforce of about **50,000 em** ployed in shipbuilding only.

The downfall of the shipbuilding industry in West-Europe in the early seventies and the following restructuring has put an end to the building of ships above 20,000- 25,000 CGT in the Netherlands and reduced significantly the number and the total capacity of its shipyards.

Today the shipbuilding and ship repair industry consists of some 100 enterprises with a workforce of about 10,000, of which about 4,000 are involved in the building of sea-going ships. **Most shipyards are small- and medium size enterprises with the largest yards having a maximum capacity of about 20,000 CGT** per year. Yet, the total output of the shipbuilding industry in the Netherlands in the year 1992 amounted to more than 400,000 CGT. Such an output indicates a much larger workforce.

Shipyards in the Netherlands rely on a flexible infrastructure of subcontractors, colleague yards and manpower pools to temporarily increase their capacity. In addition, the industry has developed some unique concepts with respect to marketing and to facilitating enterprises for design and engineering, partial work preparation, parts fabrication, hull erection and outfitting.

Following the presentation on a ship's life-

cycle, and of the various possibilities to assume strategic market positions, a number of examples from the shipbuilding industry in the Netherlands are presented. The presentation has no advisory purpose, but mainly demonstrates the applicability of the strategic positioning of shipyards within a ship's life-cycle stages and within the link with other cycles.

Case 1: The Market Approach

This case addresses an approach, which has been remarkably sucessful over the past 25 years and which was developed by the Dutch Damen Group.

The approach is based on a business strategy focusing on world-wide marketing and selling of ships, with prime importance being given to work and industrial vessels of small and medium-size capacity (tugs, suppliers, fishery, vessels, etc.).

A strong world-wide operating marketing division evaluates future needs and defines principal technical and economical parameters for work and industrial vessels. Basic designs with modular standardized components, which enable a large variety of standard solutions in terms of propulsion, equipment and outfitting within standard hull forms are prepared. Following continuous and vigorous market asesments standard hulls and other equip ment items are stocked whereas for some equip ment and outfit items long term purchase contracts are made with preferential suppliers.

At this point the group links with the market on the basis of market prices and delivery schemes, usually outpacing the competition simply because of the advanced stage of a ship's completion at the time of decision by the future owner, and because of better purchase prices for hull, equipment, etc.

This unique concept does not only require a very effective marketing department, but also highly capable design and engineering, resourceful procurement, flexible production facilities for ship outfitting and commissioning and, above all, effective management at all levels of decision. Strong links with suppliers of technology and hardware are necessary; the absence of their own production facilitates for hull construction is a striking feature of this Damen concept. An additional dimension to the strategic market position is provided by well organized after-sales services, which comprise the delivery of spare parts and services on a world-wide basis and at very short notice.

Case A The Product Technology Approach

This case addresses an approach which has been successful for over 25 years and which was developed by the Dutch IHC-group. The approach is based onabusinesss strategy focusing on the specialized technology of dredging and the world-wide market for floating dredging equipment for inland, coastal and seawaters.

This group covers the whole life-cycle of floating dredging equipment and Iii with the industrial column and with the exploitation cycle in several ways.

In the first place the group possesses a leading position in dredging technology research and development (MTI institute). This technology is put to use in several ways:

1. To develop and manufacture dredging equip ment items such as pumps, drives, measuring and control systems, etc.;
2. To develop new dredging concepts; and
3. To incorporate equipment items and concepts with the building of new dredging vessels and with the upgrading of older vessels.

The link with the exploitation process consists of the delivery of spare parts, after-sales and other supporting services at the operational level. These activities are not only profitable, but also provide important information on the operational aspects of their equipment which can be used to develop new technologies and equipment items or improve existing ones.

Another element in this strategic concept is the market approach, more specifically the market-product combinations. The group has developed standard designs for a combination of dredging techniques, operational conditions and vessel capacities, of which the "Beavers" series is a well-known example. These dredges can be delivered at a very short notice as there is always a limited stock of partly completed vessels. AU standard designs can be customized, i.e. they can be outfitted with various types and capacities of equipment.

Evidently the group also designs and builds unique dredges on a one-off basis, for well specified duties and operational conditions. In these designs too, standardized modular dredging components and systems are included. This enables to shorten delivery-times for spare parts and also to shorten repair times under operational conditions. In the dredging world, where material wearing is an accepted phenomenon these possibilities are of significant importance for the market position of the group.

Case 3: "One For All and All For One"; the Facilitating Approach.

This case addresses a unique concept which has been developed by the northern shipbuilders of the " Netherlands, in the provinces of Friesland and I Groningen over the past 25 years. The concept is

based on the principle of facilitating enterprises.

This approach was thought up in the late sixties, with the introduction of numerical controlled (NC) flame cutting installations for steel plate materials. The advantages of this technology were easily recognized and appreciated, but the cost of investments in NC-equipment was beyond the financial possibilities of the northern shipyards (mostly small family enterprises). The solution was found by setting up a joint enterprise for steel parts fabrication under the appropriate name of Central Steel (CS). Central Steel used and still uses the latest state-of-the-art CAM-technology and deliveres up to 100 steel packages per year, varying from simple inland ship forms to the most complicated forms of motor and sailing yachts.

Central Steel was shortly followed by a second centre of CAD/CAM excellence, under the appropriate name of Numeric Center. WhiIe CS concentrates on hull parts fabrication, i.e. cutting and bending of plate and rolled section materials Numeric Center carries out all preparatory activities for the fabrication of these parts, such as lofting, fairing, etc. Numerical data for NC-flame cutting is provided to CS but also directly to shipyards.

In the years to come an entire network of facilitating enterprises was founded around a holding structure, Central Industry Group (CIG) by setiing up or taking over. specialized firms. The network comprises firms for ship sales, marketing and design, engineering, manufacturing and installing of ship systems, ship equipment and outfitting, and recently shipyard development consultancy services.

A remarkable feat was the setting up of a special hull erection and outfitting yard by three Frisian shipyards, to overcome the limitation of vessel width imposed on many northern inland shipyards by the width of sluice gates, passage through bridges and others.

The network of facilitating enterprises covers the first three stages of a ship's life-cycle. The business strategy of CIG relies on advanced ship production technology (design, engineering, work preparation and hull parts fabrication) and on a very flexible infrastructure of facilitating enterprises. These enterprises also operate on markets outside the northern shipbuilding.

The long-term strategy of CIG is to improve ship production technology and expand its application through existing and new facilitating enterprises (piping systems, pre-outfitting, etc). The northern shipbuilders make effective use of this strategy which allows them to compete success-fully in the market for series of custom-built ships and occasionally for highly specialized ships on a one-off basis.

DISCUSSION

The cases presented above can now be discussed in relation with the models from the Strategic Positioning section.

Case 1 can not be easily positioned within Figure 2, as it involves standard designs (position 2) of mostly non-cargo vessels (position 1).

The strategic position within a ship's life-cycle is easily established within stages 1 (definition of needs) and 2 (product definition), as well as partially within stage 3 (production); see Figure 3. The strong links with the industrial column is evident (stages 2 and 3). However, the strategic position does not really correspond with the maritime mechnology prime contractor from Figure 4.

In a certain way the group does not contract the building of ships, but sells ships which, at the time of the final decision by the owner, are in an advanced stage of production. This unique approach addresses primarily the factors price and delivery time. The factor quality is evidently present in the form of product technology, of know-how regarding performance criteria and in the knowledge of price setting on the international market.

Case 2 can be positioned within Figure 2, as builder of innovative specialized non-cargo ships (position 1), but also as builder of .standard ships of the same type (position 2). As it seems, the model from Figure 2 can not accommodate the combination of highly specialized Ships and standard designs.

The position within a ship's life-cycle can directly be recognised in position 3 from Figure 4. The technology -oriented group is usually involved in the stages definition production and exploitation and often in the first stage of a ship's life-cycle, definition of needs. This is the strongest and . most versatile strategic market position and can be described as maritime technology prime contractor plus. "

This position addresses"all factors of competitiveness. The factor quality incorporates product and production technology, know-how regarding performance criteria, and the knowledge on price setting on the international market.

The third case is more complex, because it concerns two different groups:

1. CIG, a group of facilitating enterprises, and
2. The northern shipbuilders, a group of users of these enterprises.

The first group can not be positioned within Figure 2. The group does not build ships, but delivers technology and services through its facilitating enterprises. On the other hand the group can be positioned within a ship's life-cycle, in the stages

definition of needs and definition of product and in the link between the industrial column and the stages definition of product and production. This position addresses only the factor quality with respect to product technology, know-how regarding performance criteria and, to a certain limit, knowledge on price setting in the'international market.

The northern shipbuilders can be positioned within Figure 2 in several ways. This depends on the input from the technology infrastructure of the first group. Several possibilities are listed below.

1. A possibility is the delivery of general cargo vessels (which corresponds with the lower part of position 2). The technology input from the facilitating network is not significant.
2. Another possibility is the delivery of relatively complex specialized cargo ships on a one-off basis (which corresponds with position 3). The technology input from the facilitating network is significant.
3. A third possibility is the occasionally delivery of steel hulls or blocks for other shipyards (which corresponds with position 4). The technology input from the fiacilitating network is limited.

The position of the northern shipbuilders within a ship's life-cycle corresponds with position 1 from Figure 4. This position addresses mainly the factors price and delivery time, whereas the factor quality is related mainly to production technology.

Following the above it can be concluded that the northern shipbuilders are highly flexible enterprises which assume different strategic market positions and overall production output capacities by varying their use of the network of ficilitating enterprises.

In this concept all enterprises carry out core business activities only, hereby limiting the risks of unemployment in specialized disciplines.
The success of this concept depends clearly on the organization and the management of joint projects on the basis of co-makership.

CONCLUSIONS

The purpose of this paper is not to advise on choices regarding strategic market positioning, but merely to present solutions to competitiveness which emerged within the shipbuilding industry in the Netherlands over the past 20-25 years.

These solutions emerged in a period of downfall of the shipbuilding industry in West Europe, which resulted in a significant reduction of shipbuilding capacity. The shipbuilding industry in the Netherlands was no exception in matters of yard closures and the loss of jobs and of expertise. The building of ships above 20,000-25,000 CGT was ended and the industry had to find new markets and new solutions to achieve and maintain competitiveness ina market which often appeared to be distorted by government subsidies.

It can not be proven nor is it claimed that the Dutch solutions, which emerged, were carefully designed, engineered and implemented. The claim is on creativity, unconventional thinking and a good measure of undertaking by companies and people who are totally devoted to their profession.

The models presented are simple but useful for understanding the available options and for explaining the position taken by the various cases within the shipbuilding market. A few conclusions can be drawn.

1. The shipbuilding industry in the Netherlands is strongly technology oriented and will be capable of maintaing its competitive position as long as it can innovate and maintain a high level of maritime technology which can be incorporated in the kind of ships it builds.
2. The factors price, delivery time and quality can be handled in different ways to obtain the best possible combinations with respect to the market and to the abilities of a shipyard. If a yard limits itself to only one factor, it could be placed in a vulnerable position
3. The construction of the ship hull is not necessarily linked to the role of the shipyard as prime contractor. Case 1 demonstrates clearly that hull building is not necessarily core business, whereas maritime technology clearly is.
4. Linking a ship's life-cycle with other cycles provides market opportunities for shipyards, when they are recognized as such.
5. The concept of facilitatating enterprises offers possibilities to preserve a high level of maritime technology (product, production, etc.) and of flexible production capacity, without the risk of over capacity and unemployment. This concept, however, requires a high level of communicative skills which involves so much more than just speaking the same language.

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