

Shipbuilding Innovations and their protection in the competitive market

Preface

The European Yards and their suppliers are confronted with an increasing international competition on market shares. A leading position in merchant ship building in comparison to Asian Yards might today, if at all, still be identified in the market for cruise ships, yachts and special purpose vessels. This small "leadership" is a result of comprehensive working skills on European yards.

In addition hereto, some yards (and their suppliers) still refer their position to their strong order portfolio and the specific know-how accomplished in those markets. This applies inter alia for the highly sophisticated cruise vessel industry as well as for the naval industry with its very successful system integration for all kind of naval vessels.

I. The significance of shipbuilding innovations in the competitive market

A brought variety of activities reflects the comprehensive knowledge at European yards. Starting with the intensive technical implementation of all aspects in the course of developing a new vessel project (under severe time pressure) and finishing with the transformation of extremely complicated owners demands in the course of the vessel's erection, also under immense time pressure.

Significant shipbuilding qualities are also to be identified through a closer view on the product strategy of the European yards. Today it is no longer sufficient to trust on the long-standing reputation of the quality of European shipbuilding and to rely on a subsequent order backlog, once some further topics (financing, state aid etc.) have been sorted out. These times, if ever existing, are gone. Instead, the European yards are facing a brutal competition in particular with the Asian yards in all areas of their workmanship. As a first element for future success of European shipbuilding, a clear analysis and definition of the **product strategy** is mandatory. Such analysis must include a true definition of strong as well of weak elements in comparison with the competitive market, covering all in-house levels (project, design, knowledge-based assets, erection, financing, calculation, cost-controlling etc.). In particular, such analysis should not be reduced to a simple reliance on the existing know-how and broad experience of its employees. Such element is the most fragile part in the overall chain of success (or failure). The observation indicates that shipbuilding management still rather tends to reduce even their strong areas of activities by means of a cost-controlling in a more quantitative way, without having clearly identified all strong and weak points of their shipbuilding entities in the competitive market prior to this.

II. Improvement of the market position through a protection of internal knowledge

1. Foundation and protection of core competences

Parallel to a clear and focused strategy on Intellectual Property (IP) assets (see under b) below), a leading position in the shipbuilding market might at first be achieved through a comprehensive protection of competences identified as outlined above. The existing infrastructure in Europe allows an extensive use of existing and upcoming networks including Research and Development (R&D) facilities on all levels of the product lines, covering in particular project, design and erection. In this context the following areas are of significant importance:

a. The R&D activities of yards and suppliers should consequently follow the identified product strategy and should be used in particular in those areas where specific know-how does not exist as required. In addition hereto, redundant R&D activities have to be avoided on all levels; unfortunately, we are still observing that technical knowledge (which could e.g. be identified by an appropriate investigation is made subject of cost and time intensive R&D programs. Furthermore, such R&D investments are often not accompanied by a true cost-/result analysis with the result that the outcome of such R&D "projects" remains "forgotten" in the back office.

b. Yards and their suppliers should insist on a **product-related**-development of their core competences. As an important part hereof, contractual obligations with relevant suppliers, universities and co-operating / partner shipyards should be established. Besides this, the implementation of **knowledge data bases** will have to be established as a central activity of European yards in the future. Industry entities which treat the existing technical knowledge of their employees as a "safe bank" demonstrate a negligent treatment with their core assets. This applies in particular where a new in-house structure of (e.g. design and erection) facilities or even their outsourcing leads to the result that new employees find themselves back to "square one" and have to grow into their new function facing high hurdles before establishing own "assets" for the benefit of the company, very often after many years of frustration. Another crucial development in this respect is the retirement of employees having reached a certain age. It is a very seldom observation that suitable programs for their successors are established, which secure that the existing knowledge is not simply vanishing after they have left.

c. Finally, the outplacement of specific design activities to suppliers without contractual safeguarding leads to severe disadvantages once the internal knowledge is passing over as part (and consequence) of the supply agreement. It is a very bitter experience that in particular in the market for container vessel newbuildings in the 1980ies the (steel-) shipbuilding know-how of European yards has been disclosed to third parties without control as a result of wide-spreading co-operations with external design entities and in particular the software industry (e.g. "Tribon") over many years. Through such "co-operation" the Asian yards have found themselves very quickly in a very comfortable position to establish an equal standard for quality and workmanship on such vessels. As a result, new orders in this market area are in the vast majority placed in Japan, Korea and China. It is therefore a very strong recommendation and challenge for the European yards to improve the contractual relationships with external design and in particular software entities in order to safeguard the specific **ship building related knowledge** (for example for three dimensional design on cruise vessels) and avoid its uncontrolled delivery and submission to third parties. If the Asian yards turn out to be successful in this respect as well and gain such knowledge through their co-operations with such suppliers and software entities, the small advantage European yards may still maintain in the field of cruise vessels, yachts and special purpose vessels will be gone as quickly as it was the case 20 years ago.

d. Apart from the protection of ship yard related rights by means of a professional contractual concept as described above, the above mentioned knowledge data basis are very helpful in order to safeguard shipyards in this respect. Such data bases might for instance cover specific vessel components (including further technical subdivisions). These databases are reflecting the existing technical knowledge and should constantly increase by the receipt of additional knowledge as a result of further developments inside or outside the yard in each related field. This is more certainly a very significant part of each shipyards risk management and is therefore mandatory for all yard managers under the jurisdiction of each European member state.

Such knowledge databases first of all provide significant further advantages. Each database is constantly provided with relevant information collected from the technicians of the yard, external databases and third parties. Constantly, a specific shipyard "state of the art" is established, which allows fundamental statements as to the yard's further product strategy and its adjustment with the market conditions and competitive structures. Secondly, the yard management finds itself in a position to identify the "**key people**" as value assets for the yard along those employees that contribute to such databases. Thirdly, a database with good documentation allows clear statements in relation to the patent strategy of the yard, because in those areas where the shipyards "state of the art" has been implemented into a vessel or has been addressed towards third parties, an application of patent rights as patents etc. is out of consideration. Finally, and this may be the decisive point under cost aspects, a comprehensive establishment of technological databases helps to avoid redundant R&D activities, not to mention the improvement of communication, technical co-operation and a better understanding of the activity of employees of the different shipbuilding divisions of each yard and supplier.

2. Protection of IP assets through IP rights

An important vehicle in order to extend and improve the position of the European yards and their suppliers in the competitive market can be achieved by securing the existing technical knowledge through patent and other IP rights as an instrument towards other competitors.

In this context it is argued from time to time that the protection of IP rights is unattractive due to costs, supervision efforts and the disclosure of technical details in connection with the patent procedures.

a. Advantages and chances

Taking into account that in case of patent rights the market value of each product is protected for a period of 20 years against any competitor and that simultaneously the period for a commercial use of an idea is steadily decreasing (due to shorter product-developing periods), a **protected** innovation clearly leads to a significant competition advantage. Taking also into account that in particular in shipbuilding a leading position in certain technical fields might be vanishing due to imitation effects, a 20 year lasting patent most certainly provides the better protection. In contrast hereto the often observed "strategy" to simply keep knowledge in-house does not guarantee a safe protection, because the innovative employees (very often the decisive key people) can easily be identified by competitors and leave the company for "best offer". In such cases the supposed "advantage" is no longer existing. Another observation in this context in particular applies to the shipbuilding industry: New developments are very often subject to their disclosure in speeches and publications, with fatal consequences for the ability to protect them.

Having mentioned those advantages, the applicable costs related to such IP protection are no significant aspect. This applies in particular in case of a reasonable commercial use of protected IP rights through returns on investment over licence fees as a result of the execution of know-how - and licence agreements (see further below). Those remunerations compensate the efforts for application and protection of IP rights in most cases.

The European shipbuilding and supply industry should therefore clearly analyse their IP situation in each relevant market situation. It is hereby mandatory to inter alia

- identify the key technologies (and the related employees as "key people") in each product line
- clearly analyse the existing (documented and not documented) knowledge
- analyse the technology position in comparison with the competitors world wide.

Shipbuilding industry in this context can rely on existing databases as well as on further professional advice from external experts. Depending on the result of such investigation the identification and application of IP rights will be recommendable or even compulsory in order to safeguard the existing and future knowledge basis. At the end of such process which might cover a longer period stands a so called **patent portfolio** which enables the shipyards to steadily secure their technological position and allow a growing financial return on investment through licences.

b. Risk management

The advantages and chances outlined above are one side of the medal. The same attention must be paid to a risk analysis in connection with the IP situation on European yards and their suppliers. In many cases the yards have to fulfil modifications or wishes from the owners' side without having paid much attention to the protection of such "solutions" on behalf of other competitors, especially from Asia. Since standard shipbuilding contracts as well as the supply contracts constantly rule out that yards and suppliers have to indemnify their contract partner from any risk in relation to a violation of third party intellectual property rights, a tremendous likelihood for risks and damages becomes obvious. Such scenario becomes even more crucial in light of the fact that some Asian yards have put themselves in position to cover apparently well known shipbuilding knowledge in connection with smart patent applications and hereby achieved broad patent protections which also affects the risks of the technical performance of European yards under the governance of the above outlined contractual provisions.

III. The commercial use of intellectual property

The positive results of a protection and upkeep of innovative shipbuilding activities and product-related key competences for the market position of the European yards have been identified above. Beyond this, particular know-how of yards and suppliers and/or existing IP rights might easily be subject to a real commercial use hereof. Customers from all over the world still regard the existing shipbuilding know-how in Europe as an important asset when it comes to the decision where to place a new order. This applies also in the naval market where customers expect to have one or more vessels or submarines built on customers premises and not at the European yard. Such expectation is fulfilled through delivery of packages, know-how, transfer and/or design and erection support in a foreign country. The related risks, in particular the uncontrolled transfer of know-how, has to be avoided by means of contractual provisions; furthermore the European yards are forced to safe their technological advantage by developing the next generation of a certain product line. Transfer of shipbuilding related know-how is a significant factor for the price finding in those cases. As part of such kind of businesses but also in general terms intellectual property rights might be used as real assets in the market in a very offensive way. Apart from IP rights that are kept in-house and not

disclosed for strategic purposes, a commercial utilisation from IP rights can be achieved by a **controlled transfer** of certain technologies or protected rights. The imitation of technical solutions has been mentioned above; if a yard or a supplier has **protected** its technology, competitors are not allowed to create such imitations unless exclusive or non exclusive licences are granted under strict observation of the yards technological position in the related technical field.

Those licenses might be limited both in a territorial and material way. Today it is customary practise to distinguish between a turnover related and an up-front royalty, the latter compensating the costs for application and observation of the IP rights. The turnover related (annual) license fee must be accompanied by comprehensive contractual provisions in order to safeguard the European yards and their suppliers. The licensees have to disclose their related turnovers and co-operate extensively also in relation to new developments of the licensed technology. Brought variety of license agreements exist in the international market; in order to identify and maintain the European shipbuilders position, professional advise is mandatory in this field.

IV. Effective Protection of IP rights and know-how

A maritime entity in Europe holding specific know-how in certain product areas (special types of vessels, propulsion concepts, CAD-steering, logistics etc.) or even using such knowledge through patents or other IP rights must develop a strategy in order to effectively safeguard its technological position.

Employees' know-how is in a very broad sense the significant factor for success in the competitive market. Each shipbuilding entity has to learn its lesson by establishing a structure enabling the identification and promotion of its "key people" at a very early stage. Any kind of "equalisation", e.g. as a result of fixed (salary) structures, is contraproductive in this respect. Each company should develop individual steering mechanisms allowing a well-based and future related commitment between those innovative employees and the company. Some European states have developed statutes in order to cover and compensate those employees innovations. In any case it is recommendable for all European yards/suppliers to develop in-house regulations that form a clear basis for the steering of such innovations for the benefit of the company and the employee. All kind of improvements, proposals and inventions should be assessed in view of their specific commercial usage and must be documented clearly as part of the above mentioned "state of the art". Those employees' contributions might eventually create a leadership in the competitive market and must therefore under clear contractual provisions be transferred to the company and subsequently compensated in relation to the innovative employee. Both the yard/supplier and its employees might significantly benefit from those in-house regulations.

If IP rights once have been protected, their **supervision** is of major importance in order to maintain the IP advantage in the competitive market. Either the European yards establish a supervision system in-house or they delegate this function to external advisors which simultaneously supervise the patent fees. Such supervision should form a part of the a.m. overall knowledge database system by securing that all related information are professionally collected and distributed inside the company.

V. Co-operation of yards and suppliers.

Each company tries to achieve its own objectives. The shipbuilding industry in particular can, however, be characterised by an increasing yards dependency on specific technical solutions for the overall system integration provided by (system) suppliers. Such technical assessment is seldom covered by appropriate contractual provisions, which might lead to dangerous developments in case the yards technical performance fails. To address the matter positively, both the yard and the supplier have to observe and fulfil very complex technical interfaces in order to successfully deliver a new vessel. This applies to propulsion systems as well as to electrical power systems, air condition/ventilation or the complete interior design. Both sides are facing tremendous challenges in their own scope of work but in particular on the interfaces. One requirement in this respect is a functioning contractual procedure covering all aspects of the co-operation.

The observation further indicates that yard and suppliers from time to time when fulfilling owners demands enter into a "new" technical solution. As a consequence hereof, the mutual **co-operation** should lead into a mutual **innovation**, if both parties agree at an early stage on a respective treatment of such new - mutual - developments. The chances of a "connected" technical solution are obvious; the specific demands on shipyards for platform related solutions and the implementation of specific modules and solutions by suppliers should be identified as a big opportunity to develop mutual innovations and subsequently protect them for the benefit of both sides. The Asian yards have already learned this lesson and established quite a number of patents over the years covering what has been described above.

From a suppliers point of view, it could be advantageous to mutually protect the common solution by gaining a preferred position for future projects, this to be covered by an appropriate co-operation agreement with the yard. The shipbuilding industry itself benefits through a (secured) know-how position which positively influences the ability to acquire new orders in the competitive market. Both parties interests require a contractual concept covering inter alia the extension of patent applications and their treatment by each sides. The European yards might use this co-operation with their suppliers as a strong vehicle in order to maintain their position in a market where the customers are looking for leading positions and place orders respectively.