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A Way Forward for Ship Classification and Technical Services



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Abstract

Classification societies are one of key organizations that promote the highest standards in ship safety and quality shipping. The paper reviews the ship classification industry and identifies what the classification societies can do to add value to the maritime industry more effectively. To meet this objective, an analysis of the five competitive forces is carried out, together with an opinion survey performed on some of the leading shipping companies, to assess and to establish some of the key factors which should be considered when formulating an overall business strategy for the growth of the classification services business. The findings from the study are discussed with the strategic options and choices. A classification services industrial value chain analysis together with ship management and operation is undertaken to explore the opportunities for classification societies. These findings also provide guidance to policy-makers who design and seek to implement more effective international shipping policies.

Key Words : Classification Society, Technical Service, Porter Five Forces, Industrial Value Chain

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I. Introduction

The environment for the shipping industry changes fast and is always a challenging one due to the increasing legislation, escalating running costs, and the craving for the right technology and innovation. How ship classification and technical services can adapt and continue to add and deliver value to their clients and to the shipping industry as a whole is of critical importance so that the classification society sector can improve its current strategic position and formulate action plans for the future.

Classification societies are major players in the safe and quality shipping regulatory process because they serve the shipping industry as an internal regulatory system. Their authority is illustrated by the classification certificates they issue when ships are built and maintained by means of regular surveys throughout their life. Without a classification certificate, ships cannot obtain insurance and have little commercial value. The classification societies are also the shipping industry's largest technical resource. As Recognized Organizations (RO) for the flag states, classification societies play an important role in the regulation of ship safety and pollution prevention. They are paid for these services; however, they have no legal powers of enforcement beyond withdrawing their services / certification.

The ship classification system begins at the ship's initial design and steel manufacture stages, and extends to block fabrication and the manufacture of machinery components, the building of the ship's structure, cargo hold testing, tank testing, and installation of machinery systems. Ship classification aims at ensuring that ships remain fit to operate from the day of delivery when ships' first classification certificate is issued, until the day ships are taken out of service. Therefore, classification societies' role embrace today two fundamental aspects: the first one relates to developing classification rules and the second one concerns implementing them.

In this regard, it is important to understand the difference between a classification survey and a statutory survey. A statutory survey, if carried out by a classification surveyor, is being conducted on behalf of the Flag

Administration for the Flag State with which the ship is registered. On the other hand, a classification survey is carried out on behalf of the classification society itself. Consequently, the requirements of the statutory survey are governed by the statutory regulations adopted by the Flag Administration but not the classification society's rules and regulations.

In most cases, the statutory instruments used for ships' survey are based on the internationally adopted codes and conventions covering subjects such as safe ship construction, safety equipment, navigation safety, pollution prevention, load line and safety management. It is worth noting that many countries which have adopted the existing international codes may, in addition, have their own national requirements known commonly as 'flag requirements'. As with statutory surveys, all associated services such as approval of intact and damage stability, and approval of safety equipment arrangements, which are offered by the classification society are conducted on behalf of the Flag Administration.

Most classification societies also provide technical consultancy services that are not directly related to classification or statutory issues. Technical consultancy services include a range of specialist services aimed at helping ship owners, operators and builders. These include: specification and supervision services, fuel and lubricant analysis, risk assessment and management, technical investigations of damage and vibration, training and emergency response services for major problems such as fires, groundings or collisions.¹⁾

It is also worth mentioning that ship classification is a joint process between a classification society, a ship owner and an operator. Classification must be conducted with proper care and with the correct application of the classification rules. Classification as a process provides for adequate structural strength of all essential parts of the ships' hull and their appendages; safety and reliability of their propulsion and steering systems; and for the effectiveness of those features and auxiliary systems that have been built into the ships to establish and maintain the basic conditions on board, so that cargoes and personnel (i.e. crew, staff and

1) Duncan(1992)

passengers) can be safely moved while ships are at sea, at anchor, or moored in port.

Classification societies also provide a technical guide to the condition of a given ship, based on the classification certificates they have issued, combined with memorandums and conditions recorded against her. The main benefit of classification remains the same: to allow an insurer to assess the risk, and set an appropriate premium. Others, such as Port State Control, take interests in classification society activities.

Nowadays, more than 50 classification societies are operating worldwide, some are large and prominent such as Nippon Kaiji Kyokai (ClassNK) and Lloyd's Register (LR), others are small and obscure. In 1968 the International Association of Classification Societies (IACS) was established and its main objectives are to maintain and improve standards throughout the industry to improve ships' safety and to ensure cleaner seas through pollution reduction. In achieving these objectives, IACS works closely with the International Maritime Organization (IMO) and with many other national regulatory bodies and industry groups. In 1969, IMO granted IACS a 'consultative status', and the fact that IACS is the only non-governmental organization which holds an observer status at the IMO, indicates the position of classification societies as intermediaries between the commercial shipping industry and governments. IACS now comprises the 10 major classification societies including ABS, DNV, LR and ClassNK.

Among the major classification societies, Lloyd's Register (LR), the first classification society in history, created its first Register of Ships in 1764. During the second half of the 19th century, LR opened several offices overseas in North America, Europe and Asia. Today, LR's expertise extends beyond the shipping sector to many business markets covering management systems, oil and gas industries, asset verification, and rail. LR is regarded as an independent risk management organization, providing risk assessment, risk mitigation solutions and management systems certification around the world. Presently, LR has more than 200 offices around the world with some 7,000 staff involved in various sectors, and out of these about 2,000 are marine surveyors (mainly Naval

Architects and Marine Engineers). More details can be found at LR(2013).²⁾

Because classification societies have a relatively large size of resources, technical capabilities and global coverage in the shipping industry, major classification societies represent the largest single concentration of technical expertise available to the shipping industry. In these circumstances, in addition to the classification role, it is natural for the classification societies to also take up the role of technical adviser to IMO, Flag States and ship owners on matters relating to ship structure, engineering and statutory requirements, and also undertake technical and statutory survey work on behalf of governments.

This study attempts to develop deeper understanding of the classification societies industry and to identify areas and key factors for success which classification societies can establish to serve the whole shipping industry more effectively. The remaining parts of this paper are organised as follows: Section 2 presents a literature review. Section 3 posits Five Forces Analysis. Section 4 presents opinion survey and industrial value chain analysis. Section 5 sets forth conclusions and future works.

II. Literature Review

The literature on classification societies is sparse. Duncan(1992)³⁾ provided a guide to the principles and practice of marine technical services. In the 1980s, as the maritime industries became globalised, technical services were desired by foreign ship owners and management, as well as overseas shipbuilding and repair activities. Due to the establishment of global marine technical services, the shipbuilding industry has moved from Europe to Japan, Korea and China. Duncan's handy book appeared in a timely manner with this background. In his book, marine technical services covered mainly new buildings (design, specification, and construction), maintenance and repairs, and surveying. The roles of technical advisers and superintendents were also recognized by Duncan(1992).

2) Lloyd's Register(2013)

3) Duncan(1992)

Boisson(1994)⁴⁾ reviewed the changing roles of classification societies, as they were evolving towards a global function that integrated many aspects of ship safety and quality, including construction and operation standards and technical requirements. The author concluded with several questions that classification societies and the marine industry should consider.

Brooks(1996)⁵⁾ discussed the commercialisation of ship safety programmes and different approaches of governments. She reported that the Canadian government delegated ship inspections to approved classification societies in order to use internal resources to meet new Port State Control (PSC) requirements. Though commercialisation of ship safety programmes, governments entail withdrawal of the state from the operation of ship inspection while retaining the responsibility of ship safety. The evolution of classification societies was driven by new markets.

Stopford(2009)⁶⁾ explained the relationship of maritime states and the international maritime regulatory system in a clear and easily understood organizational chart, as shown in Figure 1. We modify Stopford's figure by including a new link between classification societies and the International Labour Organization (ILO) to reflect the extended roles of classification societies to address human factors in the industry. Today, effective classification also considers the human factors and ergonomics concerns in order to provide good working methods and movements in the ship.

Recently, classification societies have become involved in flag state regulation and ship registration on behalf of governments. On the track of ship registration, Ng and Yip(2010)⁷⁾ reviewed the reengineering of Hong Kong ship registry. They reviewed the paradigm shifts of Hong Kong Ship Register in the period of 1997-2007. Hong Kong simplified the survey fee structure and then reduced fees. Hong Kong further delegated the quality monitoring obligations to the classification societies and the Government became an auditor. The classification societies are the frontline for monitoring the quality of Hong Kong flag ships. Similar paradigm shifts

4) Boisson(1994)

5) Brooks(1996)

6) Stopford(2009), pp.656-663.

7) Ng and Yip(2010)

are now being observed worldwide. Bao and Yip(2010)⁸⁾ analysed the detention rate versus the flag of registry. They applied Hofstede's five-dimension theory to quantify the cultural effects of the flag of registry. They found that the detention rate increases with 'power distance' dimension, and the detention number increases with 'individualism', 'uncertainty avoidance' and 'long-term orientation' dimensions.

Silos et al(2013).⁹⁾ provided recent data on classification societies. Their field study showed that ship owners generally do not compromise the ship quality and safety standards by using classification societies with a lower international reputation. However, there exists the black list of the Memorandum of Understanding (MoU) due to the proliferation of classification societies and then the sub-classification of risks inevitably exists.

Therefore, no literature shows systematically how ships' classification adds value to the maritime industry. Given the recent and current development of marine technical services, it is timely to review the roles of the classification society and the way forward.

III. Methodology and Industrial Analysis

Pearce and Robinson(2009)¹⁰⁾ provided the overall methodology through the external environment (Five Competitive Forces analysis) and internal environment (industrial value chain analysis). We now use the framework of Michael Porter's Five Competitive Forces¹¹⁾ to examine the drivers that define the industry structure and shape the strategy of ship classification societies. The analysis is based on our understanding and verified by interviews with the industrial leaders.

1. Threat of Entry

Lloyd's Register was the first classification society started 250 years ago,¹²⁾ while the other major organizations like ABS, DNV and ClassNK have

8) Bao and Yip(2010)

9) Silos et al.(2013)

10) Pearce and Robinson(2009), pp.10-16.

11) Porter(2008)

12) Lloyd's Register(2013)

also been in existence for more than 100 years. The surveys and certifications carried out by these classification societies are recognized and accepted by International Maritime Organization (IMO), flag State administrations, port authorities, insurance companies and shippers.

For example, in Singapore, the Maritime and Port Authority (MPA) only recognized and authorised nine well-established leading classification societies to survey and issue statutory certificates on behalf of MPA for ships registered with the Singaporean flag. The authorized classification societies are subject to a formal Classification Agreement with the MPA and to a close quality monitoring system. This approval requirement by the flag administration limits the entry of other smaller classification societies to operate in Singapore and other flag states, and is therefore the greatest barrier to any new entry.

Besides being recognised by various governmental bodies and private sector, their cumulative experience and knowledge have allowed incumbents to acquire high expertise in developing, producing and maintaining up-to-date rules and regulations for ship design, maintenance, and operations that are well tested and used by the international maritime industry.

Other barriers to entry include significant capital investment in research and development and information technology, as well as global coverage at major ports and shipyards with appropriate resources and capabilities. The threat of entry can therefore be considered low because of the relatively high entry barrier; however, the drive by the European Union to encourage more competition may have some impact on this force in the future.

2. The Power of Suppliers

Classification societies depend on well-trained naval architects and engineers to develop rules and regulations, approve design drawings for shipbuilding, and also carry out surveys, assessments and certifications on site. Many people in this supplier group are not union members, but they may move to other related professions such as ship management,

shipbuilding, and the oil and gas industry. Hence, the source of well-qualified engineers is the most important power of suppliers, and it depends very much on the market forces of supply and demand, bargaining power and the calibre of individuals.

For example, in Singapore, MPA require all recognized organisations to provide information on a real time electronic format. Hence, being a supplier of information technology (IT) is another key consideration for classification societies. The costs of good IT systems can be significant for the organization, and the switching costs incurred in changing suppliers is high, if companies have already invested heavily in specialized IT systems for supporting their operations and knowledge management.

3. The Power of Buyers

The buyers of ship classification services include ship owners, operators, third party ship managers, ship builders, repairers, and equipment makers. The most important buyers in terms of business volume and service activities are ship owners and operators for container ships, tankers and bulk carriers. In general, ship owners and operators have a relatively strong bargaining power and negotiating leverage because of the following factors:

1) There are some ship owners and operators, such as Pacific International Lines, Ocean Tankers, Tanker Pacific and A.P. Moller Maersk, who own and manage a large number of ships. They are large volume and powerful buyers and can capture more value by forcing down prices, and demand better quality or more services.

2) The procedures and deliverables for classification and certification of ship are highly standardized, and the services provided by different classification societies have little differentiation. Ship owners and operators face few switching costs in changing the service provider of classification services.

Ship classification and certification services represent a small fraction (around 3-5%) of total costs for running and maintaining ships, but many

ship owners and operators are very price sensitive because of the very difficult business conditions they are facing now. For example, due to the oversupply of ships globally and various problems in the USA and the EU, the charter rates for ships are very low and some ship owners are even strapped for cash. Hence, they are under extreme pressure to trim purchasing costs.

However, some ship owners and operators can be less price sensitive because of strong commercial requirements, as well as requiring good support and high quality service, or having a strong relationship and partnership with certain classification societies.

4. The Threat of Substitutes

Currently, governments have authorized some leading classification societies to carry out statutory surveys and certifications on their behalf, for example, MPA in Singapore, but the threat of substitute can be increased significantly if governments decide to do some or all statutory surveys and certifications themselves. Also, when ship owners and operators purchased any equipment or component produced overseas, e.g. within Europe, the EU requires the buyer and industry to accept the quality assurance certificate issued by certain non-ship classification organizations based on its Marine Equipment Directive. All these threats of substitutes can create a great impact to business and services offered by classification societies and therefore must be monitored and managed carefully.

5. Rivalry among Existing Competitors

The rivalry can be strong on some high profile projects. For example, the Tankers Conversion Projects in 2006 and 2007 and more recently a large number of new building projects from various shipping companies. There is intense competition from all the major classification societies while there are nine main existing competitors in the ship classification services industry in Singapore. The merger of classification societies, e.g. DNV and GL, will intensify the competition among service providers.

The competition takes many similar forms as in other industries, including price discounting, new product introductions, client seminars, advertising campaigns, and service improvements. The intensity of rivalry and price competition can be considered high because of the following factors:

1) The top 4 players, i.e. American Bureau of Shipping (ABS), Det Norske Veritas (DNV), Lloyd's Register (LR), and Nippon Kaiji Kyokai (ClassNK) are roughly equal in size and power¹³⁾

2) Industry growth is slow annually.

3) Main products and services are nearly identical and there are few switching costs for buyers.

4) Classification societies are selling knowledge and man-hours, and these are perishable if not utilised.

However, some classification societies like Lloyd's Register are also focusing on non-price competition, such as providing high quality and responsive support and services, active relationship building and segmentation of customer groups in the maritime sector.

6. Findings of Porter's Five Forces analysis

From the above analysis, we can see that the threat of entry, the threat of substitutes, and the power of suppliers are relatively benign. However, the rivalry between dominant classification societies and the bargaining power of the large ship owners and operators are quite strong and therefore they are the main areas of focus and of strategic consideration for most of the classification societies.

Also, by looking at the industry structure and life cycle, we know that ship classification services are already at a mature stage in the service industry life cycle because of high buyer knowledge, product standardization, and less product innovation. This has two implications: first, it tends to reduce the number of opportunities for establishing a

13) Silos et al.(2013), Figure 3

competitive edge; second, it shifts these opportunities from differentiation based factors to cost based factors. However, cost leadership is difficult to sustain, especially in the face of more open competition and relentless change. Hence, differentiating to attain some insulation from the rigors of price competition is still very critical for this industry.

IV. Discussion

The analysis of Porter's Five Forces showed that the power of large ship owners and operators can be very strong. Ship owners and operators' needs and requirements were surveyed with key shipping companies and also with the flag administration in Singapore. To assess the view and opinions from decision makers at different executive levels, the interviewees included senior management like Managing Directors and Vice Presidents as well as Fleet Managers and Superintendents who are responsible for the daily operation of ships. The companies surveyed included Pacific International Lines (Pte) Ltd, Ocean Tankers Pte Ltd, Seacastle Singapore Pte Ltd, Raffles Shipmanagement Pte Ltd, Neptune Shipmanagement Services (Pte) Ltd (NOL), Wallenius Marine Singapore Pte Ltd, SSC Ship Management Pte Ltd, Tanker Pacific Management Pte Ltd, Parakou Shipmanagement Pte Ltd, A.P. Moller-Maersk Singapore Pte Ltd, and The Maritime and Port Authority of Singapore (MPA).

We hypothesize that there exist certain key linkages between industrial value chains of classification societies and ship owners / operators. Czaja and Blair¹⁴⁾ provided guidance on the survey. The questionnaire contains seven open-ended questions. Only common opinions are reported and discussed.

The semi-structured survey was conducted in 2011-2012 in order to understand the perceptions in relation to services provided by classification societies and to seek suggestions for improvement where applicable. The surveys started with a face-to-face or telephone conversation to give a brief verbal introduction about the study before sending questionnaires to them. On completion of the questionnaire survey, some companies were re-visited for further discussion or clarification of

14) Czaja and Blair(2005), p.35.

certain topics or areas of concern. This approach provided consistency to the process, as well as a conduit to directly engage with personnel at management level, helping to build rapport and trust. The face-to-face interaction also allowed for probing and in-depth questioning in certain areas, to obtain a better understanding of their views and expectations of ship classification services. The results of interviews and surveys are consolidated and summarized in the Appendix.

In summary, we can see that there is a strong demand from shipping companies for classification societies to provide the right information for decision making, to have close interaction to improve co-operation and understanding, to provide new solutions and assistance to achieve highly efficient ships to reduce the cost of operations, increase effectiveness and efficiency in surveys and audits to reduce total costs and add value in the whole process, have strong control in quality during new construction to build the ships right, and to provide assistance during critical decision making times. Table 1 summarises the key success factors of classification societies.

All this feedback may not be new to most of the classification societies, but there are still big challenges to bridge the gap between customers' perceptions and expectations. This includes how to change the traditional service culture and practices so that the whole organization can be more customer focused to create direct value for their clients' operations and businesses, and how to use the available technologies and knowledge, to innovate and create new solutions and make the services more efficient and effective.

After collecting the relevant information, analysing the shipping industry and some leading players, we have analysed and understood how classification societies are supporting the shipping industry. There are four key linkages between industrial value chains of classification societies and ship owners / operators (Figure 2).

1. Linkage 1

- 1) Selection of ship builder, classification society and Flag State for new ship with suitable design specification;
- 2) Building of new ships under survey and certification, and commissioning of ship before entering into service;

2. Linkage 2

1) Running ships; this involves the organizing and managing of the ships' operation and function, including the maintenance of the vessels in class and in a seaworthy condition, and the supervision of procurement for all replacement parts needed for the ship;

2) Organizing and managing periodical classification surveys, certifications and dry-docking of ships to maintain ship's classification status and trading certificates;

3) Conducting periodical statutory surveys and certifications of ships on behalf of Flag States to ensure compliance with national and international standards;

3. Linkage 3

1) Conducting inspection, maintenance and repair to enhance or maintain the value of the ship;

2) Upgrading or modifying ships to meet new legislations, regulations or charterer's requirements;

4. Linkage 4

1) Dealing with emergencies in time of equipment breakdown, accident or incident;

2) Providing technical advice and consultancy to ship builders, owners and operators on matters and issues related to technical areas and legislation, and supporting and assisting them during new ship construction, operations and emergencies.

Following the analysis, several key factors for success are identified that classification societies should embark on to move forward in the ship classification industry. The key success factors are as follows:

1) Maintain good client relationship

2) Acquire well-trained and experienced staff who consistently deliver quality service

3) Improve on the quality and speed of responses

4) Develop products that are relevant, focused and market oriented for clients

5) Attain early provision and focused knowledge sharing to increase client confidence

V. Conclusion

The key conclusions drawn from the research of this paper is that ship classification services are a highly competitive and mature business. The Five Competitive Forces analysis shows that the threat of entry, the threat of substitutes, and the power of suppliers are moderate, while the rivalry between dominant classification societies and the bargaining power of the large ship owners and operators are strong. Surveys and certifications lack much potential for differentiation and large ship owners and operators are very powerful. Clearly, cost efficiency is essential but there are also opportunities for differentiation. Therefore, classification societies must focus on supporting the development of an even more sustainable marine industry by providing assistance to the industry in developing safety, environmental and efficiency improvements. To achieve this, they must work to become more effective and efficient in delivering their core classification services, use their experience and expertise to deliver a broader range of services to support their clients and the industry, and be innovative, work with people outside maritime sector to develop and deliver new solutions for the industry. Undoubtedly, classification societies will continue to make a major contribution on raising ship safety and reducing marine pollution.*

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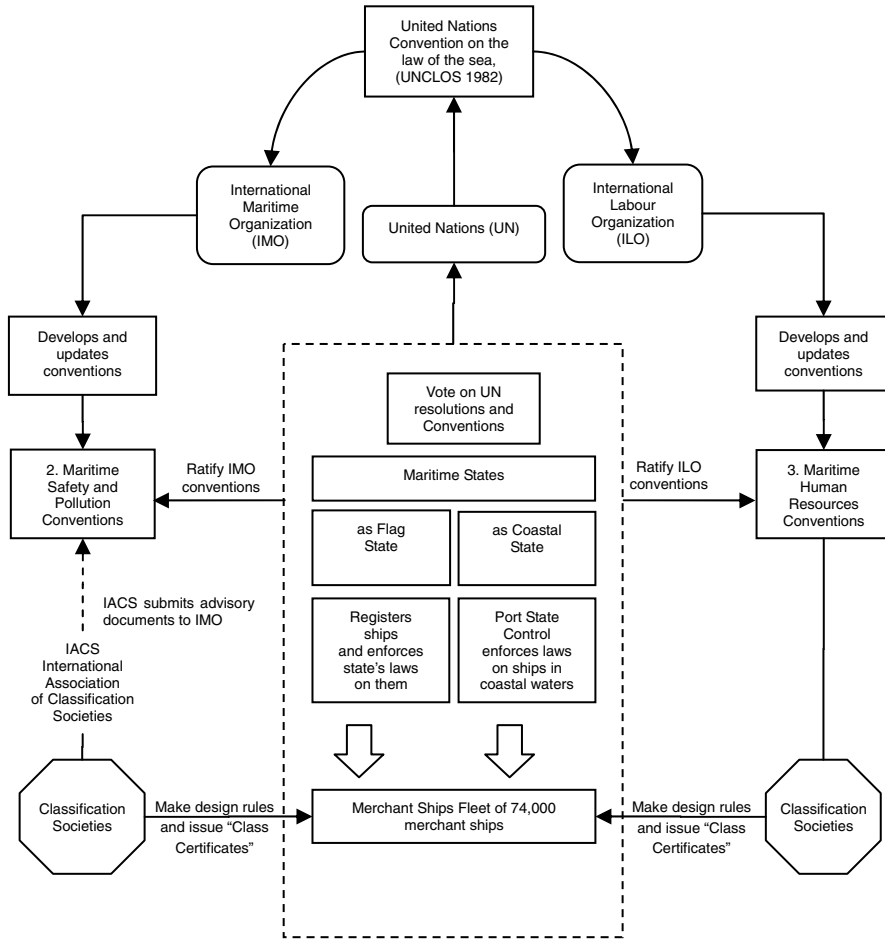
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<Table 1> Key success factors for classification societies

Key Factors for Success	Qualitative Rationale
Good client relationships – particularly at senior decision making levels	Essential for continued and repeat business. The marine business is a long term business based predominantly on relationships. With good relationships, price moves down the list of buying criteria.
Well trained and experienced staff who consistently deliver a quality service	Reduce the cost to the client, improves confidence and increases “value” of service. Poor delivery affects the foregoing and also places strain on relationships, however good they might be.
Speed and quality of response	Quick / efficient and technically sound response reduces client costs, improves confidence and satisfaction level, and strengthens relationships.
Products that are relevant, focused, timely and market oriented	Clients want products (rules / procedures / tools / complementary services) which they consider help them in their business and are delivered in a timely manner. In particular, they want products that reduce intervention whilst keeping standards up. Such products add value to the clients’ business by keeping their overall costs down.
Proactive and focused information dissemination	Early provision of technical advice / support / information to clients increases client confidence, helps them undertake their business and enhances image. It also helps build stronger relationships.

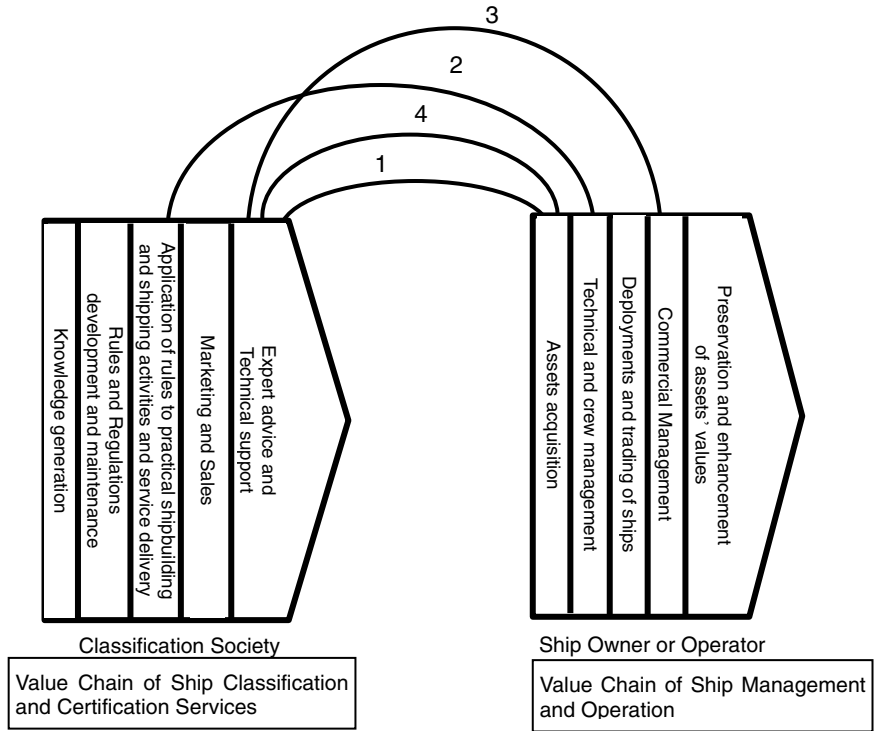
Source: based on the interview surveys

<Figure 1> The maritime regulatory system showing the role of the 166 maritime states



Source: Stopford 2009, p. 657 (modified to include new link between Classification Societies and ILO)

<Figure 2> Industrial value chain analysis



Appendix

The opinions collected from the interviews and surveys are consolidated and summarized in the following:

1. Top 3 concerns of ship owners and operators

The majority of companies (91%) that were interviewed and surveyed considered ‘safety’ (i.e. no accident and incident) as the top priority for ship owners and operators. This is followed by ‘reliability’ (i.e. no breakdown) and ‘profitability’ of ship owning and managing.

2. Classification societies’ main roles and responsibilities

It was generally agreed that classification societies have done their jobs to a large extent, by securing for the benefit of the community high technical standards of design, manufacture, construction, maintenance, operation and performance, for the purpose of enhancing the safety of life and property at sea. Classification societies also help to address some of the key concerns of ship owners and operators of running and operating ships.

However, there is room for improvement. For example, consistency in interpretation and practical application of rules and regulations; monitoring and ensuring high quality standards of ship building and equipment produced in emerging markets / countries; level of confidence and trust on the services rendered; and greater co-operation amongst the classification societies should also be encouraged.

3. Most critical things classification societies must do to improve their contributions

When asked about what is the most critical thing classification societies must do to improve their contribution to the shipping industry, there were various opinions and suggestions such as:

1) Classification societies should continue with the work and effort in setting high standards in safety.

2) As a recognized expert in rules and regulations and also with extensive knowledge and experiences in ship structure and machineries, classification societies should carry out an assessment of ship managers’ effectiveness on the management of vessel’s condition more effectively on a regular basis. And by sharing the findings and shortcomings with ship owners or operators concerned in a consultative manner, it will help with the continual improvement of the organization.

3) The ability to respond to the needs of ship owners and operators for information, consultation or services as well as the timely and effective sharing of technical knowledge gathered from the industry to create awareness. As there are numerous new legislations entering into force or being ratified, classification societies must engage the shipping community regularly to explain (or gather feedback) about the compliance and unified interpretation, their implications and the implementation

methods.

4) Timely and effective actions to assist ship owners and operators at various ports during critical moments, such as in time of accident or with issues with survey (e.g. Port State Control deficiency surveys).

5) The competency and efficiency of site surveyors and auditors required most improvement. Similar feedback was also received from the Flag State authorities. They want classification societies to use only exclusive surveyors and auditors who are competent, qualified, well trained and able to perform their work effectively and efficiently, and ensure that they can discharge their responsibilities free from any commercial, financial and other pressure.

6) As a stakeholder of the vessel, the classification society must strike a balance both in their of role policing for compliance with regulatory requirements, as well as working very closely with ship owners and managers with a common objective to avoid any unnecessary disruption to the operation of the vessel and their business. One of the ways to achieve this is through very regular close dialogue and communications on the expectations of each party in achieving a common understanding and objective.

7) Classification societies should invest and do more research & development with regard to fuel efficiency and green projects.

8) Flag states are directly influenced by international agreed rules and legislations. They must continue to maintain the favourable location for global ship owners and operators to run their business and operations. For instance, classification societies can assist by working closely with local authorities on IMO legislations development and rectification. Also, classification societies should be more vocal in voicing out the needs and problems of shipping in international forums and seminars, etc.

9) The industry must shift the emphasis towards training, certifications and proficiencies of sea staff. Whilst the industry has seen big advances in ship hardware standards, similar improvements in crew standard are lacking. This has contributed to the ship owners' operating issues today and classification societies can help to bridge the gaps.

10) Classification societies should provide distinct benefits to those companies which are market leaders in innovation and environmental friendliness.

4. Different ways to serve the industry

To serve the ship owners and operators more effectively, some suggestions were made for classification societies to change the way they carry out surveys, audits and certifications of ships during new building and in operation, such as:

1) Improve the methodology and tools to perform verification during surveys and audits more effectively and efficiently, given the time constraints to carry out these activities and heavy workload of surveyors and auditors. This should lead to a reduction in fees and increased productivity while meeting the intent and purpose of the surveys and audits.

2) Classification societies are encouraged to come up with renewed ways in

adapting to the needs of the industry or vessel types in carrying out the required surveys and certifications, and re-defining the process of survey and certification in order to reduce the need for attendances onboard whilst maintaining effectiveness.

3) During inspection and survey of existing ships, besides the core duty and activity of surveying, it is also a good opportunity for surveyors to provide constructive and valuable advice to the ship's personnel. Thereafter, the findings and gaps, good or otherwise, can be discussed with ship owners or operators so as to help the whole process of continual improvement.

4) For new ship building, classification societies can provide advice on the implications and interpretation of upcoming relevant rules and legislations. Ultimately, the owner's and operator's interest should be preferred as the owner is the final end user having the most impact on the vessels safety and benefits.

5) Classification societies should help owners and operators to start right, i.e. to get the right design and build the right ship from the very beginning of the ship life cycle. For example, classification societies must have more rigorous standards when approving new building plans and during the construction phase to avoid recurring issues during the lifetime of the vessel.

6) Classification societies often tend to limit their role to the requirements applicable for the ship. They seemingly refrain from highlighting to ship owners shortcomings of a particular new building design but hesitate to make recommendations to shipyards to improve the design. They can serve the shipping companies by better assisting the owners on issues related to new building design and construction.

7) The rules of most classifications are already extensive in scope. What needs to be improved is a practical interpretation of the rules to be reasonably applied and practiced by the surveyor when undertaking survey works onboard in service ships.

8) Some surveyors and auditors are so rigid that they fail to see the requirement to inform owner of any issues or problems well in advance. This is not only annoying but also costly to resolve the matter.

5. Provision of non classification technical services

In addition to standard classification and statutory survey and certification, most of the main classification societies also provide advisory and consultancy services, such as ship emergency response services, technical investigation and fuel oil bunker analysis. The shipping companies that were interviewed agreed that this is an acceptable approach and it complements the classification services. However, some thought that there should be a clear differentiation of the roles between classification and consultancy.

It is also suggested that classification societies can use these non-classification services and technical expertise to further assist ship owners and operators to improve the hardware and software of ship operations and management, such as:

1) Help in improving safety management skills of shipping companies and seafarers to operate and maintain their vessel effectively

- 2) Assist in hull form optimization during the new building stage, and provide a trim optimization tool for existing ships
- 3) Conduct comparative evaluation of different Ballast Water Treatment Systems in terms of efficacy, capital and operational expenditures
- 4) Develop effective tools to monitor various elements of the Ship Energy Efficiency Management Programme

6. Challenges faced by shipping companies

Shipping companies are now facing many challenges, and 2010s can be a very critical decade for them. Some typical issues include economic uncertainties, very low charter rate for tankers, container ships and bulk carriers, oversupply of ships and Port State Control detentions. In addition, some ship owners and operators interviewed also reported other concerns for their organization, such as:

- 1) Profit and sustainability of the shipping business, given the current imbalance between the revenue and costs of operation.
- 2) Quality and reliability of ship's crew, nurturing talents for both sea and shore staff, retention rate and improving productivity.
- 3) Major breakdown, repairs and downtime of ship operation by observing maintenance schedules.
- 4) Ever changing and increasing legislation. Cost of implementing new legislations. Also, legislation is more and more influenced by lobby groups which do not enhance world trade and safety of ships.
- 5) Protectionism behaviour and reduced free trade.
- 6) High fuel cost, new requirement for installing ballast water treatment systems, exhaust gas emission control and piracy.

7. Making shipping companies more technically competitive

Some world leading shipping companies have already embarked on ultra large and more fuel efficient ship design and construction, like 18,000 TEU container ships and 400,000 deadweight ton bulk carriers, to position themselves for the future requirements and challenges. When asked about how and what measures the shipping companies are doing in order to be technically competitive to compete for the next 5 to 10 years, some interviewees have the following opinions:

- 1) Like any other industry, there will always be competition. In shipping, probably safety records, flawless and economical operations, and good customer service are the most important competitive edge for the organization.
- 2) Classification societies need to be nimble, adaptable to change, and exercise good cost control at all times. Also, use competent managers who are technically sound and operationally mature to run the business and operations.
- 3) Classification societies should keep good contact with leading industry players to gain in-depth knowledge of market requirements, and procure ships that will meet the industry needs. Also, for some smaller container shipping companies, more trade expansion into growth areas within intra-Asia routes, African and South American

routes is the way forward.

4) Fuel saving is critical as it is a major variable cost in total vessel operational costs. As such, the organization is looking into energy efficient vessels as well as the available technology for the building of new vessels to stay competitive.

5) Financial strength of the company, market share and technically strong

6) Have in house expertise, and effective vessel selection to reduce life cycle cost.

7) Economies of scale, innovation and in house experience leading up to ability to manage complex and industry leading ship designs.

The interviewees focused very much on operational and management improvements, and did not mention about their in-house research & development and new innovation. Perhaps, this could be due to sensitivity of information and the size and stage of development of shipping companies.