

Chapter 2

Adoption of Green Shipping Practices

2.1 Sustainable Shipping Initiatives

International trade has grown significantly following rapid increases in global sourcing activities and dispersed production sites. On the other hand, carbon dioxide emissions by the shipping industry are estimated to increase significantly as international trade continues to flourish and prosper. As shipping firms play an imperative role in facilitating global cargo flow, the sustainable development of shipping operations has attracted increasing attention from different stakeholders, including shippers, governments, and the public. Many shipping firms are looking for ways to enhance the environmental sustainability of their operations. As sea-borne trade has grown significantly in the past decades, there have been increasing concerns about the environmental impacts caused by shipping activities. To address these concerns, a growing number of shipping firms have begun to adopt green operations as a means to achieve environmental sustainability. Green operations in the shipping industry are environmentally sustainable ways to perform shipping activities. In addition, a shipping firm operates in a transport chain where various operators (e.g., ocean carriers, freight agents, land transport service providers, warehouse operators, and barge operators) in the shipping community are closely linked, in which the environmental performance of each operator affects the environmental sustainability of the shipping chain.

Due to the imperative role of shipping in facilitating global cargo flow, the sustainable development of shipping operations has become a concern to different groups of stakeholders. After identifying improvements to environmental management within the shipping industry as one of the key issues, the World Wildlife Fund (WWF) has introduced sustainable shipping initiatives (as shown in Fig. 2.1) which are “innovative schemes that encourage shipping firms to go beyond standard

The research of the chapter is based on Lai et al. (2011) and Lun (2011).

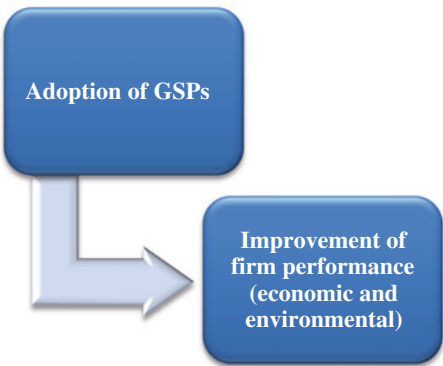
Fig. 2.1 Sustainable shipping initiative



compliance of environmental behavior and become exemplary in their approach to shipping operations and the environment.” The continuing growth in international trade and the increasing environmental concerns of shipping activities suggest that shipping firms need to adopt GSPs to improve their environmental performance.

The issue of performance in the shipping industry has received increasing research and managerial interest. Environmental protection activities are being amalgamated in business operations (Zhu and Sarkis 2004). As shown in Fig. 2.2, one of the key drivers that compel shipping firms to adopt GSPs is performance which has both economic and environmental connotations. Potential gains from implementing green or environmentally sustainable operations include cost reductions in energy consumption and waste treatment. Examples of environmental performance include increases in energy saving and resource recycle rates. Implementation of green operations also encourages shipping firms to put forth effort in committing to the environment so as to satisfy customer expectations for protecting the environment. As a result, environmental performance may be improved through the adoption of green operations.

Fig. 2.2 Relationship between GSPs and firm performance



2.2 Sustainable Economy

The concept of a sustainable economy has been a significant area of concern to society and the industry. As shown in Fig. 2.3, a sustainable economy is defined as “one that satisfies the needs and wants of the present generation without compromising the ability of future generations to meet their needs and aspirations” (O’Brien 2002). Studies on the rate of the depletion of natural resources date back to at least 1970s. A report called “Limits to Growth” by Meadows et al. (1972) concluded that “economic growth would have to be carefully limited if catastrophe was to be avoided.” In recent years, the concept of sustainability is very different from that proposed in the early 1970s. “Limits to Growth” is no longer acceptable to societies and industries.

As shown in Fig. 2.4, the challenge to sustainability is to ensure that industries support economic growth while ensuring environmental protection. The growing interest in sustainable development has led many firms to examine ways to deal with environmental issues (Bevilacqua et al. 2007). Environmentally sustainable management, or the so-called green management, has emerged as an important managerial topic for firms to achieve profit and market share on the one hand and commit to protecting the environment on the other hand (Hock and Erasmus 2000). Green management is becoming an important issue as customers and suppliers are increasingly demanding minimal negative impacts on the natural environment.

The costs of environmental protection for firms have increased considerably since the 1970s and are expected to increase even further (Christmann 2000). This implies that cost-effective green management practices are a key determinant of competitive position. Hence, research on environmental issues has expanded from a narrow focus on pollution control to green management practices (Klassen and Whybark 1999).



Fig. 2.3 Definition of sustainable economy

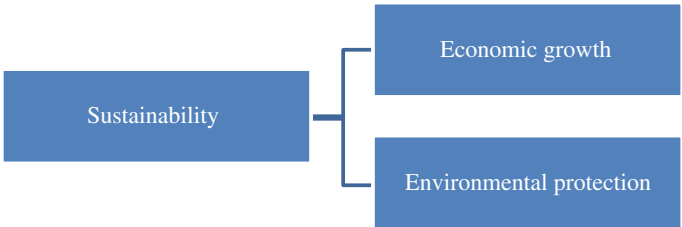


Fig. 2.4 Challenge of sustainability

The environmental management literature (Shrivastava 1995) has suggested that firms can improve their competitive positions and simultaneously reduce the negative effects of their activities on the natural environment by implementing GSPs. Consequently, firms cannot neglect economic and environmental performance. The integration of environmental components into management practices has become increasingly important in order to gain a competitive advantage. However, many firms are still reluctant to take a more active approach in incorporating GSPs due to “a perceived lack of evidence that the benefits exceed the costs of pursuing these initiatives” (Montabon et al. 2007). There is therefore the need to examine performance improvement opportunities through the implementation of GSPs.

2.3 GSPs as a Means of Comparative Advantage

The study of GSPs is focused on identifying best practices that simultaneously reduce the negative impacts of firm activities on the natural environment and contribute to better firm performance. Unlike regulatory requirements which are derived from the outside, GSPs consist of operational processes that arise from within a firm. GSPs are a collection of internal efforts in business planning and implementation. GSPs consist of a business policy and a set of business processes that require firms to assess their environmental impacts, determine environmental goals, implement environmental operations, monitor goal attainment, and undergo management reviews.

As shown in Fig. 2.5, a “five-step” approach can be used to illustrate the adoption of GSPs. The first step is to undertake a pledge for responsible environmental management. Environmental pledges, supported by the top management,



Fig. 2.5 Five-step approach to adopting GSPs

entail commitment toward the continual improvement of pollution prevention and compliance with relevant environmental legislation (Starkey 1998). The second step is the evaluation of business operations and goal setting. During this stage, decisions are made on ways to translate environmental policy into action and business priorities (Netherwood 1998). The third stage involves the creation of a management structure and linkage with business partners to realize the environmental goals. As GSPs are a tool to improve environmental management in a firm, the fourth stage, i.e., monitoring and taking corrective actions if necessary, is crucial for continuous environmental improvement. The final stage is a management review to provide critical assessments and present new environmental concerns and recommendations.

During the stages of adopting GSPs, costs will be accrued. For instance, resources are required for evaluation and goal setting since firms have to carry out extensive internal evaluations, employee training, and plan development. Despite the start-up costs, GSPs can help firms to ensure that their management practices conform to environmental regulations. As shown in Fig. 2.6, the adoption of GSPs can be a comparative advantage. GSPs also assist firms in the evaluation of their internal operations, engage employees in environmental issues, continually monitor environmental improvement, and increase knowledge about their operations. All of these actions can also help firms to improve their internal operations and achieve greater efficiencies. Knowledge-based skills are developed through these activities, which are difficult for competitors to imitate, so GSPs create opportunities to gain competitive advantages (Hart 1995).

The adoption of GSPs also encourages firms to use more sophisticated environmental strategies that build on their basic environmental protection principles. For example, firms may implement life-cycle cost analysis and assess their activities at each stage of the value chain to determine business priorities and actions to be taken. These advanced environmental strategies facilitate the integration of external stakeholders into business operations. Hence, the adoption of GSPs can eliminate environmentally hazardous operating processes and allow for the redesign of existing operating systems to reduce life-cycle impacts (Hart 1995). GSPs offer an excellent opportunity for firms to assess all aspects of their operations to minimize the shift of environmental harms from one subsystem to another (Shrivastava 1995) and achieve greater organizational improvement, so that firms may enjoy further opportunities that would result in comparative advantages.

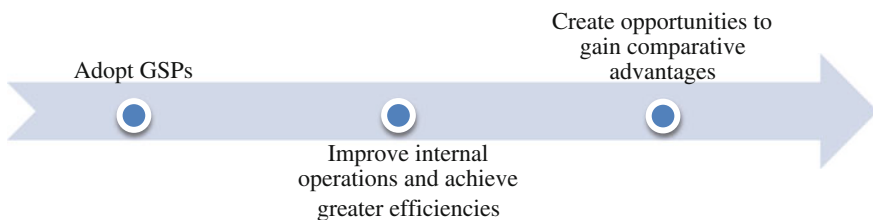


Fig. 2.6 Adoption of GSPs and comparative advantages

2.4 Basis of GSP Adoption

2.4.1 Stakeholder Theory

The stakeholder theory is useful for explaining the tendency of shipping firms to green their operations. The green operations from the perspective of the stakeholder theory are provided in Fig. 2.7. The stakeholder theory explains whether and why firms attend to the interests of stakeholders with the objective of obtaining benefits (Freeman 1984). This line of research has focused on identifying stakeholders and their interests and suggested ways to satisfy these interests (Contreras et al. 2008), thus offering a few insights on the conditions that nurture the adoption of GSPs in shipping firms.

Past studies in this area were confined to examining the relationship between how firms manage stakeholder requirements and whether the fulfillment of the requirements affects business performance (Fineman and Clarke 1996; Petek and Glavič 2000). One limitation of using the stakeholder theory for a study on the adoption of GSPs is the lack of attention to the social imperatives (e.g., environmental protection) which can be contradictory to the interests of stakeholders (e.g., productivity improvement).

2.4.2 Institutional Theory

Alternatively, the institutional theory provides an appropriate foundation to explain the adoption of GSPs as an institutional process subjected to various driving forces. As shown in Fig. 2.8, this institutional process is coercively, mimetically, and normatively driven, which results in structural isomorphism (e.g., adoption of GSPs) (DiMaggio and Powell 1983). The adoption of business practices, such as GSPs, can be the result of pressure from customers (e.g., shippers and consignees of shipments) (Eriksson 2004), industrial institutionalized norms (e.g., the use of electronic shipping documents) (Zhang et al. 2008), or regulatory requirements (e.g., compliance with the vessel speed reduction program) (Bailey and Solomon 2004).

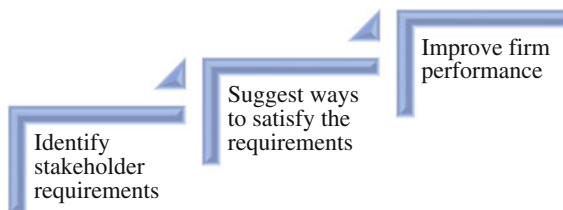
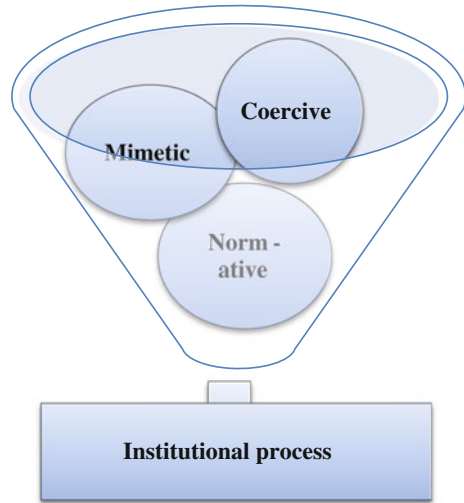


Fig. 2.7 Green operations from the perspective of stakeholder theory

Fig. 2.8 Factors that drive institutional process



In the institutional process, environmental concerns that drive other shipping firms and different stakeholder groups, e.g., regulatory bodies and shippers, to adopt green practices in a timely manner will create pressure for those who adopt green practices at a later time when they seek to reap the benefits of legitimacy due to isomorphic pressure (Wong et al. 2009). These stakeholders have a primary role in determining the extent that GSPs are adopted by shipping firms. In line with this perspective, the environmental commitment of a firm implies its compliance with the stakeholder expectations of their environmental performance. With regard to the environmental response in shipping, the adoption of GSPs represents a proactive approach that shipping firms use to cope with the stakeholder forces.

2.5 Drivers for Adopting GSPs

There are a number of drivers that influence shipping firms to adopt GSPs. Examples include regulatory requirements, norms on environmental protection, customer demand, and productivity gains.

2.5.1 Regulatory Requirements

The history of green practices and the literature on environmental management highlight the importance of regulations in environmental protection. Regulations serve as a systematic guideline to direct firms in the implementation of various environmentally responsible practices that range from proper solid waste disposal to

reduction in gas emissions. For example, there are international laws, such as the European Community Directives on Waste Electrical and Electronic Equipment (WEEE) which encourage manufacturers to collect and recycle products, and Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) which ensures that the industry adheres to determining the hazards and relaying the information to consumers. In line with these regulations, the Environmental Protection Agency (EPA) in the USA proposed regulations to reduce emissions from ships in 2009. While legislative measures are essential for environmental protection, the enforcement of these regulations is crucial to achieving the goals for environmental protection.

From the regulatory perspective, the International Maritime Organization (IMO) International Convention for the Prevention of Pollution from Ships is one of the most important conventions that regulate and prevent marine pollution by ships. It has been modified by the Protocol of 1978 related thereto (MARPOL 73/78), which covers accidental and operational oil pollution, as well as pollution by chemicals, goods in packaged form, and sewage, garbage, and air pollution. The IMO also holds secretariat responsibilities for the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (LDC), 1972, generally known as the London Convention, which has been updated by the 1996 Protocol. Prior research has argued that loose regulatory enforcement is found to be insufficient in driving the environmental actions of firms (Economy and Lieberthal 2007). By failing to appreciate the dire consequences of the prosecution of heavy polluters, shipping firms are less keen to comply with environmental regulations. Alternatively, shipping firms will find it in their best interests to focus on environmental protection when they are mandated by regulations to undertake related actions.

2.5.2 Norms on Environmental Protection

It is commonly seen that industries establish their own norms of practice in support of their own sustainable development. Many industrial associations, e.g., the Marine Environmental Protection Committee (MEPC), often lead the development and promotion of good practices for environmental protection and provide assistance (e.g., sharing best practices) to their members to guide their environmental efforts. In recognizing the imperative environmental degradation caused by shipping activities, the MEPC has recently considered proposals on reducing the carbon footprint of the shipping industry with particular focus on the recycling of end-of-life ships and reducing the levels of harmful emissions. An example that illustrates such a green practice is a project launched by Maersk Line to develop an environmentally friendly “ship-recycling” process that replaced the previous procedure of ship scrapping. Maersk’s vessels are also designed and built with materials with a high recycling ratio.

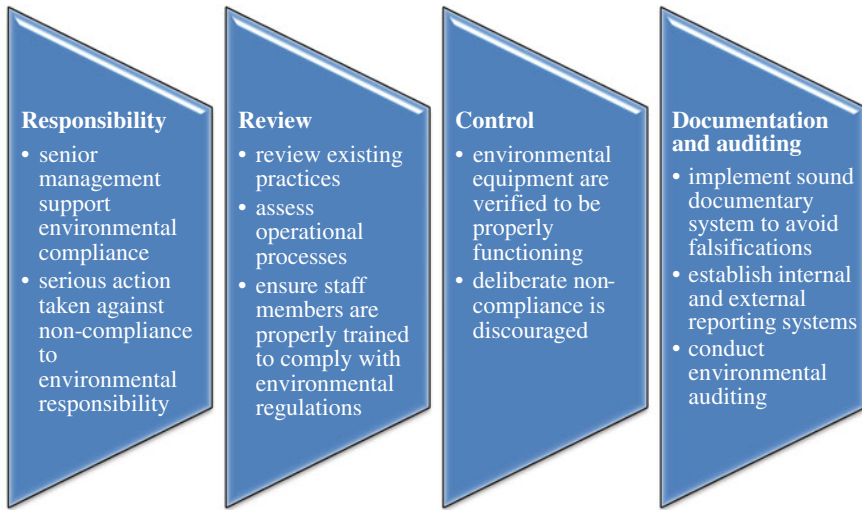


Fig. 2.9 Elements of environmental compliance framework

These industry-initiated programs provide direction and guidelines on the environmental responsibilities that are expected of shipping firms, thus dictating their practices through peer pressure. Similarly, the *Shipping industry guidance on Environmental Compliance: A framework for ensuring compliance with MARPOL* prepared by the International Chamber of Shipping (ICS) (www.ics-shipping.org) provides a framework to ensure environmental compliance. The suggested elements of the framework that are to be reviewed by shipping companies are shown in Fig. 2.9. This framework aims to facilitate sustainable development of the shipping industry and promote eco-efficiency in ocean transportation. The development of industrial norms in environmental protection which is granted legitimacy in the shipping industry can increase the rate that GSPs are adopted and shipping firms can benefit from the assistance provided by the related associations, such as the ICS and IMO, to facilitate their efforts in GSP adoption.

2.5.3 Customer Demand

Shipping firms are compelled by increasingly greater environmental awareness to carry out more environmentally friendly operations. Vessel operations inevitably generate pollutants such as oily waste. If a shipping firm is accused of pollution, customers may give their business to another firm to avoid backlash for being environmentally irresponsible. To reduce the discharge of oily water, mega shipping firms, such as Maersk Line, have installed polishing filters in the oil–water separator on its vessels. This practice ensures that oily water is treated, thus

Fig. 2.10 7 Rs of Wal-Mart

resulting in effluent concentrations below 5 parts per million (pmm), which is well below the regulatory requirements of 15 pmm.

From the institutional theory perspective, shipping firms are motivated to comply with environmental regulations as required by shippers for legal purposes and in the hopes of continuing business with them. For example, Wal-Mart emphasizes the “7 Rs” of sustainable packaging and requires its suppliers to comply with them. As shown in Fig. 2.10, the 7 Rs are to remove, reduce, reuse, renew, recycle, revenue, and read. Wal-Mart states in its fact card that: “when Wal-Mart tells a supplier that it wants a change in packaging, that supplier will change all its packaging,” which demonstrates how a customer can exert considerable pressure onto its suppliers in terms of environmental protection. Shipping firms, as well as logistics service providers, are driven by customers to adopt green practices such as sustainable packaging in order to sustain their business relationships, as in the case of Wal-Mart.

2.5.4 Productivity Gains

In view of the growing environmental concerns in international trade, there is an urgent need for shipping firms to cope with environmental pressures in a way that does not jeopardize their business growth, while at the same time, it produces economic and environmental benefits in the global shipping chain (Lai et al. 2008, 2006; Lai et al. 2010a, b). Along with the above-mentioned institutional forces that pertain to regulatory requirements, industrial norms, and consumer demand for an environmental focus in shipping operations, shipping firms need a solution in which GSPs can be a viable option for addressing environmental and productivity challenges.

Fig. 2.11 Benefits of GSP adoption

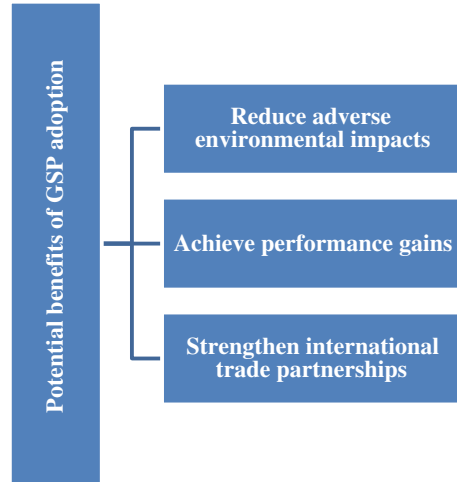
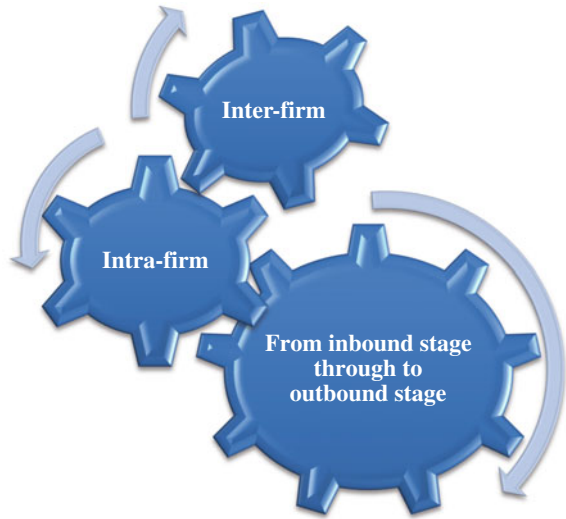


Figure 2.11 illustrates the potential benefits of adopting GSPs. As a shipping management innovation, GSPs help shipping firms to reduce the adverse environmental impacts of their shipping activities while enabling them to achieve performance gains. This sort of green practice offers not only opportunities to increase profitability, but also the potential to strengthen international trade partnerships through compliance with regulatory requirements established to address environmental issues. Furthermore, there are serious implications of the growth in shipping activities for regional development, global logistics and shipping activities, and environmental policies. In addressing the increasingly large volumes of physical flows of cargo in international trade, it is essential for the shipping industry to meet and balance both economic and environmental goals in performing their shipping activities.

As shown in Fig. 2.12, GSPs are important inter-firm and intra-firm practices that require shipping firms to take into consideration environmental concerns as part of their decision-making in each inbound stage from cargo receipt through to the outbound stage of cargo delivery, the so-called closed loop concept in shipping management. Pressure from the government and public, increase in number of conscious shippers, and increased international trade have collectively led to an increasing number of shipping firms that adopt GSPs, such as through the use of recyclable packaging materials. With scarcity of resources and the potential “green barriers” to trade, shipping firms have had more than adequate reasons to initiate and take corporate and industrial environmental management measures.

Some of the measures that are being promoted are environmental impact assessment, ISO 14001 certification, and recently GSPs. The development of the GSP concept and the adoption of GSPs can help to reduce the environmental burdens in the developing, distributing, and disposing of products by shipping firms, while improving their efficiency and economic position. There is also

Fig. 2.12 Closed loop concept in shipping management



increasing evidence that the adoption of green practices can improve performance (Lai et al. 2010a). Organizations have found environmental collaboration with upstream suppliers and downstream customers useful for reaping performance gains (Vachon and Klassen 2008; Yang et al. 2009; Zhu et al. 2010). These collaborations encompass joint environmental goal setting, shared environmental planning, and working together to reduce pollution or other environmental impacts. The ISM code and ISO 14000 standards have been gaining in popularity, and there is a growing desire from maritime executives to pursue environmental management systems and practices with the view to improving the environmental performance of the shipping industry (Celik 2009).

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