An empirical investigation of green shipping practices, corporate reputation and organisational performance in container shipping

Kelvin Pang* and Chin-Shan Lu

Department of Logistics and Maritime Studies,
The Hong Kong Polytechnic University,
11 Yuk Choi Road, Hung Hom, Kowloon, Hong Kong
Email: kkpang@polyu.edu.hk
Email: chin-shan.lu@polyu.edu.hk
*Corresponding author

Kuo-Chung Shang

Department of Transportation Science,
National Taiwan Ocean University,
No. 2, Beining Rd, Keelung City, 20224, Taiwan
Email: gordon@mail.ntou.edu.tw

Hsiang-Kai Weng

Department of Logistics and Maritime Studies,
The Hong Kong Polytechnic University,
11 Yuk Choi Road, Hung Hom, Kowloon, Hong Kong
Email: hsiangweng@gmail.com

Abstract: This research examined the effects of green shipping practices on corporate reputation and organisational performance amongst container shipping firms. Structural equation modelling was employed in this study using survey data collected from 130 container shipping firms in Taiwan. Results indicated that green shipping practices are positively associated with organisational performance, and corporate reputation positively influences organisational performance. This research also found that corporate reputation mediates the effects of green shipping practices on organisational performance. This study suggests that container shipping companies could enhance their environmental responsibility to improve their corporate reputation and organisational performance. The implications of the findings are discussed.

Keywords: green shipping; container shipping; corporate reputation; organisational performance.

Biographical notes: Kelvin Pang is currently a Teaching Fellow at the Department of Logistics and Maritime Studies, The Hong Kong Polytechnic University. He received his BSc, MSc and PhD from the University of Plymouth, UK. His research interests include organisational behaviour, shipping logistics, green sustainability in shipping and ports, and maritime education.

Chin-Shan Lu is currently a Professor at the Department of Logistics and Maritime Studies and a Director for the C.Y. Tung International Centre for Maritime Studies of the Hong Kong Polytechnic University. He received his BBA and MBA in the Department of Shipping and Transportation Management, National Taiwan Ocean University, Taiwan, and PhD in Cardiff University, UK. He served at the National Cheng Kung University in Taiwan between 1998 and 2013. He has contributed more than 60 articles in professional journals. His research interests include shipping management, port logistics, sustainability, and safety climate in shipping operations.

Kuo-Chung Shang is a Professor of the Department of Transportation Science at National Taiwan Ocean University. He received his PhD in Logistics and Operations Management (1998–2002), from the Cardiff University, UK. His recent research addresses the issues of sustainable supply chain management, supply chain resilience, green shipping and port, and cold chain logistics in the context of logistics, shipping and port sectors.

Hsiang-Kai Weng received his BEng from California State Polytechnic University, Pomona, EMBA in Shipping and Transportation Management from National Taiwan Ocean University, Taiwan and PhD in Logistics and Maritime Studies from The Hong Kong Polytechnic University. His research interests include maritime logistics, port and terminal operations and organisational behaviour.

This paper is a revised and expanded version of a paper entitled 'Green shipping practices, corporate reputation and organisational performance: an empirical study of container shipping companies' presented at IAME 2017 Conference, Kyoto, Japan, 27–30 June 2017.

1 Introduction

Maritime transport carries over 80% of global trade, which makes a great contribution to the economic development . However, the significant growth in the maritime sector has brought negative impacts on environment such as spill pollution, noise, carbon emission, waste, and biodiversity. The International Maritime Organisation (IMO) is developing several international regulations and conventions to prevent pollution of the sea by vessels. For example, the international convention for the prevention of pollution from ships (MARPOL) concerns about the pollution from ships by oil; harmful substance carried by sea in packaged form; sewage, garbage; noxious liquid substances carried in bulk; and the prevention of air pollution (Christodoulou et al., 2019; Topali and Psaraftis, 2019). The similar environmental conventions include ballast water management, biofouling, anti-fouling systems, ship recycling, and so on. It is imperative for shipping as an international industry to emphasise and implement green shipping practices (GSP) into their company's programs. In recent years, container shipping companies have

placed more emphasis in the areas on green shipping. This can be seen by the comprehensive reporting on their company websites (A.P. Moller-Maersk Group, 2017; NYK Line, 2017; Yang Ming Group, 2017). In addition, Taiwan's Evergreen Line and Yang Ming Marine Transport Corporation joined the European-based Business for Social Responsibility (BSR) organisation and its initiatives in reducing oil consumption and carbon dioxide emissions, ballast water and anti-fouling paint management and the promotion of environmental measures.

Recently, there has been a number of research literature to point out the importance of green shipping management (Lirn et al., 2014) and the conceptualisation of GSP in the shipping sector (Lai et al., 2011). Yang et al. (2013) addressed the effect of green supply chain management on firm competitiveness in the container shipping industry in Taiwan. The research findings confirmed that green practices positively influence on firm competitiveness. Lirn et al. (2014) identified critical green shipping management dimensions in terms of greener policy, greener ships, and greener supplier. The results found that greener policy had a positive impact on greener ships and greener suppliers, whereas greener ships and greener suppliers had an indirect impact on financial performance via environmental performance.

In particular, it is increasingly important to pay attention on green shipping implementation for corporate image and benefits (Montabon et al., 2007). Despite the growing interest in GSP, research to date has typically analysed the measures of these practices and their impacts on performance. According to resource-based view, corporate reputation is an intangible asset that is difficult to imitate and helps a company to establish a long-lasting competitive advantage (Fombrun and Shanley, 1990; Hall, 1993; Deephouse, 2000). Extant academic studies repeatedly found positive relationships between corporate reputation and organisational performance (Fombrun and Shanley, 1990; Antunovich et al., 2000; Roberts and Dowling, 2002; Rindova et al., 2005). To date, however, relative little research has investigated the relationships between GSP, corporate reputation and organisational performance. Therefore, this study aims to develop and test a model in which the influence of GSP on corporate reputation and organisational performance in the context of container shipping firms.

There are five sections in this paper. The first section provides the background for this study. The second section reviews the literature on GSP, corporate reputation and organisational performance to develop the hypotheses. The third section describes the research methodology, research instrumentation and data analyses. Section four presents the results and findings to the research hypotheses. The managerial implications for container shipping companies are discussed in the final section.

2   Conceptual background

2.1   Green shipping practices

Shipping companies are experiencing increasingly stringent environmental regulations, which require them to be more environmentally responsible in their operations. This involves the use of environmentally friendly vessels, green purchasing behaviour, pollution control measures, slow steaming approaches and management of resources (e.g., water, paper, electricity and oil). The IMO adopted Ship Energy Efficiency

Management Plan (SEEMP) in 2013, Energy Efficiency Design Index (EEDI) in 2015 and by 1 January 2020 a new 0.5% global sulphur cap on fuel content will be enforced.

Mansouri et al. (2015) found that there are increasing researches on environmental sustainability in shipping since 2005. Prior to that, very little research was devoted to this particular research area. Lam and Lai (2015) attributed this to the external pressures along the supply chain, which has seen an increasing adoption of GSP in the shipping industry. Shipping companies through environmental governance started to adopt GSP to reduce environmental damage (Lun et al., 2015). Lai et al. (2013) defines GSP as a "management approach that emphasises the handling and distribution of cargoes in an environmentally sustainable way with a view to reducing waste create and conserving resources in performing shipping activities". There are six dimensions of GSP and they include company policy and procedure, shipping documentation, shipping equipment, shipper cooperation, shipping materials and shipping design for compliance. Lam and Lai (2015) argued that internal practices such as company policy and procedures are crucial to successful implementation of GSP. Closer cooperation with customers is required to enable companies to improve their environmental performance (Cheng et al., 2014). Chang and Danao (2017) adopted four dimensions from Lai et al. (2013) to propose four factors, which may influence the adoption of GSP by shipping companies. The four factors consist of regulation, industrial norms, customer demand and firm's own environmental strategy. Their findings found that shipping companies are motivated by their own strategy to provide a good corporate image. However, international regulations were not significant in influencing shipping firms to adopt GSP.

From the perspective of container shipping practices, the Maersk Group enhanced its environmental performance through incorporating new technologies into its new ships. For instance, the Triple E class, getting its name through three design principles of economy of scale, energy efficient and environmentally improved, was built with a twin-skeg design with two diesel engines, which increases propeller efficiency. Carbon dioxide emissions, per container, were expected to be 50% lower than ships on the Asia-Europe route (A.P. Moller-Maersk Group, 2011). From a company's policy perspective, shipping firms begun to adopt more environmental-friendly policies to improve their operational performance. Yang Ming Group promoted the use of green vessels and green terminals (Yang Ming, 2017). NYK Group, which is renowned for its environmental initiatives, uses Internet of Things (IoT) and Big Data Analysis to monitor the on-board modification of its ship's bulbous bow and energy-saving equipment. It also introduced the Innovative Bunker and Idle-time Saving (IBIS) project on their containerships (NYK Line, 2017). CMA-CGM partner with ENGIE to promote LNG as the marine fuel for its container vessels. Through these environmental initiatives, shipping companies demonstrate that they are focusing on environmentally friendly operations while achieving optimal performance (PortNews, 2016).

2.2 *Corporate reputation*

Corporate reputation is regarded as an intangible and valuable asset of an organisation (Fombrun, 1996; Deephouse, 2000; Walsh and Beatty, 2007). Numerous researchers have asserted that companies can enhance their competitive advantage and attract more customers by maintaining a sound corporate reputation (Hall, 1993; Gardberg and Fombrun, 2002). The literature offers a variety of definitions (Barnett et al., 2006; Walker, 2010). Fombrun (1996) described corporate reputation as a perceptual

representation of a company's past actions and future prospects that describes the firm's overall appeal to all of its key stakeholders when compared with other leading rivals. Rose and Thomsen's (2004) included stakeholders' perception towards the company in which they have a vested interest. Other researchers also found consistent link between corporate reputation and improving organisational performance (Hall, 1993; Deephouse, 2000). By taking all of the above assertions into consideration, this study acknowledges corporate reputation to be a key asset of a company and concurs with the view that reputation results from stakeholders' assessments after perceiving a company through the products or services offered (Fombrun and Shanley, 1990), and that reputation is a crucial factor for corporate success (Kay, 1993). For these reasons, not only are business corporations required to maintain a sound reputation, but their supply chain firms must also behave in a manner that supports the company's reputation.

Various viewpoints exist regarding the corporate reputation dimension. Raithel and Schwaiger (2015) pointed out that differences in definitions of corporate reputation have led to a variety of measurement approaches. Walsh and Beatty (2007), for example, asserted that corporate reputation should be measured based on customer satisfaction, loyalty, trust, and positive word of mouth. Chun (2005) maintained that a company's reputation is measured by six factors, namely, positive goodwill, quality products and services, excellent leadership, positive future prospects, retention of competent employees, and fulfilment of environmental and social obligations. Finally, Ewing et al. (1999) identified positive reputation, service quality, and leadership as the three factors for measuring corporate reputation.

2.3   *Organisational performance*

For organisations, performance is one of the ways to measure the extent of its effectiveness. Performance has been viewed in a great variety of ways by researchers, which posed a challenge for researchers because organisations have multiple and frequently conflicting goals (Chow et al., 1994). Steers (1975) opined that companies, when measuring performance, can either select single or multiple indicators of performance. The use of only one single indicator has severe limitations, which might undermine the integrity and relevance of the research. Hence Hood et al. (1994) advocated the use of multiple indicators, such as market share, production efficiency, product quality, as performance measurements. Murphy et al. (1996) analysis of 51 articles between 1987 and 1993 found that only 19% utilised one single indicator whilst 81% consisted of two or more performance indicators. Jose and Lee (2007) in their study of CSR on organisational performance advocated that the impact of CSR on business should not be confined to financial indicators such as return on investment and profit rate. Instead, it should include other non-financial indicators such as market share, brand positioning, corporate image, employee satisfaction and customer loyalty. Thus, this study suggests the use of multiple indicators to measure organisational performance.

Organisational performance can be measured by both financial and non-financial performance (Pang and Lu 2018; Venkatraman and Ramanujam, 1986). Financial performance reflects the fulfilment of the economic goals of the organisation includes profit before tax, returns on investment, return on sales, earnings per share. By contrast, non-financial performance measures include market share, product quality, employee productivity, customer satisfaction and customer loyalty. Three performance indicators used in previous research were used to measure non-financial performance (Lu et al.,

2009; Panayides and Polyviou, 2011), namely service quality, customer satisfaction and customer loyalty and three were used to measure financial performance (Lu et al., 2009; Lun et al., 2014), namely turnover growth rate, profit before tax and market share.

2.4 *GSP and corporate reputation*

Many studies have highlighted that corporate environment responsibility have a positive impact on corporate reputation (Logsdon and Wood, 2002; Mahon and Wartick, 2003; Brammer and Pavelin, 2004; Hsu, 2012). Khojastehpour and Johns (2014) highlights that balancing environmental CSR issues and corporate reputation could lead to sustainable advantages for organisations. Tang et al. (2012) in their examination of 500 largest US enterprises found that environmental governance leads to green reputation, which enhances organisations' corporate reputation and economic performance. Zou et al. (2015) concluded that organisation which has a previous record of environmental violations is more likely to be seen as responsible for adverse environmental events and suffer further damage to their reputation. Within the maritime and transport literature, whilst there are studies who have examined the link between GSP and firm performance (Lun et al., 2014; Lirn et al., 2014), to our knowledge, no study could be found exploring the link between GSP and corporate reputation. Thus, we made the following hypothesis:

H1   GSP has a direct positive effect on corporate reputation in the container shipping industry.

2.5 *GSP and organisational performance*

Freeman (1984) pointed out that when organisations pay attention to corporate social responsibility, especially in the areas of social and environmental, it enhances the relationships between stakeholders and business performance. Shipping, as a service industry, is subjected to the constant pressure by its customers to adopt greener operations. Customers do not want to be associated with companies who are seen to be a major environmental polluter (Lam and Lai, 2015).

Studies have shown a close links between green practices and firm performance. Miroshnychenko et al. (2017) found that internal green practices play a major role in driving financial performance, especially firm profits. Lirn et al. (2014) found that green policy implementation enhances organisations financial performance through environment performance.

H2   GSP has a direct positive effect on organisational performance in the container shipping industry.

2.6 *Corporate reputation and organisational performance*

Corporate reputation is often described as an intangible asset playing an important role to help firms to maintain a competitive advantage over its rivals and build up credibility, reliability, responsibility and trustworthiness with its customers. Sabate and Puente (2003) conducted a comprehensive review of the literature examining the relationship between corporate reputation and organisational performance. Their results indicate that most literature shows that a positive corporate reputation enhances organisational performance. Many other studies also support the view that a good reputation affects an

organisation's performance (Fombrun, 1996; Roberts and Downing, 1997; Boyd et al., 2010; Lee and Roh, 2012). As mentioned earlier, it has been justified that GSP could be positively related to corporate reputation. However, according to the authors' knowledge, it seems relative few prior studies examined the mediating effect of corporate reputation on the relationship between corporate reputation and organisational performance. With this gap in knowledge, it can be concluded that corporate reputation could act as a possible mediator on the GSP and organisational relationship. Accordingly, we hypothesised as follows. Thus, the study proposes the following hypotheses:

H3   Corporate reputation has a direct positive effect on organisational performance in the container shipping industry.

H4   Corporate reputation mediates the relationship between GSP and organisational performance in the container shipping industry.

3   Methodology

3.1   Defining the population and sample

The samples for this study primarily focus on the container shipping industry in Taiwan. Basically, the Taiwanese container shipping industry includes container shipping companies and shipping agencies. The population of these shipping firms were drawn from the Directory of ROC (Republic of China) National Shipping Companies and National Association of Shipping Agencies. However, based on the Directory of National Association of Shipping Agencies, those companies container and bulk shipping companies. A total of 246 container shipping managers or representatives have been identified via a telephone poll and invited to participate in this research survey. The initial mailing elicited 106 usable responses. A follow-up mailing was sent two weeks after the initial mailing and an additional 24 usable responses were returned. The total number of usable responses was 130 and the overall response rate for this study was approximately 55%.

3.2   Non-response bias

A comparison of early (those responding to the first mailing) and late (those responding to the second mailing) respondents was carried out in this study to test for non-response bias (Armstrong and Overton, 1977). The 130 survey respondents were divided into two groups based on their response wave. We received 106 (81.5%) and 24 (18.5%) usable questionnaires from the first mailing and second mailing, respectively. T-tests were performed on the two groups' responses of the survey items regarding GSP, corporate reputation and organisational performance attributes. With the exception of the item "our company has a standard operating procedure to dispose of ships' waste", Table 1, Table 2 and Table 3 indicated that, at the 5% significance level, there were no significant differences in the two groups' perceptions of other measures. The test results suggested that non-response bias was not a problem in this study since late respondents' responses were similar to those of the first wave of respondents.

Table 1   Comparison of respondent and non-respondent groups in terms of GSP attributes

GSP attributes	Respondent (N = 106)		Non-respondent (N = 24)		F ratio	F prob.
	Mean	S.D.	Mean	S.D.		
1 Our company's ships strictly complies with the laws or regulations applicable to the international flag state or regions, such as MARPOL.	6.04	1.28	5.25	1.54	2.667	0.105
2 Our company has effective solutions to avoid the improper discharge of ballast water and harmful substances, and its impact on marine ecology.	5.80	1.25	5.08	1.38	0.457	0.500
3 Our company reduces emissions of greenhouse gases or harmful gases (CO_2, SOx, NOx) from ships	5.69	1.25	4.80	1.32	0.085	0.771
4 Our company has a standard operating procedure to dispose of ships' waste.	6.00	1.16	5.12	1.45	4.254	0.041
5 Our company actively reduces noise which generated from ships.	5.82	1.15	4.87	1.29	0.224	0.637
6 Our company attaches great importance to all ways which can reduce ships' fuel consumption.	6.05	1.15	5.67	1.34	1.179	0.280
7 Crew strictly implements company's environmental regulations and policy.	6.01	1.10	5.38	1.37	3.156	0.078
8 Our company has stringent environmental assessment into our selection of suppliers.	5.95	1.17	5.25	1.45	4.813	0.030

Table 2   Comparison of respondent and non-respondent groups in terms of corporate reputation attributes

Corporate reputation attributes	Respondent (N = 106)		Non-respondent (N = 24)		F ratio	F prob.
	Mean	S.D.	Mean	S.D.		
1 In general, my company's reputation is good.	6.08	1.11	5.21	1.21	0.896	0.346
2 My company provides good service quality.	5.70	1.18	5.30	1.46	1.365	0.245
3 My company is famous in the world.	6.02	1.04	5.25	1.22	3.699	0.057

Table 3   Comparison of respondent and non-respondent groups in terms of organisational performance attributes

Organisational performance attributes	Respondent (N = 106)		Non-respondent (N = 24)		F ratio	F prob.
	Mean	S.D.	Mean	S.D.		
1 Profit before tax	4.65	1.17	4.67	0.86	2.162	0.144
2 Service quality.	5.32	1.17	4.95	1.19	0.273	0.602
3 Customer satisfaction	5.37	1.16	4.88	1.03	0.251	0.618
4 Customer loyalty	5.26	1.19	4.75	0.99	1.323	0.252

3.3   Measures

GSP was measured by eight items adapted from published environmental or CSR reports of major liner shipping companies (K Line Group, 2016; MOL Group, 2016; NKY Line, 2016; Yang Ming Marine Transportation Corporation, 2016). Corporate reputation was measured by three items adapted from Michaelis et al. (2008) and Puncheva-Michelotti and Michelotti (2010). Organisational performance was measured by four items covering financial and non-financial measures including profit before tax, customer satisfaction and customer loyalty (Lu et al. 2009; Shang et al., 2010). In this study, each GSP and corporate reputation items was measured using a seven-point Likert scale, where 1 corresponds to 'strongly disagree' and 7 to 'strongly agree'. As for organisational performance measures, respondents were asked to rate their firm's performance relative to its major competitors using a seven-point Likert scale with end points of 'much worse' and 'much better'.

3.4   Data analysis method

The aim of this study was to examine the relationships between GSP, corporate reputation and organisational performance in the container shipping industry in Taiwan. Confirmatory factor analysis (CFA) was performed to assess the convergent and discriminant validity of the measurement items (Iacobucci et al., 2015). Structural equation modelling (SEM) was used to examine the effects of GSP on corporate reputation and organisational performance.

4   Results and empirical analysis

4.1   Profile of respondents

With regards to the profile of respondents shown in Table 4, results reveal that questionnaire survey respondents were vice presidents or above (20.8%), senior manager (9.2%), junior manager (22.3%), supervisor (6.9%), and general employee (40.8%). In general, managers are actively involved in and anchor operations in their business. More than 52.3% of responses come from managers or above thus endorsing the reliability of the survey findings. The finding implied that respondents has abundant practical experience to answer the questions. With regards to ownership pattern, 44.6% of

respondents were local company, while 43.1% and 12.3% were foreign company and foreign-local venture. More than 77% of the firms have been well-established for over 10 years or more, which indicates the familiarity of the container shipping business.

Table 4 Profile of respondents

Demographics	Number of respondents	Percentage
Job title		
Vice president or above	27	20.8
Senior manager	12	9.2
Junior manager	29	22.3
Supervisor	9	6.9
General employee	53	40.8
Ownership pattern		
Foreign company	56	43.1
Local company	58	44.6
Foreign-local venture	26	12.3
Age of firms		
Less than 5 years	3	2.3
6–9 years	2	20.8
10–19 years	24	18.5
More than 20 years	76	58.5

4.2 Descriptive analysis

Table 5 shows the mean scores of GSP, corporate reputation and organisational performance measures. From the GSP results, "Our company attaches great importance to all ways which can help reduce ships' fuel consumption" was ranked as the utmost importance to the respondents followed by "Crew will strictly implement company's environmental regulations and policy". All of the factors were above 5.0, which shows that companies are in strong agreement with regards to the GSP measures. In general, Taiwanese container shipping companies perceived that they have good corporate reputation with all three measures above 5.5. For organisational performance measures in terms of performance level compared with their main competitor, '*Profit before tax*' was rated below 5.0 which reflected respondents recognised their corporate reputation rather than financial performance.

Table 5 Mean scores of measures by respondents

Green shipping practices	Mean	S.D.
Our company attaches great importance to all ways which can reduce ships' fuel consumption.	5.985	1.194
Crew strictly implements company's environmental regulations and policy.	5.900	1.180
Our company's ships strictly complies with the laws or regulations applicable to the international flag state, such as MARPOL.	5.892	1.360
Our company has a standard operating procedure to dispose of ships' waste.	5.846	1.260

Table 5   Mean scores of measures by respondents (continued)

Green shipping practices	Mean	S.D.
Our company has stringent environmental assessment into our selection of suppliers.	5.823	1.254
Our company has effective solutions to avoid the improper discharge of ballast water and harmful substances, and its impact on marine ecology.	5.669	1.302
Our company actively reduces noise which generated from ships.	5.646	1.232
Our company reduces emissions of greenhouse gases or harmful gases (CO_2, SOx, NOx) from ships	5.523	1.307
Corporate reputation		
In general, my company's reputation is good.	5.923	1.179
My company provides good service quality.	5.885	1.111
My company is famous in the world.	5.623	1.241
Organisational performance		
Customer loyalty.	5.277	1.148
Company provides employees' with good vision of the future.	5.254	1.183
Customer satisfaction.	5.169	1.169
Profit before tax.	4.654	1.126

4.3   Reliability test

The internal consistency and reliability of each dimension, reliability tests, including Cronbach's alpha statistics and corrected item-total correlation, were performed in this study (Cooper and Schindler, 2008). Table 6 indicates that the Cronbach's alpha values of each dimension were found to be well above the suggested threshold of 0.7, which is considered adequate for a satisfactory level of reliability in basic research (Iacobucci et al., 2015; Hair et al., 2010). Results of the corrected item-total correlation are also depicted in Table 5 and indicate that all corrected item-total correlation value were well above 0.5, confirming that these 15 items measured the same underlying constructs (Koufteros, 1999; Iacobucci et al., 2015).

Table 6   Descriptive statistics and reliability test

Green shipping practices (Cronbach's alpha = 0.957)	Range of corrected item-total correlation
1 Crew strictly implements company's environmental regulations and policy.	0.860
2 Our company has effective solutions to avoid the improper discharge of ballast water and harmful substances, and its impact on marine ecology.	0.863
3 Our company reduces emissions of greenhouse gases or harmful gases (CO_2, SOx, NOx) from ships.	0.807
4 Our company has a standard operating procedure to dispose of ships' waste.	0.871
5 Our company attaches great importance to all ways which can reduce ships' fuel consumption.	0.835

Table 6 Descriptive statistics and reliability test (continued)

| *Green shipping practices (Cronbach's alpha = 0.957)*	*Range of corrected item-total correlation*
6 Our company actively reduces noise which generated from ships.	0.800
7 Our company's ships strictly comply with the laws or regulations applicable to the international flag state, such as MARPOL.	0.853
8 Our company has stringent environmental assessment into our selection of suppliers.	0.823
Corporate reputation (Cronbach's alpha = 0.900)	
1 In general, my company's reputation is good.	0.843
2 My company provides good service quality.	0.733
3 My company is famous in the world.	0.836
Organisational performance (Cronbach's alpha = 0.959)	
1 Customer loyalty.	0.666
2 Company provides employees' with good vision of the future.	0.887
3 Customer satisfaction.	0.918
4 Profit before tax.	0.874

4.4 Confirmatory factor analysis

The hypothesised model, presented in Figure 1, implies a measurement model where there are 3 latent variables composed of their corresponding multiple indicators. The three constructs in the measurement model, namely, GSP, organisational performance, and corporate reputation are inter-related, as indicated by the two-headed arrows. In addition, the 15 observed variables are enclosed in squares. Eight observed variables (g1, g2, g3, g4, g5, g6, g7, g8) are loaded onto GSP; three observed variables (r1, r2, and r3) are loaded onto corporate reputation: four observed variables (f1, f2, f3, and f4) are loaded onto organisational performance.

The statistical criteria for model modification decisions include squared multiple correlations, standardised residual covariance and model fit indices (Koufteros, 1999; Min and Mentzer, 2004). The results of fitting the structural model to the data revealed that the model had a good fit as indicated by the normed Chi-Square ($\chi 2/df = 1.395$), comparative fit index (CFI = 0.985), root mean square residual (RMR = 0.049) and root-mean-square error of approximation (RMSEA = 0.055). The tests of validity, reliability and unidimensionality were discussed and described below.

Convergent validity can be tested by t-values that are all statistically significant on the factor loadings (Dunn et al., 1994). The t-value, in the AMOS text output file, is the critical ratio (C.R.), which represents the parameter estimate divided by its standard error. As a rule of thumb, the C.R. needs to be greater than 2.00 or smaller than –2.00 for the estimate to be acceptable (Koufteros, 1999; Byrne, 2001; Hair et al., 2010). Results in Table 7 showed that all C.R. values were significant at the 0.05 level, in effect confirming that all indicators measured the same construct and providing satisfactory evidence of the convergent validity and unidimensionality of each construct (Anderson and Gerbing, 1988). Moreover, item reliability (R^2) can be used to measure the reliability of a particular observed variable or item (Koufteros, 1999). Results revealed that all R^2

values were greater than 0.3, providing evidence of convergent validity (Carr and Pearson, 1999; Hair et al,, 2010).

Figure 1   Path diagram representing the measurement model (see online version for colours)
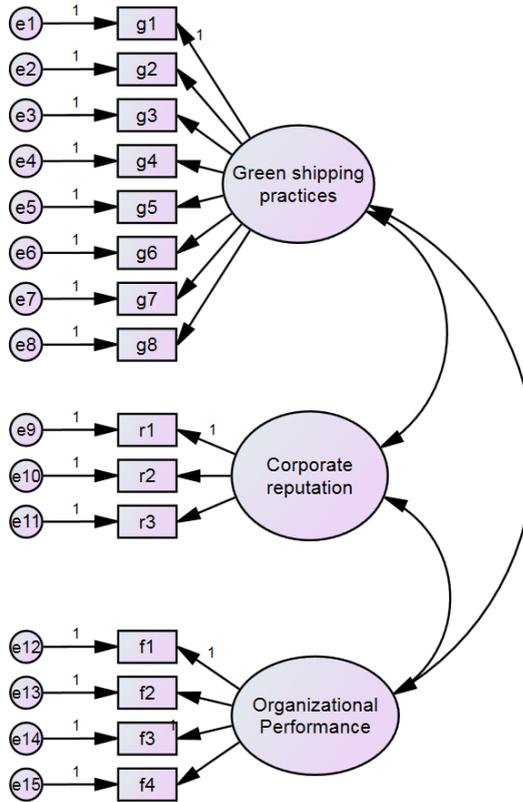
Notes: g1: Our company's ships strictly complies with the laws or regulations applicable to the international flag state or regions, such as MARPOL.
g2: Our company has effective solutions to avoid the improper discharge of ballast water and harmful substances, and its impact on marine ecology.
g3: Our company reduces emissions of greenhouse gases or harmful gases (CO_2, SO_x, NO_x) from ships.
g4: Our company has a standard operating procedure to dispose of ships' waste.
g5: Our company actively reduces noise which generated from ships.
g6: Our company attaches great importance to all ways which can reduce ships' fuel consumption.
g7: Crew strictly implements company's environmental regulations and policy.
g8: Our company has stringent environmental assessment into our selection of suppliers.
r1: In general, my company's reputation is good.
r2: My company provides good service quality.
r3: My company is famous in the world.
f1: Customer loyalty.
f2: Company provides employees with good vision of the future.
f3: Customer satisfaction.
f4: Profit before tax.

Composite reliability provides a measure of the internal consistency and homogeneity of the items comprising a scale (Churchill, 1979). It means that a set of latent indicators of construct are consistent in their measurement. The reliability of construct can be estimated using AMOS output. In more formal terms, this reliability is the degree to which a set of two or more indicators share the measurement of a construct. Highly reliable constructs are those in which the indicators are highly interrelated, indicating that they are all measuring the same latent construct. The range of values for reliability is between 0 and 1. Results, as presented in Table 8, indicated that the reliability of the constructs of GSP, corporate reputation, and organisational performance scales were 0.964, 0.939, 0.950, respectively. All constructs exceeded the recommended level of 0.7 which indicates a good reliability for all of the three studied constructs (Bagozzi and Yi, 1988; Sanchez-Rodriguez et al., 2005; Hair et al, 2010).

Table 7 Indicators of GSP, corporate reputation and organisational performance for the final model

	Completely standardised factor loadings	*Standard error*[a]	*Critical ratio*[b]	R^2
Green shipping practices				
g1	0.878	---[c]	---[c]	0.772
g2	0.851	0.061	15.238	0.724
g3	0.816	0.073	12.240	0.665
g4	0.903	0.062	15.257	0.816
g5	0.863	0.064	13.810	0.745
g6	0.829	0.065	12.742	0.688
g7	0.879	0.060	14.456	0.773
g8	0.834	0.068	12.876	0.696
Corporate reputation				
r1	0.938	---[c]	---[c]	0.880
r2	0.768	0.073	11.744	0.590
r3	0.905	0.053	17.208	0.819
Organisational performance				
f1	0.652	0.077	8.982	0.425
f2	0.939	0.055	19.163	0.882
f3	0.988	0.047	22.724	0.976
f4	0.910	---[c]	---[c]	0.828

Notes: [a]S.E. is an estimate of the standard error of the covariance.
[b]C.R. is the critical ratio obtained by dividing the estimate of the covariance by its standard error. A value exceeding 1.96 represents a level of significance of 0.05.
[c]Indicates a parameter fixed at 1.0 in the original solution.

Table 8 Descriptive statistics and composite reliability for each measure

Measures	*Mean*	*S.D.*	*Composite reliability*
Green shipping practices	5.786	1.108	0.964
Corporate reputation	5.810	1.075	0.939
Organisational performance	5.088	1.05	0.950

A complementary measure to composite reliability is the average variance extracted and these statistics measure the amount of variance in the specified indicators accounted for by the latent construct. Higher variance extracted values occur when the indicators are truly representative of the latent construct. Typically, recommendations suggest that the variance extracted value should exceed 0.50 for a construct (Bagozzi and Yi, 1988; Hair et al., 2010). As shown in Table 9, the AVE for each construct is greater than the squared correlation between the construct and the other constructs. The highest squared correlation is observed between GSP and reputation with a value of 0.637, which was lower than the AVE values of GSP (0.768), corporate reputation (0.837), and organisational performance (0.827), respectively.

Table 9   Assessment of average variance extracted

Measures	AVE[a]	GSP	Corporate reputation	Organisational performance
Green shipping practices	0.768	1		
Corporate reputation	0.837	0.798** **(0.637)**[b]	1	
Organisational performance	0.827	0.551** **(0.304)**[b]	0.724** (0.413)[b]	1

Notes: **Correlation is significant at the 0.01 level. *Correlation is significant at the 0.05 level
[a]Average variance extracted (AVE) = (sum of squared standardised loading)/ [(sum of squared standardised loadings) + (sum of indicator measurement error)]; Indicator measurement error is calculated as 1-(standardised loading)^2.
[b]The square root of the shared variance between the constructs and their measures are provided in the diagonal (in bold).

4.5   Results of hypothesis testing

After confirming and establishing a good model fit for the measurement model, the proposed structural model was evaluated and the hypothesised relationships examined. For the purposes of illustration, we examined the models shown in Figure 2 and Figure 3 involving

a   GSP as the independent variable

b   corporate reputation as the mediator variable

c   organisational performance as the dependent variable.

The hypothesis of interest is that corporate reputation will be a significant mediator of the relationship between GSP and organisational performance.

Result shown in Figure 1 indicated that the direct effect of GSP on organisational performance and the data adequately supported the estimated model. The chi-square statistic ($\chi^2 = 107.411$, df $= 77$) at 0.013 is below the threshold level of 0.05 significances, which suggests the differences in predicted and actual matrices are insignificant and strongly demonstrates the model's fitness to the data collected. In addition, the goodness-of-fit index (GFI) was calculated to be 0.911 and adjusted goodness-of-fit (GFI) index yielded 0.861 after adjustment was made for degrees of freedom relative to the number of variables. This indicated 80.67% of the variances and covariance in the

data observed were predicted by the estimated model. Moreover, results of fitting the structural model to the data revealed that the model had a good fit as indicated by the normed Chi-Square (χ^2/df = 1.395), comparative fit index (CFI = 0.985), root mean square residual (RMR = 0.049) and root-mean-square error of approximation (RMSEA = 0.055).

Figure 3 indicated that the direct effect of GSP on organisational performance and the results also adequately supported the estimated model. The GFI was 0.911 and AGFI index was 0.861. Results indicated that the model also had a good fit as indicated by the normed chi-square (χ^2/df = 1.318), CFI = 0.984, RMR = 0.049 and RMSEA = 0.055.

**Figure 2** The direct of GSP on organisational performance (see online version for colours)
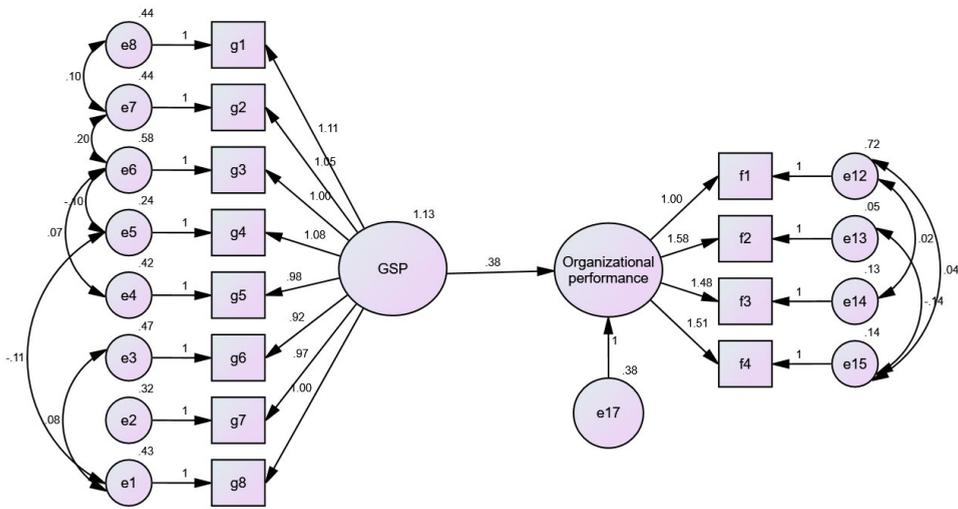
Notes: Chi-square = 58.002, Degrees of freedom = 44, Probability level = 0.077
GFI = 0.933, AGFI = 0.8881, CFI = 0.991, RMR = 0.05, RMSEA = 0.05
(a) e1 to e8 are errors for indicators of exogenous variables, whereas e12 to e15 are errors for indicators of endogenous variables.
(b) GFI represents the goodness-of-fit index, AGFI represents the adjusted goodness-if-fit index, RMR represents root-mean-square-residual, RMSEA represents root-mean-square-error-of-approximation.
(c) Co-efficiencies were based on unstandardised estimates.

Table 10 summarised the results of the hypotheses testing which showed that all hypothesised relationships were significant and in the expected direction, except for the paths from GSP to organisational performance, which were insignificant. GSP was found to have significant relationships with corporate reputation (estimate = 0.827, C.R. > 1.96). Corporate reputation was found to have a significant relationship with organisational performance (estimate = 0.520, C.R. > 1.96) in this study. Thus, H1 and H3 were supported in this study. However, the direct effect of GSP on organisational performance was not significant. Thus, H2 was not supported.

Further, to perform the bootstrap analysis, we used the SPSS AMOS 24.0 programme, which is the one currently available software package to examine the indirect effects based on bootstrapped percentile (Arbuckle, 2016). Table 11 shows the test of the indirect effect of GSP on organisational performance. The percentile

confidence interval is between 0.271 and 0.647, which does not include zero. We can conclude that the indirect effect is statistically significant at the 0.05 level. Thus. H4 was supported in this study.

Figure 3   SEM results (see online version for colours)
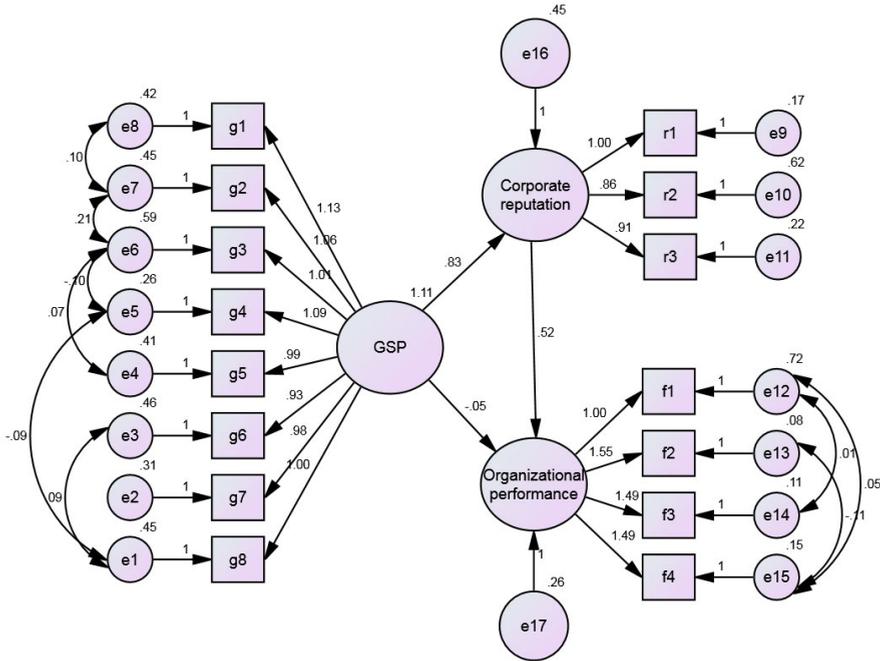
Notes: Chi-square = 107.411, Degrees of freedom = 77, Probability level = 0.013
GFI = 0.911, AGFI = 0.861, CFI = 0.984, RMR = 0.049, RMSEA = 0.055
(a) e1 to e8 are errors for indicators of exogenous variables, whereas e9 to e15 are errors for indicators of endogenous variables.
(b) GFI represents the goodness-of-fit index, AGFI represents the adjusted goodness-if-fit index, RMR represents root-mean-square-residual, RMSEA represents root-mean-square-error-of-approximation.
(c) Co-efficiencies were based on unstandardised estimates.

Table 10   SEM results

Paths	Result			
	Estimate	*S.E.*	*C.R.*	*P*
Green shipping practices → Corporate reputation	0.827	0.082	10.121	***
Green shipping practices → Organisational performance	–0.046	0.083	–0.554	.580
Corporate reputation → Organisational performance	0.520	0.099	5.232	***

Notes: S.E. is an estimate of the standard error of the covariance
C.R. is obtained by dividing the covariance estimate by its standard error.
Underlined values are critical ratios exceeding 1.96 at the 0.05 level of significance.

Table 11 Results of Bootstrap methods to test significance of mediation effects

Path/effect	95% confidence interval (bootstrap percentile)		
	Lower	*Upper*	*P value*
H1: Green shipping practices → Corporate reputation	0.645	1.023	0.010
H2: Green shipping practices → Organisational performance	–0.249	0.090	0.515
H3: Corporate reputation → Organisational performance	0.364	0.770	0.010
H4: Green shipping practices→ Corporate reputation → Organisational performance	0.271	0.647	0.014

5 Discussion and conclusions

This study investigated the linkages between GSP, corporate reputation and organisational performance in the container shipping industry. Several studies (Lai et al., 2011; Lirn et al., 2014; Lun et al., 2014; Schmidt et al., 2017) have examined the relationships between GSP and firm performance but none have focused on the linkage between corporate reputation. To fill this gap in the literature, this study explored the mediating effects of corporate reputation on GSP and organisational performance in the container shipping industry in Taiwan.

5.1 Implication of the research findings

There are several implications from the research findings. First, respondents agreed that all GSP measures were of high importance. Most respondents strongly agreed that finding ways to reduce their ships' fuel consumption was utmost important. From an economic perspective, high oil prices will hurt companies' revenue and profit in the short and medium term. Reducing ships' fuel consumption will help to protect the environment and enable companies to project a positive image to their stakeholders (Lun et al., 2014). The introduction of slow steaming and adoption of liquefied nitrogen gas (LNG) as an alternative source of marine fuel are some of the measures which have been undertaken by the shipping industry to reduce fuel consumption (Maloni et al., 2013; Thalis et al., 2014). Shipping companies should continue to explore new ways to reduce fuel consumption as it brings economic and environmental benefits. Most respondents opined that their company has strong internal company policy and procedures with regards to onboard operations (Lai et al., 2013). Onboard crew strictly implements company's environmental regulations and policy while ships complies with international regulations.

Second, IMO has passed stricter regulations which requires shipping companies to comply with new sulphur regulations in three ways, namely using abatement technology, compliant fuels or adopting LNG. This regulation forces shipping companies to place greater emphasis on reducing emission of greenhouse gases or harmful gases on their ships to improve their GSP.

Third, from the results, GSP has a direct positive effect on corporate reputation. Complying with international regulations and having crew that will strictly implement

company's green regulations and policy may enhance a company's reputation with its stakeholders in the supply chain. Business corporations who also need to protect their reputations will engage transport companies with strong corporate reputations and image (Lam and Lai, 2015). Shipping companies should investigate and implement GSP on all aspects in its organisations (Hsu, 2012; Tang et al., 2012). Fourth, GSP was found not to have a direct positive effect on organisational performance. This is in contrast with Lu et al. (2009) and Lun et al. (2014). However, with corporate reputation as a mediating effect, GSP has an indirect positive effect on organisational performance. From a theoretical implication, this finding suggest a role for GSP in indirectly promoting performance through enhancing reputation (Saeidi et al., 2015). From the findings, companies can focus on providing good service quality and provide closer cooperation with customers (Lai et al. 2013).

5.2   Limitations and direction for future research

There are several key limitations of this study. First, this study has shown that GSP are crucial and should be strictly enforced at all organisational levels for container shipping companies in Taiwan. However, in order to show that it is also important globally, it would be valuable to collect data from other countries to acquire a balanced view of the relationships between the three factors in the context of container shipping. Second, GSP in this study was based on an organisational perspective. GSP should be carried out by the ships' crew. Future research could gather seafarers' and shippers' perspectives on the shipping industry's role in designing and implementing GSP. Future research could also be extended to other industries such as air transport and trucking. Third, this study only covers environmental responsibility. Corporate social responsibility includes economic responsibility and social responsibility. The model could incorporate these two dimensions for future research. In addition, other organisational factors such as organisational green citizenship behaviour or ethical leadership could be added to make the model more robust. Further, we used simply four items to measure the organisational performance construct and three of them are non-financial ones. A company's profit may derive from both of their shipping operation and from non-shipping operation. Thus, it will be reasonable if future research can specifically focus on the relationships between the operation profit before interest, return on investment, market share, and the GSP and CR. Finally, the collected data obtained from self-reported customer loyalty and organisational performance in container shipping operations may have been subject to bias due to respondents' reluctance to report actual situation. Because potential repercussions and an interest in avoiding lawsuits being brought against respondents by their employing company. Hence, further research might measure customer loyalty by actual observation.

References

A.P. Moller-Maersk Group (2017) *A.P Moller-Maersk Group Sustainability Report 2014*, A.P. Moller-Maersk Group [online] http://www.maersk.com/en/the-maersk- group /sustainability/ ~/media/The%20Maersk%20Group/Sustainability/Files/Publications/2014/maersk_sustainabil ity_report_2014_print_version.pdf (accessed 28 January 2019).

Anderson, J.C. and Gerbing, D.W. (1988) 'Structural equation modelling in practice: a review and recommended two-step approach', *Psychological Bulletin*, Vol. 103, No. 3, pp.411–423.

Antunovich, P., Laster, D. and Mitnick, S. (2000) 'Are high-quality firms also high-quality investments', *Current Issues in Economics and Finance*, Vol. 6, No. 1, pp.1–6.

Arbuckle, J.L. (2016) *IBM SPSS Amos 24 User's Guide*, IBM, USA.

Armstrong, J. and Overton, T.S. (1977) 'Estimating non-response bias in mail surveys', *Journal of Marketing Research*, Vol. 14, No. 3, pp.396–402.

Bagozzi, R.P. and Yi, Y. (1988) 'On the evaluation of structural equation models', *Journal of Academy of Marketing Science*, Spring, Vol. 16, pp.74–94.

Barnett, M.L., Jermier, J.M. and Lafferty, B.A. (2006) 'Corporate reputation: the definitional landscape', *Corporate Reputation Review*, Vol. 9, No. 1, pp.26–38.

Boyd, B., Bergh, D.D. and Ketchen, D.J. (2010) 'Reconsidering the reputation-performance relationship: a resource-based view', *Journal of Management*, Vol. 36, No. 3, pp.588–609.

Brammer, S. and Pavelin, S. (2004) 'Building a good reputation0', *European Management Journal*, Vol. 22, No. 6, pp.704–713.

Byrne, B.M. (2001) *Structural Equation Modeling with AMOS: Basic Concepts, Applications, and Programming*, Taylor and Francis, New Jersey, USA.

Carr, A.S. and Pearson, J.N. (1999) 'Strategically managed buyer-supplier relationships and performance outcomes', *Journal of Operations Management*, Vol. 17, No. 5, pp.497–519.

Chang, Y.T. and Danao, D. (2017) 'Green shipping practices of shipping firms', *Sustainability*, Vol. 9, No. 5, pp.829–852.

Cheng, C.C.J., Yang, C.L. and Sheu, C. (2014) 'The link between eco-innovation and business performance: a Taiwanese industry context', *Journal of Cleaner Production*, February, Vol. 64, pp.81–90.

Chow, G., Heaver, T.D. and Henricksson, L.E. (1994) 'Logistics performance: definition and measurement', *International Journal of Physical Distribution & Logistics Management*, Vol. 24, No. 1, pp.17–28.

Christodoulou, A., Gonzalez-Aregall, M., Linde, T., Verth, I. and Cullinane, K. (2019) 'Targeting the reduction of shipping emissions to air: a global review and taxonomy of policies, incentives and measures', *Maritime Business Review*, Vol. 4, No. 1, pp.16–30.

Chun, R. (2005) 'Corporate reputation: meaning and measurement', *International Journal of Management Reviews*, Vol. 7, No. 2, pp.91–109.

Churchill, G.A. (1979) 'A paradigm for developing better measures of marketing constructs', *Journal of Marketing Research*, Vol. 16, pp.360–375.

Cooper, D.R. and Schindler, P.S. (2008) *Business Research Methods*, McGraw-Hill, Irwin, USA.

Deephouse, D.L. (2000) 'Media reputation as a strategic resource: an integration of mass communication and resource-based theories', *Journal of Management*, Vol. 26, No. 6, pp.1091–1112.

Dunn, S.C., Seaker, R.F. and Waller, M.A. (1994) 'Latent variables in business logistics research: scale development and validation', *Journal of Business Logistics*, Vol. 15, No. 2, pp.145–172.

Ewing, M.T., Caruana, A. and Loy, E.R. (1999) 'Corporate reputation and perceived risk in professional engineering services', *Corporate Communications: An International Journal*, Vol. 4, No. 3, pp.121–128.

Fombrun, C.J. (1996) *Reputation: Realising Value from the Corporate Image*, Harvard Business School Press, Boston.

Fombrun, C.J. and Shanley, M. (1990) 'What's in a name? Reputation-building and corporate strategy', *Academy of Management Journal*, Vol. 33, No. 2, pp.233–258.

Freeman, R.E. (1984) *Strategic Management: A Stakeholder Approach*, Pitman Publishing Inc., Massachusetts.

Gardberg, N.A. and Fombrun, C. (2002) 'The global reputation quotient project: first steps towards a cross-nationally valid measure of corporate reputation', *Corporate Reputation Review*, Vol. 4, No. 4, pp.303–307.

Hair, J., Anderson, R. and Black, W. (2010) *Multivariate Data Analysis*, 7th ed., Pearson, New Jersey, USA.

Hall, R. (1993) 'A framework linking intangible resources and capabilities to sustainable competitive advantage', *Strategic Management Journal*, November, Vol. 14, pp.607–618.

Hood, W., Young, S. and Lal, D. (1994) 'Strategic evolution with Japanese manufacturing plants in Europe: UK evidence', *International Business Review*, Vol. 3, No. 2, pp.3–26.

Hsu, K.T. (2012) 'The advertising effects of corporate social responsibility on corporate reputation and brand equity: evidence from the life insurance industry in Taiwan', *Journal of Business Ethics*, Vol. 109, No. 2, pp.189–201.

Iacobucci, D., Churchill, G.A. and Iacobucci, D. (2015) *Marketing research: Methodological Foundations*, South-Western, USA.

Jose, A. and Lee, S.M. (2007) 'Environmental reporting of global corporations: a content analysis based on website disclosures', *Journal of Business Ethics*, Vol. 72, pp.307–321.

K Line Group (2016) *K Line Report 2016*, K Line Group [online] https://www.kline.co.jp/en/ir/library/report/main/017/teaserItems1/00/file/KlineReport2016_en.pdf.

Kay, J. (1993) 'The structure of strategy', *Business Strategy Review*, Vol. 4, No. 2, pp.17–37.

Khojastehpour, M. and Johns, R. (2014) 'The effect of environmental csr issues on corporate/brand reputation and corporate profitability', *European Business Review*, Vol. 26, No. 4, pp.330–339.

Koufteros, X.A. (1999) 'Testing a model of pull production: a paradigm for manufacturing research using structural equation modelling', *Journal of Operations Management*, Vol. 17, No. 4, pp.467–488.

Lai, K.H., Lun, V.Y.H., Wong, C.W.Y. and Cheng, T.C.E. (2011) 'Green shipping practice in the shipping industry: conceptualisation, adoption, and implications', *Resources, Conservation and Recycling*, Vol. 55, No. 6, pp.631–638.

Lai, K.H., Lun, V.Y.H., Wong, C.W.Y. and Cheng, T.C.E. (2013) 'Measures for evaluating supply chain performance in transport logistics', *International Journal of Shipping and Transport Logistics*, Vol. 5, No. 6, pp.217–235.

Lam, J.S.L. and Lai, K.H. (2015) 'Developing environmental sustainability by ANP-QFD approach: the case of shipping operations', *Journal of Cleaner Production*, October, Vol. 105, pp.275–284.

Lee. J. and Roh, J.J.B. (2012) 'Revisiting the corporate reputation and firm performance link', *Benchmarking: An International Journal*, Vol. 19, Nos. 4/5, pp.649–664.

Lirn, T.C., Lin, H.W. and Shang, K.C. (2014) 'Green shipping management capability and firm performance in the container shipping industry', *Maritime Policy & Management*, Vol. 41, No. 2, pp.159–175.

Logsdon, J.M. and Wood, D.J. (2002) 'Reputation as an emerging construct in the business and society field: an introduction', *Business and Society*, Vol. 41, No. 4, pp.365–370.

Lu, C.S., Lin, C.C. and Tu, C.J. (2009) 'Corporate social responsibility and organizational performance in container shipping', *International Journal of Logistics: Research and Applications*, Vol. 12, No. 2, pp.119–132.

Lun, V.Y.H., Lai, K.H., Wong, C.W.Y. and Cheng, T.C.E. (2014) 'Green shipping practices and firm performance', *Maritime Policy & Management*, Vol. 41, No. 2, pp.134–148.

Lun, V.Y.H., Lai, K.H., Wong, C.W.Y. and Cheng, T.C.E. (2015) 'Environmental governance mechanisms in shipping firms and their environmental performance', *Transportation Research Part E*, June, Vol. 78, pp.82–92.

Mahon, J. and Wartick, S.(2003) 'Dealing with stakeholder: how reputation, credibility and framing influence the game', *Corporate Reputation Review*, Vol. 6, No. 1, pp.19–35.

Maloni, M., Jomon, A.P. and Gligor, D.M. (2013) 'Slow steaming impacts on ocean carriers and shippers', *Maritime Economics and Logistics*, Vol. 15, No. 2, pp.151–171.

Mansouri, S.A., Leee, H. and Aluko, O. (2015) 'Multi-objective decision support to enhance environmental sustainability in maritime shipping: a review and future directions', *Transportation Research Part E*, June, Vol. 78, pp.3–18.

Michaelis, M., Woisetschlager, D.M., Backhaus, C. and Ahlert, D. (2008) 'The effects of country of origin and corporate reputation on initial trust', *International Marketing Review*, Vol. 25, No. 4, pp.402–422.

Min, S. and Mentzer, J. (2004) 'Developing and measuring supply chain management concepts', *Journal of Business Logistics*, Vol. 25, No. 1, pp.63–92.

Miroshnychenko, I., Barontini, R. and Tests, F. (2017) 'Green practices and financial performance: a global outlook', *Journal of Cleaner Production*, March, Vol. 147, pp.340–351.

MOL Group (2016) *MOL Group Annual Report 2016*, MOL Group [online] https://molgroup.info/storage/documents/publications/annual_reports/2016/ar_2016_book_eng_0606.pdf.

Montabon, F., Sroufe, R. and Narasimhan, R. (2007) 'An examination of corporate reporting, environmental management practices and firm performance', *Journal of Operations Managements*, Vol. 25, No. 5, pp.998–1014.

Murphy, G.B. Trailer, J.W. and Hill, R.C. (1996) 'Measuring performance in entrepreneurship research', *Journal of Business Research*, Vol. 36, No. 1, pp.15–23.

NKY Line (2016) *NYK Report 2016*, NYK Line [online] https://www.nyk.com/english/ir/pdf/2016_nykreport_all.pdf.

NYK Line (2017) *CSR Report 2017: Taking a Step Forward*, NYK Line [online] http://www.nyk.com/english/ir/library/nyk/pdf/2014_nykreport_all.pdf (accessed 17 June 2017).

Panayides, P.M. and Polyviou, M. (2011) 'The effects of ports' logistics attributes and services on the business and supply chain performance of shipping firms', *International Journal of Shipping and Transport Logistics*, Vol. 3, No. 4, pp.430–453.

Pang, K. and Lu, C.S. (2018) 'Organizational motivation, employee job satisfaction and organizational performance: an empirical study of container shipping companies in Taiwan', *Maritime Business Review*, Vol. 3, No. 1, pp.36–52.

PortNews (2016) *CMA CGM Inks First MoU with ENGIE to Promote LNG* [online] http://en.portnews.ru/news/228257/ (accessed 20 July 2018).

Puncheva-Michelotti, P. and Michelotti, M. (2010) 'The role of the stakeholder perspective in measuring corporate reputation', *Marketing Intelligence & Planning*, Vol. 28, No. 3, pp.249–274.

Raithel, S. and Schwaiger, M. (2015) 'The effects of corporate reputation perceptions on the general public on shareholder value', *Strategic Management Journal*, Vol. 36, No. 6, pp.945–956.

Rindova, V.P., Williamson, I.O., Petkova, A.P. and Sever, J.M. (2005) 'Being good or being known: an empirical examination of the dimension, antecedents, and consequences of corporate reputation', *Academy of Management Journal*, Vol. 48, No. 6, pp.1033–1049.

Roberts, P.W. and Dowling, G.R. (1997) 'The vale of a firm's corporate reputation', *Corporate Reputation Review*, Vol. 1, No. 1, pp.72–76.

Roberts, P.W. and Dowling, G.R. (2002) 'Corporate reputation and sustained superior financial performance', *Strategic Management Journal*, Vol. 23, No. 12, pp.1077–1093.

Rose, C. and Thomsen, S. (2004) 'The impact of corporate reputation on performance: some Danish evidence', *European Management Journal*, Vol. 22, No. 2, pp.201–210.

Sabate, J.M. and Puente, E. (2003) 'Empirical analysis of the relationship between reputation and financial performance: a survey of the literature', *Corporate Reputation Review*, Vol. 6, No. 2, pp.61–177.

Saeidi, S.P., Sofian, S., Saeidi, P., Saeidi S.P. and Saaeidi, S.A. (2015) 'How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation and customer satisfaction', *Journal of Business Research*, Vol. 68, No. 2, pp.341–350.

Sanchez-Rodriguez, C., Hemsworth, D. and Martinez-Lorente, A.R. (2005) 'The effect of supplier development initiatives on purchasing performance: a structural model', *Supply Chain Management: An International Journal*, September, Vol. 10, pp.289–301.

Schmidt, C., Foerstl, K. and Schaltenbrand, B. (2017) 'The supply chain position paradox: green practices and firm performance', *Journal of Supply Chain Management*, Vol. 53, No. 1, pp.3–25.

Shang, K.C., Lu, C.S. and Li, S. (2010) 'A taxonomy of green supply chain management capability among electronics-related manufacturing firms in Taiwan', *Journal of Environmental Management*, Vol. 91, pp.1218–1226.

Steers, R.M. (1975) 'Problems in the measurement of organizational effectiveness', *Administrative Science Quarterly*, December, Vol. 20, pp.546–548.

Tang, A.K.Y., Lai, K.H. and Cheng, T.C.E. (2012) 'Environmental governance of enterprises and their economic upshot through corporate reputation and customer satisfaction', *Business Strategy and the Environment*, September, Vol. 21, pp.401–411.

Thalis, Z., North, R.J. and Panagiotis, A. (2014) 'Evaluation of cold ironing and speed reduction policies to reduce ship emissions near and at ports', *Maritime Economics and Logistics*, Vol. 16, No. 4, pp.371–398.

Topali, D. and Psaraftis, H.N. (2019) 'The enforcement of the global sulfur cap in maritime transport', *Maritime Business Review*, Vol. 4, No. 2, pp.199–216.

Venkatraman, N. and Ramanujam, V. (1986) 'Measurement of business performance in strategy research: a comparison of approaches', *Academy of Management Review*, Vol. 11, No. 4, pp.801–814.

Walker, K. (2010) 'A systematic review of the corporate reputation literature: definition, measurement and theory', *Corporate Reputation Review*, Vol. 12, No. 4, pp.357–387.

Walsh, G. and Beatty, S.E. (2007) 'Customer-based corporate reputation of a service firm: scale development and validation', *Journal of the Academy of Marketing Science*, Vol. 35, No. 1, pp.127–143.

Yang Ming Group (2017) *2017 Corporate Social Responsibility Report*, Yang Ming Group [online] https://www.yangming.com/files/Investor_Relations/csr_2017(eng).pdf (accessed 17 June 2017).

Yang Ming Marine Transportation Corporation (2016) *Corporate Social Responsibility Report 2016', Yang Ming Marine Transportation Corporation* [online] https://www.yangming.com/files/Investor_Relations/csr_2016(eng).pdf.

Yang, C.S., Lu, C.S., Haider, J.J. and Marlow, P.B. (2013) 'The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan', *Transportation Research Part E*, August, Vol. 55, pp.55–73.

Zou, H.L., Zeng, R.C., Zeng, S.X. and Shi, J.J. (2015) 'How do environmental violation events harm corporate reputation?', *Business Strategy and the Environment*, December, Vol. 24, pp.836–854.