An analysis of institutional pressures, green supply chain management, and green performance in the container shipping context

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Abstract

This paper presents a study which utilized a conceptual framework with institutional theory as its base to empirically evaluate the impact of institutional pressures, internal green practices, and external green collaborations on green performance. Factor analysis was employed to identify the key institutional pressures (i.e. coercive, normative and mimetic pressures), internal green practices (i.e. green shipping practices and green operations), external green collaborations (i.e. green collaboration with supplier, green collaboration with partner, and green collaboration with customer), and green performance (i.e. reduction of pollutants, and perceived green brand) dimensions. We collected data from surveyees employed by 129 container shipping companies and agencies in Taiwan, and applied a structural equation model (SEM) to test the research hypotheses. The findings revealed that institutional pressures have positive effects on internal green practices; internal green practices positively influence external green collaborations; internal green practices and external green collaborations positively influence green performance but institutional pressure is not positively associated with external green collaborations. Theoretical contributions and managerial implications are presented to help container shipping operators improve green performance.

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1. Introduction

The globalization of business has had a profound impact on the way companies operate. Maritime transportation is a dominant mode of transport since over 90% of the global trade volume is carried by sea. In addition, in 2015 estimated world seaborne trade volumes surpassed 10 billion tons and the world’s total container ship deadweight tonnage (DWT) had increased from 11 million DWT in 1980 to 180.66 million DWT in 2016 (UNCTAD, 2016), reflecting the vital role of shipping in global supply chain management. Container shipping, as a key link in the supply chain, is critical to the trade and transportation networks (Notteboom and Rodrigue, 2008). Concentrations of maritime logistics, container shipping, and terminal activities, integrated with other inland transportation activities, result in severe environmental degradation. Moreover, globalization has led to much more intense global competition and changed the way shipping companies operate. As a result of the increases in trade volume, cargo size and number of ships, and consequent rapid growth in the maritime sector, serious concerns have been raised concerning their environmental impacts (e.g. Tiquio et al., 2017), hazardous/harmful/toxic materials (e.g. Grote et al., 2016), noise pollution (e.g. Chen et al., 2017; Garrett et al., 2016), greenhouse gases (e.g. Shi, 2016),

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http://dx.doi.org/10.1016/j.trd.2017.07.005
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Please cite this article in press as: Yang, C.-S. An analysis of institutional pressures, green supply chain management, and green performance in the container shipping context. Transport. Res. Part D (2017), http://dx.doi.org/10.1016/j.trd.2017.07.005
waste (e.g. Wilewska-Bien et al., 2016), and demand on energy (e.g. Poulsen and Johnson, 2016). Environmentally-friendly shipping has therefore attracted increasing attention because of growing awareness of environmental issues such as climate changes, and the environmental impacts of shipping-related activities (Gavronski et al., 2011). The changing structure of global markets and increasing sustainable demands have forced container shipping service firms to remodel their business processes to accommodate shippers’ environmental protection needs. Balancing economic growth and reducing the ecological impact of shipping activity has become increasingly important for container shipping companies facing public regulatory and competitive pressures. Ocean going shipping is recognized as being a major contributor to environmental issues through its modes, infrastructures and flows.

The International Convention for the Prevention of Pollution from Ships (MARPOL), adopted by the International Maritime Organization (IMO), covers pollution by oil, chemicals, harmful substances in packaged form, sewage and garbage (Gollasch et al., 2007). The Convention includes regulations aiming at preventing and minimizing pollution from ships. The European Union (EU) has built its legislation on international maritime environmental protection standards, EU directives and regulations. Such legislation encourages the use of environmentally-friendly tankers (Regulation 417/2002/EC), requires the provision of adequate waste reception facilities (Directive 2000/59/EC), and outlines sanctions for pollution offences (Directive 2005/35/EC) which are enforceable for all ships calling at ports in the EU.

Because of the rapidly increasing importance of environmental issues, like other economic sectors, the container shipping sector is facing a dual challenge in terms of green performance and economic performance. To establish their green image, enterprises have to re-examine the purpose of their business (Hicks, 2007). According to “Shipping industry guidance on Environmental Compliance” of the International Chamber of Shipping (ICS) and the International Shipping Federation (ISF), the global shipping industry is committed to proactively addressed their environmental and related socio-economic responsibilities through implementing environmental management systems (e.g. ISO 14000 series) (ICS, 2007), the framework is a tool for shipping companies to use in reviewing their own practices and ensure compliance with environmental protection obligations. Owing to regulatory control and the need for fulfilling corporate social responsibility (CSR), shipping companies are also required to attain higher social and environmental standards (Lam, 2015; Lai et al., 2013). The interaction between the environment and supply chains is also viewed as critical in the shipping operations and environment literature (Darbra et al., 2004). The developing field of green supply chain management (GSCM) is seen as an opportunity for the container shipping industry to present a more eco-friendly face. Container shipping GSCM can be broadly classified into internal green practices and external green collaborations. Internal green practices are defined as a number of internal green shipping practices and operations that can be implemented and managed independently by individual container shipping company to reduce the environmental impacts of day-to-day activities and operations. External green collaborations typically require some level of collaboration with external stakeholders such as suppliers, partners, and customers.

Shipping industries are required to improve the environmental performance of their transportation services to cope with the growing importance of global environmental issues. With increased pressures for sustainable shipping transportation, it is expected that container shipping companies will need to implement green supply chain management in order to reduce the environmental impacts of their shipping logistics services. Green supply chain management is a concept that is gaining popularity in the container shipping industry, since it helps to enhance environmental performance, minimize waste, and save costs (Zhu and Sarkis, 2004; Rao and Holt, 2005; Vachon and Klassen, 2006; Zhu et al., 2007). In this paper, we argue that the reasons why companies adopt green supply chain management (i.e. internal green practices and external green collaborations) depend on the institutional pressures that are exerted on them by public organizations and competitors in the container shipping context.

There are six sections in this paper. Following this introduction, the next section presents a review of previous research on institutional pressures, green supply chain management, and green performance in container shipping operations. Five research hypotheses are postulated. The third section describes the research method, including the research sample, survey measures, and data analysis methods. The fourth section presents the results of empirical analysis, including exploratory and confirmatory factor analysis results, and structural equation modeling. The fifth section draws conclusions from the research findings and discusses their implications for container shipping. Study limitations and further research suggestions are presented in the final section.

2. Theoretical background and hypotheses

2.1. Institutional pressures

Organizational field is a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services and products (DiMaggio and Powell, 1983). Institutional theory argues that firms embedded in social networks perceive strong pressure to conform to institutional expectations to acquire social legitimacy and access to important and rare resources because violations may jeopardize organizational performance (DiMaggio and Powell, 1983; Zucker, 1987; Scott, 2001) and long-term development (Teo et al., 2003). Institutional theory provides insights into how “best practices” are disseminated and institutionalized, paving the way for the emergence and formation of institutions (Dedoulis, 2016; DiMaggio and Powell, 1983). Therefore, institutional isomorphism leads organizations to adopt similar structures, strategies, and processes (DiMaggio and Powell, 1983) to achieve rationality with
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