Chapter 14
A Selection of Shipping Business Strategy for Containership using an Evidential Reasoning Method

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ABSTRACT
Various shipping business strategies have been proposed by researchers due to the uncertainty of global conditions. The aims of those strategies are to reduce emissions produced by containerships and the vessel expenditure costs. A decision-making technique incorporating an evidential reasoning method, a fuzzy-link-based technique, and an analytical hierarchy process approach is used for selecting the most beneficial shipping business strategy. A set of qualitative data is obtained from expert judgments. A strategy “combination of Mega Containership and Reduction of Ports of Call” is classified as the most beneficial shipping business strategy in a dynamic operational environment.

INTRODUCTION
1976, 1986, 1997, and 2008/2009 were the years which possessed the bad economic histories globally (Tomas et al., 2010). The major impacts of these years were the decrease of the domestic and international business activities, ultimately increasing the price of all consumables, foods and fuels. The increase of fuel price resulted in the increase of public and private transportation costs. Due to the bad global economic situation, the development of economic activity was dramatically slow; thus, firms decided to save money rather than invest.
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The Impacts of Global Crisis to the Container Shipping Sector

The service performance of the container shipping industry depends on both the global economy and the container market demand conditions (Bendall and Stent, 2003). The period from September 2008 to April 2009 was the worst economic recession after World War 2 and in over seven decades (International Monetary Fund, 2009; UNCTAD, 2010). As a consequence, the world’s Gross Domestic Products (GDP) decreased by up to 5% in 2009 compared to the year before (World Bank, 2010).

In the same year of the global economic recession, the global financial crisis occurred. The crisis originated in the United States and spread rapidly to the rest of the world in a matter of days (Samaras and Papadopoulou, 2010). The global financial crisis in September 2008 was triggered by the sudden bankruptcy of Lehman Brothers (Barry Rogliano Salles, 2009). Bad debts were revealed at most western banks and billions of dollars in value were wiped from stock markets (Barry Rogliano Salles, 2009). This phenomenon was such that almost all international businesses including the container shipping sector suffered and some of them collapsed. This crisis was the biggest global economic contraction on record, due to the reduction of global exports by 9% in 2009 (World Trade Organization, 2009).

Together with the global economic recession and the global financial crisis, the bunker fuel price has increased extremely in 2008 (Barillo, 2011; Kontovas and Psaraftis, 2011). The current situation of the bunker fuel price is still under debate among the liner shipping players because it plays a major role in influencing the bunker fuel cost of containerships (Clarkson Research Services, 2009). The high bunker fuel price is leading to the increase of bunker fuel cost (Kontovas and Psaraftis, 2011). Historically, the bunker fuel price has fluctuated from US$142 per tonne in 1980s, US$81 in 1990s, US$265 in 2000s, spiking at US$495 in April 2008, suddenly falling to US$276 in April 2009 before increasing again at a level of US$467 in April 2010 and the price continued to increase to a level of US$650 per tonne in April 2011 (Clarkson Research Services, 2012). Such an issue makes shipping companies under pressure to find a good solution in reducing the bunker fuel cost. This is because the bunker fuel cost is accounting for 60% of total voyage costs per sailing (Ben, 2009).

The downturn in the global economy and the global financial crisis has resulted in reducing the container market demand (UNCTAD, 2010; Wiesmann, 2010; Clarkson Research Services, 2012). The international seaborne trade volumes have been decreased by up to 7% in 2009 compared to 2008 (UNCTAD, 2010). In the first half of 2009, the container volumes reduced by double digits over the full year, and global box trade faced an unprecedented collapse (Clarkson Research Services, 2009). Also, in 2009, the total liner fleet expanded by 9.6% to a total 15.7 million TEUs (UNCTAD, 2010). The increase of vessel capacity in carrying containers and the decrease of container volumes occurred together in 2009 and led to an imbalance between vessels’ supply and the demand of container shipping (Clarkson Research Services, 209). Such a condition was significant downwards pressure on the container shipping markets as a whole.

At the same time, the new regulation of global emissions has been introduced by the International Maritime Organization (IMO) in October 2008 with the purpose of monitoring air emissions produced by containerships (IMO, 2010; Kontovas and Psaraftis, 2011; Wiesmann, 2010). The IMO adopted a number of important amendments to Annex VI of the Maritime Pollution (MARPOL) Convention which regulates air emissions. It introduced more stringent controls on Nitrogen Dioxide (NO\textsubscript{x}) and undertook much work to gradually reduce the global limit for Sulphur Dioxide (SO\textsubscript{x}) emissions from 4.5% to 0.5% sulphur content in fuel by 2020 (IMO, 2010). Also, the new MARPOL includes “Sulphur Emissions
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