Transportation Research Part D 55 (2017) 1–11

Contents lists available at ScienceDirect

Transportation Research Part D

journal homepage: www.elsevier.com/locate/trd

Environmental standard adoption in Marinas: A spatiotemporal analysis of a special form of maritime transportation hubs

William J. Ritchie [a], Steve A. Melnyk [b], John Z. Ni [c,*]

[a] College of Business, James Madison University, MSC 205, Harrisonburg, VA 22807, United States
[b] Eli Broad College of Business, Michigan State University, N327 Business College Complex, East Lansing, MI 48824, United States
[c] Farmer School of Business, Miami University, 800 E. High Street, Oxford, OH 45056, United States

ARTICLE INFO

Article history:
Available online 20 June 2017

Keywords:
Environmental standard
Maritime transportation hubs
Spatiotemporal analysis
Geographical information systems

ABSTRACT

The growth of both commercial and recreational boating has posed significant environmental challenges to waterways. As an effort by the U.S. government and other public service organizations to prevent and mitigate the environmental impact, Clean Marina Programs (CMP) have been developed to encourage marina owners and operators to meet environmental standards and become better stewards of the environment. This study examines the impact of geospatial proximity on the adoption timing and diffusion of a CMP in marinas, a special form of a maritime transportation hub. Drawing upon case study methodology and literature on geography and organizational clusters, we find that the adoption timing of an environmental standard varies with the density of the market within which it is promoted. These results lend support to the notion that firms in close proximity can accelerate standard adoption, hastening information flow about environmental standards through local labor pools, customer interactions, and resources.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

An established stream of transportation research centers on ocean-going vessels and related environmental issues (Acciaro, 2014; Ölçer and Ballini, 2015; Chang and Jhang, 2016). The vast majority of this literature addresses critical questions related to Business-to-Business (B2B) relationships such as costs-benefit scenarios with processes that minimize firms' ecological footprints. However, another significant yet overlooked segment in the maritime transportation context is that of marinas. Marinas serve as a special form of transportation hub for commercial fishing vessels and recreational boating. In recent years commercial and recreational maritime transportation across coastal regions has increased dramatically in the United States. Currently there are more than 67,000 commercial fishing businesses in the United States, comprising $6 billion in annual revenues (D'Costa, 2016: 3). Recreational maritime activities (e.g. wakeboarding, waterskiing, and yachting) entertain millions of people every year. According to the National Marine Manufacturers Association (NMMA, 2015), 35.7% of the U.S. adult population, some 87.3 million Americans, participated in recreational boating at least once in 2014. The NMMA estimates that in 2014, there were 16 million registered boats in the United States, representing more than 33,000 businesses in the marine industry and employing more than 500,000 workers.

The growth of both commercial and recreational boating has posed significant environmental challenges for waterways. In addition to the apparent environmental threats associated with litter entering waterways from yachts and recreational

* Corresponding author.
E-mail addresses: ritchiwj@jmu.edu (W.J. Ritchie), melnyk@broad.msu.edu (S.A. Melnyk), nijz@miamioh.edu (J.Z. Ni).

http://dx.doi.org/10.1016/j.trd.2017.06.013
1361-9209/© 2017 Elsevier Ltd. All rights reserved.

moorings, the maintenance, operation, and storage of these vessels in marinas pose significant risks to both marina owner/-operators and adjacent waters. The greatest threats for marinas regarding environmental hazard management are re-fueling activities, discharge from bilges, dust from hull maintenance operations, solvents from engine repair shops, sewage discharges, and heavy metals from antifouling paints. These pollutants may be deposited directly into waterways or transported by storm-water runoff from boatyards. An excess of nutrients, primarily from sewage and discarded fish parts can also result in algal blooms and low-dissolved oxygen in nearby waterways. Toxicants, such as those from paints, can kill life at the bottom of the marine food chain. According to the California Air Resource Board fact sheet, a typical personal watercraft with a two-stroke engine generates more smog-producing emissions in seven hours of operation than a 1998 passenger car driven 100, 000 miles. By an expert estimate, the gasoline, diesel fuel, and oil typically spilled out of recreational boats each year equal the amount of at least 15 Exxon Valdez oil spills in U.S. waterways (Fields, 2003).

The number of facilities in a marina (e.g. boat slips, mooring pins, launching ramps, gas docks, sewage pumpout stations, boating supply stores, and boatyards), make it extremely difficult to estimate the amount of pollution a marina generates. Effective management of these issues through self-regulation is complicated further for two key reasons. First, these transportation hubs have an extremely broad geographic distribution along secluded inlets, islands, and waterways. Second, 70% of marinas in the United States are privately owned, and incentives to document events that compromise environmental sustainability have traditionally been limited or nonexistent. In 1992, the U.S. Congress passed the Clean Vessel Act (CVA) to help reduce pollution from vessel sewage discharge. In 2000, the Clean Marina Program (CMP) was developed by the Florida Department of Environmental Protection's Division of Law Enforcement to complement and enhance the CVA Grant Program. The CMP is a voluntary pollution prevention program that encourages marinas and boatyards to meet environmental standards and become environmental stewards. A Clean Marina designation signifies that businesses meet or exceed program criteria, which includes specific environmental measures and Best Management Practices (BMPs).

For marinas, this certification provides a number of benefits. First, the CMP provides a template for best practices and can be used to reduce waste. Second, by participating in the Clean Marina Program, marinas can signal that they are making a significant commitment to satisfying regulatory requirements, thus reducing legal liabilities. Third, through public display of special burgees and signs, a clean marina demonstrates its environmental stewardship. Fourth, a Clean Marina designation confers a substantial marketing advantage to adopting marinas. According to the National Oceanic and Atmospheric Administration's (NOAA) Office of Ocean and Coastal Resource Management, clean marinas can charge slightly higher slip fees and have fewer vacancies (FDEP, 2016).

While previous studies have examined factors that influence the standard adoption decision (e.g. ISO 9000, ISO 14000) in a manufacturing context (Terlaak and King, 2006; Benner and Veloso, 2008; Kennedy and Fiss, 2009), certifications related to transportation hubs such as marinas have never been examined. Due to the relative newness of the CMP, little is known about how the standard diffuse across marinas. New product innovation literature suggests that when a new standard's adoption has reached a critical mass, its perceived risk decreases and thus, most firms will choose to adopt it (Albuquerque et al., 2007). To examine CMP adoption patterns, we posit that geographic proximity to past adopters affects the decision to adopt the new standard. Geographic proximity has been linked to knowledge spillovers and innovation (Audretsch and Feldman, 1996; Glaeser et al., 1992), thereby facilitating the transmission of new ideas and imitation. Also, geographic clusters increase the pressure of standard adoption through social contacts and the localized competitive environment.

The purpose of this study is to apply a geospatial analysis to the CMP certification adoption to better understand adoption patterns among marinas. To study geospatial influences on adoption, we examine all clean marinas on the east coast of Florida using the Getis-Ord Gi clustering statistic. We then employ the average nearest neighbor calculation to demonstrate that the concentration of these transportation hubs influences the timing of Clean Marina certification adoption. Our research context focuses on the state of Florida. Florida has been described as the world's largest water park (State of Florida, 2004) with an estimated 80,000 km of streams, 7770 square kilometers of lakes, and 10,359 square kilometers of estuaries (FDEP, 2002). There are nearly 2000 marinas operating in Florida today and hundreds of thousands of vessels use Florida's waterways daily (FDEP, 2002). According to the Marine Industries Association of Florida, boating in Florida is a $10.2 billion water intensive industry that includes marinas, boatyards, and commercial and recreational boaters (Murray, Thomas & Associates, 2005). The effects of year-round boating and boat traffic and their related pollutants contribute to the constant, growing pressure on the state's fragile aquatic and marine ecosystems. Both the vast bodies of water and the number of marinas in the state can benefit from the CMP certification, as the program encourages marina owners and operators to consider best practices related to preserving the aquatic environment and protecting it from vessels' damaging anthropogenic discharge.

2. Literature review

2.1. Certified management standards

Since the 1980s, certified management standards, including Lean/Just-in-Time Systems, ISO 9001, ISO 14001, Total Quality Management (TQM), and Environmental Management System (EMS), have transformed the way firms create and manage their resources. Initially implemented by Japanese manufacturers, JIT focuses on minimizing waste in the production system through a set of ten programs. TQM has been defined as an integrative management philosophy aimed at continuously

Download English Version:

https://daneshyari.com/en/article/5119361

Download Persian Version:

https://daneshyari.com/article/5119361

Daneshyari.com