# Investigating the green practices of Chinese logistics service providers: a socio-technical system perspective

Chang Wu, Yongyi Shou
School of Management, Zhejiang University, Hangzhou 310058, China

Kee-hung Lai
Department of Logistics and Maritime Studies, Faculty of Business, The Hong Kong Polytechnic University, Hong Kong

## Abstract

**Background** - The logistics sector, accounting for approximately 30% of emissions, presents a difficult decarbonization challenge. In recent years, the increasing online shopping and international trade activities have accelerated the market demand for cargo movements and rapid growth of the logistics industry. Meanwhile, the industry growth has brought many environmental issues, such as greenhouse gas emissions, noise, waste, resources consumption, and so on. A critical green transition is essential to alleviate pollution and reduce resource consumption for this industry.

**Objectives** - This study scrutinizes the green practices of publicly listed Chinese Logistics Service Providers (LSPs) from 2015 to 2021, aiming to extract green practices occurrence and categories, identify their structures, and examine their evolution.

**Methods** - We employed the Latent Dirichlet Allocation (LDA) model for textual analysis of the LSPs' sustainability and CSR reports. This study covers LSPs operating in at least one of three modes: road, maritime, and air freight. Our investigation identified 18 unique green practice topics within LSP operations. Through the lens of socio-technical system theory, we classified these topics into social and technical green

practices.

**Findings** - Post-2015, China's logistics industry witnessed a burgeoning of green topics, initially dominated by technology-centric topics aimed at reducing pollution and enhancing efficiency, gradually yielding two new evolution trends: emerging green technologies (e.g., alternative fuels, new energy trucks) and social green practices (e.g., employee training, green culture development). Maritime transport pioneered the green shift, trailed by aviation and road transport, each cultivating unique green priorities. Maritime emphasized legal compliance and energy efficiency, aviation stressed energy efficiency, and road transport focused on new energy vehicles and green packaging. Six post hoc interviews further bolstered our findings' interpretation and validation.

**Contributions** - This research offers significant contributions to existing literature. Current research lacks a comprehensive classification of LSP green practices, and our study employs socio-technical system theory to provide clarity through textual analysis of LSP reports. Moreover, this study is among the few to examine green practices across different operation modes in logistics, illuminating the shared and unique elements of LSPs' green transition. These findings offer valuable insights for both LSPs and policymakers in driving informed actions toward the industry's decarbonization.

**Keywords**: Green practice; logistics service provider; socio-technical system; road freight; aviation freight; maritime freight; latent Dirichlet allocation