

Study on International Logistics Service Trade and Sustainable Development of Ecological Environment

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ABSTRACT

How to transform and upgrade the traditional transport service trade into a modern logistics service trade is of great significance for studying the coordinated development of logistics service trade and ecological environment. This paper analyzes the export structure of service trade and the export trend of logistics service of ten major countries in the world. According to the analysis results, the evaluation index system of the coordination degree of the logistics service trade-ecological environment complex system was constructed and used to analyze the coordinated development type and level of the coordinated development of the logistics service trade and the ecological environment in each country. The results showed that the coordination degree of the logistics service trade-ecological environment complex system of various countries has shown a spiral development trend. This paper provides a theoretical basis for calculating the degree of coordination between regional logistics service trade and the ecological environment.

KEYWORDS

Compound System Coordination Degree Model, Coordinated Development, Ecological Environment, Logistics Service Trade

INTRODUCTION

With the continuous deepening of globalization and rapid economic development, the direction and structure of service trade are gradually expanding and penetrating into emerging industries such as finance, healthcare, and communication (Tan et al., 2006). However, traditional service industries such as tourism and transportation still occupy an important position (Parolo et al., 2009). Transportation service trade is a resource and labor-intensive industry (Francois & Woerz, 2008), and its development is closely related to the ecological environment (Chisuwa et al., 2019). In this study I aim to explore the coordination level between regional logistics service trade and ecological environment and to provide a theoretical basis for this field. By applying the theory of coordinated development to the logistics service industry, I have expanded my research perspective on the logistics

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service trade industry to promote the coordinated development of the regional logistics service trade and the ecological environment.

LITERATURE REVIEW

At present, the number of research results on the relationship between trade and environment is considerable (Chakraborty & Mukherjee, 2010). Domestic and foreign scholars mainly conduct theoretical and empirical analysis on the relationship between trade and environment from two aspects (Chen et al., 2018): the impact of international trade on environmental quality (Halicioglu & Ketenci, 2016) and the impact of environmental regulations (Dechezleprêtre & Sato, 2017) on international trade. The impact of international trade on environmental quality is mainly divided into three perspectives. The first is that the liberalization of trade can promote the sustainable development of the environment (Barros & Martínez-Zarzoso, 2022). Antweiler et al. (2001) used the pollution demand-supply model and selected SO₂ data from 1971 to 1996 for fixed effects and random effects regression analysis. Research shows that the technical effects and scale effects caused by trade can reduce the pollution concentration by 1.25% to 1.5%. He (2010) used different econometric methods to investigate the impact of China's service trade on China's air, water, and other environmental indicators, concluding that technical effects have the effect of reducing pollution to a certain extent. The second is that international trade will cause increased environmental pollution (Jayadevappa & Chhatre 2000). Sun and Zang (2009) used a mixed unit input-output model to measure energy consumption and pollutant emissions from commodity exports. The results showed that as China's export trade to the world grows, energy consumption intensity and pollutant emission intensity also increase at the same time. The third is that the relationship between the two is more complicated, and trade has no clear promotion or inhibition effect on the environment (Dean, 2002). Cole and Elliott (2003) studied the structural effects of trade based on the pollution paradise hypothesis and the factor endowment theory, respectively, and their conclusions showed that the net effect of trade on environmental quality varies with the selection of pollutants and dependent variables.

By reading the literature, I discovered that few scholars have studied the relationship between logistics service trade and the ecological environment (Evangelista et al., 2018).

MATERIALS AND METHODS

Coordination Degree Model of Composite System

This article takes the coordination degree of the composite system composed of the logistics service trade subsystem (E1) and the ecological environment subsystem (E2) as the research object (Cha, 2006). The indicators of its various subsystems are shown in Table 1. The order parameter of the logistics service trade subsystem $e1 = (e11, e12, \dots, e1n)$, the order parameter of the ecological environment subsystem $e2 = (e21, e22, \dots, e2n)$, where $n > 2$. The change of the order parameter may promote the development of the system in a better direction. Such variables are generally called positive indicators; that is, the greater the value of $e11, e12, \dots$, and $e1i$, the higher the order of the system is. The change of the order parameter may also hinder the development of the system. Such variables are generally called negative indicators. That is, the larger the value of $e1i+1, \dots, e1n$, the lower the order of the system is. Therefore, the following definition shown in equation (1) is given for the degree of order of the order parameter of the subsystem:

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