Research on the Influence Factors of Sustainable Supply Chain Management under the TOE Theory

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Abstract. Promoting sustainable supply chain management is an effective way for enterprises to solve the contradiction between emission reduction and development. We explore the drivers of sustainable supply chain management practices in Chinese companies from a TOE theoretical perspective. The results show that digital technology application, government environmental regulation, corporate social responsibility, and customer green literacy are conducive to promoting enterprises to carry out sustainable supply chain management practices. This study provides theoretical support and micro-empirical evidence for enterprises in developing countries to implement sustainable supply chain management, which is conducive to promoting the realization of sustainable development goals.

Keywords: Abstract. Keywords: TOE theoretical framework; Sustainable supply chain management; Chinese context; Structural equation model (SEM)

1   Introduction

Maximizing efficiency and minimizing total cost is the ultimate goal of enterprise supply chain management under the traditional crude economic development model. Accompanied by the increasingly severe global climate problems, the aggravation of environmental pollution, the gradual increase of some enterprises cheating their customers or exploiting their employees, and the frequent occurrence of product quality and food safety problems, sustainable supply chain management, which realizes the synergistic development of economic, social and environmental goals[7], has become an important hand of Chinese enterprises to accelerate the transformation of their economic development mode and promote sustainable development[1].

Sustainable supply chain management refers to the integration of environmental, social, and governance sustainable factors into the operation, management, decision-making, and strategy of enterprises in the economic links such as purchasing, production, storage, transportation, sales, and recycling, to promote the comprehensive, coordinated and sustainable development of the enterprise's economy, environment and society[5]. Currently, previous studies have paid less attention to the drivers of enterprise

sustainable supply chain management in developing countries. Based on the TOE theoretical framework, we explore how the drivers motivate Chinese firms to develop sustainable supply chain management practices[6].

2   Research Framework and Theoretical Hypothesis

The application of digital technology is an important technological factor in promoting sustainable development. Relying on big data, AI, and other digital technologies effectively realizes the intelligent transformation of manufacturing, logistics, warehousing, and other links, reduces the pollution emissions of the operation process, and improves the environmental performance of enterprises[3]. At the same time, the combination of digital technology and traditional operational processes is conducive to the effective supervision of corporate violations and enhances the degree of corporate practice of sustainable development goals[9]. Therefore, the hypothesis is proposed:

H1: Digital technology application promotes enterprise sustainable management.

Corporate social responsibility is one of the important organizational factors to promote sustainable development. Enterprises actively practicing green social responsibility is conducive to enhancing their awareness of environmental protection and public welfare, encouraging them to actively implement environmental protection investment, carry out social welfare activities, and establish a responsible identity image of the enterprise, to promote enterprises to spontaneously choose suppliers and distributors that meet their value orientation to establish cooperative relationships, and jointly establish a supply chain management system that promotes the realization of sustainable goals[4].

Government environmental regulation is another important organizational factor in promoting sustainable development. Government environmental regulations increase the cost of environmental violations for enterprises, prompting them to choose to carry out sustainable supply chain management practices to reduce costs and increase efficiency[10]. At the same time, moderate environmental regulation is conducive to the formation of effective incentives for enterprises to actively carry out green technological innovation, reshaping the core competitiveness of enterprises, and providing a good foundation for the transformation of sustainable supply chains. Therefore, the hypothesis is proposed:

H2a: Corporate social responsibility promotes enterprise sustainable management.

H2b: Government environmental regulation promotes enterprise sustainable management.

Customer green literacy is an important environmental factor in promoting sustainable development. Customers with high green literacy are more concerned about whether the products, production processes and raw materials of enterprises have environmental attributes, to avoid indirect pollution of the environment by their consumption behavior[2]. In order to meet their market demand, enterprises are more inclined to develop and produce environmentally friendly products and realize the co-creating of economic value in the process of promoting environmental protection[8]. Therefore, the hypothesis is proposed:

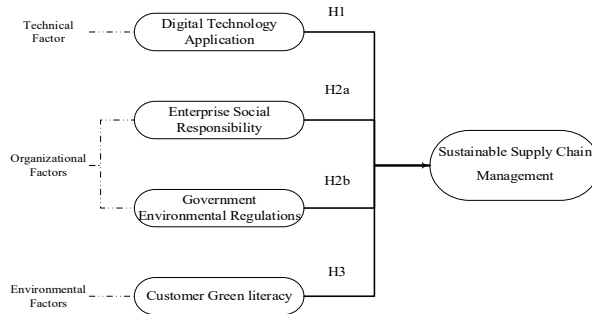H3: Customer green literacy promotes enterprise sustainable management.

Fig. 1. Conceptual Model
Source: Author's homemade.

Based on the TOE theoretical framework, this paper aims to explore the antecedents of enterprise sustainable supply chain management and build a research theoretical framework combined with China's development context, as shown in Figure 1.

3   Research Methodology

We collected the research sample by questionnaire method in this paper and then synthesized the results of classic literature, expert recommendations, and pre-surveys to determine the final measurement scale. Variables cover digital technology (DT), corporate social responsibility (CSR), government environmental regulation (GER), customer green literacy (CGL), and sustainable supply chain management (SSCM), which includes dimensions such as internal sustainable positioning (ISP), sustainable design (SD), sustainable sourcing (SS), sustainable manufacturing and sales (SMS), sustainable circulation (SC), and sustainable recycling (SR). All question items were measured using a 5-point Likert scale (1=strongly disagree, 5=strongly agree), containing a total of 45 question items as well as some demographic variables. Due to space limitations, detailed question items will be available upon request.

In this paper, sample data were collected through the Questionnaire Star platform (http://www.sojump.com/) with strict quality control, and a total of 203 questionnaires were obtained after data cleansing. The data were analyzed through the SPSSAU platform, and descriptive statistics, reliability and validity tests, principal component analysis (PCA), and structural equation modeling (SEM) were performed sequentially.

4   Empirical test and Result Analysis

4.1   Reliability and Validity

The value of Cronbach's alpha coefficient is 0.94 which means that the data has good reliability. The variance explained by the first eigenvalue greater than 1 was 27.658%, meaning that the common deviation test was passed. The value of KMO is 0.882, and

the p-value of Bartlett's sphericity test is significant at the 1% level, which means that it is suitable for further factor analysis. As shown in Table 1, the AVEs are all greater than 0.5 and the CRs are all greater than 0.7, implying good convergent validity; the square roots of the AVEs of each variable are all greater than their correlation coefficients, implying good discriminant validity. In addition, each fitting index of the model meets the requirements and its fit is good.

Table 1. Tests of Convergent and Discriminant Validity

	AVE	CR	ISP	SD	SS	SMS	SC	SR	DT	CSR	CGL	GER
ISP	0.57	0.869	0.755									
SD	0.547	0.828	0.434	0.739								
SS	0.608	0.861	0.396	0.461	0.78							
SMS	0.609	0.903	0.214	0.259	0.365	0.781						
SC	0.559	0.863	0.231	0.328	0.314	0.257	0.747					
SR	0.588	0.851	0.336	0.32	0.33	0.36	0.326	0.767				
DT	0.572	0.8	0.326	0.518	0.384	0.304	0.273	0.262	0.756			
CSR	0.595	0.815	0.317	0.416	0.368	0.294	0.353	0.386	0.342	0.771		
CGL	0.54	0.854	0.275	0.362	0.43	0.378	0.197	0.285	0.399	0.304	0.735	
GER	0.639	0.842	0.397	0.489	0.512	0.408	0.286	0.35	0.395	0.376	0.523	0.799

Note: The oblique diagonal numbers are AVE square root values
Source: Author's homemade.

4.2   Structural Equation Modeling

We measured the comprehensive level of sustainable supply chain management by principal component analysis and tested the hypotheses using the path analysis method. The results in Table 2 show that the influence coefficients of each influence factor on

sustainable supply chain management are all significantly positive at the 1% level, and all hypotheses are tested.

Table 2. Path Analysis Test

X	→	Y	Unnormalized path coefficients	SE	Z (CR values)	p	Normalized path coefficient	Results
DT	→	SSCM	0.589	0.152	3.88	0	0.207	Yes
CGL	→	SSCM	0.634	0.151	4.203	0	0.226	Yes
CSR	→	SSCM	0.306	0.169	1.814	0.07	0.103	Yes
GER	→	SSCM	0.868	0.147	5.92	0	0.339	Yes

Source: Author's homemade.

5   Conclusion and Suggestion

Based on the TOE framework, we empirically examine the significant positive impact of digital technology application, corporate social responsibility, government environmental regulation, and customer green literacy on sustainable supply chain management. Therefore, enterprises should accelerate the deep integration of digital technology and business operations, and actively practice corporate social responsibility. While strengthening environmental supervision, government departments should further advocate the importance of environmental protection and enhance users' environmental awareness and green literacy.

Acknowledgment

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