

Analysis of Sustainable Supply Chain Management and Circular Economy Capability from the Perspective of Institutional Pressure

Aicun Sun

School of Business Administration, Qinghai Nationalities University, Xining, Qinghai, China

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Abstract: With the consumption of non-renewable resources and the increasing environmental problems, sustainable supply chain management with the circular economy model will inevitably become the trend of industrial development. Institutional pressure has a significant impact on the sustainable supply chain management and circular economy capability. However, few studies have been conducted from the perspective of institutional pressure. Hence, this paper gives a thorough analysis related to the impact of institutional pressure on sustainable supply chain management and circular economy capacity. The raw data came from the survey questionnaires of eco-industrial. This study not only enriches the boundary of sustainable supply chain management, but also provides theoretical guidance for the production practice of eco-industrial.

1. Introduction

In recent years, China has been committed to establish a resource-saving and environment-friendly society, that is reducing the impact of economic development on the natural environment. A series of laws and regulations about resource-saving and environment-friendly have been promulgated. Every character, including our country and companies, is committing to promote the comprehensive, balanced and sustainable development. Among them, circular economy is regarded as an important means to achieve sustainable development [1]. It is the main carrier for the realization of the "resources-products-renewable resources" cycle model. There are various effects on the realization of sustainable supply chain management and the circular economy [2, 3]. And institutional pressure is cannot be ignored [4]. This study will give a thorough analysis related to the impact of institutional pressure on sustainable supply chain management and circular economy capacity. First of all, the definition and explanation of each noun are as follows.

Institutional Pressure: The constraints and influence of institutions on the behaviors decision-making of organizations. Qian et. al [5] defined it as "the influence of the institutional environment, which is consist of social concepts, rules, norms and cultures, on whether the organizational form, structure or behavior can become more reasonable, acceptable and easily supported". It is a new theoretical perspective to analyse the sustainable supply chain management and circular economy ability. In detail, institutional pressure can be divided into forced pressure (pressure came from the social culture or the expectations of other organizations, and one is forced to adopt it by institution), normative pressure (pressure came from specialization process, which is expressed as the company expectations of some codes of conduct and values), and imitation pressure (came from the thought to align with the industry benchmark) [6].

Sustainable supply chain management: It includes green supply chain management [7]. Besides, it emphasizes not only environmental and economic effects, but also social effects. Sudarsan et. al [8] believed that the resource used throughout a product's service life cycle should be minimized. And harmful substances, wastes and greenhouse gas emissions should also be reduced. In short, sustainable supply chain management is the process of finding the balance point of ecological efficiency within an enterprise, that is, a balance point to get optimal profit with least resource consumption and the least pollution [9] [10].

Circular economy capability: Circular economy capability: The core idea of circular economy is to guide the entire economic activities, including production, distribution, resource consumption

and waste recycling according to ecological laws. Besides, the aim of circular economy is to realize the reduction of resource consumption, maximize production efficiency, minimize environmental impact, and completely convert the economic growth model from traditional open loop to the closed-loop model of “resources – products – renewable resources”. Based on a lot of research, the 3R principles, which means reduction, reuse and recycle, have been agreed to follow in the practice of circular economy. And the circular economy capability of any company means the ability to implement the 3R principle [11, 12].

Herein, this study gives a thorough analysis related to the impact of institutional pressure on sustainable supply chain management and circular economy capacity. The raw data came from the survey questionnaires of eco-industrial. This study not only enriches the boundary of sustainable supply chain management, but also provides theoretical guidance for the production practice of eco-industrial.

2. Acquisition of raw data and establishment of hypotheses

2.1. Acquisition of raw data

The raw data in this study is mainly from questionnaire surveys of Chinese eco-industrial park enterprises. Besides, public data published by government environmental management agencies were also used. “Objective” corporate environmental behaviour and the effects of external environmental pressure on corporate behaviour were provided by public data. While raw data from questionnaires can give the information of the perceptions and the measures taken by companies (employees) when they faced the external environmental pressure. Raw data from these two approaches gives researchers more objective information, so that they can analysis problems more comprehensive.

2.2. Establishment of hypotheses

Based on all the 357 valid data obtained, we have made the following reasonable hypotheses.

Table 1 Hypotheses established in this study

NO.	Hypotheses
Hypotheses 1	Institutional pressure has a positive impact on the practice of supply chain relationship management.
Hypotheses 2	Institutional pressure has a moderating effect on the capacity of circular economy in supply chain relationship management
Hypotheses 3	Forced pressure has a moderating effect on the capacity of circular economy in supply chain relationship management.
Hypotheses 4	Normative pressure has a regulating effect on the influence of supply chain relationship management on circular economy.
Hypotheses 5	Simulation pressure has a moderating effect on the influence of supply chain relationship management on circular economy

Correspondingly, we draw a schematic diagram based on the relationship between each hypothesis and the subject being analysed.

If the truth or false of assumptions have been established in this study through the analysis of the raw data, the effects of institutional pressure on the circular economy and sustainable supply chain management would be obtained. And then a theoretical guidance for the production practice of eco-industrial can be provided

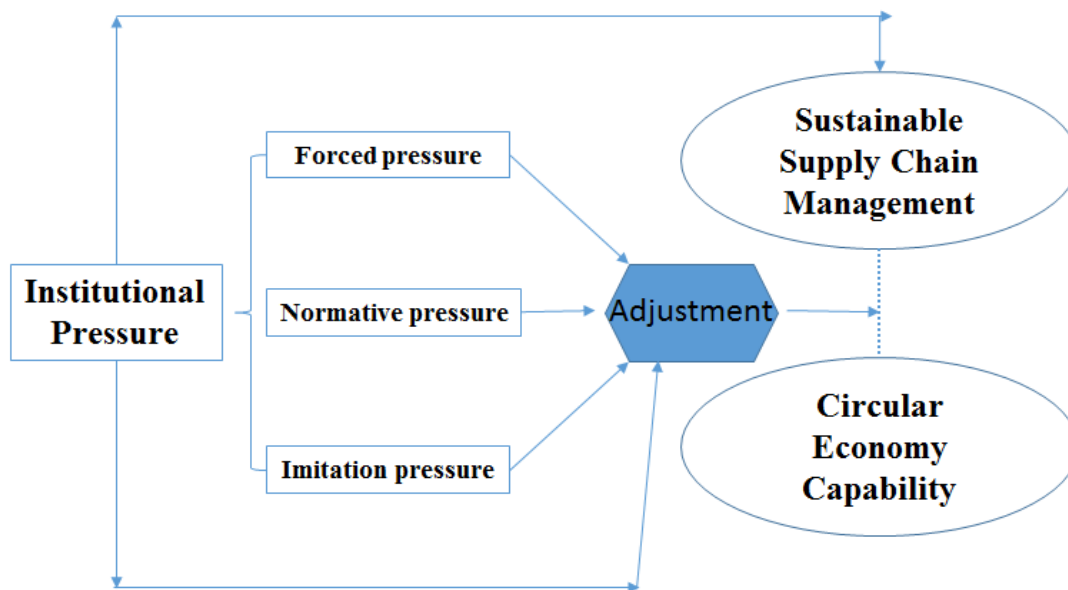


Fig.1. The schematic including the relationship between each hypothesis and the subject being analyzed.

3. Results and discussion

Table 2 Calculation of reliability and validity

Independent variable	Sub-independent variable	Description	Factor loading	SCR	AVE
Institutional Pressure $\alpha=0.79$	Forced pressure $\alpha=0.82$	Environmental protection law provides guidance for enterprises	0.819	0.873	0.651
		It serves as a warning for enterprises and individuals who damage the environment to be severely punished	0.802		
		Environmental protection departments strictly monitor enterprises' damage to the environment	0.830		
	Normative pressure $\alpha=0.77$	Environmentally responsible businesses are more popular with customers	0.730	0.799	0.643
		Customers are more willing to cooperate with enterprises with good social image	0.812		
	Simulation pressure $\alpha=0.68$	Business management advocates environmental protection	0.881	0.818	0.669
		Enterprises need to abide by environmental laws and regulations in the process of operation	0.865		

The data analysis in this paper mainly uses two statistical softwares, SPSS 19.0 and AMOS 22.0. The aim of data analysis mainly focuses on verifying the true or false of the hypotheses. Methods taken to analysis raw data are structural equation models and hierarchical regression analysis methods.

By calculation, the results are shown in table 2.

The alpha value in table 2 are the indications of the reliability. And all results indicate that the

reliability of the data in this study is good. In addition, in terms of internal consistency, the value of each SCR in this study is bigger than 0.7, which suggested that the scale has sufficient reliability.

This paper mainly tests the validity of the scale from three aspects: content validity, convergence validity and differential validity. Before finalizing the scale, we also invited scholars in the field and experts in the management of eco-industrial parks to conduct semi-structured interviews and revised some of the content and items. Therefore, the scale has good content validity.

Above results indicated that all results obtained by the raw data analysis were with good validity and reliability. Which meant, the results in this study are true, reliable and consistent. Next, we will verify the authenticity of the established hypothesis and draw relevant conclusions.

Table 3 Hypothesis test results of the structural model

NO.	Normalized coefficient	S.E.	C.R.	Results
Hypotheses 1	0.600	0.68	8.726	support

From the results in Table 3, we can find that the normalized coefficient of the impact of institutional pressure on sustainable supply chain management is 0.6, which is at a significant level of 0.001. Hence, we can get the conclusion that institutional pressure has a significant positive impact on sustainable supply chain management, ie, The hypothesis 1 established in this study is a true hypothesis. Therefore, enterprises in the closed-loop supply chain should pay close attention to national laws, regulations, customer expectations and industry benchmarks when formulating relevant production directions.

Next, we verified the true or false of the regulatory hypothesis, that is hypothesis 3 to hypothesis 5. The analytical method in this part is hierarchical regression analysis, which consist of two steps. Then the signal, whether the changes of R2 or interaction term coefficients are significant, can be regarded as judgements of whether there is an adjustment effect between institutional pressure and sustainable supply chain management/ circular economy capability.

The results are shown in Table 4.

Table 4 Test of the Regulating Effect of Institutional Pressure on Supply Chain Relationship Management and Circular Economy Capability

	IP=CP		IP=NP		IP=MP	
First step						
IP	0.106	0.137	0.102	0.125	0.181	0.039
SCRM	0.545	0.636	0.540	0.630	0.475	0.039
R2	0.474		0.471		0.488	
Second step						
IP	0.447	0.580	0.350	0.365	0.342	0.115
SCRM	0.833	0.977	0.782	0.901	0.666	0.132
IP*SCRM	-0.093	-0.644	-0.445	-0.055	-0.061	-0.337
R2	0.488		0.476		0.491	
▲R2	0.013		0.005		0.003	

As shown in Table 4, we examined the effects of forced pressure, normative pressure, and imitation pressure on supply chain relationship management and circular economy capabilities. The results suggested that both forced and normative pressures have a significant negative regulation effect. The interaction term normalization coefficients are -0.644 ($P < 0.01$) and 0.445 ($P < 0.05$), respectively. And R2 has significant changes. Hypothesis 3 and Hypothesis 4 are positively supported. Hence, we get an interesting conclusion that forced pressure and normative pressure will weaken the positive impact of supply chain relationship management on the ability of circular economy. On the contrary, the regulation effect of imitation pressure is not obvious. Thus Hypothesis 5 is falsified.

4. Conclusions

This paper studied the effect of institutional pressure on sustainable cyclic supply chain management and circular economy capabilities. Five hypotheses related to the research topic were established before the data analysis. Real and effective raw data were obtained from questionnaires and public information. By analysing the original data, the authenticity of the hypothesis was verified. Whether the institutional pressure has a regulatory effect on the circular economy capability in sustainable supply chain management were also verified. The conclusions are as follows: (1) Institutional pressure has a significant positive impact on sustainable supply chain management. (2) In the adjustment effect between supply chain relationship management and circular economy capacity, both forced pressure and normative pressure have played an important role. By the way, they both have significant negative regulation effect. (3) Imitation pressure has no obvious regulation.

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