A Study on the Effects of Sustainable Development Management of Manufacturing Enterprise Performance: Focus on Liaoning Manufacturing Enterprise

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Abstract: This Paper Based on the Sustainable Development Management and Green Supply Chain Management is Not Only the Positive (+) to the Performance of Enterprise, But Also Improve Enterprise Performance Leading Research Point of View, Empirical Analysis of Liaoning Manufacturing Enterprise on the Sustainable Development Management and Green Supply Chain Management, Has Any Impact on Corporate Performance, and the Mediation Effect of Green Supply Chain Management and So on Questions. the Analysis Results Show That the Manufacturing Enterprises in Liaoning to Ignore the Green Purchase, That is, They Do Not Pay Much Attention to the Pro-Environment Management of Suppliers, and Generally Pay Attention to the Short-Term Development, But Ignore the Long-Term and Sustainable Development Management. in Particular, “Green Supply Chain Management”, Which Should Be Paid Attention to, Has No Intermediary Effect. the Analysis Results of This Study Will Provide an Important Basis of Relevant Government Departments to Formulate Manufacturing to Support Policies of the “ Five Regional Development Strategies “ .

1. Introduction

From the Perspective of Science and Technology, the Revolutionary Breakthrough and Cross Integration of Information Technology, New Energy, New Materials, Biotechnology and Other Important Fields and Cutting-Edge Directions Are Triggering a New Round of Industrial Transformation, Which Will Have a Subversive Impact on the Global Manufacturing Industry and Change the Development Pattern of the Global Manufacturing Industry. with the Changes of Scientific and Technological Revolution and Industrial Transformation, the Lack of Sustainable Business Activities of Traditional Manufacturing Enterprises, Which Are Transforming to Artificial Intelligence and Precision Manufacturing Fields and Lack of Competitiveness in Original Technologies, Has Become a New Topic.

Based on the Leading Research Viewpoint That Sustainable Business Activities and Green Supply Chain Management Not Only Have a Positive (+) Effect on Business Performance, But Also Can Improve Business Performance, This Paper Analyzes the Impact of Sustainable Business Activities on Environmental Management, Economic Performance and Environmental Performance of Liaoning Manufacturing Enterprises, and the Impact of Green Supply Chain Management on Environmental Performance and Economic Performance of Enterprises, I.e. the Intermediary Effect of Green Supply Chain, and Puts Forward Feasible Suggestions for Liaoning Manufacturing Enterprises to Refer to. the Main Contributions of This Paper Are as Follows: First, Build a Research Model of Sustainable Development Management on Green Supply Chain and Business Performance Based on the Previous Research, and Test the Model with Liaoning Manufacturing Enterprises as an Example; Second, What is the Impact of Sustainable Management Activities on Green Supply Chain, Economic Performance and Environmental Performance of Liaoning Manufacturing Enterprises, and the Causal Relationship between Green Supply Chain Management and Environmental Performance and Economic Performance; Thirdly, the Intermediary Effect of Environmental Management is Tested.the Conclusion of This Paper Has Rich Reference Significance. on the One Hand, It Provides Necessary Theoretical Support for the Sustainable

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Development and Operation of Liaoning Manufacturing Enterprises by Analyzing the Intermediary Effect of Green Supply Chain, Which Makes Up for the Lack of Research in the Existing Literature.on the Other Hand, the Results of Empirical Analysis Provide Decision Support for the Sustainable Development of Liaoning Manufacturing Enterprises.

2. Business Continuity and Business Performance

Sustainable development management refers to that in the process of pursuing self-survival and sustainable development, enterprises should not only consider the realization of their business objectives and improve their market position, but also maintain their sustained profit growth and improvement of their capabilities in the already leading competitive field and the future expanding business environment, so as to ensure their long-term and stable development. Scholars at home and abroad have studied the sustainable development of enterprises from different perspectives and different research methods.

For example, Kasych and Vochozka (2018) used scientific methods such as combination, structure, resources, coordination and interaction to determine the characteristics of the sustainable development process of enterprises, and summarized the conclusions of previous studies. Molokanova and Petrenko (2016) investigated the sustainable development management of metallurgical enterprises through a series of projects, and put forward the conceptual framework of management project portfolio, so as to organize and formalize the method basis of establishing value oriented development portfolio for metallurgical enterprises. Zemigala, Marcin (2019) analyzed the research on sustainable development in the field of management science based on scientific journal articles published from 1974 to 2016, and concluded that the research trends on sustainable development in environmental science, social science and engineering in management science are increasing.

At present, scholars at home and abroad focus their research on sustainable development management on nine aspects, including economic responsibility activities, social responsibility activities, environmental responsibility activities, internal environmental management, green purchase, cooperation with customers, pro-environment design, environmental performance, and economic performance. However, most of them focus on the causal relationship between sustainable management activities and enterprise performance, which is composed of economic responsibility, social responsibility and environmental responsibility variables, or the structural equation model which focuses on the causal relationship between environmental management and enterprise performance. In the actual business activities, whether the internal environment management, green purchase, cooperation with customers, pro environment design and other intermediary variables have intermediary effect? At present, there are very few domestic literatures that can give relevant conclusions on this issue.

3. Research Hypothesis

In view of the advanced research on sustainable development and management by scholars at home and abroad, this study takes economic responsibility activities, social responsibility activities and environmental responsibility activities as indicators for evaluating enterprises' sustainable management activities, and takes internal environmental management, green purchase, cooperation with customers and pro-environmental design as indicators for evaluating green supply chain management. Taking environmental performance and economic performance as indicators to evaluate enterprise performance, this paper analyzes the impact of sustainable operation on enterprise performance and the intermediary effect of green supply chain, and puts forward the following research hypotheses.

H1.1: “Economic responsibility activity” has a significant positive effect on “internal environmental management”.

H1.2: “Economic Responsibility Activity” has a significant positive (+) effect on “Green Purchase”.

H1.3: “Economic Responsibility Activity” has a significant positive (+) effect on “Cooperation with Customers”.

H1.4: “Economic Responsibility Activity” has a significant positive (+) effect on “Pro-environmental Design”.

H1.5: “Social Responsibility Activity” has a significant positive (+) effect on “Internal Environmental Management”.

H1.6: “Social Responsibility Activity” has a significant positive (+) effect on “Green Purchase”.

H1.7: “Social Responsibility Activity” has a significant positive (+) effect on “Cooperation with Customers”.

H1.8: “Social Responsibility Activity” has a significant positive (+) effect on “Pro-environmental Design”.

H1.9: “Environmental Responsibility Activity” has a significant positive (+) effect on “Internal Environmental Management”.

H1.10: “Environmental Responsibility Activity” has a significant positive (+) effect on “Green Purchase”.

H1.11: “Environmental Responsibility Activity” has a significant positive (+) effect on “Cooperation with Customers”.

H1.12: “Environmental Responsibility Activity” has a significant positive (+) effect on “Pro-environmental Design”.

H2.1: “Economic Responsibility Activities” Have Significant Positive (+) Impact on “Environmental Performance”.

H2.2: “Economic Responsibility Activity” has a significant positive (+) effect on “Economic Performance”.

H2.3: “Social Responsibility Activity” has a significant positive (+) effect on “Environmental Performance”.

H2.4: “Social Responsibility Activities” Have Significant Positive (+) Effect on “Economic Performance”.

H2.5: “Environmental Responsibility Activity” has a significant positive (+) effect on “Environmental Performance”.

H2.6: “Environmental Responsibility Activities” Have Significant Positive (+) Impact on “Economic Performance”.

H3.1: “Internal Environmental Management” has a significant positive (+) effect on “Environmental Performance”.

H3.2: “Internal Environmental Management” has a significant positive (+) effect on “Environmental Performance”.

H3.3: “Green Purchase” has a significant positive (+) effect on “Environmental Performance”.

H3.4: “Green Purchase” has a significant positive (+) effect on “Environmental Performance”.

H3.5: “Cooperation with Customers” has a significant positive (+) effect on “Environmental Performance”.

H3.6: “Cooperation with Customers” has a significant positive (+) effect on “Environmental Performance”.

H3.7: “Pro-environmental design” has a significant positive (+) effect on “environmental performance”.

H3.8: “Pro-environmental design” has a significant positive (+) effect on “environmental performance”.

4. Empirical Analysis

From May 10, 2018 to November 10, 2018, this study conducted a paper questionnaire survey on 25 manufacturing enterprises in Liaoning Province by direct interview.At the same time, provide the person-in-charge of the enterprise who accepts the paper questionnaire with the questionnaire link of the Questioning Star website. Each enterprise is required to recommend 5 enterprises in the same industry in Liaoning province that have business relations with this enterprise to participate in

this investigation and study, i.e. the paper questionnaire and the online questionnaire are used in parallel. 259 questionnaires are collected, 85 questionnaires are removed, and 174 valid questionnaires are actually collected.The specific analysis results are as follows.

Table 1 Sample Distribution

Category		Frequency(人)	Percentage(%)
Gender	Men	101	58%
	Women	73	42%
Age	Under 30 years old (excluding 30 years old)	65	37.4%
	30-39 years old	68	39.1%
	40-49 years old	37	21.3%
	50-59 years old	4	2.2%
	Over 60 years old	0	0%
Department	Marketing	55	31.6%
	Production	67	38.5%
	Environment	16	9.3%
	Finance	18	10.3%
	Planning	18	10.3%
	Other()	0	0%
Enterprise scale	Small and medium enterprises	158	90.8%
	Large enterprises	16	9.2%
Post	Staff member	31	17.8%
	Department head(主任)	35	20.1%
	Section chief	25	14.4%
	Company Manager	32	18.4%
	Chairman	30	17.2%
	Management	-	-
	Other()	21	12.1%
Working years	0-4 years	45	25.9%
	5-9years	52	29.9%
	10-14years	52	29.9%
	More than 15 years	25	14.3%

4.1 Factor Analysis and Reliability Analysis

In order to test the validity of the scale, principal component analysis (PCA) and maximum variance rotation (MVR) were used to conduct exploratory factor analysis (EFA). The reliability reflects the consistency or stability of the measurement results. The higher the reliability of the measurement, the more reliable the measurement results are.

Table 2 Results of Exploratory Factor Analysis and Reliability Analysis on Sustainable Development Management

Factor (dimension)	Number of starting items	Number of remaining items	Factor 1	Factor2	Factor3	α coefficient
Economic responsibility	4	3	0.849 Remove 0.836 0.890			0.898
Social responsibility	4	3		0.913 Remove 0.943 0.909		0.801
Environmental responsibility	5	4			0.843 0.887 0.897 0.794	0.909

The analysis results of sustainable development management factors show that three

characteristic value factors are extracted from the sustainable development management factors of Liaoning manufacturing enterprises, and the factor load factors are all greater than 0.794, and the Kronbach coefficient (α) is also greater than 0.801, which indicates that the reliability and validity of the questionnaire on sustainable development management are high.

Table 3 Exploratory Factor Analysis and Reliability Analysis Results of Green Supply Chain

Factor (dimension)	Number of starting items	Number of remaining items	Factor 1	Factor 2	Factor 3	Factor 4	α coefficient
Internal environment	7	4	0.856 0.863 0.802 0.911				0.898
green buying	5	5		0.832 0.840 0.921 0.864 0.840			0.748
Cooperate with customers	3	3			0.849 0.875 0.770		0.830
Pro-environmental design	3	3				0.871 0.873 0.866	0.880

The analysis results of the green supply chain factors show that four eigenvalue factors are extracted from the green supply chain factors, and the factor load factors are all greater than 0.770, and the Kronbach coefficient (α) is also greater than 0.748, which indicates that the reliability and validity of the green supply chain questionnaire are high.

Table 4 Exploratory Factor Analysis and Reliability Analysis Results of Enterprise Performance Evaluation

Factor (dimension)	Number of starting items	Number of remaining items	Factor 1	Factor 2	α coefficient
Environmental performance	6	5	0.723 0.657 0.629 0.666 0.776		0.728
Economic performance	5	5		0.854 0.839 0.819 0.849 0.822	0.897

The analysis results of the enterprise performance evaluation factors show that the performance evaluation factors extract two eigenvalue factors, and the factor load coefficient is greater than 0.629, and the kronbach coefficient (o) is greater than 0.728, indicating that the reliability and validity of the performance evaluation questionnaire are high.

4.2 Structural Equation Model Test

4.2.1 Analysis Results of Overall Fitting Degree of the Model

The analysis results by structural equation software AMOS24.0 show that CMIN/DF (minimum sample difference divided by degree of freedom, which is called relative chi-square or canonical chi-square), GFI (goodness of fit index), AGFI (adjusted goodness of fit index), IFI (value-added goodness of fit index), CFI (comparative goodness of fit index), RMSEA (root mean square of approximate error) and other indexes basically reach or approach the recommended values, indicating that the model has good goodness of fit.

Table 5 Statistical Table Of Overall Fit Index of the Model

Fitting index	CMIN/DF	GFI	AGFI	IFI	CFI	RMSEA	P value
Recommended value results	<2	>0.9	>0.9	>0.9	>0.9	<0.10	
Recommended value results	2.021	0.884	0.905	0.897	0.881	0.102	0.000

4.2.2 Results of Standardized Path Analysis of the Impact Model of Sustainable Development Management on Green Supply Chain Management

The results of standardized path analysis of the impact model of sustainable development on green supply chain show that the stronger the awareness of economic responsibility, social responsibility and environmental responsibility of enterprises, the more inclined they are to green purchase, the more attention they pay to internal environment, cooperation with customers and pro-environment design. At the same time, manufacturing enterprises in Liaoning Province neglect green purchasing, i.e. pay less attention to the pro-environment management of suppliers.

Table 6 the Impact Model of Sustainable Development Management on Green Supply Chain Standardized Path Coefficient Table

Hypothesis	Path			Path coefficient	T value	P value	Hypothesis test
H1.1	Economic responsibility	→	Internal environment	-1.072	-3.213	0.001	Not through
H1.2	Economic responsibility	→	Green buying	1.211	3.125	0.002	Via
H1.3	Economic responsibility	→	Cooperate with customers	-0.863	-2.898	0.004	Not through
H1.4	Economic responsibility	→	Pro-environmental design	-0.902	-2.677	0.007	Not through
H1.5	Social responsibility	→	Internal environment	-0.269	-1.986	0.047	Not through
H1.6	Social responsibility	→	Green buying	1.060	5.451	***	Via
H1.7	Social responsibility	→	Cooperate with customers	-3.04	-2.458	0.014	Not through
H1.8	Social responsibility	→	Pro-environmental design	-0.259	-1.848	0.065	Not through
H1.9	Environmental responsibility	→	Internal environment	1.643	5.619	***	Via
H1.10	Environmental responsibility	→	Green buying	-1.047	-3.191	0.001	Not through
H1.11	Environmental responsibility	→	Cooperate with customers	1.445	5.433	***	Via
H1.12	Environmental responsibility	→	Pro-environmental design	1.630	5.562	***	Via

4.2.3 The Results of Standardized Path Analysis of the Impact Model of Sustainable Development on Enterprise Performance

The results of standardized path analysis of the impact model of sustainable development management on enterprise performance show that Liaoning manufacturing enterprises generally attach importance to short-term development while ignoring long-term and sustainable development management, and believe that enterprises' sustainable management activities based on “economic responsibility”, “social responsibility” and “environmental responsibility” cannot bring “environmental performance” and “economic performance” to enterprises.

Table 7 Standardized Path Coefficient Table of the Impact Model of Sustainable Development on Enterprise Performance

Hypothesis	Path			Path coefficient	T value	P value	Hypothesis test
H2.1	Economic responsibility	→	Environmental performance	0.221	0.364	0.716	Not through
H2.2	economic responsibility	→	Economic performance	-10.817	-0.445	0.656	Not through
H2.3	Social responsibility	→	Environmental performance	-0.629	-0.913	0.361	Not through
H2.4	Social responsibility	→	Economic performance	-1.086	-0.154	0.877	Not through
H2.5	Environmental responsibility	→	Environmental performance	-1.451	-0.751	0.453	Not through
H2.6	Environmental responsibility	→	Economic performance	23.716	0.552	0.581	Not through

4.2.4 The Impact of Green Supply Chain on Enterprise Performance: Results of Standardized Path Analysis

The standardized path analysis results of the impact model of green supply chain management on enterprise performance show that none of them has positive (+) impact. The analysis results show that Liaoning manufacturing enterprises generally have not implemented green supply chain management.

Table 8 the Impact Model of Green Supply Chain on Performance is Standardized Path Coefficient Table

Hypothesis	Path			Path coefficient	T value	P value	Hypothesis test
H3.1	internal environment	→	Environmental performance	-0.417	-1.145	0.252	Not through
H3.2	internal environment	→	Economic performance	-1.178	-1.732	0.083	Not through
H3.3	Green buying	→	Environmental performance	1.717	1.748	0.080	Not through
H3.4	Green buying	→	Economic performance	-2.584	-1.123	2.262	Not through
H3.5	Customer cooperation	→	Environmental performance	-0.302	-0.989	0.323	Not through
H3.6	Customer cooperation	→	Economic performance	-1.092	-1.804	0.071	Not through
H3.7	Pro-environmental design	→	Environmental performance	2.120	1.214	0.225	Not through
H3.8	Pro-environmental design	→	Economic performance	-14.101	-0.546	0.585	Not through

5. Conclusion

From the perspective of sustainable development and management, this paper analyzes the impact of sustainable development and management of Liaoning manufacturing enterprises on enterprise performance and the intermediary effect of green supply chain. Although the stronger the awareness of economic responsibility, social responsibility and environmental responsibility of enterprises, the more inclined they are to green purchase, the more emphasis they place on internal environment, cooperation with customers and pro-environmental design, the analysis results show that manufacturing enterprises in Liaoning province pay less attention to green purchase, i.e. pay less attention to the pro-environmental management of suppliers, and generally pay attention to

short-term development, while ignoring long-term and sustainable development management. they believe that sustainable business activities based on “economic responsibility”, “social responsibility” and “environmental responsibility” cannot bring “economic performance” and “environmental performance” to enterprises. The “green supply chain management”, which needs to be paid more attention, has no intermediary effect.

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