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FACTORS AFFECTING GREEN SUPPLY CHAIN MANAGEMENT - CASE STUDY AT ANIMAL FEED PRODUCING ENTERPRISES IN HANOI

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Abstract

The authors investigated and evaluated factors affecting green supply chain management at animal feed manufacturing enterprises in Hanoi. Data was surveyed and collected from 31 animal feed manufacturing enterprises in Hanoi in 2023 and analyzed using the SPSS26 tool. Animal feed production enterprises in Hanoi include large enterprises and small and medium enterprises. The survey subjects were mainly business administrators and accountants. Survey results show that there are 3 factors affecting green supply chain management at animal feed manufacturing enterprises in Hanoi: (*1) Internal Enterprise Factors; (2) Social relationship network; and (3) Government support*. Based on the results obtained, the author makes new proposals in improving the efficiency of green supply chain management at animal feed production enterprises in Hanoi.

Keywords: Animal Feed Manufacturing Enterprises, Green Supply Chain, Green Supply Chain Management.

1. INTRODUCTION

As the economy develops, the problem of environmental pollution is increasing. Facing global challenges of energy security, water scarcity, and climate change, in the process of implementing green supply chain management, medium-sized businesses must comply with all regulations and sanctions related to green supply chain management.

Environment, national, regional and global hygiene and safety, and must also proactively set standards for suppliers. Those regulations and standards need to be implemented both within the company as well as with partners. To enhance environmental protection activities as well as sustainable development for manufacturing businesses in general, green supply chain management is one of the effective solutions. Through green supply chain management, it also helps businesses improve their reputation and competitive advantage.

According to the Ministry of Agriculture and Rural Development (MARD), Vietnam is the country with the world's 5th largest pig farming industry in quantity and 6th in meat output. Livestock is contributing 25.26% to the agricultural sector's GDP. In 2024, this industry targets production value to increase by about 4-5% compared to last year.

However, the transition from small livestock farming to concentrated, large-scale livestock farming is posing many challenges for environmental protection and greenhouse gas emissions. Because of the above emissions pressures, in Decision 1520/QD-TTg of the Prime Minister on

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Livestock Development Strategy for the period 2020 - 2030, vision to 2045, the Government has set out goals and objectives. Clear direction to promote the livestock industry to develop in a green, clean and sustainable direction. Therefore, the article studies factors affecting green supply chain management at animal feed manufacturing enterprises in Hanoi.

2. RESEARCH OVERVIEW

Beginning in the early 1990s, research on green supply chain management gained popularity after the year 2000 (Srivastava, 2007; Seuring & Müller, 2008; Fahimnia et al., 2015). Many scholars have suggested integrating the environment into supply chain management in response to the environmental crisis and to maintain balance between economics and the environment. Green supply chain management boosts corporate competitiveness and benefits the environment, as demonstrated by Rao & Holt (2005).

According to Woo et al. (2016), who examined data from 103 suppliers to the Korean construction sector, collaboration between suppliers and construction companies on environmental preservation lowers costs and boosts competitiveness. Balasubramania & Shukla (2017) made the case that putting green supply chain management—which includes green design, green purchasing, green transportation, and green construction—into practice improves both economic and environmental efficiency through a survey of 200 construction companies and 455 experts in the United Arab Emirates.

Using survey data from 281 manufacturing companies in Turkey, Yildiz Çankaya & Sezen (2019) found that green supply chain management (green production, green marketing, green packaging and distribution, internal environmental management, reinvestment) improves economic, environmental, and social performance.

According to research findings by Tam, L. T., (2020), green design and green production have a good impact on social, economic, and environmental performance, however green procurement has an impact on social and economic performance but has no effect on the environment.

Research by Micheli et al., (2020) has shown 8 factors that promote green supply chain management activities: product image, internal products and processes, customers, social community, and members. Supply chain, internal factors, competitors and regulations. Research by Fianko et al., (2021) suggests that green shopping, green design, and green construction have a direct positive relationship with environmental performance.

Hang, T. T. H., (2022) examines green supply chain management from the standpoint of environmentally friendly methods, cooperation with suppliers and consumers, and the beneficial effects of environmental monitoring with suppliers and customers. Significantly direct effects on social and environmental outcomes; indirectly influences the financial performance of Vietnamese building companies. In her doctoral thesis, Dung, D. T., (2023) noted that government assistance, social networks, and corporate dedication all positively and favorably affect green supply chain management techniques.

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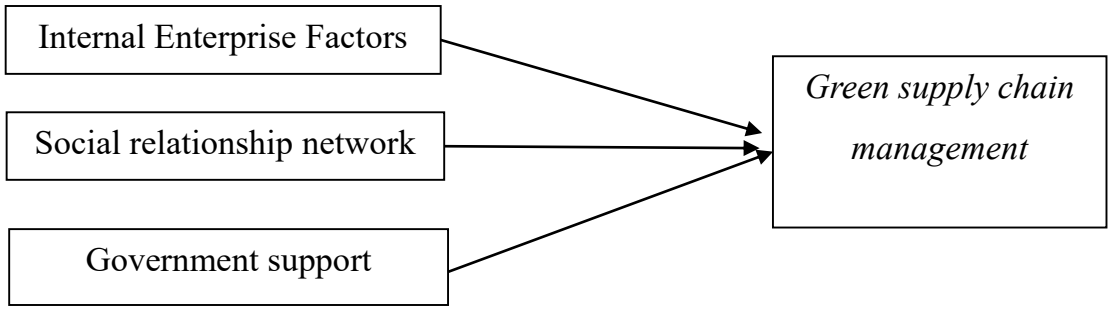
The author determines the research model based on the research overview:



Dig 1: Research model

Source: Authors' synthesis

Research model with 3 research hypotheses:

H1: Internal Enterprise Factors that have a positive effect on Green Supply Chain Management

H2: Social Relationship Networks that have a positive effect on Green Supply Chain Management

H3: Government support that have a positive effect on Green Supply Chain Management

3. THEORETICAL BACKGROUND

Green supply chain

Since the early 1990s, manufacturers have faced pressure to address environmental management in their supply chains. When adding the "green" element, the concept of green supply chain is defined as a method to minimize the environmental impact of a product or service, including all stages of its life cycle. a product from raw material sourcing, design, manufacturing and distribution until it reaches the final consumer and how they use it. According to Narasimhan and Carter (1998), green supply chain is a method to minimize the environmental impact of a product or service including stages in the product's life cycle. It can be seen that a green supply chain is a process in which environmental factors are considered in all supply chain activities from design, sourcing input materials, purchasing, production and distribution. The product reaches the final consumer and delivers it back. Therefore, the green supply chain is associated with the links that create the supply chain and adds environmental factors, so people can call the links of the green supply chain: green design, green operations, green purchasing, green input transportation, green output transportation, green strategy, green production,...

Green supply chain management

Green supply chain management is an extremely large field, so many different concepts exist. Narasimhan and Carter (1998) point out that green supply chain management involves using

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methods to reduce materials in addition to recycling and reuse. Research by Sivastasa (2007) shows that green supply chain management is incorporating environmental factors into service supply chain management including: searching for raw materials, product design, production and distribution of products. final product.

Sirkis (2012) believes that green supply chain management is a combination of environmental improvement and transportation businesses, which confirms that reverse transportation plays an important role in green supply chain management.

Jain, V. K, & Sharma, M. (2014) argue that green supply chain management is a closed circular supply chain in which resources are used minimally and is environmentally friendly and safe.

The integration of environmental considerations into supply chain management, encompassing product design, sourcing and selection of raw materials, production procedures, and final product delivery to customers, is known as "green supply chain management, " usage and post-use management of the product's end of life. Green supply chain management refers to conventional supply chain management techniques that incorporate environmental norms or considerations into planned purchases and enduring supplier relationships. The management of its links, such as green design, green operations, green purchasing, green input and output logistics, waste management, green production, etc., is linked to green supply chain management.

Green supply chain management, which makes efficient use of energy and natural resources, is currently thought to be an effective way to address environmental issues in the global value chain, assisting in the reduction of pollution and the protection of public health**.**

4. RESEARCH METHODS

Qualitative research methods

The elements influencing green supply chain management at animal feed manufacturing companies in Hanoi are discussed using a qualitative approach. The author created and modified a questionnaire based on in-depth conversations with specialists in order to study 31 animal feed manufacturing enterprises in Hanoi.

Quantitative research methods

Collect data

According to Hair et al (2010), the smallest sample size should be 50, preferably 100, and the ratio of observations/measured variables should be 5/1. The research model is built with 3 groups of factors measured through 20 observed variables, so the minimum sample size is 100. The author selected 31 animal feed manufacturing enterprises in Hanoi. The sampling method is a convenient random method.

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Data processing

Survey data processing is carried out in the next stage to screen out inappropriate survey forms due to blank answers or inconsistencies in the answers. The number of survey questionnaires included for data analysis included 142 valid questionnaires. The questionnaires included in the analysis are entered and processed using SPSS software with the main analysis techniques: descriptive statistics, EFA testing and regression analysis. Finally, there is the presentation of the research results and the presentation of the article.

5. RESEARCH RESULTS

Cronbach's Alpha test

All Cronbach's alpha coefficients of the variables were ≥ 0.6, thus meeting the requirements to be included in factor analysis. At the same time, the total correlation coefficients of the observed variables all meet the requirement of ≥ 0.3, ensuring that the given scales can be trusted in a statistically significant way.

Table 1: Reliability Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Cronbach's Alpha = 0.811				
IE1	12.2715	8.393	.652	.732
IE2	12.3054	8.241	.724	.768
IE3	12.2408	8.315	.658	.736
IE4	12.3741	8.295	.680	.732
IE5	12.1523	9.465	.707	.792
Cronbach's Alpha=0.839				
SO1	13.3127	9.112	.585	.820
SO2	13.2546	7.674	.664	.797
SO3	13.5163	9.052	.569	.823
SO4	13.0182	7.830	.645	.803
SO5	13.6014	7.282	.752	.769
Cronbach's Alpha =0.842				
GO1	11.0903	10.528	.611	.814
GO2	11.1326	10.506	.625	.811
GO3	11.6540	11.091	.569	.821
GO4	12.0153	10.784	.645	.808
GO5	11.9281	10.253	.673	.801
GO6	11.7839	10.796	.574	.822
Cronbach's Alpha= 0.807				
GSCM1	12.3230	8.993	.603	.766
GSCM	12.3584	8.987	.596	.768
GSCM3	12.4779	9.023	.600	.767
GSCM4	12.5265	9.110	.567	.777

Source: Results compiled

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Exploratory factor analysis (EFA)

Exploratory investigation of EFA components to determine the degree of convergence of the factors included in the study when analyzing their impact on blue ocean economic development. This is to determine whether the measuring scales are consistent with the thesis's original intention. To use factor analysis, the observed variables must be connected to one another. To evaluate the hypothesis about the correlation between variables in the population, apply Bartlett's sphericity test. As a result, the higher the value of Bartlett's test, the greater the likelihood that the observed variables are connected. If the observed variables are not correlated, factor analysis is probably not appropriate.

To test the appropriateness of the factor analysis model, the author uses the KMO coefficient (Kaiser – Meyer – Olkin) which is the index used to consider the appropriateness of factor analysis. Therefore, the KMO coefficient must reach a value of 0.5 or higher ($0.5 \leq KMO \leq 1$), indicating that factor analysis is appropriate. Next, the author uses the extracted variance (% of variation explained by the factors) to determine the appropriateness of the factor analysis method. The standard for extracted variance is to reach 50% or more, Eigenvalue > 1, (Hair et al., 2010).

The author uses the factor loading coefficient of observed variables to select the number of factors to include in the analysis. Factor loading coefficient reflects the correlation between factors and observed variables. This large coefficient indicates that the factor and observed variable are closely related to each other. These coefficients are also used to explain the factors. Usually, an observed variable is selected when it satisfies the factor loading coefficient greater than or equal to 0.5. However, there are also different standards, the factor loading coefficient is greater than or equal to 0.3 to ensure discriminatory value between factors. In the article, the author chose a factor loading greater than or equal to 0.5 (Hair et al., 2010), then observed variables with loading factors greater than or equal to 0.5 were retained for inclusion in the analysis. After being retained, the observed variables will be named according to each factor in case these factors are not the same as the factors presented by the author in the research model.

Apply the Principal Axis Factoring extraction approach with Promax rotation (Gerbing anderson, 1988) and factor loading > 0.5 (Hair et al., 2010) to both independent and dependent variables. Finally, examine the EFA model findings with the rotated factor matrix.

Table 2: Rotated Component Matrixa

KMO	0.774
Sig.	0
Eigenvalue	1.461
Cumulative %	74.82

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Rotated Component Matrix[a]

	Component		
	1	2	2
IE3	.750		
IE1	.736		
IE2	.735		
IE5	.721		
IE4	.681		
SO1		.731	
SO2		.728	
SO4		.706	
SO3		.693	
SO5		.685	
GO1			.767
GO2			.732
GO3			.727
GO4			.725
GO6			.712
GO5			.723

Source: Results compiled

The results of testing the data with KMO = 0.774 (> 0.5), Sig of Bartlett's Test is 0.000, less than 0.05, showing that these observations are correlated with each other and completely consistent with factor analysis. Factor loading factor of the observed variables are all > 0.5, the total variance extracted is 74.82% (> 50%) and the Eigenvalue coefficient = 1.461 (> 1). These tests were warranted for exploratory factor analysis.

Thus, all the scales selected for the variables in the model meet the requirements and can be used in subsequent analyses.

Results of regression analysis

Regression analysis will determine the relationship between the dependent variable *(Green Supply Chain Management)* and the independent variables *(Internal Enterprise Factors, Social Relationship Network and Government Support).*

The regression analysis model will describe the form of the relationship and thereby help predict the level of the dependent variable when the value of the independent variable is known.

Assumption: The dependent variable is *Green Supply Chain Management*. Let the dependent variable be Y

Independent variables include: *(1) Internal Enterprise Factors, (2) Social relationship network, (3) Government support*. Let the independent variable be X.

When using SPSS software for multivariate regression analysis, the results of standardized Beta coefficients will be obtained. Set the normalized Beta coefficient to β.

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On that basis, there are independent variables X that are statistically significant (if sig. value < 0.05).

The linear regression model between a dependent variable Y and statistically significant independent variables X has the following form:

$$Y = \beta i * Xi + \alpha$$

(i: from 1 to 3 corresponding to which independent variable is statistically significant)

Table 3: Results of equation regression analysis

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.478	.214		2.235	.026		
	IE	.152	.043	.174	3.509	.001	.737	1.357
	SO	.125	.038	.168	3.245	.001	.679	1.473
	GO	.142	.051	.172	2.785	.006	.572	1.548
R= 0.748; R^2 =0.564, R^2 correction =0.541; F=43.536; Sig (F)= 0.000,								

Source: Results compiled

The results of the regression analysis of the model of factors affecting the intention to use T with 3 independent variables are as follows: Model fit test value sig. = 0.000 (< 0.05 shows that the variables in the model can explain the change in the dependent variable.

The linear regression model shows the impact of factors affecting green economic development in businesses:

$$GSCM = 0.174*IB + 0.\ 168*\ SO + 0.172*GO + \alpha$$

Testing the regression model and research hypotheses shows that the adjusted R2 coefficient (Adjusted R Square) = 0.541 (54.1%), so the research model is consistent with the research data at 54.1%. The model does not violate the assumptions of independence of errors and the VIF coefficient <2 shows that there is no multicollinearity phenomenon.

Table 4: Results of testing research hypotheses

Content	Expected	Result	Conclude
H1: Internal Enterprise Factors that have a positive effect on Green Supply Chain Management	+	+	Accept H1
H2: Social Relationship Networks that have a positive effect on Green Supply Chain Management	+	+	Accept H2
H3: Government support that have a positive effect on Green Supply Chain Management	+	+	Accept H3

Source: Results compiled

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6. CONCLUSION

Supply chain management is necessary and important, contributing to improving business efficiency while also contributing to environmental protection.

Research results show that there are 3 groups of factors affecting green supply chain management at animal feed manufacturing enterprises in Hanoi:

(1) *Internal Enterprise Factors*;

(2) *Social relationship network; and*

(3) Government support.

Among them, factors within the enterprise have the most influence on green supply chain management. Based on the research results, the author recommends some solutions to enhance green supply chain management.

(1) For businesses: Improve managers' understanding of green supply chain management. Maintain a continually operational environmental management system. Strengthen financial resources and enhance the quality of human resources.

(2) Foster positive social connections.

(3) Utilize government assistance as needed.

(4) Furthermore, firms that use digital technology in their supply chains build a green supply chain, which aims to provide transparency in accordance with environmental protection legislation while actively contributing to the conservation of natural resources for future generations.

References

1) Dung, D. T., 2023, Research on factors promoting green supply chain management practices at Vietnamese FDI enterprises, Doctoral thesis.

2) Fahimnia, B., Sarkis, J., & Davarzani, H. (2015), 'Green supply chain management: a review and bibliometric analysis', *International Journal of Production Economics*, 162, 101–114.

3) Fianko, S. K., Amoah, N., Jnr, S. A., & Dzogbewu, T. C. (2021), 'Green supply chain management and environmental performance: the moderating role of firm size', *International Journal of Industrial Engineering and Management*, 12, 163-173.

4) Hair, J. F., Black, W. C., Babin, B. J. & Anderson, R. E. (2010), *Multivariate Data Analysis*, 7th Edition, Pearson, New York

5) Jain, V. K, & Sharma, M. (2014), Driver Affecting the Green Supply Chain Management Adaptation: A Review, *Journal of Operation Management*, 13.

6) Nagurney (2006), *Supply chain network Economics*, Books, Edward Elgar Publishing.

7) Narasimhan, R. and Carter, J.R. (1998) Linking Business Unit and Material Sourcing Strategies. *Journal of Business Logistics*, 19, 155-171.

8) Rao, P., & Holt, D. (2005), 'Do green supply chains lead to competitiveness and economic performance?', *International Journal of Operations & Production Management,* 25(9), 898-916

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.13994958

9) Sarkis, J. (2003), 'A strategic decision framework for green supply chain management', *Journal of Cleaner Production*, 11(4), 397-409.

10) Seuring, S., & Müller, M. (2008), 'From a literature review to a conceptual framework sustainable supply chain management', *Journal of Cleaner Production*, 16(15), 1699–1710.

11) Sivastasa S. K (2007), Green supply chain Management: A state of Art literature review, *International Journal of management reviews*, 9(1), 53-80.

12) Tam, L. T., (2020), 'The effect of green supply chain management practices on sustainability performance in Vietnamese construction materials manufacturing enterprises', Uncertain Supply Chain Management, 8(2020), 43–54.

13) Yildiz Çankaya, S., & Sezen, B. (2019), 'Effects of green supply chain management practices on sustainability performance', *Journal of Manufacturing Technology Management*, 30(1), 98-121.