# THE INFLUENCE OF RISK ON SUPPLIER RELATIONSHIPS IN SMALL AND MEDIUM-SIZED ANIMAL FEED MANUFACTURERS IN NORTHERN VIETNAM

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**Abstract: Small and medium-sized enterprises (SMEs) engaged in animal feed production in Northern Vietnam are currently operating under constrained economic conditions and are encountering significant challenges. These difficulties primarily stem from the substantial influx of imported raw materials for animal feed and the elevated input costs associated with domestic production, which result in low investment efficiency. Such factors are likely to continue impacting the profitability of the animal feed sector in the foreseeable future. This study aims to identify four risk factors that influence the relationships with suppliers of animal feed raw materials: (1) Supply risk; (2) Market demand risks; (3) information sources risks; and (4) Environmental risks. The research methodology involved an online survey, which collected 175 responses from leaders, business owners, and heads of functional departments within animal feed SMEs in Northern Vietnam. Following the analysis of the data, the author presents recommendations designed to assist Vietnamese animal feed producers in establishing suitable strategies and policies to secure a stable supply of raw materials.**

***Keywords:*** *Small and medium-sized enterprises (SMEs) engaged in animal feed production, supplier links, supply chain risk*

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## 1. Introduction

The Ministry of Agriculture and Rural Development has established the Vietnam Animal Feed Industry Development Project for the period of 2021 to 2030, which includes a clear objective for the year 2030. The goal is to reach an annual production volume of approximately 30 to 32 million tons of industrial animal feed. Market research firm Mordor Intelligence predicts that the Vietnamese animal feed market will experience a compound annual growth rate (CAGR) of 4.6% from 2021 to 2026. The anticipated robust expansion of the animal feed market presents both opportunities and challenges for small and medium-sized enterprises engaged in animal feed production in Vietnam. The Vietnam Animal Feed Association reports that small and medium-sized enterprises (SMEs) constitute 82.2% of the total enterprises within the animal feed production sector in the country. Small and medium-sized enterprises (SMEs) within the industry face significant competitive challenges posed by robust foreign companies and corporations. These SMEs tend to operate independently and are characterized by fragmentation, limited economic potential, and inadequate management and administrative capabilities. Additionally, fluctuations in input materials further exacerbate the difficulties encountered by these businesses.

Numerous businesses, as evidenced by practical experience, fail to grasp the significance of the supply chain within today's globally competitive landscape (Nguyen & Sarker, 2018; Phan et al., 2019). With economic advancement, there is a rise in specialization (Lummus & Vokurka, 1999), prompting companies to enhance their connections with other supply chain participants. This strategy allows them to leverage the high-quality resources of their partners at a reduced cost compared to in-house production, which frequently proves to be inefficient. Supply chains are established by companies to minimize expenses and maintain competitiveness within the market. A disruption in any segment of the supply chain can have

repercussions for the entire network, potentially hindering the operations of the organization. Supply chain risk refers to the likelihood of an event occurring that leads to such disruptions, thereby impacting the effectiveness of the supply chain link (Ghadge et al., 2012). Comprehending the connection between risk and supply chain integration will establish a robust basis for companies to grow rapidly and sustainably.

This study is grounded in various domestic and international research findings, as well as expert insights regarding the unique circumstances of Vietnam's animal feed production sector. It aims to analyze the influence of four risk factors associated with the relationships with suppliers of animal feed raw materials, which include: (1) Supply risks; (2) Market demand risks; (3) Risks related to information sources; and (4) Environmental risks.

## 2. Theoretical basis of risk and supply chain linkage

### *2.1 Supply chain linkage*

*Supply chain*

The most common concept of the supply chain was developed by La Londe & Masters (1994), who stated that the supply chain is a collection of businesses in a sequence from raw material suppliers to product manufacturers and product distributors to the end consumers. Similarly, Lambert et al. (1998) also defined the supply chain as the collaboration among businesses to bring products and services to the market. In this research, the notion of the supply chain encompasses the actions of all pertinent stakeholders, ranging from the procurement of raw materials and the manufacturing of goods to the distribution to final consumers. A supply chain is characterized as a network that connects various organizations, incorporating both upstream and downstream linkages, through processes and activities that generate value for the products and services offered in the marketplace.

*Supply chain risks*

Various academic disciplines offer distinct definitions of risk, tailored to the specific subject matter and temporal context of their analyses. Risk is characterized as the potential for uncertainty regarding future results. In the context of business, risk refers to a situation or event that adversely impacts the value of the enterprise. It is important to note that while risk cannot be entirely eradicated, it can be mitigated to the greatest extent possible.

In the examination of supply chains within businesses, the interpretation of risk differs across various studies. Ketchen and Short (2012) characterized risk in connection with the intricacies of the supply market, encompassing factors such as supply scarcity, technological advancement rates, alternative sources of inputs, market entry barriers, logistics expenses or complexities, and conditions of monopoly. To enhance the understanding of supply chain risks, Christopher and Peck (2004) categorized these risks into three distinct groups. The initial category of risks pertains to the organization itself, encompassing process risk and control risk. Process risk refers to the potential for uncertainty or interruptions in activities that generate value for the organization. Control risks stem from either the implementation or the lack thereof of policies designed to oversee the organization's processes. The subsequent category of risks is external to the business yet remains within the supply chain, which includes risks associated with supply and demand. Market demand risk arises from the unpredictable, intricate, and unstable nature of market demand (Boyle et al., 2008). High-risk markets are defined by rapidly evolving customer demands, making accurate forecasting challenging. In such environments, businesses frequently struggle to satisfy customer requirements. Supplier risks can arise from low planning and production capabilities, leading to unstable production processes or cycles, imbalanced production systems, inflexible production processes, or insufficient ability to adopt new technologies (Punniyamoorthy et al., 2013). The third category of risks pertains to external environmental factors that exist beyond the supply chain, including the political landscape, legal frameworks, economic conditions, governmental policies, social dynamics, and natural surroundings. Additionally, risks may arise from the unreliability of information sources, which can include inaccessible information, delays in information delivery, compromised and disrupted information systems, or inadequate security measures for information sources. (Punniyamoorthy et al., 2013).

In the context of methodologies and risk categorization, the framework proposed by Christopher and Peck (2004) alongside that of Punniyamoorthy et al. (2013) is frequently utilized in supply chain research. This study specifically focuses on the relationship with the supplier within the supply chain. Consequently, the notion of risk in the supply chain aligns with the research aims, which encompass four distinct categories of risk: supply risk, market risk, information source risk, and environmental risk.

*Supply chain linkage*

In the current landscape characterized by volatility and intense competition, organizations must adopt more adaptable and interconnected operations to mitigate potential risks (Sertic et al., 2018). Consequently, both theoretical frameworks and empirical studies highlight the significance of collaborative linkages in establishing a competitive supply chain, defining such cooperation as "the adhesive that unites organizations and departments within an organization's supply chain" (Min & Zhou, 2002; Sertic et al., 2018). Supply chain linkage refers to the capacity of multiple businesses to function and collaborate efficiently, coordinating and organizing their activities within the supply chain towards a shared objective (Mentzer et al., 2001).

According to the evolution of supply chain linkage concepts in both theoretical and practical contexts, Bechtel and Jayara (1997) identified four distinct types of supply chain linkage: (1) Logistics activity linkage; (2) Information linkage; (3) Process linkage; and (4) Functional chain linkage. Of these, functional chain linkage is the most prevalent and is categorized into internal and external linkages. Internal linkages refer to the collaboration among various departments within the organization (Pagell, 2004; Van Dong and Van Der Vaart, 2005). External linkage emphasizes the examination of connections

among businesses. This includes establishing relationships with customers, engaging with suppliers, and facilitating connections from suppliers and manufacturers through intermediaries to reach the end consumer (Swink et al., 2007). Maintaining a strong relationship with suppliers is essential to guarantee the availability of input factors such as raw materials, machinery, equipment, and critical information, which are vital for the timely production and distribution of products and services to customers. This concept aligns with the notion of supplier association as utilized in this research.

***2.2. Risk factors influencing the relationship with suppliers.***

Supply risks, including delays in delivery and the inability to fulfill specified quantity and quality requirements, can adversely impact the supply chain linkages (Zhao et al., 2013). As the prevalence of supply risks rises, manufacturers may become reluctant to allocate capital and may also hesitate to reinforce their long-term commitments to suppliers. Organizations are increasingly opting to establish relationships with multiple suppliers rather than committing to a single or a few suppliers. This strategy aims to mitigate risks and enhance the safety of production and business operations. Any delays in the timely delivery of goods, disruptions, or breaches of supply contracts can significantly hinder the coordination between various departments, such as procurement and production (Frohlich, 2002). Consequently, this complicates the ability of manufacturing firms to deliver products on schedule, in adequate quantities, and with the required quality to their customers. An analysis of the animal feed supply chain revealed a negative correlation between the level of risk and the degree of cooperation among its members. The following hypothesis, H1, is proposed:

*H1: The risks associated with supply exhibit an inverse correlation with the extent of relationship between enterprises and their suppliers.*

Market instability, ongoing demand fluctuations, and challenges in forecasting significantly impact the connections within the supply chain. When market risks are elevated, manufacturers frequently find it necessary to alter their products, production levels, and order quantities (Trkman & McCormack, 2009). This situation will impact the flow of raw materials from suppliers to manufacturing companies. The elevated market risk further complicates the ability of the Marketing and Sales departments to collaborate effectively with other divisions within the organization, including the production and supply departments. The following hypothesis, H2, is proposed:

*H2: Market risk exhibits an inverse correlation with the extent of relationship between enterprises and their suppliers*

Effective coordination among functional departments within a business, as well as among supply chain members, is significantly influenced by the availability of information (Lee et al., 1997). A primary contributor to diminished efficiency is the presence of incomplete information. Enhancing information sharing and the quality of information sources can mitigate risks, enhance decision-making accuracy, and foster greater alignment among supply chain participants. Consequently, risks stemming from insufficient information, delays in information flow, issues with information systems, or inadequate information security can adversely impact operational outcomes and the coherence among members, as well as within organizations (Christopher and Lee, 2004). The following hypothesis, H3, is proposed:

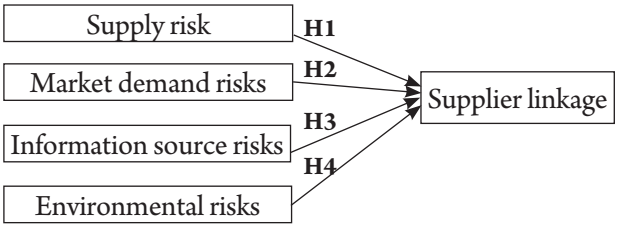
*H3: Information sources risks have an inverse relationship with the degree of linkage between businesses and suppliers.*

*Supply chain risks can arise from various factors, including political, economic, social, and environmental influences. As supply chains continue to expand and grow in complexity, the prevalence of these risks is on the rise* (Khan & Burnes, 2007). The aforementioned risks are typically objective and lie outside the control of individual members within the chain. Consequently, members frequently opt to diversify their relationships in order to mitigate these risks, rather than focusing on enhancing cooperation and establishing closer ties with a limited number of partners. The H4 hypothesis is articulated as follows:

*H4: The risks posed by the environment exhibit an inverse correlation with the degree of linkage between businesses and suppliers.*

This research will investigate how supply chain risk factors influence the connections between suppliers and small to medium-sized enterprises (SMEs) within the animal feed production sector of the Red River Delta. The research model and the relationships to be tested are illustrated in Figure 1.

**Figure 1.** A model of risk factors influencing supplier linkage




*Source: The author proposes*

**3. Research methods**

The research was conducted in two phases: qualitative and quantitative analysis. Initially, a theoretical framework was established, focusing on studies related to supply chain risks, interconnections within the supply chain, and the current conditions of animal feed-producing small and medium-sized enterprises (SMEs) in the Red River Delta. This framework was utilized to develop a scale for qualitative research. Subsequently, the author engaged in direct interviews with experts, staffs, and employees within the industry to verify the accuracy of the statements included in the scale. The calibration scale derived from the preliminary study was then adopted as the official research scale. In the formal study, the observed variables were evaluated using a 5-point Likert scale, ranging from (1) Completely disagree to (5) Completely agree.

**Table 1.** Scale and source of variable scale

| No. | Encode | Scales | Source |
|---|---|---|---|
| | NC | Supply risks | |
| 1 | **NC1** | The logistics operations of the supplier are characterized by substandard quality (delays in delivery, late scheduling of appointments, etc.) | Wagner & Bode, 2008; Punniyamoorthy et al., 2013; with adjustments based on findings of qualitative research |
| 2 | NC2 | Suppliers frequently provide raw materials that exhibit quality issues. | |
| 3 | **NC3** | The complexity and challenges associated with substituting vital materials. | |
| 4 | **NC4** | Unexpected supplier insolvency (for instance, as a result of bankruptcy). | |
| 5 | **NC5** | Suppliers exhibit limited adaptability in response to changes in market demand. | |
| 6 | **NC6** | The supply market exhibits considerable volatility. | |
| | NCTT | Market demand risks | |
| 1 | **NCTT1** | Uncertainty in customer demand | Wagner & Bode, 2008; Zhao et al., 2013; Manuj & Mentzer 2008; with adjustments based on findings of qualitative research |
| 2 | **NCTT2** | Forecasting market demand presents challenges and frequently diverges from the actual demand observed. | |
| 3 | **NCTT3** | Customer needs are varied and subject to frequent changes. | |
| | TT | Information source risks | |
| 1 | **TT1** | Information frequently experiences delays or becomes inaccessible as a result of insecure information systems both within organizations and across business networks. | Punniyamoorthy et al., 2013; Trung, 2018 |
| 2 | **TT2** | The infrastructure of information technology is frequently flawed. | |
| 3 | **TT3** | Information system with low security measures. | |
| 4 | **TT4** | Illogical selection of communication channels or methods for information exchange. | |
| | MT | Environmental risks | |
| 1 | **MT1** | Unstable political environment | Punniyamoorthy et al., 2013; Wagner & Bode, 2008; with adjustments based on findings of qualitative research |
| 2 | **MT2** | Intricate and interrelated legal and policy frameworks. | |
| 3 | **MT3** | Changeable economic indicators | |
| 4 | **MT4** | The labor source has not met the requirements, there is a shortage of highly skilled workers, or strikes... | |
| 5 | **MT5** | Risks from the natural environment (disasters, epidemics, floods, extreme climates...) | |
| | NCU | Supplier linkages | |
| 1 | NCU1 | Businesses maintain cooperative relationships with suppliers | Zhao và cộng sự, 2013; Trung, 2018; with adjustments based on findings of qualitative research |
| 2 | **NCU2** | Companies engage in dialogue with suppliers regarding modifications pertaining to product design. | |
| 3 | **NCU3** | The enterprise's suppliers participate in the development of new product designs. | |
| 4 | **NCU4** | Suppliers furnish the necessary inputs associated with the enterprise's development projects. | |
| 5 | **NCU5** | Companies consistently strive to foster enduring partnerships with their suppliers. | |
| 6 | **NCU6** | Companies consistently collaborate with suppliers to enhance the quality of their products. | |

*Source: The author gathered*

The sample size was determined in accordance with the guidelines established by Hair et al. (1998), which stipulate that for exploratory factor analysis (EFA), the ratio of observation to measurement variables should be 5:1. This implies that each measurement variable requires a minimum of five observations. In this research, all 24 observation variables were measured for the factors within the formal quantitative research model. Consequently, the minimum sample size required for this study was set at 120 samples. Considering the objectives of the study and budgetary constraints, the research team gathered data from 60 businesses. Within each organization, three managers were surveyed, comprising both business leaders and middle management. This resulted in a total of 180 survey responses, of which

175 were deemed valid for inclusion in the official analysis.

The collected research data underwent a cleaning and analysis process utilizing SPSS 22.0 software. This study employs a multivariate regression approach to examine the influence of supply chain risk factors on supplier relationships.

**4. Findings of the study**

***4.1 Description of the study sample***

The research methodology outlines that the study's participants consist of directors or business owners, as well as heads or deputy heads of sales and production departments within small and medium-sized enterprises (SMEs) in the animal feed production sector located in the Red River Delta. A total of 180 votes were issued, with 180 votes collected, resulting in 175 usable votes, which corresponds to a rate of 97.2% for inclusion in the official analysis. The characteristics of the 175 samples utilized in the official study are detailed as follows:

**Table 2.** Descriptive statistics of the formal quantitative research sample

| | | Quantity | Percentage (%) |
|---|---|---|---|
| Type of enterprise | Private enterprise | 24 | 13.5 |
| | Limited liability companies | 37 | 21.3 |
| | Joint stock company | 114 | 65.2 |
| The duration of the enterprise's operation. | Less than 5 years | 23 | 13.3 |
| | From 5 t0 10 years | 100 | 57.3 |
| | Above 10 years | 52 | 29.3 |
| Enterprise scale | Less than 50 employees | 108 | 61.5 |
| | From 50 employees or more | 67 | 38.5 |
| Title of the respondent | Senior Management | 53 | 30.0 |
| | Middle management. | 122 | 70.0 |

*Source: Author's data analysis results*

The survey findings indicate that a significant proportion of businesses within this sector are joint-stock companies, comprising 65.2% of the total. The remaining entities are categorized as limited liability companies and private enterprises, representing 21.3% and 13.3%, respectively. A majority of these businesses have been in operation for a duration of 5 to 10 years, accounting for 57.3%. Additionally, there are 22 enterprises that have been functioning for over 10 years, which corresponds to 29.3% of the total. Conversely, the number of enterprises that have been active for less than 5 years is the smallest, making up 13.3%. Furthermore, the majority of the surveyed enterprises employ fewer than 50 individuals, which constitutes 61.5% of the total.

***4.2. Evaluate the reliability of the scale***

The findings from the data analysis indicate that the observed variables utilized in this research exhibit reliability, as evidenced by the Cronbach Alpha coefficient and the correlation coefficient between the component variable and the aggregate variable, both exceeding 0.6 and 0.3, respectively. Consequently, the observed variables confirm the reliability of this study.

**Table 3.** The Cronbach Alpha coefficient

| TT | Components | Cronbach's Alpha |
|---|---|---|
| 1 | Supply risks | 0.897 |
| 2 | Market demand risks | 0.848 |
| 3 | Information source risks | 0.824 |
| 4 | Environmental risks | 0.840 |
| 5 | Supplier linkages | 0.913 |

*Source: Author's survey data*

***4.3. Outcomes of the correlation coefficient matrix analysis***

The analysis of the correlation coefficient between the independent variables (environmental risks, supply risk, market demand risk, and information source risks) and the dependent variable (supplier linkage) revealed that the correlation coefficients for the inversely correlated variables ranged from -0.266 to -0.545. Additionally, the significance test values for these variables were below 0.05 (significant value = 0,05), indicating a statistically significant association at the 5% significance level. These findings suggest that the relationship between the independent and dependent variables is not strong, leading to the acceptance of hypotheses H1, H2, H3, and H4 in this research.

**Table 4.** Correlation coefficient matrix between risk and supplier linkage

| | | Supplier linkages | Environmental risks | Supply risks | Market demand risks | Information source risks |
|---|---|---|---|---|---|---|
| Supplier linkages | Pearson Correlation | 1 | -0.266** | -0.399** | -0.503** | -0.545** |
| | Sig. (2-tailed) | | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 175 | 175 | 175 | 175 | 175 |
| Environmental risks | Pearson Correlation | -0,266** | 1 | -0.173* | 0.178* | -0.069 |
| | Sig. (2-tailed) | 0,000 | | 0.022 | 0.018 | 0.361 |
| | N | 175 | 175 | 175 | 175 | 175 |
| Supply risks | Pearson Correlation | -0,399** | -0.173* | 1 | -0.136 | -0.232** |
| | Sig. (2-tailed) | 0,000 | 0.022 | | 0.072 | 0.002 |
| | N | 175 | 175 | 175 | 175 | 175 |
| Market demand risks | Pearson Correlation | -0,503** | 0.178* | -0.136 | 1 | 0.170* |
| | Sig. (2-tailed) | 0,000 | 0.018 | 0.072 | | 0.024 |
| | N | 175 | 175 | 175 | 175 | 175 |
| Information source risks | Pearson Correlation | -0,545** | -0.069 | -0.232** | 0.170* | 1 |
| | Sig. (2-tailed) | 0,000 | 0.361 | 0.002 | 0.024 | |
| | N | 175 | 175 | 175 | 175 | 175 |

***. Correlation is significant at the 0,01 level (2-tailed).*

***. Correlation is significant at the 0,05 level (2-tailed).**

*Source: Author's data analysis results*

### *4.4. Results of the research model testing*

The analysis results indicate that the adjusted coefficient of determination is 0.553, which signifies that the independent variables—namely, risk from supply, risk from market demand, risk from information sources, and risk from the environment—account for 55.3% of the variance in the dependent variable related to supplier associations. The F-test significance level, which is below 0.05, confirms the appropriateness of the regression analysis model utilized in this study. Furthermore, the significance levels of the regression coefficients for the four independent variables are also below 0.05, indicating that these coefficients are statistically significant. There is no indication of multicollinearity among the independent variables, as evidenced by the variance inflation factor (VIF) values being less than 10. Additionally, the significance of the correlation coefficient test between the normalized residuals and the independent variables exceeds 0.05, suggesting that there is no variance in the error of changes. Consequently, the regression model effectively demonstrates the statistically significant impact of risk factors on supplier linkage in this study (refer to Table 5). The analysis of the absolute values of the standardized regression coefficients for the independent variables indicates that the information source risk exerts the most significant influence on the relationship with the supplier, as evidenced by the highest regression coefficient value of 0.447. Following this, the subsequent factors are as follows: market demand risk at 0.363, supply risk at 0.212, and the environmental risk at 0.196.

**Table 5.** Regression coefficient between risk and supplier linkage

| Model | | Unstandardized regression coefficients | | Standardized regression coefficients | T | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 0.856 | 0.449 | | 1.908 | 0.058 | | |
| | Supply risks | -0.278 | 0.070 | -0.212 | -3.986 | 0.000 | 0.906 | 1.103 |
| | Market demand risks | 0.284 | 0.041 | -0.363 | -6.915 | 0.000 | 0.931 | 1.075 |
| | Information source risks | -0.395 | 0.047 | -0.447 | -8.410 | 0.000 | 0.908 | 1.101 |
| | Environmental risks | -0.316 | 0.085 | -0.196 | -3.717 | 0.000 | 0.927 | 1.079 |
| Dependent Variable: Supplier linkage<br>Adjusted R Square: 0.553<br>F - value: 54.823; Sig. of F: 0.000<br>*Source: Author's data analysis results* | | | | | | | | |

## 5. Conclusions and recommendations

This research examines the impact of four risk factors on the supplier relationships of animal feed SMEs. The findings of the study validated the proposed hypotheses. In particular, the four identified risk factors include supply risk, market demand risk, information source risk, and environmental risk, all of which significantly influence supplier linkages. The results indicate that both information source risks and market demand risks exert a substantial effect on the supplier relationships of animal feed SMEs.

The animal feed production sector has relied heavily on imported raw materials for many years and is likely to continue doing so in the foreseeable future. To safeguard the long-term interests of the livestock industry and farmers, it is essential for the Government, relevant ministries, sectors, and Vietnam feed Associations to address the challenges faced by animal feed production companies, particularly during the input material phase. Specifically:

- Efforts should be directed towards enhancing domestic production, diversifying supply sources, and utilizing alternative raw materials to mitigate reliance on imported supplies. This includes the strategic planning of areas dedicated to the production of animal feed raw materials. Additionally, The establishment of planning regions for the production of animal feed components is essential. This initiative aims to promote the utilization and processing of supplementary feeds derived from local raw materials, including feed crops, by-products from feed manufacturing, fish meal, and fish oil. Such measures are intended to decrease import dependency and reduce the overall costs associated with animal feed.

- It is essential to enhance and expand the ability to anticipate market fluctuations concerning input materials and trends in product consumption, ensuring timely supply to enterprises. Concurrently, adjustments to import policies are required, particularly in relation to export and import tax rates. A recommendation is made to reduce the import tax to 0% for all imported animal feed ingredients. While certain raw materials currently enjoy a 0% tax rate, many others are subject to a tax rate ranging from 2% to 5%. Furthermore, it is advisable to increase the export tax on raw materials used in animal feed production to a range of 10% to 20%, depending on the specific type of material.

- Arranging seminars to facilitate the exchange of experiences concerning legislation and documentation pertinent to the organization of activities within the industry supply chain, as well as strategies for accessing

raw material markets and export markets for finished products. Establishing strong connections among animal feed manufacturers, farmers, and relevant associations.

- Vietnam's animal feed production companies are presently characterized by fragmentation, with weak joint ventures and associations. There is a pressing requirement for restructuring strategies, establishing the joint ventures and partnerships to develop large, diversified enterprises. The Ministry of Agriculture and Rural Development serves as the governmental authority responsible for assisting these enterprises in restructuring, as well as in formulating and developing business strategies aimed at mitigating the disadvantages faced by Vietnamese companies in comparison to foreign enterprises operating in Vietnam.

We anticipate that the findings of this study will provide valuable recommendations for small and medium-sized enterprises (SMEs) to enhance their connections, mitigate risks within the supply chain, and secure the stability of raw materials in the future.

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