

The Effects of Risks in Agricultural Supply Chain Management on Business Performance: A Case Study in Vietnam

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Risks in the agricultural supply chain management can cause significant losses to the production and business activities of enterprises in the market. This study aims to examine the impact of risks in the agricultural supply chain management on the business performance of enterprises. Applying a quantitative research method through SEM linear structure model analysis, with survey data size including 625 samples of managers who have experience and knowledge of agricultural supply chain operations management in enterprises in Vietnam. Research results show that risks in the supply chain have both direct and indirect effects on business performance through intermediaries, which are trust and linkages in the agricultural supply chain management. Besides, research also shows that there is a negative impact from the trust of participants and linkages in the agricultural supply chain management on the business performance of enterprises. In addition, research has also demonstrated that links positively affect both trust and opportunistic behavior of the participants in the agricultural supply chain management. On that basis, the study has given several recommendations to improve business performance for enterprises. The findings of this study have shown the importance and impact of risks in the agricultural supply chain management in multiple dimensions and aspects of business performance.

Keywords: Risks in the agricultural supply chain management; Business performance; Trust; Linkages in the agricultural supply chain; Opportunistic behavior.

1. Introduction

Risks exist and arise in any type of business or business activity. Risk is often understood in a negative way such as dissatisfaction with customer needs or impact on safety of customers (Zsidisin, 2003). On the other hand, Spekman and David (2004) argue that risk is the possibility of uncertainty over possible future outcomes, risk can have both positive and negative results. In the context of agricultural supply chain management, risks are perceived as the jeopardy related to information, the flow of materials and products from supplier to end-consumers, and the ability to influence market supply and demand mismatches (Juttner et al., 2003).

Venkatraman and Ramanujam (1986) argue that business performance is a factor that is of interest not only in managers, leaders in organizations and enterprises, but also receives a lot of attention from researchers interested in different aspects such as terminology, level of analysis (individual, group, department, etc.). Business performance of an enterprise can be seen in terms of financial results, non-financial results, or a combination of these indicators. There are many ways and criteria to measure business performance of enterprises in the agricultural supply chain management context. Business performance can be measured from three perspectives: resource utilization, outcomes, and flexibility (Beamon, 1999).

Up till now, in their studies, many authors have mentioned the relationship between risk in the agricultural supply chain management and business performance of enterprises. The studies have explored the risks from many different aspects and studied the impact of each aspect on business performance. Trkman and McCormack (2009) argue that the high-risk market is characterized by changing customer needs that are difficult to predict. Businesses often find it difficult to meet customer needs in such environments. Risks from suppliers can be caused by low planning and production capacity that causes the production process or production cycle to be unstable, followed by an imbalanced production system, inflexible production, or inability to apply new technologies (Punniyamoorthy et al., 2011). The business environment of the business is constantly fluctuating, the agricultural supply chain operation also has potential risks arising from this volatility from the environment. The theory of organization's dependence on external resources asserts that organizations need to adjust as their environment or circumstances change. The organization's environment includes: (1) customers and consumers; (2) funding sources; (3) input suppliers; (4) science and technology (Tossi & Slocum, 1984). Modifications often involve changing the organizational structure, strategies, or other limitations of the organization. In the field of agricultural supply chain management, the influence of the environment on an organization has been extensively

studied (Wong, 2011). David (1993) asserted that organizations establish and develop relationships with agricultural supply chain partners to limit the risks and impacts of environmental instability. Mentzer et al. (2001) support this assumption, while further asserting that increased global competition increases environmental instability and promotes linkages among members in the agricultural supply chain. Chen and Paulraj (2004) also confirm that volatility of supply, demand and technology are the primary factors that lead to environmental volatility and this volatility affects the strengthening relationship between buyers and seller.

In fact, Vietnamese enterprises with most small and medium-sized enterprises, although considered to have made significant progress in many fields, many businesses still have only limited operation scale, fragmented manual methods and unclear business strategies, leading to an overall low business performance. In the market economy, risk is always an important issue when participating in production and business activities. Until now, many businesses in Vietnam are still unable to define strategies and coordinate them to minimize risks as well as promote agricultural supply chain management link development and business performance. To limit risks and create a position in the market, businesses need solutions to promote their own competitiveness. Besides, engagement and building trust among participants and controlling opportunistic behavior is an effective path, thereby promoting enterprises to increase initiative, develop working efficiency and improve business performance.

This research is based on an overview of the theory and related works, constructing the model, and testing the impact of risks in the agricultural supply chain management on the business performance of the business. Given the context of enterprises in Vietnam, research shows the importance of risk control and the relationship in which risks in agricultural supply chain management impacts the business performance of firms. At the same time, the research results also show a theoretical contribution when it substantiates the negative impact from the trust of participants and linkages in the agricultural supply chain management on the business performance of enterprises. In addition, research also demonstrates the mediating role of participants' trust factors and the link in agricultural supply chain management in the relationship between risks and business performance. Based on these results, the study proposes several recommendations to encourage businesses gain insight into agricultural supply chain management risks as well as its factors for business performance, thereby calling for more effective and efficient solutions and policies for the future.

2. Literature Review and Hypotheses

2.1. Risks in the supply chain and business performance of the enterprises

Risk is defined in different ways depending on the area of

study (Wagner & Bode, 2008). According to Juttner et al. (2003), agricultural supply chain management risks are those that disrupt or impede information, the flow of materials and products from supplier to end consumer, and the ability to influence the mismatch between market supply and demand. There are many ways to classify the origin of risks (Chien, Pantamee, et al., 2021). First, the source of risks can be explained by a spiral that has four components including lack of visibility or transparency, lack of confidence, creating buffers and length of agricultural supply chain. When the visibility or transparency of agricultural supply chain is limited, it reduces confidence in participating in the agricultural supply chain management, thereby creating buffers, gaps between members or dividing into multiple individual segments of the agricultural supply chain and thus lengthening the agricultural supply chain (Christopher & Lee, 2004).

Spekman and David (2004) classify risks in the agricultural supply chain management into six groups, including: risks occurring in the physical flow (commodity) of the agricultural supply chain management; information flow; currency; the organization's internal information system; relationships and social responsibility of members in agricultural supply chain management. Cavinato (2004) divides risk in the supply chain from the following five sources: risks in the physical flow; currency; information; innovational opportunities for members in agricultural supply chain. Juttner et al. (2003) classify risks in the agricultural supply chain management into three groups: environmental risks due to uncertain business environments, such as disasters or crises; Organizational risks are caused by chain actors, such as malfunctions in the production and distribution system; The last is the risk related to workers' strikes or errors from the structure and characteristics of the agricultural supply chain management such as lack of cooperation, linkages and sharing among members in the chain (Chien, Sadiq, et al., 2021).

Supplier risk can develop due to many problems associated with new product development, distribution problems or relationships among members, problems with product quality, input costs, inability to satisfy customer needs, outdated technology, scarce resources, shortages or price constraints and ultimately geographic distance between buyers and sellers (Zsidisin, 2003). A third group of risks is related to environmental factors outside the agricultural supply chain management such as political environment, macroeconomic environment, laws, government policies, society, labor resources and nature (Punniyamoorthy et al., 2011). Risks can also come from information source volatility including information that is unavailable, information provided with delays, damaged and disruptive information infrastructure, or information coming from insecure sources. (Punniyamoorthy et al., 2011).

In addition, Juttner et al. (2003) divide agricultural supply chain management risks into three different categories.

The first group of risks resides within the organization, including process risks and control risks. Process risk involves uncertainty or disruption in value - adding activities. Control risk arises from adopting or not applying policies to manage the organization's processes (Nawaz et al., 2020). The second group of risks is the group of risks outside the business but still inside the agricultural supply chain management, including the risks from supply and demand. Risks from market demand are due to the fluctuating, complex and unstable market environment (Boyle et al, 2008). Among the approaches and risk classification, the approach according to Juttner et al. (2003) and Punniyamoorthy et al. (2011) is quite common in agricultural supply chain management studies, including: Risks from the agricultural supply sources, risks from the market, risks from information sources and ultimately, risks from the environment.

Neely et al. (1995) argue that business performance is a set of criteria to quantify the efficiency of all aspects of enterprises. It is examined by three levels: individuals, enterprises' goals, and the relationship between such evaluation criteria with the operating environment (culture, customer satisfaction, development strategy, etc.,). Maisel (2001) evaluates the business performance of enterprises as a system that allows enterprises to plan, measure and control the results of sales, marketing, information technology activities, and business decision-making and other activities to set goals and create value for people with related interests. According to Kaplan and Norton (1993), the business performance is determined from four basic groups of components, including finance, customers, internal processes, and developmental learning. It builds the basis for converting the content of the business strategy into execution terms.

A study of Delaney and Huselid (1996) measures business performance not based on financial indicators but on employee perceptions of an organization's performance based on criteria such as product quality, new product development, ability to attract employees, customer satisfaction and the relationship between managers and employees as indicators of the performance of the management in the business. Awareness-based measurement had a positive effect on organizational performance (Dollinger and Golden, 1992). In addition to the two directly impacting factors mentioned in the research content, which are risks in the agricultural supply chain management and business performance, the study also mentions intermediate factors including trust, the linkages in the agricultural supply chain management and the opportunistic behaviors of the members participating in the agricultural supply chain management (Shair et al., 2021).

Trust is one of the factors that create effectiveness in relationships. Maryer Roger C. et al. (1995) believe that trust is when we put our belief in another; it is necessary to clarify the concept of trust in the relationship between trustees and believers. In the agricultural supply chain

partnerships, building trust among the participants is considered an urgent requirement, affecting knowledge sharing, work productivity, thereby promoting enterprises' business performance (Sun et al., 2020). Linkages in agricultural supply chain management are widely studied in supply chain management (Jianjun et al., 2021). The linkages exist both inside and outside of the business. Entrepreneurship implies cooperation in agricultural supply chain management-related activities such as inventory management, freight transportation, warehouse management or order and purchasing management (Romano, 2003). External links are like the internal, however, these activities are outside or between businesses. Based on the development of the concept of agricultural supply chain management linkages in both practice and theory, Bechtel and Jayaram (1997) have divided four different schools of concept about agricultural supply chain management linkages: (1) the "linkages/logistics school", which assumes that agricultural supply chain management link logistics activities; (2) the "information school", which presumes linking flows of information to be both inside and outside the business; (3) the "integration / process school", which calls for the concept of linking business processes between businesses in the agricultural supply chain management; (4) The "functional chain awareness school", which divides supply chain linkages into external links (links between businesses) and internal links (Mohsin, Kamran, Nawaz, Hussain, & Dahri, 2021).

Meanwhile, many other studies on agricultural supply chain management linkages focus on studying the links between organizations, individuals, and businesses. Specifically, the link between enterprises and customers, links with suppliers, or links from suppliers, manufacturers, and through intermediaries to end consumers (Swink et al., 2007). Linking with customers to determine the right needs of customers and thereby mobilize the necessary resources needed to create products and services that customers desire. Cooperating closely with the customer reduces the risk from market volatility, at the same time improving the efficiency of production and ultimately increasing enterprise's profits (Enkel et al., 2005). Besides linking with customers, linking with suppliers is also focused. Building an intimate connection with suppliers to always be guaranteed when acquiring enterprise inputs such as raw materials, machinery, equipment, experts, and even valuable information, etc., to ensure a smooth and timely process of manufacturing and distributing products and services to customers (Klein & Rai, 2009). This study focuses only on the external linkages, between members of the agricultural supply chain management, from input suppliers and customers (Nawaz et al., 2021).

In a partnership, the behavior of the participants includes both positive and negative behaviour. The opportunistic behavior is the act of seeking personal gain by fraud (Williamson, 1975), the essence of which is the breaking

of commitments or the violation of obligations and responsibilities that require performance (Morgan & Hunt, 1994). According to Nguyen et al. (2020), opportunistic behavior is considered as a form of negative behavior, governed and determined by the perception, attitude, and capacity of individuals and organizations.

2.2. Research Hypotheses

2.2.1. Risks in agricultural supply chain management and business performance

Business performance can be measured on three levels: resource utilization, output results and flexibility (Beamon, 1999). The instability of the business environment creates many risks for businesses (David, 1993; Simchi & Zhao, 2003). Uncertainty can result from delayed deliveries from suppliers, sudden increases in market demand, or canceled contracts. To mitigate these risks, conventional businesses tend to increase the level of reserves. However, this does not solve the problem that the business may still have shortages or excesses of inventory (David, 1993). Strengthening cooperation and information sharing with members in the agricultural supply chain management to reduce risks and thereby improve business performance is considered an effective solution to solve the above effect (Lee & associates, 1997). In order to test and consider the impact of risks in the agricultural supply chain management on business performance of enterprises in Vietnam, the following hypothesis is built:

H1: Risks in the agricultural supply chain management negatively affect the business performance of enterprises in Vietnam (see Figure 1).

2.2.2. Risks and trust among participants in agricultural supply chain management

Trust among participants in the agricultural supply chain management shows a positive sign in relationships and has a positive impact on the business performance of enterprises. However, trust and risk are always linked in each specific case. Failure to deliver on time, delay or destruction of supply contracts would affect the coordination of activities between departments in the organization such as those between the procurement department and the production department (Frohlich & Westbrook), 2001). This also makes it difficult for manufacturing enterprises to meet deadlines, in sufficient quantity and in terms of quality for customers. Customers' trust and cooperation with manufacturers will be reduced (Zsidisin, 2003). In the context of enterprises in Vietnam, in order to test the relationship between risk and trust among participants in the agricultural supply chain management, the authors hypothesize:

H2: Risks of negative impact on trust among participants in the agricultural supply chain management in Vietnam (see Figure 1).

2.2.3. Trust among participants in agricultural supply chain management and business performance

Bakiev (2013) argues that the high-performance work

system through mediation is the relationship between trust, organizational engagement and organizational performance perception that has a positive effect on the business performance of the enterprise. Guinot et al. (2014) argue that trust among participants is a factor that positively affects the business performance of organizations. With most research results, the same point of view is that trust among members in the agricultural supply chain management has a positive impact on the performance of enterprises such as the research of Klein and Rai (2009). However not all studies have found a positive relationship between trust and business performance. In partnership, building trust among members is one of the necessary solutions, having an impact on the effectiveness of management decisions, and at the same time, affecting the productivity of enterprises. Therefore, in the context of enterprises in Vietnam, trust among *participants* in the agricultural supply chain management will affect the business performance of enterprises. The hypothesis built:

H3: Trust among participants in the agricultural supply chain management positively affects the business performance of enterprises in Vietnam (see Figure 1).

2.2.4. Risks and linkages in the agricultural supply chain management

Linkages in the agricultural supply chain management create added value for each participant. However, in this linking process there may exist different risks. Risks can affect both positively and negatively. On the negative side, the relationship between instability or risks and linkages in the agricultural supply chain management was also tested in a number of studies and showed results contrary to the suggestions of a positive relationship. Agricultural supply chain management risks such as on-time delivery, failure to meet requirements in terms of quantity and quality can negatively affect supply chain linkages (Zhao et al., 2013). When agricultural supply chain management risks increase, manufacturers will not want to invest capital or strengthen their commitment to long-term relationships with suppliers. Instead of linking and being loyal to one or several suppliers, enterprises tend to choose to have relationships with many suppliers to reduce risks and increase safety for production and business.

Risks due to unstable market, constantly fluctuating demand, are difficult to predict insofar as they affect the alignment of the agricultural supply chain management. High market risk cause manufacturers to frequently change products, volumes, and orders (Trkman & McCormack, 2009). This will affect the supply of raw materials from suppliers to manufacturing enterprises. The high risk from the market also makes it difficult for the marketing department to coordinate smoothly with other departments in the organization such as the production department or the material supply department. Finally, market demand fluctuates and changes, making it difficult for manufacturers to identify market needs and customer feedback, and to connect with customers (Calantone et al.,

2003). In order to test the impact relationship of risks on the link in the agricultural supply chain management and its impact direction, in the context of enterprises in Vietnam, the hypothesis is built:

H4: *Risks have a negative impact on the linkages in the agricultural supply chain management of enterprises in Vietnam (see Figure 1).*

2.2.5. Agricultural Supply Chain Management Linkages and Business Performance

The relationship between linkages in the agricultural supply chain management and business performance of enterprises is studied from different angles. From an agricultural supply chain management perspective in general, linkage implies the connection with suppliers and with customers (Li et al., 2006). This view can also imply the relationship between buyers and sellers in terms of logistics (Chen & Paulraj, 2004). In general, most studies suggest that external linkages have an impact on the business performance of enterprises. Li et al., 2006 argue that agricultural supply chain management and linkages have a direct and long-term impact on a firm's financial and marketing performance. Linking logistics activities with suppliers and customers improves the efficiency of both sellers and buyers (Chen & Paulraj, 2004).

From an agricultural supply chain management perspective in general, Li et al. (2006) demonstrates the impact of supply chain linkages on long-term marketing and financial performance. In the scope of logistics, Paulraj (2007) also discover a relationship between the linkage of logistics activities between enterprises and the business performance of each enterprise participating in the association. Although many studies confirm the impact of agricultural supply chain management linkages on the business performance of enterprises, this relationship is only partially confirmed in other studies. Specifically, while the degree of association affects the sales-to-asset ratio, it does not affect the increase in customer satisfaction and sales (Rosenzweig et al., 2003). Similarly, Vickery et al. (2003) confirm a failure to find evidence of the effect of agricultural supply chain management linkages on the ratio of revenue before tax to total assets (ROA). Collaboration with key suppliers and key customers will reduce costs, improve product design and quality and service quality. And finally, the above improvements will help improve productivity, while also improving business results. With the context of enterprises in Vietnam, to test more clearly the relationship between agricultural supply chain management linkages and the business performance of enterprises, the following hypothesis is set out:

H5: *Agricultural supply chain management linkages positively affect the business performance of enterprises in Vietnam (see Figure 1).*

2.2.6. Risks and opportunistic behavior of participants in agricultural supply chain management

Risks in the agricultural supply chain management can

arise due to the impact of the political, economic, social, natural environment, etc., and these risks increase as the agricultural supply chain managements increasingly expands and becomes more complex. (Khan & Burnes, 2007). These risks are often objective and beyond the control of each member of the chain and can create negative opportunistic behavior. Therefore, members often tend to diversify their relationships to minimize the above risks instead of enhancing cooperation, closely linking with a few partners, and thereby also minimizing unwanted actions from partners. To further analyze and examine the relationship between risks and opportunistic behavior of participants in the agricultural supply chain management in enterprises in Vietnam, the following hypothesis is built:

H6: *Risks have a positive impact on the opportunistic behavior of participants in the agricultural supply chain management in Vietnam. (see Figure 1).*

2.2.7. Opportunistic behavior of participants agricultural supply chain management and business performance

According to Katsikeas et al. (2009), opportunistic behavior negatively affects trust, thereby affecting the performance of businesses. Opportunity behavior often stems from the individual needs and interests of each organization. In this relationship, needs determine interests. Performance depends on the relationships among the participants, tolerance, adaptability, and teamwork, which are also important behaviors of each member. Business performance, if dominated by personal interests, will have a negative impact. Most research have shown the impact of the opportunistic behavior of members in the agricultural supply chain management on the business performance of enterprises. Thus, in the context of Vietnamese enterprises, whether there is a direct relationship between the opportunity behavior of the members in the agricultural supply chain management on the business performance of enterprises or not. The hypothesis is set forth:

H7: *Opportunistic behavior of participants in the agricultural supply chain management has a negative impact on the business performance of enterprises in Vietnam (see Figure 1).*

2.2.8. Linkages and Trust among participants in the agricultural supply chain management

George and Jones (1996) argue that satisfaction is a set of feelings and beliefs associated by members with their job. Creating sustainable linkages in the agricultural supply chain management improves the satisfaction of participants, creates initiative in activities, reduces costs and increases profits (David, 1993). Also, the association and cooperation between members in the agricultural supply chain management help enterprises expand their market share, reduce costs and ensure sustainable development (Lee & Whang, 2000). To examine and clarify the direction of the impact of the association on trust among participants in the agricultural supply chain

management in the context of enterprises in Vietnam, the following hypothesis is proposed:

H8: Linkages positively affect trust among participants in the agricultural supply chain management in Vietnam (see Figure 1).

2.2.9. Linkages and Opportunistic Behavior of participants in Agricultural Supply Chain Management

In fact, opportunistic behavior in relationships frequently appears and has a significant influence on the performance of organizations. Opportunistic behavior is often associated with risks in agricultural supply chain management linkages in a negative direction such as not satisfying the needs of partners or affecting the safety of enterprises (Zsidisin, 2003). The high-risk market is characterized by the constantly changing and unpredictable needs of customers and institutions in their commitment. Enterprises find it difficult to do business when operating in such an environment (Trkman & McCormack, 2009). In the context of enterprises in Vietnam, in order to clarify the relationship between linkages and opportunistic behavior of agricultural supply chain management members, the authors hypothesize:

H9: Linkages have a negative impact on the opportunistic behavior of participants in agricultural supply chain management in Vietnam (see Figure 1).

3. Research Method

3.1. Research Scale

Based on theoretical overview and related research works,

the article proposes a research model with independent variables as Risks in agricultural supply chain management including Risks from the supply sources; Risks from the customers; Risks from information sources and ultimately, Risks from the environment. The scale used in the study is a Likert scale with 5 levels (Strongly agree; Agree; Normal; Disagree; Strongly disagree). Variable measurement indicators are applied with adjustments to the characteristics of the research sample from previous studies.

The variable, agricultural supply chain management risk (ASCMR) is measured using the research scale of Wagner and Bode (2008), Punniyamoorthy et al. (2011), Zhao et al (2013) includes 18 observations with 4 groups of factors: Supply Risk (RS) has 5 observations; Risk from customer (RC) has 3 observations; Risk from Information (RI) has 4 observations; Risk from Environment (RE) has 6 observations.

Trust of participants in the agricultural supply chain management (TR) using the scale of Morgan and Hunt (1994) with 5 observations; agricultural supply chain linkages (ASCL) uses a research scale of Zhao et al. (2013) including 13 observations with 2 groups of factors: Linkages with Suppliers (LS) has 7 observations; Linkages with Customers (LC) has 6 observations; Opportunistic behavior (OPB) using the scale of Katsikeas et al. (2009) consisting of 5 observations; Business performance (BP) uses the scale of Huselid (1995) consisting of 6 observations.

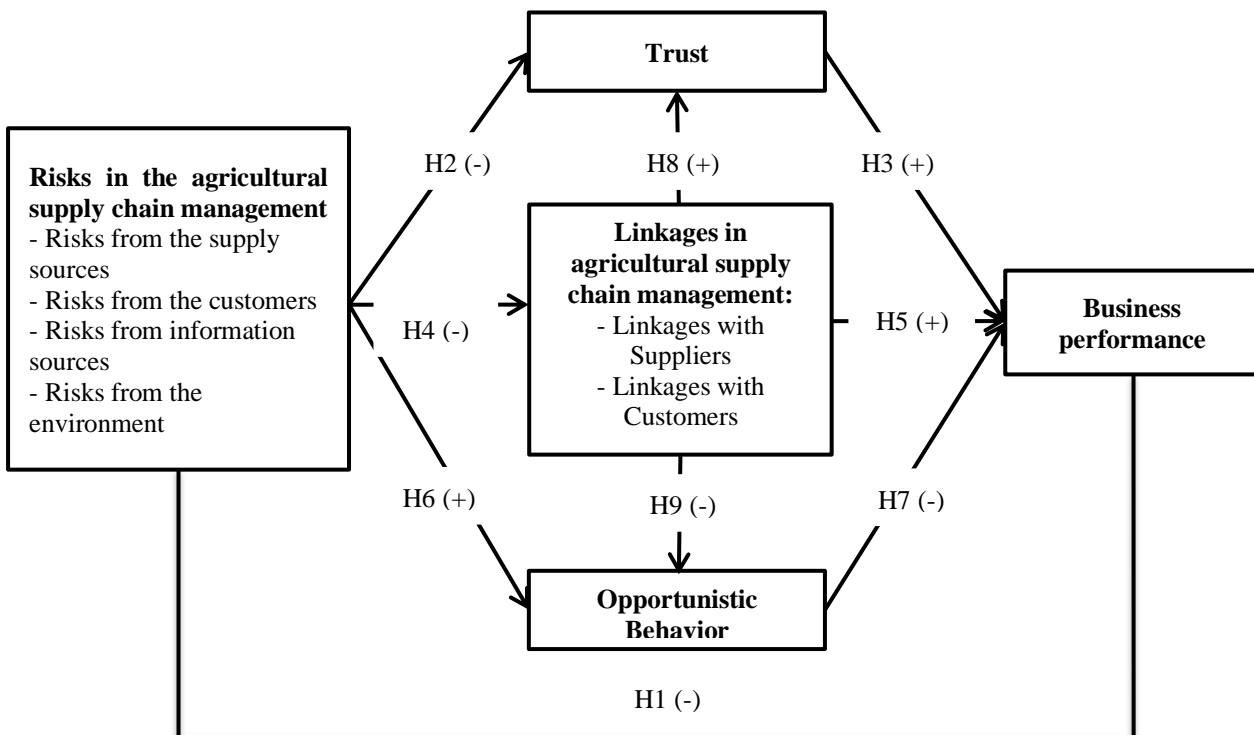


Figure 1: Proposed research model

3.2. Research Sample

The research sample is selected through the non-

probability sampling method, which is convenient sampling stratified relatively according to provinces and

localities in Vietnam. The unit of analysis in this study are those individuals who are identified as managers with experience and knowledge of agricultural supply chain management in enterprises in Vietnam. The sample size for collection is 625 samples. The data collection process is conducted in two ways: direct and online questionnaires distribution.

The number of online questionnaires collected is 397 while the the number of available questionnaires is 359. In terms of direct survey, the number of questionnaires issued is 400, the number of questionnaires collected is 298, and the number of questionnaires used is 266. The total number of valid questionnaires used for analysis is 625. Based on the study of Hair et al. (1998), for reference to the expected sample size, the minimum sample size is 5 times the total number of observed variables. With the number of observations in the paper being 39, the research scale includes 598 samples to ensure analysis requirements. The time to complete data collection spanned from November 2020 to January 2020.

3.3. Data Processing

The research applies quantitative methods. The data after collection and cleaning are processed through SPSS and Amos. First, the study assesses the reliability of the scale

with Cronbach’s Alpha value > 0.7, the study analyses the EFA discovery factor with the aim of determining the "convergence value" and "discriminatory value of the scale" and with the requirement of Factor loading > 0.5, KMO coefficient >= 0.5 and <=1, Sig value. < 0.05, and the percentage of variance extracted > 50%. After that, AMOS software is used to evaluate the suitability of the research model through CFA test and finally test the research hypotheses by analyzing the SEM linear structural model with the requirements of chi-square/df index < 5 in the case of sample size > 200 (Kettinger et al., 1995); GFI, TLI, CFI > 0.8, RMSEA < 0.08 (Taylor et al., 1993).

4. Results and Discussion

4.1. Testing the Reliability of the Scale

Cronbach's Alpha test analysis results show that in terms of reliability of the scale used in the analysis that the Cronbach's Alpha coefficient of all variables > 0.7. However, BP6 indicator has Cronbach's Alpha if Item Delete coefficient as 0.959 which is larger than the Cronbach's Alpha coefficient of BP variable (0.940). Therefore, in order to increase the relevance of the scale, this indicator is conducted (see Table 1).

Table 1: Assess the reliability of the scale through Cronbach's Alpha coefficient

No.	Variables	Ref. code	Cronbach's Alpha
1	Risks from the suppliers	RS	0.863
2	Risks from the customers	RC	0.884
3	Risks from information	RI	0.919
4	Risk from enviroment	RE	0.886
5	Trust	TR	0.808
6	Linkages with the Suppliers	LS	0.894
7	Linkages with Customers	LC	0.732
8	Opportunistic Behavior	OPB	0.856
9	Business Performance	BP	0.959

4.2. EFA

After testing the appropriateness of the scale, the study analysed the discovery factor EFA for both the variables, the intermediate variable, and the dependent variable. For the independent and intermediate variables, the EFA analysis is conducted twice, in which the factor loading in each analysis was > 0.5, showing the appropriate correlation between the variables observed (indicators) and selected factors in the model. However, in the first analysis, because "convergence value" does not guarantee the same factor, the RE2, LS5, LC3 indicator were rejected. The second analysis shows that the remaining

data are eligible for analysis due to factor load coefficients > 0.5 and satisfy two conditions; "Convergence value" (observed variables converge to the same one factor) and "Distinguishing value" (observed variables belonging to one factor distinguished from another).

With the dependent variable being business performance, the analytical results showed that the KMO coefficient was 0.893 (> 0.5), the Sig of Bartlett's test was 0.000 (<0.05), the total variance extracted was 86.195% (> 50%). At the same time, the indicators of the scale are combined into a single group, ensuring the "convergence value" of the scale. (see Table 2)

Table 2: Results of analysis EFA factor

EFA analysis		KMO coefficient	P-value	Average Variance Extracted	Factors loading	Conclusion
Independent and intermediate variables	The 1st time	0.881	0.000	64.698	All are > 0.5	Remove indicator RE2, LS5, LC3
	The 2nd time	0.884	0.000	66.104	All are > 0.5	Ensure analysis requirements
Dependent variable	The 1st time	0.893	0.000	86.195	All are > 0.5	Ensure analysis requirements

4.3. CFA

The research results indicate the appropriateness of the measurement model. Chi-square = 2916.087, df = 820, Chi-square/df = 3.556 (<5), P= 0.000, GFI = 0.825 (>0.8), TLI = 0.886 (>0.8), CFI = 0.897 (>0.8), RMSEA = 0.064 (<0.08).

4.4. SEM Analysis

Conducting analysis of the SEM model for the research model, we see that the synthetic indicators are satisfactory. Specifically, Chi-square = 3248.013, df = 841, Chi-square/df = 3.862 (<5), P= 0.000, GFI = 0.810 (>0.8), TLI = 0.873 (>0.8), CFI = 0.881 (>0.8), RMSEA = 0.068 (<0.08) (see Figure 2).

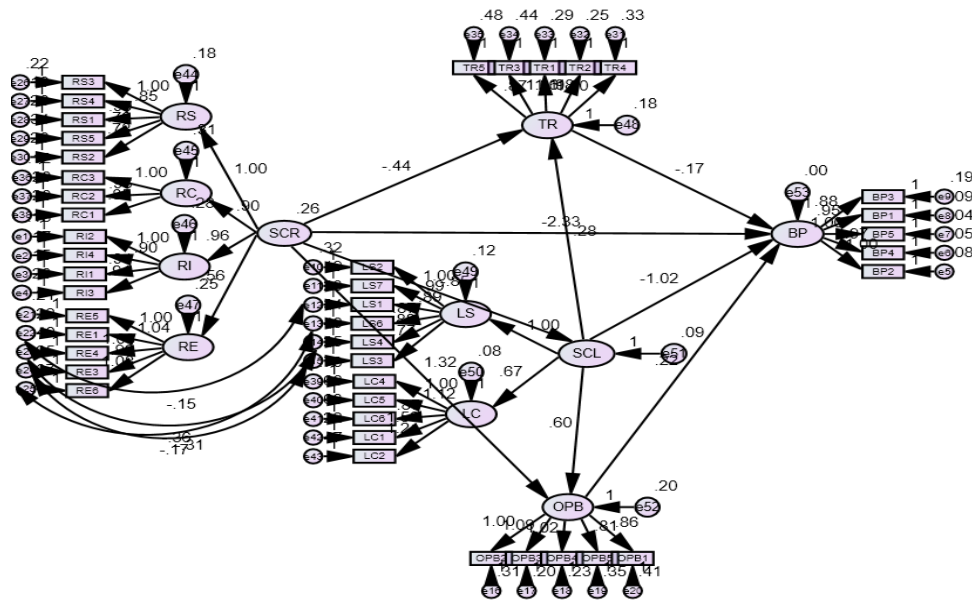


Figure 2: SEM model analysis

The results of the estimation of relationships in the model show that the research model is appropriate, the hypotheses H1, H2, H4, H6, H8 are accepted, while H3, H5, H7, and H9 are rejected according to the test results.

Particularly, with the hypothesis H1 which tests the impact of risks in the agricultural supply chain management on the business performance of enterprises in Vietnam, the research results show that the hypothesis is accepted with the significance level $P < 0.05$ and the regression weight is $-2.334 < 0$. This proves that risks in the agricultural supply chain management have a negative impact on business performance. This result corresponds to the research works of David (1993); Simchi and Zhao (2003); Lee et al., (1997), etc,

With hypothesis H2 and H3, which test the impact of risks in the agricultural supply chain management on the trust of participants and the impact of trust on business performance of enterprises in Vietnam, the results show that with the significance level of $P < 0.05$ and the regression weight of -0.437 and $-0.167 (<0)$, the study accepts the hypothesis H2 and rejects H3. Thus, the research results are similar to those of Frohlich and Westbrook (2001); Zsidosin (2003), etc., when arguing that risks in the agricultural supply chain management have a negative impact on the trust of participants. However, with the second dimension, the study proves that the trust of participants in the agricultural supply chain management has a negative impact on business performance, this result

is in contrast to other works as Bakiev's study (2013); Guinot et al (2014); Klein and Rai (2009). This is explained by taking advantage of the partners' trust in the relationships, and not making efforts to contribute to the overall success of the organizations. Moreover, the loose connection between participants in the agricultural supply chain management can create loopholes for participants' profiteering behaviors and thereby affect the business performance of other participants. .

With hypothesis H4 and H5, which test the impact of risk on linkages in the agricultural supply chain and the impact of linkages on business performance of enterprises in Vietnam, the results show that the significance level of $P < 0.05$ and the regression weights of -0.847 and -1.024 , respectively (<0), leading this study to accept the hypothesis H4 and rejects the H5 hypothesis. This result shows similarities with the studies such as Zhao et al (2013); Trkman and McCormack (2009); Calantone et al. (2003) when arguing that risks have a negative impact on linkages in the agricultural supply chain. However, with the other direction, although rejecting the H5 hypothesis, the study proves that linkages in the agricultural supply chain have a negative impact on business performance. This result is contrary to the work of Li et al (2006); Li et al (2006); Rosenzweig et al. (2003), etc., but it partly reflects the current reality of enterprises in Vietnam where although there are linkages, these linkages are based heavily on computational relationships, for the interests of the participants themselves, but not based much on the

interests of the participants. This may result in personal profiteering behaviors and a lack of positive cooperation from participants, thereby affecting the business performance of the entire system of enterprises participating in the agricultural supply chain management.

With hypothesis H6 and H7, which test the impact of risk on opportunistic behavior of agricultural supply chain management participants and opportunistic behavior on business performance of enterprises in Vietnam, the research results show that the hypothesis H6 is accepted with the significance level $P < 0.05$ and the regression weight is 1,317 (> 0), which proves that there is a positive impact of risk on behavior opportunities of participants in the agricultural supply chain management. This result shows similarities with the works of Khan and Burnes (2007); Katsikeas et al. (2009), etc., While, with a P significance level of 0.129 (> 0.05), hypothesis H7 is rejected, that is, there is no impact of opportunistic behavior of participants in the chain. provided to the business performance of enterprises, this result is in contrast to the research work of Katsikeas et al (2009); Zhao et al (2013), etc.,. While, with a P significance level of 0.129 (> 0.05), hypothesis H7 is rejected, that is, there is no impact of opportunistic behavior of agricultural supply chain management participants on business performance, this result is in contrast with the studies such as Katsikeas et al. (2009); Zhao et al (2013).

Thus, with the above results, the study has shown that risks in the agricultural supply chain management have both

direct and indirect impacts on the business performance of enterprises through intermediary factors as trust and linkages in the agricultural supply chain. At the same time, the research results also show a theoretical contribution when it is shown that there is a negative impact from the trust of participants and linkages in the supply chain on the business performance of the enterprise (see Table 3).

In addition, for hypothesis H8 and H9 which tests the impact of linkages in the agricultural supply chain management on the trust and opportunistic behavior of participants, research results show that with the significance level of $P < 0.05$ and the regression weight of 0.276 (> 0), the study accepts the hypothesis H8, that is, there is a positive impact of the linkages on trust between participants in the agricultural supply chain management. This shows similarities with the work of George and Jones (1996); David, 1993); Lee and Wang (2000), etc.,. Meanwhile, with $P < 0.05$ significance and regression weight of 0.276 (> 0), hypothesis H9 was rejected and at the same time, the study also proved that there is a positive effect of the linkages in the agricultural supply chain to the opportunistic behavior of participants. This result is in contrast to the studies of Zsidisin (2003); (Trkman and McCormack, 2009), ec., and shows the downside of agricultural supply chain linkages necessitating the need for tight control of relationships and greater attention to the opportunistic behavior of participants, limiting individualism and tendencies to value individual interests over collective interests.

Table 3: SEM analysis results for the relationships in the model

Hypothesis	Relationship	Weightage	S.E	C.R.	P	Conclusion
H1	BP <--- ASCMR	-2.334	0.446	-5.237	0.000	Accepted
H2	TR <--- ASCMR	-0.437	0.109	-4.001	0.000	Accepted
H3	BP <--- TR	-0.167	0.072	-2.333	0.020	Rejected
H4	ASCL <--- ASCMR	-0.847	0.071	-12.017	0.000	Accepted
H5	BP <--- SCL	-1.024	0.329	-3.117	0.002	Rejected
H6	OPB <--- ASCMR	1.317	0.206	6.404	0.000	Accepted
H7	BP <--- OPB	0.218	0.144	1.518	0.129	Rejected
H8	TR <--- ASCL	0.276	0.109	2.539	0.011	Accepted
H9	OPB <--- ASCL	0.595	0.191	3.117	0.002	Rejected

Thus, the study has proven the importance of risk in the agricultural supply chain management in the relationship that directly and indirectly affects the business performance of enterprises, as well as the intermediary role of elements of trust and linkage in the agricultural supply chain. To make more practically meaningful judgments and examine the relationship between the research results in terms of theory and practice, the study conducts descriptive statistical analysis to determine the mean variables. The results show that, with the highest average value of the research variables included in the model of 3.8163, the business performance factor of Vietnamese enterprises is recognized and evaluated at a relatively higher level. These are positive signs, showing steps in the right direction, breakthrough and effective solutions of Vietnamese enterprises in the current context and a positive signal to show that that Vietnamese businesses are

ready to participate more in global value chains, towards the sustainable development of businesses.

Besides, the mean value of opportunity behavioral variable is 2.1520, this is the lowest level compared to other factors included in the model. This shows that, in agricultural supply chain management activities, the opportunistic behavior of the participants has been somewhat controlled and businesses have a deeper sense of minimizing opportunistic behaviors. However, this number is still quite high today with the requirement of a negative factor, individualism still exists and it is necessary to join hands and contribute efforts of businesses and organizations to limit and eliminate it in order to create an equal business environment and strong links aimed at the long-term development of the whole system of participants in the agricultural supply chain management (see Table 4).

Table 4: The results of the descriptive statistical analysis of the variables' value

Variable	N	Min	Max	Mean	Std. Deviation
ASCMR	625	1.05	4.32	2.3860	0.49475
RS	625	1.00	5.00	2.1891	0.63013
RC	625	1.00	5.00	2.4352	0.71719
RI	625	1.00	5.00	2.3708	0.70442
RE	625	1.00	5.00	2.5488	0.66857
TR	625	1.20	5.00	3.7382	0.61401
ASCL	625	1.75	5.00	3.6011	0.54124
LS	625	1.00	5.00	3.7581	0.63657
LC	625	1.80	5.00	3.4442	0.62108
OPB	625	1.00	5.00	2.1520	0.65280
BP	625	1.00	5.00	3.8163	0.66104

5. Conclusions and administrative implications

Based on theoretical overview and related works, this research has been conducted to build a model and test the impact of risks in the agricultural supply chain management on the business performance of enterprises in Vietnam. Research results show that risks in the agricultural supply chain management have both direct and indirect impacts on business performance of enterprises through intermediary factors such as trust and linkage in the agricultural supply chain. At the same time, the study also shows that there is a negative impact from the trust of participants and linkages in the agricultural supply chain to the business performance of enterprises. In addition, the study also demonstrates that linkages have a positive effect on both trust and opportunistic behavior of participants in the agricultural supply chain management. On that basis, the study proposes several recommendations to help enterprises improve business performance and move towards the sustainable development of agricultural supply chain value.

Firstly, in term of risks in the agricultural supply chain management, it is necessary to improve the state management capacity to control activities, have mechanisms and policies to promote the participation of enterprises in the agricultural supply chain management. At the same time, the enterprise focuses on stably and gradually expanding the market, expanding the association and business scope of the participating members, thereby minimizing risks, and improving business performance.

Secondly, in term of trust among participants in the agricultural supply chain management, it is necessary to create a friendly and fair cooperation environment, encouraging open and frank information sharing among participants of the agricultural supply chain management. Building good relationships between enterprises and customers, showing confidence in the ability of partners and suppliers to work together is a sustainable way.

Third, in term of linkages in the agricultural supply chain, it is necessary to agree on appropriate mechanisms in building linkages to ensure harmonization of interests between the parties involved. Enterprises should not always prioritise lowering costs that will ultimately affect

services and products (low-quality goods, violate regulations on food safety and hygiene), or are particularly important to customers with strict requirements for major suppliers. In addition, businesses need to stabilize and gradually expand markets, and at the same time diversify export products.

Fourth, in term of the opportunistic behavior of participants in the agricultural supply chain management, it is necessary to take preventive measures, to closely build constraints in economic relations, and targets in cooperation activities. Enterprises should strengthen incentives for information sharing among participants involved in the agricultural supply chain management and control activities to limit profiteering and business dependence.

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