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Impact of Supply Chain Innovation and Risk Management Capabilities on Competitive Advantage at Steel Trading Companies in Vietnam

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Abstract

Purpose: The current research investigates the beneficial impacts of supply chain innovation and risk management on the competitive advantage of organizations, based on the resource-based theory (RBT) framework. **Research Design, Data, and Methodology:** 14 survey items were included in the study's questionnaire, utilizing a random sampling technique to gather data from 239 leaders and managers employed by various steel trading firms in Vietnam. In order to validate the data and examine relationships, the collected data is analyzed using structural equation modeling, confirmatory factor analysis, and reliability analysis via SPSS 22.0 and AMOS 22.0 software. A fictitious system has been suggested. **Results:** According to the findings, the most positive influence on competitive advantage is supply chain innovation, followed by risk management capability, having the second greatest positive influence. **Conclusions:** Some conclusions are drawn based on the research's findings in order to assist managers in realizing the significance and necessity of giving attention to supply chain innovation and improving risk management capabilities, both of which are essential components for achieving the competitive advantage of an organization.

Keywords: Risk Management Capabilities, Supply Chain Innovation, Competitive Advantage.

JEL Classification Code: A12, G32, L19.

1. Introduction

Modern businesses must constantly work to develop in the setting of broad and deep global integration to gain a competitive advantage (Hwang et al., 2020). Given the dynamic world of today, developing the competitive advantage of an organization is no easy task (Jansen et al., 2009). A company's ability to outperform its competitors will depend on whether it has a competitive advantage (Singh et al., 2021). Employing hard-to-find and irreplaceable skills will provide businesses with a competitive edge over their competitors (Dyer & Singh,

1998). Technology and capital reserves, two common sources of competitive advantage, are easily replicated (Sirmon et al., 2007).

Consequently, Barney (2001a, 2001b) emphasized the key elements of finding a challenging, original, and pertinent source of competitive advantage. Moreover, firms currently face a wide range of risks, such as complexity, changes in corporate governance, deregulation national integration, and environment and financial model changes. Increasing competitive advantage in that environment becomes one of the critical issues facing enterprises. In order to preserve a competitive edge, global supply chains

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must be managed as a whole in a way that successfully controls risks including transportation hazards (Baryannis et al., 2019). This trend, as demonstrated by Revilla and Saenz (2017), is the outcome of modern supply chain efficiency techniques, including crystal manufacturing compact, low inventory, supplier expansion, and centralized distribution taking advantage of global sourcing and using digital technologies. The management of supply chain risks is regarded as the ability which is a suitable reaction in the current environment, where several risk factors are growing. Due to its challenging process and useful way to utilize supply chain management processes, businesses should be interested in increasing supply chain innovation in order to reduce risk processes and technologies with the ultimate goal of discovering new ways to manage supply chain deployments more effectively (Lee et al., 2011; Klein-Schmeink, & Peisl, 2013). As a supplier, supply chain innovation assists in a number of responsibilities, such as increasing an organization's capacity for risk management, improving operational skills, forecasting, planning, and monitoring purchases across the supply chain. Due to the major barriers to successfully adopting innovation in the supply chain and the importance of risk management capability, Vietnam's steel businesses have a competitive edge. With the current state of deep and widespread integration in Vietnam, the research findings have management ramifications that can assist the firm in gaining a competitive edge.

2. Literature Review and Hypothesis Development

2.1. Literature Review

Supply Chain Innovation: The challenging business environment, coupled with growing competitive challenges, has compelled corporations to develop novel business models. Particularly, supply chain development has become the primary means by which businesses compete with one another and support the creation of their plans (Hartley et al., 1997). Although businesses now understand how crucial supply chain innovation is, implementing creative partnerships across partners can be challenging (Sumo et al., 2016). Businesses, especially those in developing nations, are currently dealing with a multitude of infrastructure, security, and institutional issues. Hence, in order to provide goods and services for customers in the most effective manner possible, firms must implement ways to improve systems and processes (Wadho & Chaudhry, 2018). Organizations leveraging the development of relationships with strategic partners effectively exploit supply chain innovation through a combination of tangible and intangible resources, thereby increasing the competitive advantage of

companies and parties. Moreover, organizations must adjust numerous internal and external factors that positively affect the ability to manage risks and subsequently their competitive advantage (Hohberger et al., 2015).

Risk Management Capabilities: With the development of technology in the Industrial Revolution 4.0 of globalization, supply chain management became more intricate and dangerous (Verhoef et al., 2021). Nonetheless, the capacity to manage risk has never been a novel idea given that firms must accept a certain amount of risk in order to conduct their operations (Ali et al., 2021). Since risk has numerous dimensions and no single definition of risk can account for all conceivable risk circumstances, the capacity to manage risk offers some description (Yang et al., 2021). Several academics have separated internal (endogenous) and extrinsic risks under risk management (Golan et al., 2021). As demonstrated by Sato et al. (2020) and Sarkis et al. (2020), disruption risk (man-made, economic, or natural disaster) and operational risk (demand, supply, and cost) are considered the two primary types.

From another perspective, the capacity to supply competitive operational resources at the macro-policy level might be qualitatively categorized as the capacity to manage risk (Butt, 2021). Furthermore, the capacity to handle risk can be classified into three additional categories: organizational risk, network risk, and environmental risk (Sarkis, 2021). Yet, researchers found that with the spread of one risk to the next, all of these significant categories of risk management capabilities had an overall detrimental effect on the supply chain. In order to manage the risk of unforeseen probabilistic situations, one effective strategy is to identify potential sources of risk and assess the likelihood that they will occur and ultimately the capacity to control risks, offer potential remedies, and manage the results (Zinn & Goldsby, 2020). It is a multi-step procedure that emphasizes locating mitigation access and addressing various risk management capabilities (Baryannis et al., 2019). In the era of digital transformation, risk management skills are essential since they assist managers in grasping the challenges of putting into practice effective risk management strategies. Scholars have urged an empirical study on global risk management capabilities (Riglietti et al., 2021).

Competitive Advantage: The competitive advantage of a business is thought to give it an advantage over rivals in the same sector (Porter, 1985). As mentioned by Porter (1985), companies are at crossroads when deciding whether to pursue a cost leadership approach or a differentiation strategy to acquire a competitive edge. Based on the findings of Yamin et al. (1999), the low-cost strategy focuses on cutting expenses wherever feasible, whereas the differentiation strategy seeks to establish higher quality and image. There are numerous ways to boost competitive

advantage, such as speeding up the pace at which novel products are released to the market, reducing the time of delivering products to partners and customers, increasing order completion rates, enhancing the quality of information provided to customers, improving capital deployment efficiency, and cutting marketing lead time as a form of competitive advantage which may be utilized to ensure competitive advantage. It is also obvious that the first product or service to market gains a competitive edge (Li et al., 2006). Additionally, the resource-based view contends that businesses with a diversity of resources have an advantage over rivals (Barney, 1991) by utilizing one's inherent strengths, strategically taking advantage of environmental chances, countering external threats, and avoiding internal weaknesses (Sigalas et al., 2013). Resources must be rare, imperfectly replicable, and valuable, and they must be organized to gain a competitive edge (Barney & Clark, 2007), depending on your capacity for resource management (Singh et al., 2020b). Based on the environment and the companies' overall strategy, these resources will change (Akter et al., 2020).

2.2. Hypothesis Development

Supply Chain Innovation and Competitive Advantage: In order to address unpredictability and disruption in both internal and external business contexts, supply chain innovation refers to a collection of connected processes outside the organization to offer them fresh, creative alternatives (Lee et al., 2011). Businesses build and develop essential capabilities enabling them to outperform their rivals in terms of service to their potential customers to gain long-term competitive advantage. A competence key is a distinctive collection of competencies created in significant organizational domains, including elements such as agile innovation and creative innovation (Srivastava et al., 2013). Organizations are put ahead of their rivals by the caliber and responsiveness of their customer service. Therefore, competitive advertising in this case refers to a situation when a firm has more resources and the capacity to reduce costs, enhance operational effectiveness, and provide added value for clients compared to its competitors. Supply chain innovation is the propensity for an organization to promote experimentation, novel ideas, and innovative procedures for new product offerings or technology processes based on the view of Shan et al. (2016) and DeTienne et al. (2015). Innovation enables a business to go above and beyond what customers expect. Consequently, upgrading not only increases businesses' operational effectiveness, but also enables them to develop a unique mechanism that is exceptionally diverse and challenging to duplicate (Deshpandé & Farley, 2004). According to Simatupang et al. (2004), firms increasingly view supply chain innovation as

a crucial and essential component of staying competitive. Li et al. (2006) demonstrated that businesses typically employ various techniques to increase their competitive edge, such as strengthening quality, increasing reliability, creating new products, boosting customer service, and reducing lead times in the market. Hence, demonstrating how firms have a competitive edge through effective operations in supply chain innovation can be crucial (Flint et al., 2008). The author puts up the following theory for a steel trading corporation in Vietnam based on the outcomes of earlier debate and empirical studies.

H1: Supply chain innovation positively impacts competitive advantage.

The Relationship between Competitive Advantage and Risk Management Capabilities: Enhancing risk management capabilities proactively gives firms a competitive edge because it promotes a more strategic view of hazards and aids in supply chain planning to prevent unneeded disruptions (Henke, 2009). In order to compete better in a turbulent business climate, firms must learn to manage risks resulting in differentiation and cost savings (Colicchia & Strozzi, 2012). The capacity to manage risk may not provide the expected competitive advantage right now. However, over time, the benefits will become apparent. Elahi (2013) contended that some firms underutilize their risk management capabilities because they view them as an unnecessary investment. Instead, managers prioritize risk management over lower costs, more predictable operational disruptions, and increased value added, giving them the opportunity to acquire a competitive edge through cost control risks (Waters, 2011). Due to their planned risk management processes, firms are capable of efficiently responding to shocks and developing possibilities for distinctive value while also lowering the cost of risk transfer by having more negotiating leverage and increasing their customer base. Therefore, the company can increase its market share through a competitive edge. As indicated by Grawe (2009), businesses can only sustain their competitive edge by actively participating in supply chain innovation and enhanced risk management to guarantee that their resources are superior to those of their rivals. According to opposing viewpoints and the outcomes of the discussion, the author suggests the following for steel trading enterprises in Vietnam.

H2: Risk management capabilities positively impact competitive advantage.

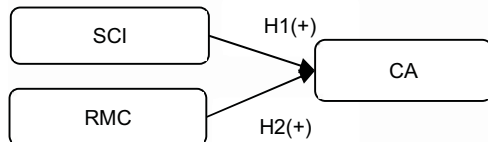
In order to illustrate the research's arguments and potential links, the current study applies fundamental ideas such as stakeholder theory, resource-based theory (RBT),

resource-based perspective (RBV), natural RBV, continuous competition theory, and management theory. Table 1 displays the breadth of each theory's applicability in the present study.

Table 1: Definition of the Main Theories.

Source	Theory	Definition and a brief explanation
Wernerfelt (1984); Barney (1991)	Resource-based theory (RBT)	Proposing that the components of competitive advantage include a firm's resources, such as dynamic capacity, management capacity, people capital, etc.
Barney (1991)	Resources-based view (RBV)	The Board of Directors is crucial in the system of corporate governance. It gives the business the strategic knowledge it needs while enhancing value and growing connections that will contribute to sustainability.
Barney (1991)	Natural RBV	By implementing sustainable innovation and boosting its capacity for innovation, the organization may produce great outcomes thanks to its commitment to the environment. They have significant effects on the natural environmental restrictions and produce a long-lasting competitive advantage.
George (1997)	Continuous competitiveness theory	Use resources both internal and external to maintain the sustainable competitiveness of businesses and nations.

Resource-based theory (RBT) contends that a firm's resources, involving its capital, human resources, and dynamic management capabilities, are what give it a competitive advantage (Wernerfelt, 1984; Barney, 1991). In addition to the outcomes and restrictions of the earlier empirical research stated above, as well as the professional debate on the variables influencing competitive advantage in Vietnamese steel trading firms, a study model was suggested including two distinct hypotheses, as shown in Figure 1.



Note: SCI: supply chain innovation; RMC: risk management capabilities; CA: competitive advantage.

Figure 1: Proposed Research Model.

3. Research Methods

The research techniques are utilized in the following order, qualitatively and quantitatively to address the objective of this study:

Qualitative Analysis Conducted in Two Groups through Focus Group Discussions: In order to identify and calibrate both the research model and the observed measurable variables of the supply chain innovation components, risk management capability, and competitive advantage in the steel industry the companies suggested. Group 1 includes three individuals who are currently directors of a representative steel company in Vietnam, while group 2 includes three experts with a PhD in business administration. To measure supply chain innovation, 5 noticed variables were changed from Lee et al. (2011), Kwak et al. (2018) and Seo et al. (2014) to measure risk management capacity, 5 observed variables were adjusted from Golgeci and Ponomarov (2013), Wieland and Wallenburg (2012) and Kwak et al. (2018) to measure competitive advantage, 4 noticed variables were changed from Kwak et al. (2018) and Li et al. (2006). The researcher clearly explained the principles in the measured observed variables and the suggested study model to the participants during the focus group discussion, allowing the participants to converse and share their opinions. The outcomes of the focus groups revealed that generally the discussion participants agreed with the suggested paradigm. Moreover, the majority of the members' opinions focused on simplifying the observed variable's phrases to be suitable for Vietnamese steel companies. The author developed a survey questionnaire with 14 observed variables after consulting with specialists (Table 2) and demographic observed variables using a 5-point scale of Likert from 1 corresponding to "totally disagree" to 5 corresponding to "totally agree."

Table 2: Measuring Variables in the Research Model.

Items	Description	References
Supply chain innovation (SCI)		
SCI1	The company pursues an advanced system (leading technology).	Kwak et al. (2018); Seo et al. (2014); Lee et al. (2011)
SCI2	The company is interested in chain innovation to satisfy the customer's supply.	
SCI3	The company pursues continuous innovation in the global supply chain.	
SCI4	The company pursues agile processes and is responsive to change.	
SCI5	The company has an innovative approach to the supply chain.	
Risk management capabilities (RMC)		
RMC1	Supply chain company remains efficient when facing internal or external disturbances.	Kwak et al. (2018); Golgeci and Ponomarov (2013);
RMC2	Supply chain company avoids or minimizes risks by forecasting and planning for them.	

Items	Description	References
Supply chain innovation (SCI)		
RMC3	Supply chain company adapts to disruption situations by rapidly re-engineering logistics processes.	Wieland and Wallenburg (2012)
RMC4	Supply chain timely and complete response of the company.	
RMC5	Supply chain company minimizes negative impact by quick response.	
Competitive advantage (CA)		
CA1	Company's supply chain has a competitive advantage in terms of financial performance.	Kwak et al. (2018); Li et al. (2006)
CA2	Company's supply chain has a competitive advantage in terms of sales.	
CA3	Supply chain has a competitive advantage in making a difference.	
CA4	Supply chain has a competitive advantage in terms of reputation.	

Analyzing Data Quantitatively: The procedure is completed in two steps. With 59 cleaned samples, primary data processing successfully completed the preliminary step. A cutoff of 0.70 was utilized for investigating Cronbach's Alpha, applied to evaluate how dependent the variables under observation were. The variable will be deleted and excluded from further research if the Cronbach's Alpha value is below the predetermined level since the results of the observed variables are promising. As part of an ongoing formal phase, collected data were surveyed over 6 months to test the hypotheses and assess observable factors (January 2022 to June 2022). The survey was distributed to the respondents in paper form. In order to meet the minimal requirement, $14 \times 5 = 70$ observations must be made. The proposed research model is put to the test by the author through the use of a 14-question survey. Applying exploratory factor analysis (EFA), developed by Hair et al. (2018), the author was able to calculate the sample size while still meeting the requirement of having at least 5 samples of the observed variable. As a result, 250 businesses decided to participate in the study. Each business sent out one survey form, delivering 239 questionnaires overall with a response rate of 95.6% in the final dataset: a linear structural model, confirmatory factor analysis (CFA), exploratory factor analysis (EFA), and structural equation modeling (SEM). The alternative resampling method, in which the initial sample played the role of the crowd and was chosen $n = 1000$, was then utilized for performing a bootstrap test processing, followed by the ANOVA processing for analyzing the data. The study outcomes section includes the results of data analysis and a qualitative factor test.

Using a qualitative approach, three experts (as opposed to the initial six) were interviewed in-depth to acquire their feedback on the findings of a quantitative analysis on the connection between supply chain innovation and competitive advantage along with the influence of risk

management. This will confirm the findings of the empirical research and suggest policy implications for businesses following the facts.

4. Results and Discussion

4.1. Results

Table 3 lists the survey sample characteristics and provides a summary of fundamental information about respondents.

Table 3: Descriptive Statistics of Samples.

Indexes	Description	Frequency	Percentage (%)
Company type	Joint venture	30	12.6
	Joint-stock company	107	44.8
	A single-member limited company	95	39.7
	Private business	7	2.9
Number of years of establishment	Less than 5 years	16	6.7
	From 5 to 10 years	127	53.1
	From 10 to 15 years	71	29.7
	15 years or more	25	10.5
Working position	General/Deputy Director	47	19.7
	Director/Deputy Director	125	52.3
	Head/Deputy Head	67	28.0
Number of samples N = 239			

Results from processing have Cronbach's alpha values over 0.7 and AVE values exceeding 0.5 matching the requirements for the analysis of the next steps. Consequently, it can be said that the suggested model's hypotheses are related to one another in some way. By assessing a number of indicators, such as CFI, CMIN/DF, GFI, RMSEA, and TLI, this study is conducted. The indexes in this research meet the acceptability threshold specified by the authors of relevant studies, and Table 4 demonstrated an overview of the model fit indices based on the study by Hair et al. (2018). Generally, it can be demonstrated that this model is suitable and reliable. The link between the model variables is then determined by the p-value. Since $p < 0.05$ is deemed statistically significant, p values vary from 0 to 1 representing the statistical significance levels. It can be asserted that the variables are statistically significant and that there is a statistically significant correlation between them because all of the p-values in this study are positive and less than 0.05. This demonstrates that the study's hypotheses are valid. Table 5 presents the outcomes of the SEM analysis after further investigation revealing that all of the normalized regression coefficients are positive.

Table 4: Examination of model fit.

Matching model index	Acceptance thresholds	Result	Conclusion
CMIN/DF	Values of 3 and 5 are satisfactory.	2,635	Good
GFI	Value > 0.9 is good, value = 1 for the optimal model.	0,911	Good
TLI	Value > 0.9 is good, value = 1 for the optimal model.	0,927	Good
CFI	Value > 0.9 is good, value = 1 for the optimal model.	0,932	Good
RMSEA	0.08 value 0.10 is normal, 0.8 is a high value, and 0.05 is low (rigid)	0,043	Good

Note: GFI: goodness of fit index; TLI: Tucker Lewis index; CFI: comparative fit index; RMSEA: root mean square errors of approximation.

Table 5: Analytical results of the linear structural model.

Estimates	Normalized estimate	SE	CR	P	Conclusion
CA <--- SCI	0.473	0.047	7.421	***	H1 Accepted
CA <--- RMC	0.315	0.058	6.369	***	H2 Accepted

Note: SE: standard error; CR: composite reliability; P: p-value; ***: $p < 0.001$.

With a sample size of $n = 10,000$, the linear structural model is tested using the bootstrapping method. The average estimate outputs reveal that while the error is currently relatively modest, a p -value $> 5\%$ is implied by the critical value's absolute value of CR 1.96. Hence, it may be stated that the study model's estimates are trustworthy. Due to the acceptance of both hypotheses, the study additionally conducts an ANOVA test. The outcomes of variance in this test reveal that Sig exceeds 0.05 for the significance threshold, indicating no difference in variance among the groups. It demonstrates that the association between the influence of supply chain innovation and energy efficiency is the same regardless of demographic factors such as firm type, number of years in operation, and employment position within the company, managing risks for a competitive edge.

4.2. Discussion

The influence of supply chain innovation and risk management on competitive advantage is explored and examined in the current study. The following are some significant recent contributions: The results of the first two hypotheses were accepted once the survey data was processed. Three directors with more than 5 years of experience were interviewed as part of the study's ongoing

process. They directly take part in management in typical Vietnamese steel enterprises. The principles of competitive advantage, supply chain innovation, risk management, and research findings have been explained. Supply chain innovation fosters competitive advantage, as evidenced by the normalization coefficient, based on the output of the linear structural model's processing with $\beta = 0.473$ and p -value = 0.000. This outcome is consistent with the opinions of the three experts, who all stated that firms must continuously and proactively alter their supply chain optimization initiatives to be most successful both now and in the future, with more rivalry between businesses. Chen (2018), Afraz et al. (2021) and Puspita et al. (2020) indicated that supply chain innovation is essential for developing a sustainable business plan, cutting costs, and quick problem-solving to fulfill demand and please customers, giving the firm a competitive advantage. Last but not least, the normalization coefficient ($\beta = 0.315$; p -value = 0.000) shows that risk management capability increases competitive advantage. This result is familiar with recent research by Gualandris and Kalchschmidt (2015) and Saeidi et al. (2019), which found that when companies effectively utilize risk management tools, they build a strong brand image. When this brand is reflected in stakeholders' minds, the organization's value also rises, and any organization will subsequently gain a competitive advantage. The three experts added that in order to fulfill their business objectives in the context of globalization, firms wishing to grow sustainably must now implement risk management capabilities.

5. Conclusion and Implications

The outcomes of the current study can be applied in both academic and real-world settings. Given the number of studies on the subject in Vietnam, the research findings have identified the impact of supply chain innovation and risk management on competitive advantage for steel business firms. This region is still small. Practically speaking, the formal model's standardized estimate for the square of the correlation multiple is 0.6735, indicating that the model is valid for the study findings via the sufficient amount of survey data to be statistically significant. The model explains 67.35% and supports the idea that enhanced risk management capabilities and supply chain innovation help businesses gain a competitive edge. The study offers governance implications to aid company executives in increasing supply chain innovation and governance implications for improving risk management capabilities to increase the organization's competitive edge. When it comes to supply chain innovation, the business's

management is constantly mindful of the importance of ensuring sophisticated technological systems and inventing the chain to assure product supply in order to satisfy the rising expectations of customers. In the context of global integration, it is crucial to increase the market while also adjusting to market challenges. The company's management makes sure that the supply chain always maintains an unbroken supply, has a department in charge of forecasting and specialized planning, and sets up the supply process. This is done to increase the company's capacity to manage risks response and carefully react to guarantee prompt and complete supply, reducing adverse effects. While this research met its objectives, it did have significant shortcomings that might result in fruitful future research directions. The survey only required a small number of samples, and the investigation was carried out in Vietnam. However, there are numerous additional variables that steel firms can utilize to boost their competitive advantage, including knowledge management, company culture, and corporate social responsibility (Rasheed & Ahmad, 2022). The following research plan explores more variables, broadening the survey sample to the entire country, as well as other industries.

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