

FACTORS AFFECTING DECISIONS OF IMPORTING STEEL OF VIETNAMESE ENTERPRISES FROM THE CHINESE MARKET

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ABSTRACT:

This study investigates the supplier selection criteria of Vietnamese steel-importing companies operating within the Chinese market. The findings identify five key factors influencing purchasing decisions: technical capability, price, delivery compliance, product quality, and resilience. Among these, product quality stands out as the most critical determinant, highlighting its central role in ensuring consistent performance standards. The study offers practical implications for suppliers seeking to better meet the expectations of Vietnamese buyers by enhancing their capabilities and improving competitiveness in the steel supply chain.

Keywords: steel, Vietnamese enterprises, the Chinese market.

1. Introduction

In the early months of the pandemic, particularly in 2020, the industry saw a sharp contraction in both production and business activities. According to the Vietnam Steel Association (VSA), member enterprises reported a 15% year-on-year decrease in steel output, with total production falling to 5.4 million tons in the first quarter of 2020. Similarly, steel consumption dropped by 20% to 4.4 million tons during the same period. This downturn was exacerbated by a significant reduction in steel exports, which declined by 38% compared to the first quarter of the previous year, reaching only 300,000 tons.

The primary cause of these declines was the disruption in supply chains, particularly the reliance on imported raw materials from China, which was severely affected by the pandemic. The pandemic also led to a reduction in domestic demand, as construction projects were delayed or canceled, and economic activities slowed down. This combination of supply chain disruptions and reduced demand created a challenging environment for steel enterprises, many of which had to scale back operations or temporarily shut down production lines.

According to VSA Vice-Chairman Trịnh Khôi Nguyên, the COVID-19 pandemic has had a

considerable impact on the domestic steel industry, largely due to steel producers' reliance on imported raw materials from China. Trading activities between Vietnam and China have significantly slowed, and in some cases, have been temporarily halted due to the pandemic. To meet increasing production needs and diversify products, Vietnamese steel enterprises must import a large amount of raw materials from the Chinese market.

As Vietnam gradually emerged from the pandemic in late 2021, the steel industry began to show signs of recovery. The lifting of lockdowns and the resumption of economic activities led to a rebound in domestic demand, particularly from the construction sector, which had been a key driver of steel consumption. By mid-2022, production levels had largely returned to pre-pandemic levels, with many companies reporting increased output to meet the growing demand. Exports also picked up as international markets reopened, though the composition of export destinations and product types showed some shifts due to changing global demand patterns.

The COVID-19 pandemic highlighted critical vulnerabilities within Vietnam's steel industry, particularly its heavy reliance on imported raw materials from China. The disruptions caused by the pandemic underscored the importance of understanding the factors that influence Vietnamese enterprises' decisions when purchasing steel in the Chinese market. These factors are crucial not only for navigating supply chain challenges but also for ensuring the stability and competitiveness of Vietnam's steel industry in the global market. As the industry recovers and adapts to the post-pandemic landscape, there is a pressing need to conduct research that examines these factors in depth. Such a study would provide valuable insights into the decision-making processes of Vietnamese steel enterprises, helping them to optimize their purchasing strategies and reduce their dependency on a single market. Additionally, this research could inform policymakers and industry leaders on how to

strengthen supply chain resilience, support domestic production capabilities, and enhance the overall sustainability of the steel industry in Vietnam.

Given the significant impact of the Chinese market on Vietnam's steel supply chain and the potential risks associated with this dependency, the author finds a focused investigation into the factors affecting purchasing decisions in this context is both timely and necessary. "Factors affecting decisions of purchasing steel of Vietnamese enterprises in the Chinese Market" contributes to a better understanding of how Vietnamese enterprises can mitigate risks, leverage opportunities, and make more informed decisions in their steel procurement activities.

2. Research methodology

The research employs an integrated approach, utilizing both qualitative and quantitative methodologies to achieve its objectives. The qualitative component is centered on constructing a theoretical framework and research model grounded in a review of relevant domestic and international literature. This approach allows for adaptability in design and helps mitigate potential researcher biases. Through an in-depth examination of previous studies, the author establishes a comprehensive research model, which serves as the foundation for formulating hypotheses. Subsequently, a structured questionnaire is developed based on this model and fine-tuned through consultations with experts in the field.

Moreover, quantitative methods are applied to gather data via email surveys. The collected data is then analyzed using SPSS software (version 22.0), along with supplementary analytical techniques. The integration of quantitative methods ensures systematic data collection, processing, and interpretation, facilitating a clear presentation of results. This dual-method approach enhances the efficiency of the findings and contributes to a more nuanced understanding of the research problem.

3. Result of the research

3.1. Overall analysis of factors influencing the decisions of Vietnamese steel enterprises purchasing steel in the Chinese market

3.1.1. Cronbach's Alpha - Reliability analysis

The Cronbach's Alpha result shows:

The Technical Capacity scale exhibits a Cronbach's Alpha coefficient of 0.777. The variable-total correlation coefficients for variables TC1 through TC4 all surpass 0.3, confirming the strong reliability of these observed variables. As a result, no variables will be removed from the scale.

The Price scale exhibits a Cronbach's Alpha coefficient of 0.842. In addition to the details mentioned, the variable-total correlation coefficients for variables PR1 through PR4 all surpass 0.3, confirming the strong reliability of these observed variables. As a result, no variables will be removed from the scale.

The Delivery Compliance scale exhibits a Cronbach's Alpha coefficient of 0.759. Moreover, the variable-total correlation coefficients for variables DC1 through DC3 all surpass 0.3, confirming the strong reliability of these observed variables. As a result, no variables will be removed from the scale.

The Sustainability Practice scale exhibits a Cronbach's Alpha coefficient of 0.897. On top of that, the variable-total correlation coefficients for variables SP1 through SP3 all surpass 0.3, confirming the strong reliability of these observed variables. As a result, no variables will be removed from the scale.

The Quality of Product scale exhibits a Cronbach's Alpha coefficient of 0.793. Moreover, the variable-total correlation coefficients for variables QOP1 through QOP4 all surpass 0.3, confirming the strong reliability of these observed variables. As a result, no variables will be removed from the scale.

The Resilience scale exhibits a Cronbach's Alpha coefficient of 0.830. As well, the variable-total correlation coefficients for variables RS1 through RS3 all surpass 0.3, confirming the strong

reliability of these observed variables. As a result, no variables will be removed from the scale.

3.1.2. Exploratory factor analysis (EFA)

Key criteria employed in EFA include:

- The Kaiser-Meyer-Olkin (KMO) coefficient evaluates the suitability of data for factor analysis. A KMO value of 0.5 or higher ($0.5 \leq \text{KMO} \leq 1$) is necessary to consider factor analysis as appropriate. If this value falls below 0.5, it suggests that factor analysis may not be applicable to the dataset.

- Bartlett's test of sphericity assesses whether the variables within a factor are intercorrelated, which is essential for factor analysis. To apply factor analysis effectively, it is crucial for variables representing the same factor to exhibit correlation, indicating convergent validity within the EFA framework. If Bartlett's test does not achieve statistical significance, it suggests an insufficient intercorrelation among variables, making factor analysis unsuitable. Conversely, a statistically significant Bartlett's test ($\text{sig} < 0.05$) confirms sufficient intercorrelation, supporting factor analysis applicability.

- The Eigenvalue criterion is fundamental in determining the number of factors to retain in an EFA model. According to this criterion, only factors that possess an Eigenvalue of 1 or more are preserved in the analysis.

- A Total Variance Explained value of at least 50% indicates that the EFA model is adequately representative. This percentage reflects the amount of data variance accounted for by the factors (including the percentage of condensed observed variables and the percentage lost due to the extracted factors), with the total variance being considered as 100%.

- As noted by Mayers, Gamst, and Guarino (2006), Principal Components Analysis (PCA) is a commonly applied method in factor analysis, frequently combined with Varimax rotation to achieve simpler and more interpretable factor structures. Factor loading, sometimes referred to as factor weight, reflects the degree of correlation between an observed variable and a factor. Higher

factor loadings, which approach a value of 1, signify a stronger association. Referring to Hair et al. (2014), a factor loading of 0.5 or above indicates a strong and acceptable correlation for an observed variable. However, a loading of 0.3 is considered the minimum threshold for inclusion. Hair et al. (1998) also emphasize that factor loading serves as an essential criterion for validating the practical significance of Exploratory Factor Analysis (EFA) which is presented below:

+ A factor loading above 0.3 represents the minimum acceptable level;

+ A factor loading above 0.4 is indicated as important

+ A factor loading above 0.5 is indicated as practically significant

The including: KMO = 0,805, Sig = 0,000, Eigenvalue = 1,051, TVA = 69,075%.

The research which has employed Exploratory Factor Analysis (EFA) using the Principal Component extraction method with Varimax rotation yielded the following results:

The EFA analysis of the variables shows a Kaiser-Meyer-Olkin (KMO) index score of 0.805, presenting that the data is suitable for factor analysis (as it falls within the acceptable range, $0.5 < 0.805 < 1$). Additionally, Bartlett's test returns a significance value of 0.000, which is less than 0.05, suggesting significant intercorrelation among variables and supporting the validity of EFA results. The analysis explains 69.075% of the total variance, surpassing the minimum requirement of 50%, with all factors showing Eigenvalues above 1, thus satisfying essential criteria.

All observed variables have factor loadings coefficient greater than 0.5. As a result, all 21 independent observed variables are grouped into the initially proposed six factors without modification, indicating a well-structured model.

3.1.3. Multiple regression analysis

Pearson: The Pearson correlation analysis indicated that the independent variables, specifically TC, PR, DC, SP, QOP, and RS, demonstrated strong correlations with the dependent variable. The correlation coefficients

for these variables fell within the range of 0.2 to 0.6, representing levels from weak to strong correlation. Additionally, the significance coefficient (sig) values for all variables were below 0.05, confirming the presence of statistically significant relationships between the independent and dependent variables. Consequently, these independent variables TC, PR, DC, SP, QOP, and RS are deemed appropriate for inclusion in the regression model to explain variations in the dependent variable. As a result, no variables were excluded from the model based on the findings of the Pearson correlation analysis, ensuring that all relevant factors are considered in the subsequent regression analysis.

In summary, the anticipated regression model can be expressed as follows:

$$SSICM = \beta_0 + \beta_1*TC + \beta_2*PR + \beta_3*DC + \beta_4*SP + \beta_5*QOP + \beta_6*RS$$

In which: SSICM - Dependent variable; TC, PR, DC, SP, QOP, RS - Independent variables; regression coefficients between independent variables and dependent variables; β_0 - coefficient;

Multiple regression model analysis: Following Pearson's correlation assessment, a multiple linear regression analysis was conducted to evaluate the quantitative variables, including Technical Capability (X1 - TC), Price (X2 - PR), Delivery Compliance (X3 - DC), Sustainability Practice (X4 - SP), Quality of Product (X5 - QOP), and Resilience (X6 - RS).

The regression model employed the average values of each variable showed the adjusted R^2 value of 0.538 reflects a solid alignment between the linear regression model and the dataset, signifying that the model effectively captures the relationship between the independent and dependent variables. This coefficient indicates that 53.8% of the variance in the dependent variable is explained by the independent variables in the model. However, regarding the coefficient statistics table, despite that all the VIF indexes are under 2, the Sig. of factor Sustainability Practice(SP) is 0,414 and higher than the standard 0.05. This means that SP is statistically insignificant

to the dependent variable Supplier Selection in the Chinese market (SSICM). To elaborate for the lack of statistically significant results for the Sustainability Practice factor, the author suggested that this might originate from several core reasons. Firstly, this might be due to the limited awareness and understanding of sustainability concepts of many Vietnamese steel purchasing companies, which reduces the perceived importance of sustainability in supplier selection. Additionally, considerations such as cost often outweigh sustainability concerns in decision-making processes, as price competitiveness remains crucial in the steel industry. Furthermore, it might have been that the regulatory environment in Vietnam does not place a significant focus on sustainability in industrial procurement, which results in fewer incentives for companies to prioritize this factor. Finally, steel purchasers tend to focus more on immediate operational metrics, such as delivery compliance, price, and quality consistency, rather than long-term sustainability benefits. Consequently, the author decided to exclude Sustainability Practice from the research model and conduct the analysis again.

After the removal of factor SP, the regression model has indicated the result as below: (Table 1, 2)

The results of the model fit test indicate an F value of 33.246 ($p < 0.05$), which is statistically significant as this outcome suggests that the independent variables collectively maintain a meaningful relationship with the dependent variable. Consequently, the multiple linear regression model is deemed a suitable fit for the data set.

The findings indicate that the factors of Technical Capability (TC), Price (PR), Delivery Compliance (DC), Quality of Product (QOP), and Resilience (RS) each have a positive impact on supplier selection decisions in the Chinese market, with significance values below the 0.05 threshold. This outcome allows for the rejection of the null hypothesis that the Beta coefficients of these variables are equal to zero. This result thereby confirming a statistically significant correlation between each independent variable and the dependent variable leading to the partial regression coefficients of these five independent variables are deemed significant. Based on this

Table 1. Multiple regression results (After excluding factor SP)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin- Watson
1	0,732	0,536	0,520	0,46337	1,718

Source: collected by the author from using SPSS 22.0 analysis, 2024

Table 2. Variables coefficients statistic summary (After excluded factor SP)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Constant	-0,256	0,264		-0,968	0,335		
TC	0,186	0,072	0,166	2,601	0,010	0,795	1,258
PR	0,226	0,077	0,191	2,951	0,004	0,766	1,306
DC	0,249	0,064	0,264	3,874	0,000	0,691	1,446
QOP	0,266	0,067	0,273	3,966	0,000	0,683	1,465
RS	0,179	0,067	0,167	2,657	0,009	0,814	1,228

Source: collected by the author from using SPSS 22.0 analysis, 2024

analysis, a specific standardized regression model can be formulated as follows:

$$\text{SSICM} = 0,166 \cdot \text{TC} + 0,191 \cdot \text{PR} + 0,264 \cdot \text{DC} + 0,273 \cdot \text{QOP} + 0,167 \cdot \text{RS}$$

The analysis has established a hierarchy of independent factors affecting supplier selection decisions in the Chinese market, ranked by their influence. Factor Quality of Product emerges as the most influential factor, with a Beta coefficient of 0.273, followed by Delivery Compliance with a Beta of 0.264. Price holds the third position, carrying a Beta coefficient of 0.191, while Resilience ranks fourth, indicated by a Beta of 0.167. Finally, Technical Capability has a slightly lower but notable influence, with a Beta coefficient of 0.166.

3.2. General assessment

The regression analysis reveals that five independent variables have a significance level (sig) of less than 0.05, meaning that the initial model, excluding the Sustainability Practice (SP) variable as per hypothesis H4, is retained. The influence of each factor is represented by its standardized coefficient Beta (β):

The standardized coefficient for Technical Capability (TC) is $\beta_1 = 0.166$ ($p \leq 0.05$), indicating a meaningful positive association with supplier selection in the Chinese Market (SSICM).

For Price (PR), the standardized coefficient is $\beta_2 = 0.191$ ($p \leq 0.05$), suggesting that price consideration positively impacts SSICM.

Delivery Compliance (DC) exhibits a standardized coefficient of $\beta_3 = 0.264$ ($p \leq 0.05$), highlighting its strong influence on SSICM.

Quality of Product (QOP) stands out with the highest standardized coefficient, $\beta_4 = 0.273$ ($p \leq 0.05$), confirming its critical role in influencing SSICM.

Finally, Resilience demonstrates a standardized coefficient of $\beta_5 = 0.167$ ($p \leq 0.05$), underscoring its substantial contribution to SSICM.

The results show that all four factors are statistically significant, with p-values under 0.05, supporting the acceptance of each hypothesis at a 5% significance level. This indicates that each

factor plays a role in influencing Vietnamese steel-purchasing enterprises' supplier selection in the Chinese Market. Among these factors, Quality of Product exerts the strongest influence, shown by a standardized Beta value of 0.273, while Technical Capability has the weakest impact, with a Beta value of 0.166. Price and Delivery Compliance follow closely, with Resilience contributing meaningfully as well.

4. Conclusion

This study explores the supplier selection process for Vietnamese steel-purchasing companies within the Chinese market, identifying six primary criteria supported by 21 sub-criteria that aid in informed decision-making. Notably, the "Quality of Product" factor emerges as the most pivotal criterion, underscoring its importance in maintaining consistent standards. Beyond identifying the primary selection factors, the research delves into sub-criteria specific to the steel sector, offering a nuanced understanding that bridges a gap in existing literature. The findings contribute valuable insights for Vietnamese enterprises, equipping them with a detailed framework to prioritize selection factors during procurement planning. This structured approach not only supports more informed decision-making but also aids in refining production processes to align with strategic goals.

Additionally, this study benefits suppliers aiming to serve steel-purchasing companies, particularly within the Chinese market, by providing a clearer understanding of clients' expectations. With these insights, suppliers can better assess their own capabilities and make targeted improvements to enhance their competitive positioning. By aligning their services with the prioritized selection criteria of Vietnamese steel firms, suppliers can increase their market relevance.

Nevertheless, the study's limited scope and brief duration may constrain its generalizability. The analysis excludes certain potentially relevant criteria, which could impact supplier selection dynamics ■

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CÁC YẾU TỐ ẢNH HƯỞNG ĐẾN VIỆC LỰA CHỌN NHÀ CUNG CẤP CỦA CÁC DOANH NGHIỆP VIỆT NAM KHI TIẾN HÀNH NHẬP KHẨU THÉP TỪ TRUNG QUỐC

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TÓM TẮT:

Nghiên cứu này phân tích các tiêu chí lựa chọn nhà cung cấp của các doanh nghiệp Việt Nam khi tiến hành nhập khẩu thép từ Trung Quốc. Kết quả cho thấy có năm yếu tố chính ảnh hưởng đến quyết định nhập khẩu, gồm: năng lực kỹ thuật, giá cả, mức độ tuân thủ thời gian giao hàng, chất lượng sản phẩm và khả năng thích nghi. Trong đó, chất lượng sản phẩm là yếu tố có vai trò quyết định, thể hiện tầm quan trọng trong việc đảm bảo tiêu chuẩn ổn định. Nghiên cứu này kỳ vọng cung cấp những hàm ý thực tiễn cho các nhà cung cấp trên thị trường thép, giúp họ hiểu rõ hơn về kỳ vọng của khách hàng Việt Nam, từ đó đánh giá năng lực nội tại và có giải pháp nâng cao năng lực cạnh tranh.

Từ khoá: thép, doanh nghiệp Việt Nam, thị trường Trung Quốc.