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Driving Supply Chain Performance in China's Imported Soybean Supply Chain Through Strategies: The Mediating Role of Supply Chain

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Abstract. As the world's largest soybean importer, China's imported soybean supply chain faces recurrent disruptions, highlighting the urgency to clarify how supply chain strategies translate into operational performance under uncertainty. Grounded in dynamic capability theory, this study examines the mediating role of supply chain resilience (SCR) in linking four core strategic capabilities—flexibility, collaboration, agility, and innovation—to supply chain performance (SCP), using partial least squares structural equation modeling (PLS-SEM) with data from 332 firms spanning procurement, logistics, and processing. Results show SCR partially mediates all four strategy-performance relationships, with significant heterogeneous indirect effects: collaboration exhibits the strongest indirect effect on SCP via SCR (β=0.058, $p<0.01$, 95% CI [0.021, 0.103]), followed by flexibility (β=0.046, $p<0.01$), agility (β=0.040, $p<0.05$), and innovation (β=0.030, $p<0.05$). This study is the first to quantify heterogeneous mediating effects of SCR in agricultural import supply chains, extending dynamic capability theory to context-specific agricultural systems. Practically, it provides actionable insights for prioritizing strategies, with firms advised to prioritize collaboration and flexibility to strengthen resilience in import-dependent soybean supply chains.

Keywords: Imported soybean supply chain; supply chain resilience; mediating effect; dynamic capability theory; supply chain strategy; supply chain performance

1. Introduction

As the world's largest importer of soybeans, China's soybean import supply chain holds strategic significance for national food security and agricultural economic stability (Hu, 2023; Zhu et al., 2025). Soybeans serve as the core 'anchor' of China's international agricultural trade (Liu et al., 2025), with the country highly reliant on global procurement — in 2024, China imported 74.65 million tons of soybeans from Brazil (71% of total imports) and 22.13 million tons from the United States (21% of total imports). This high import dependency renders the supply chain vulnerable to frequent disruptions: geopolitical conflicts (e.g., U.S.-China trade friction (Ansong, 2025), natural disasters (e.g., droughts in Brazil that impact production (Hu et al., 2024), and public health crises (e.g., COVID-19-induced logistics bottlenecks (Sharma et al., 2020) have repeatedly caused cost surges and supply shortages in domestic feed and oil processing industries (Min, 2023; Ben Hassen, & El Bilali, 2022). In this context, how to effectively translate supply chain strategies into operational performance amid uncertainty has become an urgent challenge for businesses and policymakers.

Existing research has confirmed that strategies such as supply chain flexibility, collaboration, agility, and innovation are key to improving performance (Jama, 2023; Ghomi et al., 2023), but the core gap lies in how these strategies translate into performance in high-risk agricultural supply chains. Traditional research has largely focused on direct effects (e.g., procurement flexibility reduces costs (Devaraj et al., 2012), neglecting the 'black box' of intermediate mechanisms. In fact, the effectiveness of strategies often depends on the system's ability to withstand shocks and recover quickly — i.e., supply chain resilience (Christopher & Peck, 2004; Shi et al., 2024). For example, collaboration may not directly improve performance but instead enhance resilience by strengthening information sharing, thereby mitigating the impact of disruptions (Sudusinghe, & Seuring, 2022). This 'capability conversion' role of resilience in the imported soybean supply chain has not been sufficiently explored.

There are three prominent gaps in current research:

(1) Limited focus on high-dependency agricultural supply chains: While supply chain resilience has been widely explored in manufacturing, research on agricultural networks—particularly highly import-dependent systems like soybean supply chains—remains underdeveloped. Agricultural supply chains exhibit unique risk profiles (e.g., climate sensitivity, trade policy volatility) and operational constraints (e.g., perishability, seasonality) that demand context-specific analysis (Tukamuhabwa et al., 2015; Kamalahmadi & Parast, 2016);

(2) Insufficient analysis of intermediary mechanisms: While some studies acknowledge the intermediary role of resilience (Jia, 2020; Ali & Mahfouz, 2025), few quantify the heterogeneous intermediary effects across multiple strategies (e.g., whether the indirect effects of resilience generated through collaboration outweigh those of agility);

(3) Insufficient development of dynamic transformation theory: Strategy-performance research primarily centres on the RBV, while dynamic capability theory explaining how resilience transforms strategic resources into performance lacks empirical validation in the agricultural sector (Teece et al., 1997).

Against this backdrop, this study focuses on China's imported soybean supply chain, aiming to explore the mediating role of supply chain resilience in the relationship between four core strategies (flexibility, collaboration, agility, and innovation) and supply chain performance. Based on dynamic capability theory, it addresses two core questions: Are the links between the four strategies and performance partially mediated by supply chain resilience, and if so, what are the underlying mechanisms of transmission? Which strategy exhibits the strongest indirect effect on performance through resilience, and why do these differences arise? The theoretical contributions of this study are threefold:

(1) It is the first empirical validation of the 'strategy-resilience-performance' mediating chain in the imported soybean supply chain, filling a gap in research on supply chain resilience in agriculture;

(2) It quantifies heterogeneous mediating effects, revealing which strategies can most effectively leverage resilience to enhance performance, providing refined criteria for prioritising strategy selection;

(3) It extends dynamic capability theory to the agricultural sector, elucidating the mechanism by which resilience acts as a ‘dynamic converter’ to facilitate the transformation of strategic resources into performance in a turbulent environment.

2. Literature Review and Hypotheses Development

2.1 Theoretical Foundation: Dynamic Capability Theory

Dynamic capability theory emphasizes an organization's core ability to adapt to environmental changes through resource integration and restructuring (Teece et al., 1997). This perspective goes beyond the resource-based view (RBV), which posits that competitive advantage stems from "scarce and inimitable static resources" such as exclusive procurement channels or technological patents (Teece et al., 1997). Although RBV highlights the value of tangible and intangible resources, it fails to explain how these resources can be effectively transformed in dynamic environments. Dynamic capability theory focuses on "the ability to integrate and restructure resources," with supply chain resilience (SCR) being the core manifestation of such dynamic capabilities in risk scenarios. The three dimensions of SCR—responsiveness, recovery capability, and adaptability—act as conversion mechanisms that transform static resources into performance. The four supply chain strategies (flexibility, collaboration, agility, and innovation) constitute the "static resource foundation," but their value depends on the dynamic transformation of supply chain resilience. For example, a flexible procurement network requires responsiveness for rapid allocation in crises; a collaborative network relies on recovery capability to convert information sharing into coordinated emergency actions; and technological tools depend on adaptability to translate technological advantages into sustained risk mitigation effects. This process empirically validates the "resource → capability → performance" transmission mechanism in dynamic capability theory, establishing a clear logical chain for hypothesis derivation: each strategy influences performance by acting on specific dimensions of supply chain resilience, which then drive performance improvement through targeted pathways.

2.2 Supply Chain Strategy and Supply Chain Resilience

Supply chain strategy refers to systematic measures taken by enterprises to respond to uncertainty. Existing research indicates that four strategies—flexibility, collaboration, agility, and innovation—have a major impact on the resilience of the supply chain (Jama, 2023; Ghomi et al., 2023).

Supply chain flexibility (SCF) refers to a company's ability to adjust resource allocation, production plans, or logistics solutions in response to disruptions, with particular emphasis on cross-border adaptability in agricultural import contexts (Williams er al., 2013). Tang and Tomlin (2008) confirmed that transportation and production capacity flexibility can alleviate supply disruptions, but their analysis focuses on domestic supply chains and overlooks the "cross-border nature" of agricultural imports—for instance, disruptions caused by concentrated production risks (e.g., droughts in Brazil, which supplies 71% of China's soybeans) require flexible deployment of transnational resources, such as switching between South American and North American sources, which involves complex coordination of international logistics, tariffs, and customs clearance. Similarly, Mandal et al. (2016) validated the value of flexible order adjustments, but their single-market setting fails to capture the differentiated value of multi-source procurement flexibility in China's soybean supply chain, where reliance on Brazil (71%) and the US (21%) demands targeted flexibility strategies for different regions (e.g., adapting to Brazil's rainy season logistics delays vs. US policy volatility).

Supply chain collaboration (SCC) emphasises that cross-border entities address risks through information sharing and joint decision-making, with unique challenges in international agricultural trade (Simatupang, & Sridharan, 2008). Richey and Autry (2009) highlighted that trust and information symmetry enhance resilience, but their framework does not account for "institutional barriers in international collaboration"—for example, during Sino-US trade frictions, policy coordination barriers (e.g., tariff fluctuations) disrupted collaborative plans between Chinese importers and US suppliers, requiring institutional-level coordination mechanisms beyond enterprise-to-enterprise trust. Sudusinghe and Seuring (2022) identified collaboration as a core antecedent of food supply chain resilience, but their analysis omits the "long-cycle transportation characteristics of bulk agricultural products": soybean shipments from Brazil to China take 30-40 days, making collaboration among cross-border logistics nodes (e.g., Brazilian ports, shipping companies, and Chinese customs) critical to reducing transit delays—for instance, joint scheduling of loading/unloading plans can cut port detention time by 20% .

Supply Chain Agility (SCA) focuses on rapid response to sudden changes in international markets, particularly policy-driven volatility (Swafford et al., 2006). Ivanov (2024) noted that agility enhances adaptability through shortened decision-making cycles, but his model does not incorporate the "suddenness of tariff policy fluctuations"—a key risk in China's soybean supply chain. For example, the 2018-2019 Sino-US trade war saw US soybean tariffs rise from 3% to 25% overnight, requiring agile adjustments to import plans (e.g., switching to Brazilian sources within 72 hours) that go beyond general market response frameworks; Sullivan-Taylor and Branicki (2011) also confirmed that agility is a key capability for SMEs to enhance resilience.

Supply Chain Innovation (SCI) enhances system adaptability through technology application or process optimisation, with unique constraints in agricultural data ecosystems (Zamboni, 2011). Odimarha et al. (2024) highlighted that blockchain and big data improve risk anticipation, but their analysis overlooks "agricultural data fragmentation"—a critical barrier in soybean supply chains. For instance, blockchain traceability requires integrated data from Brazilian farms, US exporters, and Chinese ports, but fragmented data ownership (e.g., smallholder farms in Brazil lacking digital records) reduces traceability accuracy by up to 30%. Similarly, big data weather prediction for major producing countries is hindered by inconsistent data standards across regions, limiting the effectiveness of innovation in resilience building; Belhadi et al. (2024) find that innovation can indirectly enhance the supply chain's risk-resistance capabilities by optimising resource integration efficiency.

2.3 Supply Chain Resilience and Supply Chain Performance

The ability of a system to sustain dynamic equilibrium, react swiftly, and return to an optimal condition in the face of disruptions is known as supply chain resilience, or SCR. Its core dimensions include responsiveness, recovery capability, and adaptability (Christopher & Peck, 2004). The role of resilience in improving performance is reflected in the following ways: Risk Buffering: Resilience reduces production stagnation and cost surges caused by disruptions through rapid responses (e.g., activating alternative suppliers) (Shi et al., 2024); Efficiency Optimisation: Recovery capacity shortens supply chain recovery time and reduces the impact of disruptions on delivery cycles (Jia et al., 2020); Long-Term Adaptability: Adaptability helps supply chains optimise their structure in the face of repeated shocks, enhancing long-term operational stability (Sheffi, 2007). Jia et al. (2020) confirmed in their study of the pharmaceutical supply chain that resilience can convert strategic advantages into performance improvements, with a mediating effect of 42% ; Ali and Mahfouz (2025) also demonstrated in their case study that the five core capabilities of resilience (anticipation, adaptation, response, recovery, and learning) can significantly improve the operational performance of Irish food companies.

2.4 The mediating role of supply chain resilience

Dynamic capability theory posits that organisations must integrate resources and capabilities to respond to environmental changes, with resilience serving as the core manifestation of this dynamic adaptive capacity. The four strategies serve as the 'resource foundation,' but they can only effectively influence performance through the 'dynamic transformation mechanism' of resilience: Flexibility provides 'resource redundancy,' but it requires resilience's responsiveness to achieve rapid reallocation of resources; Collaboration builds 'network resources,' but it requires resilience's recovery capability to transform information sharing into coordinated response actions; Agility possesses 'rapid decision-making resources,' but requires resilience's adaptability to achieve long-term performance stability; Innovation forms 'technological resources,' but requires resilience's predictive capability to convert technological advantages into risk mitigation effects. Based on the above logic, supply chain resilience mediates between strategies and performance, and the mediation pathways vary across different strategies.

2.5 Research Hypothesis

Dynamic capability theory posits that organisations must integrate resources and capabilities to respond to environmental changes, with resilience serving as the core manifestation of this dynamic adaptive capacity (Teece et al., 1997). Based on the core interpretation of 'resilience as a capability converter' from the dynamic capability theory, and combining the four major strategies with the mechanisms linking resilience and performance, this paper proposes the following specific hypotheses to clarify the logical roles of each pathway:

Supply chain flexibility (such as diversified procurement channels, dynamic capacity adjustments, and inventory optimization) provides a static foundation of "resource redundancy" for addressing supply chain disruptions (Tang & Tomlin, 2008), and this resource must be dynamically transformed through the dual dimensions of 'responsiveness' and "adaptability" of supply chain resilience: In the short term, the flexible network of diverse suppliers and rapid adjustment capabilities can leverage resilience's "responsiveness" (e.g., switching import sources from Brazil to the US within 48 hours) to enable immediate resource allocation, shorten disruption duration, directly reduce operational costs, and enhance delivery efficiency (Salam & Bajaba, 2023); In the long term optimization perspective, flexibility enables enterprises to dynamically adjust transportation routes or quarterly optimize the distribution of import sources, thereby strengthening resilience's "adaptability" (i.e., the ability to reduce long-term risks through structural optimization) (Mandal, 2016). This reduces raw material shortages caused by reliance on a single source, stabilizes processing capacity utilization rates, and improves inventory turnover efficiency, ultimately enhancing performance from a long-term perspective (Shi er al., 2024). It is evident that resilience, through the synergistic mechanism of "short-term response - long-term adaptation," serves as the key bridge for transforming flexibility resources into actual performance. Therefore, resilience serves as the intermediary through which flexibility is transformed into performance. Thus,

H1: Supply chain resilience mediates the relationship between supply chain flexibility and supply chain performance

Supply chain collaboration (such as real-time inventory sharing and joint emergency decision-making) builds "network resources" (Glenn Richey Jr & Autry, 2009), which must be transformed into dynamic performance through the resilient "recovery capability" dimension: collaboration accelerates post-disruption coordinated responses (such as launching joint emergency plans within 24 hours) by accumulating trust and achieving information symmetry (such as co-building delay warning mechanisms with ports), directly strengthening the resilient "recovery capability" (Sudusinghe & Seuring, 2022), while high recovery capacity reduces idle capacity caused by logistics stagnation (e.g., reducing downtime for processing companies due to raw material shortages by 30%), thereby improving performance through "improved on-time delivery rates" and "reduced production costs".Therefore, resilience serves as the intermediary between collaboration and performance. Thus,

H2: The Relationship Between Supply Chain Resilience, Intermediary Supply Chain Collaboration, and Supply Chain Performance

Supply chain agility is reflected in "rapid decision-making resources" (Ivanov, 2024) .This resource must be realized through the resilient "responsiveness" dimension for immediate conversion:

Agility enhances the speed of immediate response during disruptions by shortening decision-making cycles, thereby strengthening the resilience of 'responsiveness' (Ivanov, 2024). High responsiveness reduces the duration of raw material shortages caused by sudden risks (such as sudden weather changes in major producing countries), ultimately improving performance through "increased market demand fulfillment rates" and "short-term revenue stability" (Sullivan-Taylor & Branicki, 2011). Therefore, resilience serves as the intermediary through which agility is transformed into performance. Thus,

H3: The relationship between supply chain resilience, supply chain agility, and supply chain performance

Supply chain innovations (such as blockchain traceability and big data early warning systems) form "technological resources" (Odimarha et al., 2024), which must be transformed through a resilient "responsiveness + adaptability" dual-dimensional approach. Innovative technologies (such as a weather warning model for major producing countries six months in advance) can enhance risk prediction accuracy and strengthen resilience's "responsiveness" (by adjusting procurement schedules in advance); simultaneously, technology-enabled process optimization (such as intelligent inventory systems) can sustainably optimize supply chain structure, reinforcing "adaptability" (Belhadi et al., 2024), the synergistic integration of both dimensions can mitigate risks such as "sudden price fluctuations leading to surging procurement costs" and "long-term supply structure homogeneity causing risk concentration," improving performance through "enhanced cost control precision" and "stable long-term return on investment" (Odimarha et al., 2024).Therefore, resilience is the intermediary that transforms innovation into performance. Thus,

H4: The Relationship Between Supply Chain Resilience, Supply Chain Innovation, and Supply Chain Performance

2.6 Conceptual Model

Based on the above assumptions, an intermediary effect model of 'supply chain strategy → supply chain resilience → supply chain performance' was constructed (Figure 1), in which resilience is the core intermediary variable, and the four strategies indirectly affect performance through resilience.

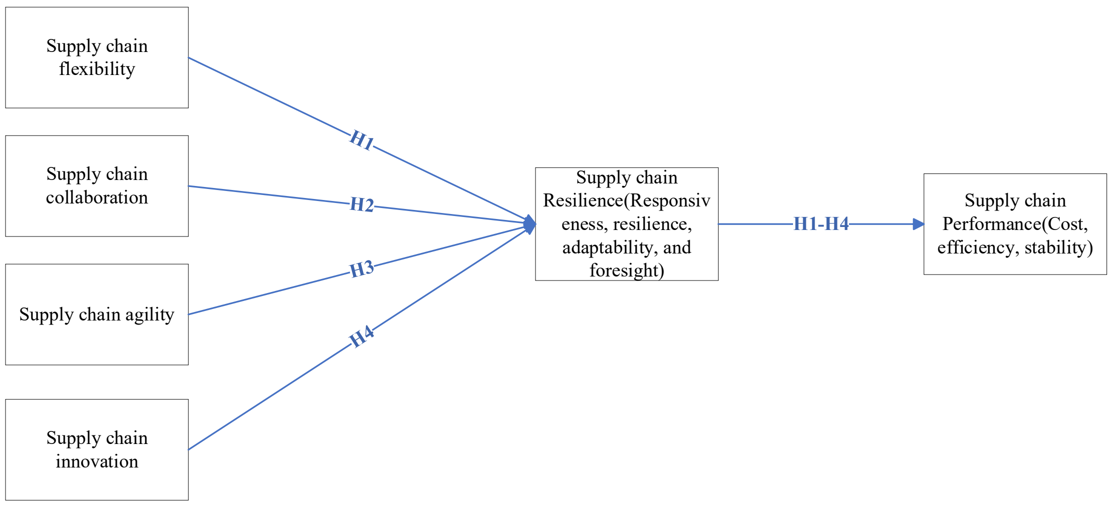

Fig.1: Conceptual Model

3. Research Methodology

3.1 Sample Selection and Data Collection

3.1.1 Sampling Framework and Data Sources

This study focuses on core enterprises in China's soybean import supply chain, including soybean importers, processing companies, and logistics service providers, covering the entire chain from “international procurement — cross-border logistics — processing and distribution.” Sample selection employed stratified random sampling, with the sampling frame derived from industry association directories (e.g., the China Soybean Industry Association), corporate databases, and international trade platforms. This ensured coverage of major soybean import hubs in the North China, East China, and South China regions, including Shandong, Liaoning, and Guangdong provinces — regions that account for approximately 85% of the nation's total soybean imports, thereby enhancing the representativeness of the sample.

Data was collected online via the “QuestionStar” platform, with the distribution period spanning August 2024 to March 2025, during which 485 questionnaires were distributed. After rigorous validity screening, 332 valid questionnaires were retained, yielding an effective response rate of 68.45%. This sample size (332 questionnaires) meets the minimum requirement for structural equation modeling (⩾ 200 questionnaires), and the ratio of sample size to questionnaire observed variables (32 items) is 10.4:1, meeting the statistical power standards for PLS-SEM analysis.

3.1.2 Sample characteristics

The sample structure is as follows (Table 1):

Table 1: Distribution of sample respondents

Characteristic Dimension	Classification	Sample Size	Proportion (%)
Type of Enterprise	Agricultural production and planting enterprises	45	13.55
	International trading companies	35	10.54
	Warehousing and transportation enterprises	49	14.76
	Oil and fat processing enterprises	58	17.47
	Others (including logistics, feed, etc.)	135	40.66
Years of Enterprise Operation	< 1 year	2	0.6
	1–3 years	56	16.87
	4–10 years	99	29.82

Enterprise type: Primarily oilseed processing enterprises (17.47%), logistics and warehousing enterprises (14.76%), and international trading companies (10.54%), covering core supply chain segments. The impact mechanisms of resilience-building and strategy implementation on performance are more representative in these sectors;

Operational tenure: 52.71% of the companies have been in operation for over 10 years, and 29.82% for 4 – 10 years. Companies with long-term involvement in the imported soybean supply chain better reflect the dynamic process of resilience accumulation and strategy optimisation;

Regional distribution: The sample covers major import ports such as Qingdao Port, Dalian Port, and Guangzhou Port, aligning with the geographical concentration of China's soybean imports, ensuring the industry applicability of the research conclusions.

3.2 Research Tools and Variable Measurement

3.2.1 Questionnaire Design

The research tool is a structured questionnaire comprising seven sections: the first section covers basic company information (such as company size and years of operation), while the remaining six sections correspond to the measurement of four categories of supply chain strategies, supply chain resilience, and supply chain performance. All items use a 5-point Likert scale (1 = ‘strongly disagree,’ 5 = ‘strongly agree’). The item design is based on internationally established scales and adjusted to reflect the characteristics of the imported soybean supply chain. After optimising the wording through a pre-survey (60 samples), the final version was finalised.

3.2.2 Variable Measurement

The core variables (independent variables, mediating variables, and dependent variables) in this study are all adapted from internationally recognised scales, with question items adjusted to reflect the actual context of China's imported soybean supply chain (e.g., geopolitical risks, cross-border logistics, processing characteristics) to ensure the validity and industry relevance of the measurements. All variables are measured using a 5-point Likert scale (1 = ‘strongly disagree,’ 5 = ‘strongly agree’).

The questionnaire items are adapted from the following studies: Construct 1: Supply Chain Agility (SCA) Factors [Market Response Speed, Order Adjustment Efficiency, Risk Response Timeliness] Adapted from Park et al. (2023), with a total of 5 measurement items.

Construct 2: Supply Chain Flexibility (SCF) Factors [Procurement Channel Adjustment, Transportation Mode Switching, Production Capacity Adaptability] Adapted from the research of Cui et al. (2023) and Shen et al. (2023), with a total of 5 measurement items.

Construct 3: Supply Chain Collaboration (SCC) Factors [Information Sharing, Joint Decision-Making, Risk Sharing] Adapted from the research of Fernie et al. (2023), with a total of 5 measurement items.

Construct 4: Supply Chain Intelligence (SCI) Factors [Technology Application, Process Optimization, Data-Driven] Adapted from Yang et al. (2021), with 5 measurement items.

Construct 5: Supply Chain Resilience (SCR) Factors [Responsiveness, Recovery Capacity, Adaptability] Adapted from El Baz et al. (2021), with 5 measurement items.

Construct 6: Supply Chain Performance (SCP) Factors [Operational Efficiency, Cost Control, Stability] Adapted from Altekar (2023), with 5 measurement items.

4. Results

4.1 Measurement Model Evaluation

4.1.1 Reliability Testing

The reliability testing results show that the Cronbach’s α coefficients, rho_A values, and composite reliability (CR) of all variables are greater than the critical value of 0.7 (Table 2), indicating that the scale has good internal consistency. Among these, the Cronbach’s α coefficient for supply chain performance (SCP) was the highest (0.921), and the CR value for supply chain resilience (SCR) was 0.913, both far exceeding the standard threshold, thereby validating the reliability of the measurement tools.

Table 2: Results of Reliability Test

Variable	Cronbach's Alpha	rho_A	CR	AVE
Supply Chain Flexibility	0.902	0.902	0.927	0.717
Supply Chain Collaboration	0.904	0.905	0.929	0.723
Supply Chain Agility	0.903	0.907	0.928	0.72
Supply Chain Innovation	0.909	0.913	0.932	0.734
Supply Chain Resilience	0.88	0.889	0.913	0.677
Supply Chain Performance	0.921	0.924	0.941	0.76

4.1.2 Validity Testing

(1) Convergent Validity

All item factor loadings ranged from 0.702 to 0.888, exceeding the critical value of 0.6; the average variance extracted (AVE) ranged from 0.677 to 0.760, all exceeding the standard of 0.5, indicating that the items effectively reflect the underlying constructs of their respective variables, and the convergent validity meets the criteria.

(2) Discrimination Validity

Fornell-Larcker criterion: The square roots of the AVE values for each variable (bolded diagonal values) are all greater than the correlation coefficients between those variable and other variables (Table 3). For example, the square root of the AVE for Supply Chain Innovation (SCI) is 0.857, and its correlation coefficient with Supply Chain Collaboration (SCC) is 0.333, meeting the criteria for discrimination validity.

Table3: Fornell-Larcker criterion

	Supply Chain Innovation	Supply Chain Collaboration	Supply Chain Agility	Supply Chain Flexibility	Supply Chain Performance	Supply Chain Resilience
Supply Chain Innovation	**0.857**					
Supply Chain Collaboration	0.333	**0.85**				
Supply Chain Agility	0.301	0.363	**0.848**			
Supply Chain Flexibility	0.241	0.299	0.364	**0.847**		
Supply Chain Performance	0.387	0.455	0.397	0.379	**0.872**	
Supply Chain Resilience	0.326	0.434	0.392	0.385	0.475	**0.823**

HTMT Ratio: All HTMT values between variables are less than 0.85 (Table 4). For example, the HTMT value between Supply Chain Resilience (SCR) and Supply Chain Performance (SCP) is 0.521, far below the critical value, further validating the independence between variables.

Table 4: Heterotrait-monotrait ratio (HTMT)

	Supply Chain Innovation	Supply Chain Collaboration	Supply Chain Agility	Supply Chain Flexibility	Supply Chain Performance	Supply Chain Resilience
Supply Chain Innovation						
Supply Chain Collaboration	0.362					
Supply Chain Agility	0.328	0.399				
Supply Chain Flexibility	0.263	0.332	0.401			
Supply Chain Performance	0.419	0.496	0.433	0.414		
Supply Chain Resilience	0.363	0.488	0.432	0.427	0.521	

4.2 Structural Model Evaluation Results

4.2.1 Multicollinearity and Model Fit

The variance inflation factor (VIF) test showed that the VIF values for all variables ranged from 1.187 to 1.446 (Table 5), all of which were less than 10, indicating no significant multicollinearity issues and suitability for path analysis. Among the model fit indices, the Standardised Root Mean Square Residual (SRMR) was 0.042 (<0.08), and the Normed Fit Index (NFI) was 0.904 (close to 0.9), indicating that the model fits the data well (Table 6).

Table 5: VIF values for the internal model

Relationship	VIF
Supply Chain Innovation → Supply Chain Performance	1.213
Supply Chain Innovation → Supply Chain Resilience	1.187
Supply Chain Collaboration → Supply Chain Performance	1.362
Supply Chain Collaboration → Supply Chain Resilience	1.263
Supply Chain Agility → Supply Chain Performance	1.339
Supply Chain Agility → Supply Chain Resilience	1.293
Supply Chain Flexibility → Supply Chain Performance	1.274
Supply Chain Flexibility → Supply Chain Resilience	1.21
Supply Chain Resilience → Supply Chain Perform	1.446

Table 6: Model R^2 Results

Variable	R^2	Adjusted R^2
Supply Chain Performance	0.502	0.496
Supply Chain Resilience	0.457	0.450

The coefficient of determination (R^2) results show that the R^2 value for supply chain resilience (SCR) is 0.457 indicating that the four strategies can explain 45.7% of the variation in resilience; the R^2 value for supply chain performance (SCP) is 0.502, indicating that the combined effect of the strategies and resilience can explain 50.2% of the variation in performance. According to Chin (1998) standards, both values reach the ‘moderate explanatory power’ level, and the model's ability to explain the relationship between variables is acceptable.

4.3 Mediating effect test

4.3.1 Mediating effect

In order to validate the transmission path of ‘supply chain strategy → supply chain resilience → supply chain performance,’ this study used the bootstrapping method (5,000 samples, 95% confidence interval) to calculate the indirect effects. The results show that the mediating effects of the four strategies are all significant, and there are clear differences in their strengths, as shown in the table below:

Table 7: Mediating effect test results

Mediating Pathway	Indirect Effect Value (β)	t-value	p-value	95% Confidence Interval	Effect Strength Ranking
Supply Chain Collaboration→Resilience→Performance	0.058	2.747	0.006	[0.021, 0.103]	1
Supply Chain Flexibility→Resilience→Performance	0.046	2.642	0.008	[0.018, 0.082]	2
Supply Chain Agility→Resilience→Performance	0.040	2.396	0.017	[0.012, 0.076]	3
Supply Chain Innovation→Resilience→Performance	0.030	2.100	0.036	[0.005, 0.063]	4

As shown in Table 8:

(1) Supply chain collaboration → resilience → performance

This path has the highest indirect effect value (β = 0.058), indicating that collaboration has the strongest driving effect on resilience. Real-time information sharing between companies and supply chain partners and joint decision-making can significantly enhance resilience's ‘responsiveness’ and ‘recovery capacity’, thereby reducing disruption losses and improving performance stability.

(2) Supply chain flexibility → resilience → performance

The indirect effect value is 0.046, reflecting the important role of flexibility in performance through resilience. A company's ability to quickly switch import source countries and adjust transportation routes can enhance resilience's ‘adaptability’, ensuring raw material supply under risks such as drought in Brazil and port congestion, and ultimately improving operational efficiency.

(3) Supply Chain Agility → Resilience → Performance

The indirect effect value is 0.040, reflecting the dynamic support of agility for resilience. A company's ability to adjust production capacity within 48 hours when order fluctuations reach ±20% and to activate alternative plans within 24 hours during logistics disruptions can strengthen resilience's ‘response speed,’ shorten recovery time from disruptions, and reduce performance losses.

(4) Supply Chain Innovation → Resilience → Performance

The indirect effect value is 0.030, indicating that innovation's influence on performance through resilience is relatively weak but still significant. The application of technologies such as blockchain traceability and big data risk warning can enhance resilience's ‘predictive capability’.

4.3.2 Summary of Hypothesis Test Results

The four mediation effect hypotheses (H1-H4) proposed in this study were all verified, indicating that supply chain resilience plays a partial mediating role in the relationship between the four strategies and performance (Table 8).

Table 8: Hypothesis Test Results

Hypothesis Number	Hypothesis Content	Test Result
H1	Supply chain resilience mediates the relationship between supply chain flexibility and performance	Supported
H2	Supply chain resilience mediates the relationship between supply chain collaboration and performance	Supported
H3	Supply chain resilience mediates the relationship between supply chain agility and performance	Supported
H4	Supply chain resilience mediates the relationship between supply chain innovation and performance	Supported

5. Conclusion

Through an empirical analysis of 332 enterprises in China's imported soybean supply chain, this study focuses on the intermediary transmission mechanism of supply chain resilience and draws the core conclusion: Supply chain resilience plays a significant mediating role between the four strategies (flexibility, collaboration, agility, and innovation) and supply chain performance, revealing the internal logic of "strategic resource investment → resilience capability building → performance output improvement" and verifying its theoretical conception as the core link in the "strategy-performance" relationship. There is heterogeneity in the driving and mediating effects of strategies on resilience: supply chain collaboration has the strongest direct and indirect effects, followed by flexibility, while agility and innovation, though relatively weaker, still have significant effects. This heterogeneity stems from the differentiated contributions of different strategies to the three dimensions of resilience (responsiveness, recovery capacity, and adaptability). The three dimensions of resilience form a complementary mechanism: collaboration and agility enhance responsiveness, flexibility improves adaptability, and innovation strengthens predictive capabilities. Together, they synergistically constitute the key pathway for strategy transmission, providing systematic support for performance improvement.

Based on the findings of this study, the research contributions and implications are summarized as follows. The contributions of this study lie in: expanding the application of supply chain resilience theory in the context of agricultural globalization and constructing a "strategy-resilience-performance" analytical framework; deepening the understanding of the "capability-performance" conversion mechanism in dynamic capability theory and confirming that resilience is the "key converter" for transforming strategic resources into performance advantages; revealing the differences in prioritization of supply chain strategy synergy and clarifying the dominant role of "network synergy" and "resource redundancy" in the imported soybean supply chain. In practice, enterprises need to customize strategies according to their roles; at the policy level, industry associations, governments, and academia-industry-research institutions should collaborate to promote the development of resilience assessment systems, infrastructure construction, and risk response tool development.

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