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The Impact of Supply Chain Resilience on Firm Performance -- An Example from the Electronic Information Industry

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Abstract

The global pandemic and the trade disputes between China and the United States have led to a serious impact on the supply chain at home and abroad, and how to establish an open, stable and safe supply chain system has become a strategic priority that must be addressed. By reviewing the existing articles, it is found that there is a lack of research on the impact of supply chain resilience on enterprise performance. Based on this, combined with the industry background of China's electronic information industry and using the important position of Chongqing in the electronic information industry, the important role played by supply chain resilienc e in enterprise performance is explored. The results of the analysis show that supply chain resilience positively affects firm performance and that there are differences between the core dimensions of supply chain resilience and the impact of firm performance in different categories.

Keywords

Supply Chain; Supply Chain Resilience; Firm Performance; Empirical Study.

1. Introduction

Affected by the outbreak of covid-19, the international chip market has ushered in a wave of shortages. The mobile phone industry has been suffering from a shortage of chip supply, and this problem has also begun to appear in the automotive industry. Shanghai Volkswagen, FAW-Volkswagen, GEELY Automobile, and many other well-known automotive companies confirmed that some mid and high-end models of domestic car manufacturers have been forced to partially reduce production and stop production. Due to the global outbreak of the covid-19 and the trade war between China and the United States, domestic and international supply chains have been severely impacted, and how to establish an open, stable and secure supply chain system has become a strategic priority that must be addressed. In view of the challenges faced by the industrial chain supply chain, Zhou You, deputy director of the Planning Research Institute of China Electronics Information Industry Development Research Institute, pointed out that maintaining the security and stability of the industrial chain and improving the competitiveness of the industrial chain has become important tasks for the current industrial upgrading.

The industrial chain supply chain is regarded as a kind of socialized division of labor collaboration network formed based on the inter-industry division of labor. Once a problem occurs between a node in the network, it will affect other nodes in the supply chain, which will seriously affect the security and stability of the supply chain and lead to huge losses for the enterprises in the supply chain. Supply chain resilience can suppress such amplified risks in the supply chain of industrial chains, including enhancing the ability to resist risks, enhancing the ability to recover quickly, enhancing the ability to restructure and innovate and transform under extreme shocks, especially to enhance the ability to resist risks arising from sudden

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shocks to core elements and key technologies, and reducing the dependence on "strangle" technologies.

Based on this, in the new development pattern of "dual circulation", clarifying the role of supply chain resilience and its impact is crucial for Chinese enterprises, especially the manufacturing industry, to make proper use of supply chain resilience in the context of the new era, and how to efficiently improve enterprise performance, enhance supply quality and break the blockage of the national economic cycle.

Research on supply chain resilience has received extensive attention, and the current studies, as well as research reports, tend to explore ways to improve supply chain resilience, but there is a lack of relevant research on the impact of supply chain resilience on enterprise performance. At the same time, due to the impact of the pandemic, maintaining the security and stability of the value chain of the industrial chain and enhancing supply chain resilience has received extensive attention from enterprises and scholars, and some enterprises are not clear about whether their investments are conducive to enhancing enterprise performance when investing for resilience, and there is also a lack of targeted investment recommendations for resilience.

2. Literature Review

2.1. Research on Supply Chain Resilience

The research on supply chain resilience has been developed in the last decade, and Han et al. (2020) have indicated in their review article that although there are many similarities in the research on the definition of supply chain resilience, it has not reached a unified view, and only supply chain resilience has been unified as a multidisciplinary concept. Based on the context of the new operating environment, Rice and Caniato (2003) were the first to introduce the concept of resilience into the supply chain and defined supply chain resilience from an organizational perspective as the ability to respond to unexpected events and return to normal operations, while Christopher and Peck (2004) then considered supply chain resilience as the ability to return to the initial state or achieve a better state when the supply chain is disturbed. Ponomarov and Holcomb (2009) presented the first systematic and comprehensive definition of supply chain resilience, arguing that supply chain resilience is the adaptive capacity of a supply chain to respond proactively to disruptions that occur by taking preventive measures and being able to maintain the expected level of connectivity, functional and structural control, maintain continuity of operations and recover the supply chain from disruptions. In a subsequent study, Brandon-Jones et al. (2014) argue that the definition of supply chain resilience needs to consider supply chain recovery time from disruptive events. Chang and Lin (2019) define supply chain resilience by dividing it into three phases: performance readiness, response, and recovery. Aslam et al. (2020) argue that supply chain resilience should also include a fourth stage that enables a better state after recovering from a disruption. Wong et al. (2020) suggest that supply chain resilience is beneficial to increase a firm's competitive advantage; Gu et al. (2021) argue that supply chain resilience enables a supply chain to recover from disruption and maintain supplies, information, and cash. Christopher and Peck (2004) argue that supply chain resilience has various components: Supply Chain risk management culture, Agility, Supply Chain Collaboration, etc. The study of the impact of supply chain resilience can be explored from the perspective of different constituent elements.

2.2. Studies on the Impact of Resilience on Firm Performance

Abeysekara et al. (2019) argue that firm performance refers to the extent to which a firm achieves its production, human resource, marketing, and financial goals. Most of the studies have focused centrally on the financial performance of the firm and have used return on assets, profitability ratio, and market value ratio as the criteria for assessment. Meanwhile, some

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scholars explore the operational aspects of performance. Oh et al. (2020) found that supply chain cooperation can positively affect the operational performance of the supply chain by influencing the power variation management, while operational performance is assessed by taking the operational cost, service quality, product development cycle, delivery time, and flexibility to respond to product changes. Abeysekara et al. (2019) examined the positive impact of supply chain resilience on firm performance and competitive advantage in Sri Lanka's apparel industry through an empirical study; Yu et al. (2019) examined the relationship between dynamic, disruption-oriented, supply chain resilience, and financial performance in their study using the Yangtze River Economic Zone in China. The relationship between dynamics, disruption orientation, supply chain resilience, and financial performance is examined, and the positive effect of supply chain resilience on improving the financial performance of enterprises is verified.

2.3. Review of Research

From the current research, the definition of supply chain resilience is described as the ability to recover from disruption events, to the division of supply chain resilience into different stages, as well as the latest research considering specific management methods and roles of resilience, the research on resilience develops in a specific and in-depth direction and tends to explore the impact of supply chain resilience on supply chain network management and each "node" (firms, countries or regions) in the network, and measures to enhance supply chain resilience. Most scholars' research on supply chain resilience focuses on exploring the factors affecting supply chain resilience, and only some scholars have conducted empirical studies on the impact of supply chain resilience on enterprise performance, and the current research status is summarized in the following three points.

1. The current scope of the industries concerned is narrow, and there is a lack of inquiry into specific industries such as manufacturing.

2. Existing research explores the impact mechanism of supply chain resilience from the perspective of a single concept. There are different dimensions of supply chain resilience, and few studies have explored enterprise performance for explicit supply chain resilience dimensions.

3. Enterprise performance, also as a multidimensional and complex concept, most studies focus only on financial and market performance, and few domestic articles have conducted empirical studies on the competitive advantage, customer service, and operational performance of enterprises.

3. Theoretical Model and Hypothesis

Based on the previous analysis, it can be learned that most of the existing studies on supply chain resilience stay in theoretical analysis, and have accumulated richer results in exploring the influencing factors of supply chain resilience. However, it is found that the dimensional division of supply chain resilience is more controversial and there is more overlap between it and the influencing factors. In this paper, by reading relevant literature at home and abroad, we finally measure supply chain resilience in three dimensions: supply chain risk management culture, supply chain agility, and supply chain cooperation.

On the other hand, what kind of impact supply chain resilience will have on firm performance has received a lot of attention from scholars. Kamalahmadi et al. (2021) pointed out that it is unclear whether firms can benefit from the investment in supply chain disruption practices and there is an urgent need to analyze the impact of supply chain risk management practices from a holistic perspective. By reviewing the existing literature, this paper measures the firm performance in terms of two dimensions: financial performance and operational performance.

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Based on these metrics, a conceptual model is developed as shown in the figure below.

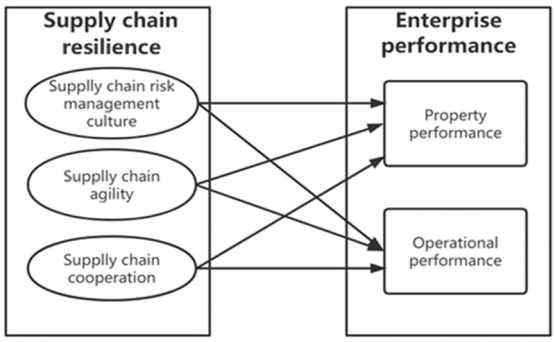

Figure 1. Conceptual model diagram

3.1. Indicators of Supply Chain Resilience Factors

3.1.1. Supply Chain Risk Management Culture

The supply chain risk management culture represents the beliefs as well as behaviors of the employees and managers of the company about risk management and reflects the business transaction activities of the company's workers dealing with internal and external business from the perspective of risk management (Kumar and Anbanandam, 2019). By building a risk management culture, enterprises can achieve continuous monitoring of risks and uncertain events in their daily production operations and take effective measures to manage them, thus achieving accurate control of internal and external business environment information. Therefore, in this paper, we believe that the level of enterprise supply chain risk management culture can be used to measure the supply chain resilience of an enterprise.

3.1.2. Supply Chain Agility

Supply chain agility, as a capability to quickly respond to market demand, can enhance a company's ability to respond in a catastrophic event (Kumar and Anbanandam, 2019). It has been pointed out that supply chain agility is the most effective way to improve supply chain resilience. Supply chain agility is considered as one of the means to control market turbulence, adjust tactics and operations, and integrate processes. The level of supply chain agility directly represents reflects the ability of the supply chain to react in the face of disruptive events. In this paper, we use agility as a dimension to measure the level of supply chain resilience.

3.1.3. Supply Chain Cooperation

Cooperation refers to firms working together to achieve a common goal (Anderson & Narus, 1990). During disruptions, partners must work together to achieve the common goal of maintaining operations and ensuring the survival of the firm, even when there are serious problematic conflicts (Mandal and Sarathy, 2018). Also, a number of studies have shown that supply chain cooperation has a positive effect on supply chain resilience. In this paper, we argue that the level of supply chain cooperation can be used as a dimension to measure the level of supply chain resilience, i.e., to a certain extent, the higher the level of supply chain cooperation, the higher the level of supply chain resilience.

3.2. Enterprise Performance Indicators

By summarizing the existing studies, we find that most of the current studies on supply chain resilience measure enterprise performance from an overall general perspective or explore only the financial performance of the enterprise. In this paper, by summarizing the existing measurement indicators, we assess the enterprise performance from both financial and operational aspects.

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3.2.1. Financial Performance

On the financial side, we have utilized net sales margin, market share, return on investment, return on sales, return on assets, profit, etc. for measurement.

3.2.2. Operational Performance

For the operational performance of the company, we have used the measurement of service quality profile, customer loyalty under comparison with competitors, customer service level, on-time delivery, new product development cycle, delivery time, etc. for the last three years.

3.3. Research Theoretical Hypothesis

Based on the existing studies, the following hypotheses are proposed in order to verify the impact of supply chain resilience on firm performance.

H1: Supply chain risk management culture has a positive impact on the financial performance of the firm.

H2: Supply chain agility has a positive impact on the financial performance of the firm.

H3: Supply chain cooperation has a positive impact on the financial performance of the firm.

H4: Supply chain risk management culture has a positive impact on the operational performance of the firm.

H5: Supply chain agility has a positive impact on the operational performance of the firm.

H6: Supply chain collaboration has a positive impact on the operational performance of the firm.

4. Questionnaire Design

In this research report, we adopted the research methodology recommended by existing studies and adopted a Likert scale (7 points) to collect sufficient relevant data. Firstly, the reliability and authenticity of the adopted metric were ensured by extensively reviewing the relevant literature on supply chain resilience. Also, the questions selected for this report are strictly cited from the existing literature and all the measures are referenced from the initial source literature. The total supply chain resilience measures in this report are referenced in the article by Abeysekara et al. (2019) and the financial performance measures are referenced from Fawcett et al. (2011), Flynn et al. (2010),Li et al. (2006),Narasimhan and Kim (2002); operational performance indicators are referenced from Huo et al. (2014),Kim (2009), Koçoğlu et al. (2011), Um et al. (2017), Wei and Wang (2010). As most of the measurement criteria referenced were derived from the existing international literature on the subject, some of the expressions were adjusted to take into account language and cultural differences, and two experts in the field were invited to conduct a critical review of the translated Chinese questionnaire to ensure the accuracy of the research.

At the same time, a small-scale experiment was conducted to ensure the readability of the questionnaire and to assess whether the respondents understood the questions correctly. Finally, based on the results of the small-scale experiment, the questions of the questionnaire were finally adjusted appropriately.

5. Data Collection

The research team conducted the survey in mainly selected Chongqing and surrounding areas by distributing questionnaires to business leaders. The reliability and validity of the questionnaire is the basis of the questionnaire research. In this paper, the research was conducted through commissioned research, using the questionnaire network research platform. The research time is January 2020 to March 2020, put 2000 questionnaires, a total of 208 questionnaires harvested, after SPSS software screening invalid questionnaires, valid questionnaires a total of 159.

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6. Data Analysis

6.1. Analysis of Empirical Research

6.1.1. Descriptive Statistical Analysis

Table 1. Descriptive statistical analysis

Dimension	Item	Variance	Standard deviation
Supply chain risk management culture	1	5.8	1.311
	2	5.27	1.334
	3	5.62	1.281
	4	5.18	1.338
	5	5.36	1.397
	6	5.64	1.304
	7	5.15	1.36
Supply chain agility	8	5.27	1.363
	9	5.38	1.435
	10	5.72	1.248
	11	5.18	1.324
	12	5.28	1.433
	13	5.48	1.391
	14	5.42	1.389
Supply chain cooperation	15	5.71	1.255
	16	5.28	1.373
	17	5.34	1.4
	18	5.16	1.373
	19	5.52	1.272
	20	5.59	1.337
	21	5.35	1.365
	22	5.15	1.374
Financial performance	23	5.14	1.335
	24	5.62	1.291
	25	5.27	1.367
	26	5.26	1.279
	27	5.11	1.341
	28	5.6	1.331
	29	5.25	1.339
	30	5.25	1.286
Operational performance	31	5.54	1.277
	32	5.41	1.36
	33	5.11	1.312
	34	5.21	1.25
	35	5.69	1.223
	36	5.26	1.314
	37	5.54	1.267
	38	5.43	1.385
	39	5.65	1.143
	40	5.48	1.368
	41	5.31	1.317
	42	5.7	1.251
	43	5.29	1.214

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As shown in Table 1, most of the means of the variables are between 5.2 and 5.8, reflecting the overall high level of the variables; the standard deviations of the variables are between 1.2 and 1.4, indicating that the concentration of the data is good and the quality of the data is ideal.

6.1.2. Reliability and Validity of the Questionnaire

Using SPSS25 data analysis software, the questionnaire was analyzed for reliability. Here, this study used the Cronbach coefficient [It is generally accepted that the Cronbach coefficient should be between 0 and 1. If the Cronbach coefficient of the scale is above 0.9, it means that the scale has good reliability; if the Cronbach coefficient of the scale is between 0.8 and 0.9, it means that the scale has acceptable reliability; if the reliability coefficient of the scale is between 0.7 to 0.8, then it means that some items of the scale need to be revised; if the Cronbach coefficient of the scale is below 0.7, then it means that some items of the scale need to be discarded]

This questionnaire's Cronbach is greater than 0.9, which indicates good reliability. The results of the analysis are as follows:

Table 2. Clone Bach value

Reliability statistics	
Cronbach Alpha	Number of items
0.979	43

Reliability tests of exploratory factor analysis, i.e. KMO and Bartlett's spherical test, were conducted on the content of the question items using SPSS data analysis software. The reliability test of exploratory factor analysis was conducted by conducting exploratory factor analysis on supply chain resilience and firm performance separately. The results show that all the selected elements are suitable for factor analysis. The following figure shows:

In this report, the equation was maximally rotated through the principal component analysis method, and the factors were extracted according to the eigenvalue of 1. The factor criterion was taken to be 0.5 or more, and the overall correlation was around 0.7 after rotation, and the factor loadings were between 0.75 and 0.83, which met the correlation test. Based on the validity test, all measure question items are greater than 0.6, indicating that the variables are credible and have good content validity. The average variance extracted (AVE) is around the standard threshold of 0.5, which indicates that the observed variables meet the requirements of the measured variables.

6.1.3. Discriminant Validity of the Constructs

The discriminant validity test is shown in the following figure, except for the agility of supply chain resilience which is greater than the open square root of its mean variance extracted, the values of all other variables meet the test condition, indicating that the discriminant degree among latent variables is relatively satisfactory.

6.1.4. Analysis of Normality of Data

The default algorithm for estimating the model using AMOS version 25.0 is the maximum likelihood estimation (ML), provided that the survey data conform to the normal distribution i.e. Gaussian distribution characteristics. Therefore, the survey data are tested for normality (as shown in the figure below), and the judgment is based on the fact that the absolute value of the skewness of the observed variables should be approximately between 0.5 and 1.6, and does not exceed the standard value of 2.6; the absolute value of kurtosis is between 0.18 and 4.42, which is less than the standard value of 10, and the data can be judged to conform to the characteristics of normal distribution.

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Table 3. Measure scale test

Dimension	Item	Factor load	Overall correlation	Reliability	Mean-variance extraction	Composite reliability
Supply chain risk management culture	1	0.79	0.749	0.902	0.59	0.912
	2	0.805	0.733			
	3	0.8	0.774			
	4	0.765	0.752			
	5	0.72	0.685			
	6	0.777	0.75			
	7	0.752	0.697			
Supply chain agility	8	0.712	0.696	0.903	0.54	0.891
	9	0.714	0.707			
	10	0.74	0.713			
	11	0.733	0.668			
	12	0.741	0.714			
	13	0.806	0.779			
	14	0.701	0.69			
Supply chain cooperation	15	0.823	0.753	0.952	0.58	0.918
	16	0.781	0.698			
	17	0.732	0.714			
	18	0.774	0.711			
	19	0.718	0.694			
	20	0.796	0.772			
	21	0.782	0.764			
	22	0.711	0.713			
Financial performance	23	0.777	0.717	0.976	0.62	0.928
	24	0.783	0.77			
	25	0.784	0.684			
	26	0.817	0.739			
	27	0.827	0.755			
	28	0.802	0.774			
	29	0.729	0.707			
	30	0.78	0.741			
Operational performance	31	0.702	0.733	0.991	0.56	0.943
	32	0.753	0.695			
	33	0.798	0.678			
	34	0.715	0.656			
	35	0.822	0.756			
	36	0.717	0.677			
	37	0.762	0.711			
	38	0.716	0.64			
	39	0.73	0.67			
	40	0.753	0.705			
	41	0.744	0.678			
	42	0.757	0.701			
	43	0.766	0.691			

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Table 4. Discriminant validity test

	Risk management culture	Agility	Cooperation	Finance	Operations
Risk management culture	(0.74)				
Agility	1.006	(0.73)			
Cooperation	0.106	0.1	(0.76)		
Finance	0.109	0.101	0.1	(0.79)	
Operations	0.74	0.737	0.078	0.084	(0.75)

As shown in the figure below, supply chain risk management culture variables (v2, v7, v11, v16, v18, v22, v23, v25, v26, v27, v33, v34, v43), supply chain agility variable (v11), supply chain cooperation variable (v16, v18, v22), financial performance variable (v23, v25, v26, v27), operational performance variables (v33, v34, v43) before correction had skewness and kurtosis that did not fit the normal distribution characteristics, so the above variables were corrected for normality in order to meet the requirements of the model fit. In this paper, after visual observation through histograms, the non-conforming data are corrected by both de-logarithmic and open square root approaches, and finally the non-conforming data are corrected by comparison using logarithmic approach.

6.1.5. Model Validation Factor Analysis

1.Measurement model testing

When testing the model fitness indicator, consideration should be given to testing the model for estimation violations. Therefore, before determining the model fitness, the correctness of the estimated phenomenon should be tested. This is done by examining both the presence of negative error variances in the estimated model and whether the standardized parameter coefficients are greater than one. The values of error variance in the model were calculated to be between 0.05 and 1.168 with no negative values, and the standardized parameter coefficients were between 0.201 and 0.834 and did not exceed 1. The overall indication was that the preliminary set model was not misestimated and the preliminary model could be tested for fitness. After testing the preliminary model, we can see that = 2.307 (GFI=0.683, RM−SEA=0.091, SRMR=0.3378, GFI=0.795, NFI=0.69, CFI=0.795, IFI=0.797), which indicates that the fit of the measurement model is low and the model needs to be adjusted. In this paper, through the Modification Indices (MI) provided by AMOS25.0 and combined with the relevant literature to support the requirement of correcting one set of parameters at a time, the model is corrected one by one and the final relational model is derived.

The graph below shows that the cardinality to degrees of freedom ratios for both the preliminary and modified models lie between 1-3, indicating a good cardinality fit test. The other fitted parameters are not so good because there is still a gap between the collected data and the model matching degree, resulting in a poor fit of some indicators, but the overall model fit indicators are not far from the ideal requirements, and the standardized path parameters as a whole reflect the relationships of the variables in the conceptual model, which can generally meet the analysis requirements.

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Table 5. Normal distribution test and its modification

	Normal distribution test before correction		Normal distribution test after correction	
Item	Skewness	Kurtosis	Skewness	Kurtosis
V1	-1.174	1.347	-1.174	1.347
V2	-0.492	-0.035	-1.768	5.4
V3	-0.999	1.232	-0.999	1.232
V4	-0.536	0.294	-0.536	0.294
V5	-0.55	-0.093	-0.55	-0.093
V6	-0.994	1.199	-0.994	1.199
V7	-0.247	-0.473	-1.456	4.435
V8	-0.548	0.034	-0.548	0.034
V9	-0.609	-0.176	-0.609	-0.176
V10	-0.91	0.76	-0.91	0.76
V11	-0.23	-0.285	-1.574	5.39
V12	-0.549	-0.103	-0.549	-0.103
V13	-1.076	1.26	-1.076	1.26
V14	-0.747	0.274	-0.747	0.274
V15	-1.014	1.343	-2.929	3.543
V16	-0.408	-0.159	-1.959	4.225
V17	-0.597	-0.013	-0.597	-0.063
V18	-0.418	-0.162	-1.628	4.341
V19	-0.857	0.955	-0.857	0.955
V20	-1.002	1.086	-1.002	1.086
V21	-0.676	0.357	-0.676	0.357
V22	-0.38	-0.127	-0.38	-0.127
V23	-0.462	0.345	-2.27	3.591
V24	-0.927	0.936	-0.927	0.936
V25	-0.456	-0.031	-2.012	3.23
V26	-0.477	0.19	-2.208	2.28
V27	-0.481	0.015	-1.676	4.374
V28	-1.017	1.078	-1.017	1.078
V29	-0.507	-0.058	-0.507	-0.058
V30	-0.541	0.209	-0.541	0.209
V31	-0.952	1.286	-0.952	1.286
V32	-0.653	0.091	-0.653	0.091
V33	-0.127	-0.508	-1.386	4.98
V34	-0.216	-0.399	-1.066	1.9
V35	-0.891	0.489	-0.891	0.489
V36	-0.602	0.244	-0.602	0.244
V37	-0.897	1.021	-0.897	1.021
V38	-0.744	0.21	-0.744	0.21
V39	-0.563	0.388	-0.563	0.388
V40	-0.704	0.006	-0.704	0.056
V41	-0.519	-0.014	-0.519	-0.054
V42	-0.956	0.622	-0.956	0.622
V43	-0.272	-0.149	-1.226	2.724
Number of valid cases (in columns)	159			

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Table 6. Model fitting test

Model fit test										
Fit indicator	x2/df	GFI	RMSEA	SRMR	AGFI	NFI	CFI	IFI	AIC	BIC
Ideal parameters	[1,3]	>=0.9	<0.10	<=0.05	>=0.9	>=0.9	>=0.9	>=0.9	The smaller the better	The smaller the better
Preliminary model	2.307	0.683	0.091	0.3378	0.649	0.69	0.795	0.797	2154.22	2436.559
Modified model	2.373	0.6898	0.063	0.3290	0.661	0.707	0.805	0.807	1727.738	1781.486

2. Structural relationship model validation analysis

Based on the results of the AMOS calculation of the modified model, the following graph shows that the normalized path coefficients are all positive. Among them, risk management culture, agility, and cooperation of supply chain resilience have a positive effect on the financial performance and operational performance of the firm with path coefficients of 0.366, 0.201, 0.834, 0.264, 0.338, and 0.549, respectively, and the hypothetical relationship set by the conceptual model has a greater role of H3, H6, which means that supply chain cooperation has a positive effect on the performance of the firm, while H1, H2, H4, H5 have a smaller role but still significant at $p<0.05$ with a path coefficient >0.2, which indicates that supply chain resilience positively affects firm performance.

Table 7. Validation of structural relationship model

Finance	←-	Risk management culture	0.366
Finance	←-	Agility	0.201
Finance	←-	Cooperation	0.834
Operations	←-	Risk Management Culture	0.264
Operations	←-	Agility	0.338
Operations	←-	Cooperation	0.549

The results of the mathematical analysis of the data recovered by taking a questionnaire survey show that supply chain cooperation, supply chain risk management culture, and supply chain agility play a significant role in the operational and financial performance of the company.

7. Summary

7.1. Government Level

7.1.1. Timely Assessment of Supply Chain Risks in Core Industries

In order to enhance supply chain resilience, government-industry authorities should conduct a timely assessment of potential supply chain risks in key industries, especially in areas and nodes related to national security to build an autonomous, controlled, safe, and reliable domestic production and supply system, assess potential risks, take measures against supply chain risk points, and remain vigilant to ensure that they can be self-circulating at critical moments and maintain normal economic operation. The industrial chain supply chain can also maintain its security and stability.

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7.1.2. Play the Role of Industrial Policy and Make Efforts to Enhance the Resilience of the Supply Chain

Under the new development pattern of the dual circulation, the role of industrial policy is brought into play to promote the improvement of the independent and controllable capability of the industrial chain supply chain. The world is now experiencing a great change unprecedented in a century, the new epidemic has a profound impact on the economies of various countries, trade protectionism is on the rise, the world economy is in the doldrums and the global market is shrinking. Under the profound changes in the domestic and international environment, competition in advanced technology and manufacturing is intensifying, and the supply chain of the global industrial chain is undergoing accelerated changes and adjustments, and there is an urgent need to play an active role in industrial policy to cope with such changes. The government should make more use of inclusive and functional industrial policies and provide the necessary public services, infrastructure, and institutional foundation to create a favorable market environment for the overall improvement of the competitiveness and self-control of the industrial chain supply chain.

7.1.3. Strengthen the Cultivation of Talents and Enhance the Level of Education

The role of high-level talents is indispensable to enhance the modernization level of the industrial chain supply chain. The development and use of new information technology are conducive to enhancing the resilience of the supply chain and reducing the impact of "necking" technology on the supply chain. Relevant departments should further strengthen the talent incentive mechanism, revitalize the talent factor kinetic energy, and give full play to the innovation ability of various talents, so as to provide a continuous source of intellectual resources and factor support for the independent and controllable industrial chain supply chain.

7.1.4. Promote the Globalization of Industrial Chain Layout of Leading Enterprises

Actively encourage China's leading enterprises to "go abroad", accelerate the layout of different links of the supply chain in major regions of the world, and fully revitalize and efficiently allocate resources such as raw materials, processing and production, and sales services. By optimizing the layout of the supply chain industry chain and integrating the advantageous resources of all parties, we can enhance the resilience of the supply chain, strengthen the ability of enterprises to cope with risks and disruptions, and reduce the impact of disruptions on the supply chain network.

7.2. Enterprise Level

7.2.1. Strengthening Information Sharing and Enhancing Cooperation in the Supply Chain

Industry associations, core supply chain enterprises, and upstream and downstream enterprises can enhance communication with enterprises in the supply chain industry chain through key information sharing by studying the establishment of a backup supplier information base, etc., to enhance the ability to cope with supply chain disruption risks, and also enhance the ability to jointly resist supply chain disruptions by integrating the resources of various enterprises in the supply chain.

7.2.2. Optimize Investment Decisions and Make Targeted Flexible Investment Decisions

The supply chain flexible investment decision needs to deeply combine the actual situation of each enterprise, consider the enterprise's industry and position in the supply chain, formulate targeted investment plans, and reduce the risk of investment.

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7.2.3. Pay Attention to Independent Innovation and Enhance the Autonomy and Intelligence of the Supply Chain

Innovation plays a central role in the overall situation of China's modernization, while independent innovation is strategic support for the independent development of the country and a fundamental solution to the independent and controllable supply chain of the industrial chain. Enterprises should strengthen the research on key basic materials, basic parts (components), advanced basic processes, industrial technology base, and industrial basic software, continuously increase the proportion of investment in basic research, and gradually establish a technological innovation system mainly based on independent research and development and supplemented by international introduction. At the same time, it will optimize the allocation of international scientific and technological innovation resources, strengthen support for multinational enterprises, encourage leading enterprises to establish overseas R&D centers, cooperate with foreign R&D institutions on common industrial technologies, and effectively utilize international scientific and technological innovation resources. By taking advantage of the new national system, we will focus on key "neck" areas and continue to narrow the gap, thereby ensuring the safety and control of science and technology innovation resources in all chains.

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