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Study on the Impact of Internal Control on Organizational Resilience

-- Evidence from Chinese Listed Companies

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Abstract

Enhancing organizational resilience is crucial for enterprises to navigate environmental uncertainties in the VUCA era. As a core governance mechanism, the question of whether and how internal control can enhance organizational resilience remains a significant theoretical and practical issue. This study examines the impact of internal control on organizational resilience using panel data from Chinese manufacturing listed companies on the Shanghai and Shenzhen A-share markets from 2011 to 2023 and investigates the process mechanisms through which internal control influences organizational resilience. The findings reveal that internal controls exert a significant positive effect on organizational resilience. Mechanistic analysis suggests that internal controls enhance organizational resilience through three key pathways: alleviating financial constraints, improving management efficiency, and increasing innovation output. Heterogeneity tests further show that the positive effect of internal controls on organizational resilience is more pronounced in firms with higher digital transformation levels, those located in eastern regions, and larger-scale enterprises. This study not only enriches the theoretical understanding of internal control and expands research on the antecedents of organizational resilience, but also offers practical guidance for enterprises to enhance organizational resilience and strengthen risk response capabilities.

Keywords

Organizational Resilience; Internal Control; Financial Constraints; Management Efficiency; Innovation Output.

1. Introduction

In recent years, the business world has faced big changes. Many sudden “black swan” events and hidden “gray rhino” risks have appeared often, bringing serious problems for firms trying to survive and grow. The four main features of volatility, uncertainty, complexity, and ambiguity (VUCA) have become clear signs of this time [1]. The question of how to deal with shocks, adjust to fast changes, and keep steady growth has become important for both research and practice. China is the second-largest economy in the world. It has the most complete industrial system and supply chains, and Chinese manufacturing makes up 12% of global exports [2]. This makes China a key center for global manufacturing. Because of this, it is important to study how

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Chinese manufacturing can deal with today's outside shocks. In this setting, organizational resilience is seen as a key skill that helps firms handle uncertainty. It is an important factor for enterprises to face crises and keep going in the VUCA era. This skill means not only standing strong against sudden risks but also adjusting and moving forward steadily while things keep changing. For this reason, building organizational resilience has become a topic of high interest for both businesses and researchers.

The word "resilience" first came from physics, where it meant "rebound" and "elasticity." As research between fields grew, it also began to be used in ecology and psychology. Meyer later brought it into management studies, and it then became an important topic in management and economics [3]. In recent years, many studies have focused on "organizational resilience," and there is wide agreement about what it means. Most studies look at it in two ways: as a "capability" and as a "process." The capability view says that organizational resilience is the ability of a firm to see changes in the environment, avoid crises, and adjust to new situations [4]. This helps enterprises recover quickly from shocks and turn crises into chances [5]. The process view says that organizational resilience is a process in which enterprises keep changing their structures to match the outside world and handle uncertainty [6]. Organizational resilience helps firms return to their old performance levels and even go beyond them. It helps them grow in a steady way and create more chances for new ideas and stronger competitiveness [7]. Recent studies have looked at what makes resilience stronger. They show that digital tools can raise resilience by improving how information is used and by making operations more efficient [8]. For example, AI-based HR systems can make the government respond to crises faster [9]. Digital change in firms also makes them more resilient by cutting costs and making information more open [10]. But much of this research looks too much at tools and not enough at the rules that make them work well. As Chi notes, digital tools work better when data is good and processes are clear, and these are main roles of internal control [11]. Other studies look at resilience through flexibility and extra resources [12]. They show that using resources in a flexible way makes it easier for enterprises to manage risk. Some studies focus on how management styles and practices affect resilience. They include leadership [13], green HR management [14], learning [15], and strategic HR management [16]. These practices improve the enterprise's ability to change and adjust, which makes it more resilient and better at facing risks. Other studies look at how ties with stakeholders matter. They show that having many kinds of investors [17] and working with supply chains [18] lowers the chance of new crises. Good ESG results also make enterprises more stable by bringing in long-term investors [19]. Some studies focus on outside factors, like bad weather, climate change [20], and outside crises [21].These studies give theoretical insights for enhancing organizational resilience in enterprises. However, We think that studying how to strengthen organizational resilience from the view of enterprise risk management needs more research.

Internal control completely shows how well a enterprise can manage and respond to risks. It is an important way for modern businesses to govern themselves from the inside out [22]. Internal control is an important part of managing corporate risk. It includes processes for oversight, evaluation, and review that are done together by the board of directors, management, and employees. Its goal is to make sure that operations run smoothly and efficiently, that financial reporting is accurate, and that all laws and rules are followed. This stops false information and fraud from happening [23]. After the U.S. Sarbanes-Oxley Act became law, many other countries around the world made rules and policies about internal control. The goal of these steps is to lower management risks, improve the quality of financial reporting, and make corporate governance systems stronger. China released the Basic Specifications for Enterprise Internal Control in 2008. This made Chinese enterprises more aware of how important internal control is for their survival and growth. After that, the Application Guidance

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for Enterprise Internal Control was released. It said that Chinese publicly traded companies had to check the quality of their internal controls and make the results public. This shows that China has always stressed how important corporate internal control is. A lot of what has been written about internal control talks about how it can improve the investment efficiency [24], innovation performance [25] ,and quality of accounting information [26]. For example, internal control improves the allocation of resources to lower abnormal cash holdings [27], increases the value of the company, and has a positive effect on equity costs [28] and accrual quality [20]. Recent studies show that strong internal controls greatly improve capital allocation[29] and financial performance [22] during the COVID-19 pandemic, while also easing financing problems to encourage R&D investment[30]. Also, internal controls have made supply chain management more efficient[26] and capital allocation more effective. Adequate internal controls also raise total factor productivity by raising capacity utilization rates[31]. The pivotal function of internal controls in the banking sector during the 2008 financial crisis exemplifies their significance as a fundamental instrument for managing uncertainty [32]. However, it is still not clear if this conclusion applies to businesses that aren't financial or to other types of crises. There is not much research on how internal controls can help organizations become more resilient, so it is especially important to look into how they work.

Based on the two areas of research above, it's clear that the studies that are already out there have a lot of problems: 1. The current literature disproportionately emphasizes technological tools while neglecting the governance frameworks essential for their effective operation. People often think of digital technologies as "technical solutions" without looking at how the basic internal control systems protect institutions and help them become more resilient. 2. While existing literature investigates the relationship between internal controls and organizational resilience, most studies focus on assessing direct effects, thereby overlooking a thorough examination of mediating mechanisms and contextual variables. Initial studies predominantly examined the function of internal controls in maintaining financial stability during crisis responses or evaluated their effects via singular mediating or moderating variables, failing to systematically clarify the underlying mechanisms by which internal controls enhance organizational resilience through various channels. 3. Most research on internal controls and organizational resilience has focused on crises, with limited studies examining how internal controls reduce uncertainty during normal operations.

Based on dynamic capability theory, this paper looks at how internal control affects organizational resilience. The main contributions are in three parts. First, this study puts internal control into the framework of organizational resilience. It shows the factors that make resilience stronger from the view of enterprise risk management and gives a base for later studies. Second, this study brings together three main ways: alleviating financial constraints, improving management efficiency, and increasing innovation output. These ways show how internal controls build resilience through better finance, better operations, and more knowledge. They also fix the limits of older studies that only looked from one side. Third, this study looks at companies in their normal daily work. It shows the link between internal control and resilience in Chinese manufacturing firms and gives useful directions and methods for them to become stronger.

2. Theoretical Analysis and Research Hypotheses

2.1. Internal Control and Organizational Resilience

In the era of VUCA (Volatility, Uncertainty, Complexity, Ambiguity), global enterprises universally face challenges posed by environmental uncertainty, with numerous industries encountering operational difficulties and resource shortages [33]. Taking COVID-19 as an example, this global crisis has delivered widespread impacts on business operations,

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particularly inflicting severe consequences on Chinese manufacturing enterprises, including production halts, layoffs, cost increases, and supply chain disruptions [34]. Against this backdrop, organizational resilience is increasingly recognized as a critical capability for enterprises to sustain development and survival amid turbulence [35]. To effectively anticipate and respond to crises, companies must establish robust risk management systems, where internal controls serve as an irreplaceable core mechanism.

Internal control is an important tool for enterprises governance and a key way to deal with risks and emergencies. Enterprises with strong internal control systems show higher resilience and can respond to crises with more speed and flexibility. Dynamic capability theory says that internal control helps a company resist risks by finding problems quickly and making countermeasures fast. This helps the company recover faster during crises. Internal control is not only a management tool inside the company but also a strategy to build resilience. Effective internal controls help enterprises keep financial safety during crises. Scholars have found [36] that enterprises with strong internal controls can check financial risks better and use measures to stop cash flow problems. These enterprises also show higher operational efficiency [37]. They improve resilience [38] by managing supply chains better and moving resources in flexible ways to face sudden problems. Carter et al. [39] found in studies on U.S. firms that enterprises with stronger internal controls not only perform better but also carry more risks and use resources with more flexibility.Feng [40] says that internal controls give managers clear and timely information. This helps with decisions and risk checks and builds a stronger base for recovery during crises. Li et al. [30] show that sound internal controls make resource use more efficient and improve debt financing by reducing information gaps and financing costs. Studies on Chinese companies also show that firms with better internal controls are more likely to do digital transformation, and this raises their competitiveness [41].

Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 1: Internal control can significantly enhance a corporation's organizational resilience.

2.2. The Influence Mechanism of Internal Control and Organizational Resilience

Internal control is the core part of corporate governance systems. It can make organizational resilience stronger in many ways. Research and practice show that high-quality internal control gives financial support, operational safeguards, and basic abilities for building organizational resilience through three main ways. These ways are easing financing limits, improving management efficiency, and raising innovation output. These parts work together to make organizational resilience stronger, and they help enterprises face shocks and keep steady growth. The next sections will look at the steps and logic of these three main ways.

First, internal controls can make enterprises more resilient by alleviating financing constraints. Financing constraints mean that high costs or few ways to get outside money stop a company from investing and working as freely as it wants. This makes it weaker when facing shocks [42]. Internal controls are an important part of corporate governance. They make financial reports clear, make business processes smoother, and make risk management better. Effective internal controls lower the gap in information between the company and people outside. They make current investors more confident and keep present financing channels steady. They also bring in new investors to give money, which opens more ways to get funds and lowers financing problems [30]. When financing problems are reduced, enterprises can get enough money to support new ideas, new plans, and ways to deal with crises. This also helps them get debt financing more easily. That gives financial support for better long-term results and stronger ways to deal with risks [42].

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Second, internal controls can make enterprises more resilient by improving management efficiency. They set rules for how financial and operational data are made, sent, and checked. This lowers information gaps and errors and gives managers more correct and timely support for decisions [40]. Internal control activities also lower risks, stop waste, and reduce losses. They check management problems and push improvements. This builds a system that keeps processes working better [27]. Enterprises with effective internal controls often keep balanced cash policies. This avoids problems that come from having too much or too little money. This shows how internal controls help manage resources better [27]. Management efficiency is a main skill for using resources well and reacting fast to changes. It decides how well a company can adapt and stay strong in hard times. Zheng and Dong say that management ability is very important for how a enterprise handles crises. Effective management lets enterprises change strategies fast, improve processes, and keep operations stable during crises [43]. It also cuts down the steps for decisions, makes responses to markets faster, and helps enterprises use chances to recover [16]. Internal controls help lower costs and make enterprises more ready for risks by improving management and making processes simple.

Finally, internal controls can make enterprises more resilient by increasing innovation output. They do this by setting clear rules for innovate processes, lowering risks, and using resources better. Innovation output shows how well a company can adapt and compete because it gives new solutions and flexibility. Internal controls help by finding and checking risks in the innovation process. They use preventive and corrective actions to cut uncertainty, pick better projects, stop waste of resources, and raise innovation efficiency [25]. Internal controls also make information flow better and clearer. They support sharing and teamwork inside the enterprise, and this speeds up innovation and output. They also make sure that innovation gets the money and people it needs [44]. Internal controls guide the use of resources in green innovation, and this increase both the number and quality of outputs. These outputs help enterprises adapt to market changes and crises because they give other options and ways to handle shocks [19]. Deng et al. show that innovation ability helps enterprises respond better and stay resilient by moving resources around. Also, innovation outputs give enterprises an edge like patent protection and lower costs, and this helps them stay stable in hard times and face outside risks [45].

Based on the above analysis, this paper proposes the following hypothesis:

Hypothesis 2: Internal controls can enhance organizational resilience by alleviating financing constraints, improving management efficiency, and increasing innovation output.

3. Methology

3.1. Sample Selection and Data Source

This study examines listed manufacturing companies on China's Shanghai and Shenzhen A-share markets from 2011 to 2023. The reasons are as follows: (1) High-quality development in manufacturing is central to the current economic transformation, and its organizational resilience warrants an in-depth study. (2) Compared to other industries, performance improvement in manufacturing tends to be more incremental and relies heavily on endogenous governance mechanisms such as internal controls, aligning closely with this study's focus. (3) Manufacturing enterprises have a long history of going public and constitute a significant proportion of the market, ensuring comprehensive sample coverage that enhances the generalizability and validity of research findings. The sample excludes companies classified as ST or *ST, delisted firms, financial institutions, and companies exhibiting abnormal or missing data for key variables, or with discontinuities in data over the observation period. To mitigate bias from extreme values and ensure the accuracy of subsequent results, all continuous variables underwent 1% tail trimming. Following data processing and outlier removal, the final

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sample comprised 2,012 companies with 18,304 valid observations. Internal control data originated from the DIB Internal Control and Risk Management Database. This paper's other financial and corporate data were sourced from the CSMAR database and the CNRDS China Research Data Service Platform. The sample exclusively includes manufacturing listed companies that remained operational from 2011 to 2023. Samples marked ST or *ST indicate businesses that have incurred losses for two consecutive years. This typically indicates that the financial situation is unusual and carries high financial risks, which may make the results less certain. But the sample may not be very representative. To further investigate other industries or companies leaving the market due to bankruptcy or acquisition, data from CSMAR/CNRDS for other industries during the same timeframe or delisted manufacturing firms can be utilized to create a comprehensive sample panel for validation.

3.2. Variable Selection

3.2.1. Dependent Variable

Organizational resilience can be measured either directly or indirectly. In the direct measurement approach, as seen in Kantur and Iseri-Say [46], organizational resilience is measured in three dimensions: robustness, agility, and integrity. Patriarca [47] et al. measure organizational resilience in four dimensions: monitoring, reacting, predicting, and learning analysis. Ortiz-de-Mandojana et al. [4] measured organizational resilience in terms of financial volatility, sales growth, and the firm survival ratio across three dimensions to assess organizational resilience. This paper draws on Zhang [48] and others to measure organizational resilience in terms of two indicators: growth and volatility. Growth is measured by the cumulative growth of operating income within three years, and volatility is measured by the standard deviation of stock returns in each month within one year. The entropy weighting method is used to calculate the "organizational resilience" variable.

3.2.2. Independent Variables

This paper utilizes the internal control index of DIB-listed companies to assess the effectiveness of corporate internal control. The DIB internal control database, created by Shenzhen DIB Company, is the first authoritative and professional internal control database in China. In the study of internal control of listed companies in China, most of the literature adopts this database.DIB database through the internal control environment, risk assessment, information and communication, supervision and inspection and control activities and other factors to derive a comprehensive score of the internal control index to reflect the effectiveness of internal control of the enterprise, the higher the score, the higher the quality of the enterprise's internal control, this paper takes the logarithmic treatment of the internal control index.

3.2.3. Mechanism Variables

Financing Constraints: Drawing upon the research of Hadlock et al. [49], this paper employs the SA index to measure the level of corporate financing constraints. The calculation formula is as follows: $SA = -0.737 * Size + 0.043 * Size^2 - 0.040 * Age$, where Size represents the natural logarithm of total corporate assets, and Age denotes the operational tenure of the firm, calculated as the observation year minus the year of establishment. Since SA values are negative, we take the absolute value of the SA index, denoted as FC. A higher absolute value indicates greater financing constraints.

Management Efficiency: Following Zhou et al. [50], we measure management efficiency by dividing operating revenue by management expenses. This ratio is then divided by 100 and denoted as ME. A higher ME value indicates relatively greater management efficiency. Higher management efficiency reflects lower management costs and higher operational performance outputs.

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Innovation Output: Following Li [25], this study uses the number of patent applications filed by a company as a measure of innovation output, denoted as IE. This includes the total annual applications for invention patents, utility model patents, and design patents. A higher annual volume of patent applications indicates greater innovation output performance.

3.2.4. Control Variables

Based on prior research [48, 51, 52], we incorporated firm size, debt-to-asset ratio, fixed asset ratio, book-to-market ratio, equity concentration, ownership structure, and return on assets as control variables to control for the influence of other factors on organizational resilience.

Table 1 presents the variables examined in this study and their respective measurement methods.

Table 1. Variable definition and calculation.

Variable type	Variable name	Code	Measurement Method
Dependent Variable	Organizational Resilience	OR	Calculated using the entropy method
Independent Variable	Internal Control	IC	Log-transformed DIB Internal Control Index
Mechanism Variables	Financing constraints	FC	Take the absolute value of the SA index
	Innovation Output	IO	Number of enterprises patents applied
	Management Efficiency	ME	Divide the Operating revenue/Management expense by 100
Control Variables	Firm Size	Size	Log(total assets+1)
	Financial leverage	Lev	Total liabilities / Total assets
	Fixed Asset Ratio	Fixed	Fixed assets / Total assets
	Book-to-Market Ratio	Bm	Book value / Total market value
	Ownership Concentration	Own	The ratio of shares held by the top five shareholders to total shares
	Ownership Type	Soe	Value is 1 if the company is state-owned, otherwise 0
	Profitability	Roa	Net profit / Total assets

3.3. Model Setting

In this paper, the impact of internal control on organizational resilience is investigated in depth by constructing a panel data model, and the benchmark model is set as follows (1):

$$OR_{i,t}=\alpha_0+\alpha_1 IC_{i,t}+\alpha_2 \sum Controls_{i,t}+\sum Year+\sum Industry+\varepsilon_{i,t} \quad (1)$$

In the model, OR represents the explained variable organizational resilience, IC denotes the explanatory variable internal control, Controls signifies the control variables, and ε is the random error term. To mitigate potential biases in the results stemming from industry and time factors, the model also controls for year fixed effects (Year) and industry fixed effects (Industry).

4. Analysis of Empirical Results

4.1. Descriptive Statistics and Correlation Analysis

Table 2 shows descriptive statistics for key variables, including sample size, mean, and standard deviation. The average organizational resilience (OR) is 0.75, with a median of 0.746, as shown in Table 2. The mean being higher than the median means that more samples of Chinese listed

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companies have lower organizational resilience. The standard deviation of 0.146 suggests that the variation in internal control quality among these companies is relatively small. The average for internal control (IC) is 6.472, and the middle value is 6.496. The median is higher than the mean, indicating that a larger number of samples exhibit better internal control quality among Chinese listed companies. The standard deviation of 0.146 indicates that the differences in internal control quality between these companies are relatively small. The characteristics of the remaining control variables are largely consistent with those found in previous studies, indicating that all variables are within reasonable ranges.

Table 2. Descriptive Statistic

	(1)	(2)	(3)	(4)	(5)	(6)
variables	N	Mean	Sd	Min	Max	p50
OR	18,304	0.750	0.015	0.724	0.823	0.746
IC	18,304	6.472	0.146	2.818	6.709	6.496
IO	18,304	2.104	1.692	0	9.289	2.197
FC	18,304	3.883	0.255	2.600	5.835	3.876
ME	18,304	0.204	0.195	0.001	3.577	0.151
Fixed	18,304	0.230	0.132	0.0203	0.616	0.205
Bm	18,304	0.340	0.154	0.0543	0.790	0.320
Soe	18,304	0.320	0.467	0	1	0
Lev	18,304	0.409	0.186	0.0628	0.864	0.405
Own	18,304	0.515	0.143	0.204	0.852	0.513
Size	18,304	22.27	1.170	20.09	25.76	22.11
Roa	18,304	0.0397	0.0577	-0.178	0.206	0.0369

Table 3 shows the correlation coefficient matrix for the variables. The correlation coefficient between Internal Control (IC) and Organizational Resilience (OR) is 0.068, and it is significant at the 1% level. This matches the earlier hypothesis and gives first evidence of the link between the variables. Most control variables have strong correlations with organizational resilience, which means the control variables used are suitable. All correlation coefficients between the variables are less than 0.5, which means there is little multicollinearity. The study also did VIF (Variance Inflation Factor) tests. The average VIF for all the variables was 1.37, which is much lower than the threshold of 10. This means multicollinearity is not a problem.

Table 3. Correlation Matrix

	OR	IC	ME	IO	FC	Size	Lev	Fixed	Bm	Own	Soe	Roa
OR	1											
IC	0.068***	1										
ME	0.180***	0.122***	1									
IO	0.101***	0.088***	0.066***	1								
FC	-0.045***	-0.104***	0.048***	-0.107***	1							
Size	0.145***	0.137***	0.334***	0.211***	0.046***	1						
Lev	0.018**	-0.039***	0.220***	0.088***	0.047***	0.451***	1					
Fixed	-0.022***	-0.052***	0.081***	-0.074***	-0.030***	0.079***	0.136***	1				
Bm	0.098***	0.008	0.032***	-0.036***	0.032***	0.052***	-0.420***	0.048***	1			
Own	0.232***	0.131***	0.087***	0.082***	-0.203***	0.100***	-0.069***	-0.001	0.033***	1		
Soe	-0.079***	0.029***	0.081***	0.005	0.083***	0.284***	0.235***	0.110***	-0.052***	-0.003	1	
Roa	0.113***	0.306***	0.085***	0.098***	-0.047***	0.055***	-0.370***	-0.117***	0.007	0.202***	-0.090***	1

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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4.2. Baseline Regression

Table 4 shows the regression results for the effect of internal control on organizational resilience. Column (1) shows that when controlling for individual and year fixed effects but without control variables, the regression coefficient for internal control (IC) on organizational resilience (OR) is 0.008 and significant at the 1% level. Column (2) shows that when controlling for individual and year fixed effects and adding control variables, the regression coefficient for internal control (IC) on organizational resilience (OR) is 0.002 and significant at the 1% level. The results mean that a 1-point increase in the internal control index leads to an average 0.002-point increase in organizational resilience, supporting Hypothesis 1.

4.3. Robustness Test

4.3.1. Substitute Explanatory Variable.

Following Yan [53], we employed the internal control index divided by 1000 (IC1) as a proxy variable for internal control quality in our tests. The regression results are presented in Column (1) of Table 5. The coefficient for internal control (IC) is 0.006 and significant at the 1% level, indicating that internal control continues to exert a positive influence on organizational resilience.

Table 4. Baseline Regression results

	(1)	(2)
	OR	OR
IC	0.008***	0.002***
	(0.001)	(0.001)
Size		0.001***
		(0.000)
Lev		0.005***
		(0.001)
Fixed		0.000
		(0.001)
Bm		0.006***
		(0.001)
Own		0.022***
		(0.001)
Soe		-0.003***
		(0.000)
Roa		0.021***
		(0.002)
Control	no	yes
Industry	yes	yes
Year	yes	yes
N	18304	18304
F	128.379***	205.450***
r2	0.007	0.083

Standard errors in parentheses,* p < 0.1, ** p < 0.05, *** p < 0.01

4.3.2. Adjusting the Sample Period.

Organizational resilience primarily manifests when enterprises encounter major shocks. The novel coronavirus outbreak in 2019 severely disrupted normal business operations. Therefore, the new sample period for regression analysis spans from 2019 to 2023, following the onset of

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the pandemic. As shown in Table 5 (2), the coefficient for internal control (IC) is 0.005 and remains statistically significant at the 1% level of significance. This confirms that internal control maintains a significant positive correlation with organizational resilience during major crises.

4.3.3. Lag Test.

The impact of internal control on organizational resilience may manifest in the future. To mitigate potential reverse causality issues, the explanatory variable internal control was lagged by one period (L1.IC). The regression results are shown in Column (3) of Table 5. The coefficient for internal control (IC) is 0.004 and remains statistically significant at the 1% level. The conclusion holds: internal control significantly enhances organizational resilience.

Table 5. Robustness Tests

	(1)	(2)	(3)
	OR	OR	OR
IC1	0.006***		
	(0.001)		
IC		0.005***	
		(0.001)	
ICL1			0.004***
			(0.001)
Size	0.001***	0.000	0.001***
	(0.000)	(0.000)	(0.000)
Lev	0.005***	0.006***	0.004***
	(0.001)	(0.001)	(0.001)
Fixed	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)
Bm	0.006***	0.008***	0.004***
	(0.001)	(0.001)	(0.001)
Own	0.022***	0.035***	0.022***
	(0.001)	(0.001)	(0.001)
Soe	-0.003***	-0.006***	-0.003***
	(0.000)	(0.000)	(0.000)
Roa	0.020***	0.018***	0.017***
	(0.002)	(0.003)	(0.002)
_cons	0.712***	0.697***	0.686***
	(0.002)	(0.008)	(0.005)
Industry	yes	yes	yes
Year	yes	yes	yes
N	18304	9424	15865
r2	0.194	0.152	0.195
F	206.51	153.76	177.90

Standard errors in parentheses, * p < 0.1, ** p < 0.05, *** p < 0.01

4.4. Endogeneity Test

4.4.1. Instrumental Variables Method.

Internal control and organizational resilience may have reverse causality. Firms with high organizational resilience have stronger internal resources and risk-bearing ability, and they put more focus on risk management and financial management, which leads to better internal control. To deal with endogeneity, this study uses the method of Wang et al. [52]. It uses whether a company hires Big4 audit firms and whether it receives regulatory sanctions (IV) as instrumental variables for internal control. Both variables are directly related to internal control and not directly linked to firm-specific error terms, so they show high exogeneity. Both

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instrumental variables passed weak instrument tests and over-identification tests, meeting the main selection rules. The Big4 and IV variables are coded as 1 if present and 0 if not. The data for both dummy variables come from the CSMAR database.

Table 6 gives the regression results. Two-stage least squares (2SLS) were used for testing. Columns (1) and (2) in Table 6 show the first-stage and second-stage regression results. Column (1) shows that whether Big4 firms audit a company has a significant positive link with internal control. At the same time, whether a company gets regulatory sanctions has a significant negative link with internal control. This confirms that the instrumental variables are valid. Column (2) shows that internal control has a significant positive effect on organizational resilience. This shows again that internal control has a clear positive effect on organizational resilience."

Standard errors in parentheses.* p < 0.1, ** p < 0.05, *** p < 0.01

4.4.2. Propensity Score Matching(PSM)

Systematic differences in internal control quality may exist across firms, which could influence regression results. To mitigate this variance, this study employs Propensity Score Matching (PSM) for testing.

Table 6. Results of endogeneity test

	(1)	(2)	(3)
	IC	OR	OR
Big4	0.121**		
	(0.006)		
Isviolated	-0.101***		
	(0.002)		
IC		0.087***	0.003***
		(0.026)	(0.001)
Size	0.175***	-0.001	0.001***
	(0.002)	(0.001)	(0.000)
Lev	-0.110	0.007***	0.006***
	(0.110)	(0.001)	(0.001)
Fixed	-0.458***	0.004**	0.000
	(0.107)	(0.002)	(0.001)
Bm	-0.123	0.007***	0.006***
	(0.011)	(0.001)	(0.001)
Own	0.050***	0.015***	0.022***
	(0.010)	(0.002)	(0.001)
Soe	0.003	-0.003***	-0.003***
	(0.003)	(0.000)	(0.000)
Roa	0.717***	-0.042**	0.023***
	(0.150)	(0.019)	(0.006)
Industry	yes	yes	yes
Year	yes	yes	yes
N	14528	14528	15335
r2	0.114	-0.865	0.197
F	10.27	77.68	172.71

Standard errors in parentheses.* p < 0.1, ** p < 0.05, *** p < 0.01

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First, internal control is divided into two groups based on the median internal control score: firms with internal control quality above the median are assigned a value of 1, while those with internal control quality below the median receive a value of 0. Next, we selected the following feature variables: firm size (Size), asset structure (Lev), fixed asset ratio (Fixed), book-to-market ratio (Bm), ownership structure (Soe), ownership concentration (Own), and return on assets (Roa). A 1:2 propensity score matching (PSM) was performed using the nearest neighbor matching method. The matched results were then incorporated into the regression model. Table 6, column (3) reports the regression results for the PSM-matched sample, which align with the prior hypothesis testing outcomes. Therefore, after accounting for potential endogeneity issues, the original research conclusions remain robust.

5. Further Analysis

5.1. Impact Mechanism Test

The theoretical analysis section of this paper proposes that internal control influences organizational resilience through three pathways: alleviating financing constraints, enhancing management efficiency, and increasing innovation output. Therefore, Model (2) is constructed to examine these mechanisms.

$$FC_{i,t}/IO_{i,t}/ME_{i,t}=\alpha_0+\alpha_1 IC_{i,t}+\alpha_2 \sum Controls_{i,t}+\sum Year+\sum Industry+\varepsilon_{i,t} \quad (2)$$

These respectively represent financing constraints, innovation output, and management efficiency. Controls denotes the consistent control variables from the preceding analysis, Year is the annual dummy variable, and Industry is the industry dummy variable, which consistently controls for year and industry fixed effects as before. εi,t represents the random disturbance term.

Table 7. Results of Mechanism Test

	(1)	(2)	(3)
	FC	IO	ME
IC	-0.083***	0.330***	0.096***
	(0.012)	(0.083)	(0.872)
Control	yes	yes	yes
Industry	yes	yes	yes
Year	yes	yes	yes
N	18304	18304	18304
r2	0.074	0.063	0.108

Standard errors in parentheses， * p < 0.1, ** p < 0.05, *** p < 0.01

The regression results are presented in Table 7. Column (1) shows that internal controls (IC) help alleviate financing constraints (FC), with a coefficient of -0.083, significant at the 1% level. Column (2) indicates that internal controls (IC) contribute to increased innovation output (IO), with a coefficient of 0.330, also significant at the 1% level. Column (3) shows that internal control (IC) contributes to enhancing management efficiency (ME), with a coefficient of 0.096, significant at the 1% level. This further validates that internal control enhances organizational resilience through three pathways: alleviating financing constraints, improving management efficiency, and increasing innovation output. Hypothesis H2 is thus supported.

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5.2. Heterogeneity Test

5.2.1. Heterogeneity in Digitalization

Digital transformation serves as the core pathway for enterprises to reshape their operational models and gain critical competitive advantages. This process is dedicated to leveraging digital technologies to break conventional practices and eliminate internal information barriers through efficient data processing and knowledge integration, thereby laying a solid foundation for establishing a new paradigm of data-driven decision-making. To analyze the impact of digital transformation levels on internal control and organizational resilience, this study categorizes companies into High Digitalization and Low Digitalization groups for comparative analysis. The degree of digital transformation (Dig) is measured by the total word frequency related to corporate digital transformation in the annual reports of publicly listed enterprises. The methodology proceeds as follows: First, key terms for corporate digital transformation are identified through existing academic literature, key policy documents, and research reports to form a feature word library. These key terms are categorized into two broad groups: "underlying technology application" and "technology implementation practice." Underlying technologies are further subdivided into four types: artificial intelligence, blockchain, cloud computing, and big data. Python web scraping tools are then employed to extract text from the annual reports of Shanghai and Shenzhen A-share listed companies. Finally, digital transformation keywords are searched within the annual report texts, and their summation yields the digital transformation metric (Dig). The digital transformation data for enterprises in this study is sourced from the CSMAR database. Table 8 displays the regression results. As indicated in columns (1) and (2), internal control (IC) demonstrates a more pronounced effect in the high digital transformation group (1) compared to the low digital transformation group (2), with coefficients of 0.004 and 0.001, respectively. This indicates that the positive impact of internal control on organizational resilience is more effective in companies with a high degree of digital transformation. Digital platforms automate and enhance internal control processes that occur in real-time. This makes it much easier and more accurate to find, assess, and respond to risks [10]. Digital technology enhances the effectiveness of internal controls. Digital transformation eliminates data silos, making it easier to utilize risk information from internal controls in strategic decision-making and operational management systems. This accelerates the transition from risk mitigation to building organizational resilience [11].

Table 8. Results of Heterogeneity Test

	(1)	(2)	(3)	(4)	(5)	(6)
	High Digitalization	Low Digitalization	East	Non East	Large Firm	Small Firm
IC	0.004***	0.001	0.003***	0.001	0.003***	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Control	yes	yes	yes	yes	yes	yes
Industry	yes	yes	yes	yes	yes	yes
Year	yes	yes	yes	yes	yes	yes
N	8371	9898	12738	5523	9133	9128
F	111	94	150	66	171	89
r2	0.097	0.072	0.087	0.088	0.132	0.073

Standard errors in parentheses,* p < 0.1, ** p < 0.05, *** p < 0.01

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5.2.2. Heterogeneity in Regions

Economic growth and local institutions can change how internal controls work. Firms in China's eastern regions usually have better management and easier access to resources. They have stronger infrastructure and more developed market systems. They have stronger infrastructure and more developed market systems. Regions outside the East face problems such as weaker markets, fewer financial resources, and less developed institutions. These differences may cause large gaps in how well internal controls work.This study divides the sample into two groups: Eastern Regions (East) and Non-Eastern Regions (Non East), using provincial data from the CSMAR database. The analysis looks at whether internal controls affect resilience differently across regions. The regression results are in Table 8. Columns (3) and (4) show that internal control (IC) has a stronger effect in the eastern region (3) than in the non-eastern region (4). The coefficients are 0.003 and 0.001.Eastern regions have higher market development and stronger enforcement of internal controls, which makes risk control more effective and reduces information gaps. They also have more financial resources and skilled workers, which helps firms turn risk information from internal controls into strategic actions faster. More developed governance systems in eastern regions also help firms integrate internal controls more smoothly into daily operations, which makes resilience stronger.

5.2.3. Heterogeneity in Firm Size

Firm size usually shows how many resources, employees, and assets a firm has. Research shows smaller firms often have lower resilience to risks in unexpected events because they have fewer resources and less capital. Large firms have more resources and stronger competitive advantages [54]. To see if internal control works differently for firms of different sizes, the sample was split into large firms and small firms. Firm size was measured by the natural log of total annual assets. Table 8 shows the regression results. Columns (5) and (6) show that internal control (IC) affects large firms (5) more than small firms (6), with coefficients of 0.003 and -0.001. This means internal control improves organizational resilience more in large manufacturing firms. Large firms have more technology, employees, and capital. They can quickly use these resources during crises to handle problems like funding gaps and supply chain disruptions. This helps internal controls work better [55]. Bigger firms also usually have wider social networks and stronger reputations [56], which helps them get stakeholder trust and financing. This also helps internal controls work well and improves organizational resilience.

6. Discussion

6.1. Conclusion

This study uses data from manufacturing companies listed on the Shanghai and Shenzhen A-share markets from 2011 to 2023 to examine how internal controls affect organizational resilience. Internal controls boost organizational resilience. Based on dynamic capability theory, internal controls help firms handle shocks and recover in VUCA environments by improving risk detection, resource allocation, and decision-making. Strong internal controls enable companies to recover faster from crises, reduce information gaps, and secure financial support for crisis reserves. This supports the basic foundation of organizational resilience. These results are similar to Wang et al., who looked at internal controls and resilience during crises. This study looks at the relationship in normal business conditions in China's manufacturing sector. Second, internal controls improve organizational resilience through three main paths: alleviating financial constraints, improving management efficiency, and increasing innovation output. Internal controls make it easier for enterprise to get financing by improving information transparency and lowering agency costs. They help use resources better by standardizing processes and keeping data accurate, which increases management efficiency.Internal controls

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also support innovation by managing risks and using resources well. These three ways show that internal controls not only directly improve resilience but also help enterprise adapt in finance, operations, and innovation. Third, firm differences show that internal controls work better when enterprise have high digital transformation, are in eastern regions, or are large. These enterprise have better digital tools, stronger market systems, and more extra resources, which make internal controls more effective at improving organizational resilience.

6.2. Management Implications

Based on the aforementioned research findings, we derive the following management insights. First, in the VUCA era, environmental uncertainty has become the norm, and organizational resilience has emerged as an indispensable capability for enterprises. Companies should heighten awareness of enhancing organizational resilience, establish systematic resilience thinking, and improve their risk-bearing capacity. Second, emphasize the critical role of internal controls, enhance their quality, and bolster organizational resilience. Enterprises should increase financial, human, and technological investments in internal controls, refine control systems, and promptly adjust operational processes and staffing in response to dynamic environments. This will further strengthen the effectiveness of internal controls and improve corporate risk management systems. Third, optimize resource allocation to leverage synergies across multiple pathways. Reduce information asymmetry through internal controls to broaden financing channels, standardize management operations to eliminate redundant costs and enhance management efficiency, and simultaneously incentivize corporate R&D investment, thereby transforming risk management into opportunities for innovation.

6.3. Research Limitations and Prospects

The limitations of this study are as follows: First, due to data availability constraints, this research only analyzed the impact of internal controls on organizational resilience within manufacturing enterprises. The applicability of these conclusions to enterprises in other industries remains to be verified. Future studies should be conducted across a broader range to enhance the generalizability of the findings. Second, while this study examined the influence of internal controls on organizational resilience through the mechanisms of financing constraints, management efficiency, and innovation output, organizational resilience is driven by multiple internal and external factors. Future research should explore these factors from multiple perspectives, such as organizational learning and corporate reputation, to further clarify the influence mechanisms and boundary conditions of organizational resilience. Third, This study identified the digital transformation of enterprises, firm size, and regional heterogeneity. Future research could explore additional sources of heterogeneity, such as firm life cycle stages or different leadership styles.

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