# Examining the Mediating effect of Risk Control Capability of Supply Chain Management on the Resilience of Public Hospitals in China

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## ABSTRACT

In the era of volatility, uncertainty, complexity, and ambiguity (VUCA) the frequency of public emergencies is rising. The COVID-19 pandemic has resulted in shortages of medical resources and disruptions in medical services, highlighting the importance of supply chain management for hospital resilience. This study conducted an online survey of 197 respondents from Chinese public hospitals to investigate the critical effect of supply chain management on the resilience of public hospitals. The analysis results of SEM-PLS indicated that leadership and digital technology capabilities in supply chain management significantly impacted the resilience of public hospitals. In addition, the risk control capability of supply chain management significantly mediated the relationship between leadership, digital technology capabilities, and resilience. The finding of this study provides support for supply chain management and decision-making in public hospitals in China and enriches the literature on supply chain management and resilience.

**Keywords:** Public hospital, Supply chain management, Dynamic capability, Resilience, Risk control capability

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## INTRODUCTION

Public hospitals serve as the pillar of the national public healthcare system, providing essential medical and emergency services (Wen, 2021). China, the largest developing country in the world and the second most populous nation has experienced a gradual acceleration in its aging population in recent years (NHC, 2022). Evolving social structures and disease patterns challenge national healthcare systems in China. In the era of volatility, uncertainty, complexity, and ambiguity (VUCA), the frequency of unexpected events has increased significantly (Jermsittiparsert, 2022). During the COVID-19 pandemic, widespread quarantine policies have severely impacted supply chains, leading to widespread inventory shortages across industries. The demand for medical resources such as ventilators, drugs, and masks has increased sharply in public medicine. Disruption of public health services caused by resource shortages seriously threatens patient safety (Leite et al., 2020). As the pillar of the medical system, China's public hospitals play a vital role in building the medical supply chain and preventing disruptions to public medical care (Xu & Liu, 2024). However, during the COVID-19 pandemic, more than 50% of public hospitals were deep in the deficit (NHC, 2024), which highlights the importance of public hospital resilience.

The Dynamic Capability Theory (DCT) refers to the ability of an organization to respond to emergencies and disruptive risks by integrating, building, and reconfiguring resources, which is considered a mechanism for cultivating hospital resilience (Teece et al., 1997). Previous studies mainly relied on the Resource Dependence Theory (RDT) and the Principal-agent Theory (PAT). Tipu et al. (2023) designed a framework based on the Principal-agent Theory to evaluate the performance of public-private partnership projects in a static environment. Qin and Chen (2022) studied the deployment of organizational strategies to ensure resource security based on resource dependence theory. However, previous research based on the Principal-agent Theory and the Resource Dependence Theory mainly focused on the impact of having resource advantages on organizational performance. It did not take account of management capabilities as a critical variable. Gerami et al. (2023) adopted data envelopment analysis (DEA) to evaluate the key factors affecting supply chain resilience. Silverman (2023) utilized a mixed method to prove that incorporating risk management strategies can improve supply chain resilience. Islam & Habib (2024) applied

SEM-PLS analysis to show that technology-driven and integrated strategies can strengthen supply chains. Although the existing supply chain literature has examined several factors that affect organizational resilience, it mainly focussedon private enterprises, such as construction and manufacturing (Ekanayake et al., 2021). In addition, literature on public health systems in developing countries remains limited. Given the critical role and challenges faced by Chinese public hospitals in providing essential medical services and emergency support, there is an urgent requirement to establish a resilience assessment framework for public hospitals, especially in terms of strategy formulation capabilities (Goldstein et al., 2002; Hasan et al., 2021), leadership capabilities (Kim et al., 2023; Southwick et al., 2017), digital technology capabilities (Furstenau et al., 2022; Garcia-Perez et al., 2023), and risk control capabilities (Brusset & Teller, 2017).

Based on the theoretical, methodological, and knowledge gaps mentioned above, the existing literature has not effectively addressed this issue. Therefore, based on the Dynamic Capability Theory, this study adopted the SEM-PLS method to address the above research gaps, aiming to identify the critical capabilities of supply chain management (strategy formulation capability, leadership capability, and digital technology capability) that affected the resilience of public hospitals, as well as the mediating effect of risk control capability on this relationship.

By adopting the Dynamic Capability Theory, this study bridges the theoretical gap between public hospital supply chain management and hospital resilience. It helps to extend dynamic capabilities and resilience to public hospitals in developing countries, provides a practical framework for maintaining healthcare resilience in resource-constrained environments, and lays the foundation for building sustainable healthcare systems.

This paper is structured as follows: Section one is an introduction. Section two conducts a literature review on hospital resilience, dynamic capabilities, and supply chain management. Section three elaborates on the research framework and proposes the research hypotheses. Section four discusses the methodology, including sampling, data collection, and analysis methods. Section five presents the data analysis and findings. Section six outlines the managerial and practical implications and limitations of this study. Finally, this study ends with a conclusion.

# LITERATURE REVIEW

## Dynamic Capability Theory

The survival and development of an organization depends on resources. However, in the VUCA era, merely possessing resources is inadequate for organizations to cope with unpredictable risks (Liadiono et al., 2022). According to the Dynamic Capability Theory (DCT), organizations can respond to unexpected events and disruptive threats by integrating, creating, and reconfiguring resources to adapt to the changing environment (Teece et al.,2009). The Dynamic Capability Theory helps organizations develop dynamic management capabilities to improve their robustness, adaptability, and flexibility in the face of resource shortages and service disruptions (Wang et al., 2023).

## Hospital Resilience

Resilience refers to an organization's ability to resist, adapt, and recover from unforeseen adverse events, such as catastrophic events such as the Covid-19 pandemic (Anderson et al., 2019). In the public healthcare sector, the shortages and disruptions caused by the COVID-19 pandemic challenged the ability of public hospitals to provide sustainable services under threat. Resilient public hospitals can maintain essential services while absorbing and responding to adversity, achieving quick recovery and development. Improving and expanding the supply capability of public hospitals is essential to preventing and alleviating resource shortages (drugs, medical equipment, etc.) in the health system and maintaining the sustainability of public health services (Gaudenzi et al., 2023).

## Supply Chain in Healthcare

The supply chain is a strategic management system, which refers to the network and process in which organizations collaborate with external departments to transform resources into products and services. Healthcare supply chain emergency management significantly impacts organization operations due to its complex processes and stakeholder networks. On the one hand, the COVID-19 pandemic has driven a surge in demand for medical resources (such as masks, gloves, ventilators, backup personnel, and isolation wards). On the other hand, staff shortages and other resource constraints related to COVID-19 have affected the sustainability of public health service supply (Dubey et al., 2022). During COVID-19, the public health sector in England effectively alleviated resource shortages and ensured the sustainability of health services through an active supply chain collaboration strategy (Horton et al., 2022; Ivanov & Dolgui, 2019). This supports the idea that supply chain collaboration strategies can help mitigate or prevent sudden disruption risks during the COVID-19 pandemic and help organizations rapidly recover from public health emergencies.

## HYPOTHESES DEVELOPMENT

### Dynamic Capability and Risk Control Capability

Supply chain strategy includes external and internal integration strategies, emphasizing utilizing private partners' resources and technological advantages to help organizations resist, adapt, and recover from crises. Adequate strategy formulation capabilities support and prevent and mitigate future uncertain disruptions by flexibly allocating resources by establishing flexible inventory (redundancy) and alternative logistics networks (backup). In supply chain strategic management, medical institutions need excellent management to cope with the growing medical needs and disruption risks. In addition, when management strengthens internal integration through knowledge and technology sharing, it will contribute to responding to public health emergencies.

At the same time, digital medical technology has changed the traditional way of providing medical services. Digital medical technology, like the Internet of Things (IoT), enables real-time analysis and demand tracking to help manage inventory and monitor the supply chain. The application of artificial intelligence (AI) technology in medical supply chain management can filter and identify information that helps with risk identification and assessment (Dubey et al., 2022b). Digital medical technology improves the supply chain's ability to respond to emergencies and enhances the flexibility of hospitals. Therefore, the following hypothesis is developed:

**H1**: The strategy formulation capability of supply chain management positively and significantly affects risk control capability.

**H2**: The leadership in supply chain management positively and significantly affects risk control capability.

**H3**: The digital technology capability of the supply chain management positively and significantly affects public risk control capability.

## Risk Control Capability and Hospital Resilience

Compared with investing in redundant construction, risk control has become a best practice for improving the emergency management capabilities of organizations under budget constraints. It can support organizations in identifying and examining all potential risks, thereby helping to formulate targeted policies to reduce unforeseen and sudden shortages and disruptions (Shi et al., 2023). Supply chain strategy emphasizes using private partners' resources and technologies to help resist, adapt, and recover from crises. Incorporating risk management concepts into supply chain strategy can help improve cooperation between public hospitals and private suppliers to cope with future uncertainties (Um & Han, 2021). Therefore, the following hypothesis was proposed:

**H4**: Risk control capability has a positive and significant effect on the relationship between the dynamic capability of supply chain management and hospital Resilience.

## Dynamic Capability and Hospital Resilience

Integration strategies require public hospitals to leverage the resources and technologies of private partners to help resist, adapt, and recover from crises through internal and external integration, which is believed to improve the resilience of public hospitals. The complexity of cross-departmental collaboration in supply chain management requires leaders with excellent communication skills and influence to resolve conflicts and promote internal integration (Phung et al., 2023). At the same time, the inherent complexity of the supply chain requires management to mobilize and allocate resources to overcome the shocks caused by public emergencies (Balasubramanian & Fernandes, 2022). Digital technology has reshaped the traditional operating model of healthcare organizations, which can overcome time and geographical limitations to improve supply chain visibility and departmental collaboration. The Internet of Things provides real-time data on the source, location, and ownership of supply chain assets. Big data and blockchain technology enhance the security of management decision-making and data storage. The above emergency management capabilities will enhance hospital management's robustness, adaptability, and flexibility. Based on the above analysis, the following three hypotheses were proposed:

**H5**: Strategy formulation capability of supply chain management has a positive and significant effect on the hospital's Resilience.

**H6**: Leadership in supply chain management has a positive and significant relationship with hospital resilience.

**H7**: The capability of digital technology in supply chain management has a positive and significant effect on public hospital resilience.

### The Mediating Role of Risk Control Capability Between Dynamic Capability and Hospital Resilience

According to Eisenhardt and Martin (2000), organizational development follows a predictable linear path, especially when operating in a stable industry with clear operating boundaries. However, the organizational development path in management practice is nonlinear and unpredictable. The Dynamic Capability Theory emphasizes the ability of organizations to prevent, respond to, and recover from disruptions. During the COVID-19 pandemic, the external environment characterized by volatility, uncertainty, complexity, and ambiguity highlighted the unpredictability of the operating environment and emphasized that risk control capabilities were a mediating variable (Brusset & Teller, 2017). Therefore, the following hypothesis was proposed:

**H8**: There is a significant mediating effect of risk control capability on the relationship between strategy formulation capability and hospital resilience

**H9**: There is a significant mediating effect of risk control capability on the relationship between leadership capability and hospital resilience

**H10**: There is a significant mediating effect of risk control capability on the relationship between digital technology capability and hospital resilience

In the context of public hospital supply chain emergency management, this study combined the Dynamic Capability Theory with the concept of resilience to explore the mechanisms and processes by which supply chain management affects the resilience of public hospitals, emphasizing the critical role of dynamic management capabilities in improving hospital resilience (Ye et al., 2024). As shown in Figure 1, this study developed a research model based on the hypothesis between the variables.

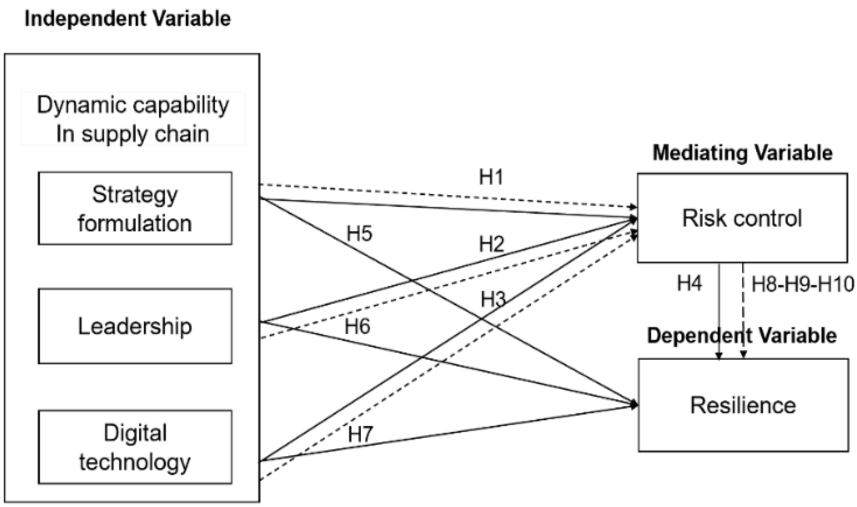


**Figure 1: The Dynamic Capability of Supply Chain Effect on Hospital Resilience**

## METHODOLOGY

China is the largest developing country in the world. The changing social structure and disease patterns challenge its healthcare system. In public health emergencies, public hospitals, as the pillar of China's medical system, play a vital role in building medical supply chains and preventing public health interruptions (Xu & Liu, 2024). Because Chinese public hospitals (including tertiary hospitals, secondary hospitals, and primary community hospitals) experienced shortages of medical resources and service disruptions during the COVID-19 pandemic, they overcame the impact of supply chain disruptions and eventually recovered from the crisis. This study utilized purposive sampling to investigate managers and staff of public hospitals in China as respondents. (Nikolopoulos, 2023).

Based on previous literature, this study adopted the theoretical structure and measurement items to develop a seven-point Likert scale as a structured questionnaire (1 = strongly disagree, 7 = strongly agree) (Dijkstra & Henseler, 2015). The questionnaire consisted of three parts (Part A, B, and C). Part A collected demographic information such as gender, age, position, and years of work experience (Cheah et al., 2023). Section B focused on the organizational details of public hospitals, including level, number of employees, and location. Meanwhile, Section C included four dimensions of dynamic capabilities of supply chain management in public hospitals. These dimensions included strategy formulation capabilities (Hutsaliuk et al., 2020; Robinson, 2023; Yoshikuni et al., 2023), leadership (Kim et al., 2023; Southwick et al., 2017), digital technology capabilities (Furstenau et al., 2022; Garcia-Perez et al., 2023), risk control capabilities (Barhmi, 2023; Brusset & Teller, 2017), and hospital resilience.

G*Power is an analytical instrument for calculating statistical power, which was utilized to confirm the sample size in this study (Faul et al., 2007). Based on the criteria of effect size $F^2 = 0.15$, power (1-B error) = 0.95, and number of predictors = 5, the minimum sample size for this study should be 138. The data were collected through an online questionnaire (WJX.CN) at the China Public Hospital Management Conference held from June to September 2024. Among the 319 public hospital management and staff, 197 (47%) responded to this survey. The sample size calculated by G*power exceeded the minimum requirement, improving the statistical power and reliability of the SEM analysis results. Then, the demographic information was analyzed by SPSSAU (Liang et al., 2023), and the data were analyzed using Smart PLS 4.1 (Guenther et al., 2023).

## FINDING AND DISCUSSION

As shown in Table 1, 42.13% of the respondents were male, and 57.87% were female. 44.67% of the respondents were between 30 and 40 years old, and 36.70% were over 40. 59.90% of the respondents held management positions, and 78.17% worked in public hospitals at the secondary level and above. In addition, 52.28% had a bachelor's degree, 21.83% had a master's degree, and 13.71% had a PhD degree. Most respondents (52.79%) had worked for ten years or more. Therefore, most of the respondents in this study had professional experience, education level, and cognitive ability related to the field of this study.

**Table 1: The Frequency Analysis of Demographic Information**

| Items | Categories | N | Percent (%) | Cumulative Percent (%) |
|---|---|---|---|---|
| Gender | Male | 83 | 42.13 | 42.13 |
| | Female | 114 | 57.87 | 100.00 |
| Age | Above 50 | 40 | 20.30 | 20.30 |
| | 41 - 50 | 52 | 26.40 | 46.70 |
| | 30-40 | 88 | 44.67 | 91.37 |
| | Less 30 | 17 | 8.63 | 100.00 |
| Education | PhD | 27 | 13.71 | 13.71 |
| | Master | 43 | 21.83 | 35.53 |
| | Bachelor | 103 | 52.28 | 87.82 |
| | College | 24 | 12.18 | 100.00 |
| Years | Above 20 | 37 | 18.78 | 18.78 |
| | 10-20 | 67 | 34.01 | 52.79 |
| | 1-10 | 82 | 41.62 | 94.42 |
| | Less than1 | 11 | 5.58 | 100.00 |
| Position | Dean | 18 | 9.14 | 9.14 |
| | Director | 100 | 50.76 | 59.90 |
| | Staff | 79 | 40.10 | 100.00 |
| Level | The tertiary | 71 | 36.04 | 36.04 |
| | The secondary | 83 | 42.13 | 78.17 |
| | The third | 43 | 21.83 | 100.00 |
| Total | | 197 | 100.00 | 100.00 |

Next, Kaiser-Meyer-Olkin (KMO) and Bartlett's Sphericity Test were conducted in this study. As shown in Table 2, the KMO value and Bartlett's Sphericity Test exceeded the standard. The KMO was 0.865, which was greater than 0.8, and the Sig value was significantly less than 0.05. The test outcome indicated that the research model was sufficient to extract relevant information and that the variables showed sufficient correlation (Kaiser, 1960).

**Table 2: KMO and Bartlett's Test Analysis in EFA**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .865 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 2136.870 |
| | df | 190 |
| | Sig. | <.001 |

## Measurement Model Assessment (Inner Model)

The confirmatory factor analysis (CFA) was conducted by Smart-Pls to validate the EFA results. We examined the reliability, validity, and model fit of the measurements. Hair et al. (2019) recommend SEM-PLS with outer loadings above 0.708 and Cronbach's α above 0.70. As shown in Figure 2, the factor loadings for RC15ST and HR10ADP were less than the acceptable level of 0.708. However, the average variance extracted (AVE) ranged from 0.587 to 0.758, all above the minimum requirement of 0.5 (Chin, 2010; Fornell & Larcker, 1981). As a result, the items in question were included in the study. Additionally, as shown in Table 3 the overall reliability (CR) values were higher than 0.7, which meant that the model had a good level of internal consistency (CR>0.776), which supported its convergent validity (Hair et al., 2019). All VIF values were less than 3.3, demonstrating that the model had no multicollinearity.

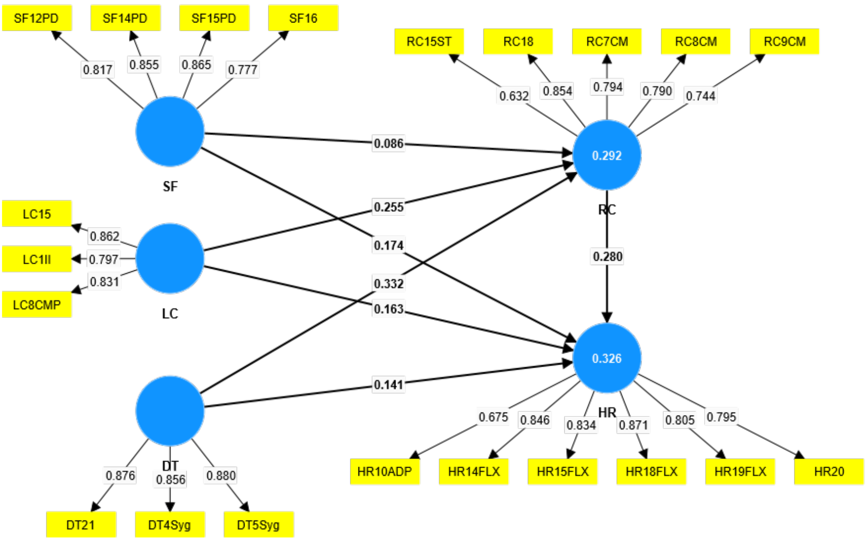


**Figure 2: The Measurement Model of Hospital Resilience**

**Table 3: The Reliability Test for the Measurement Model**

| | Factor Loading | Cronbach's Alpha | Composite reliability | AVE | VIF |
|---|---|---|---|---|---|
| DT | 0.871 | 0.844 | 0.880 | 0.758 | 2.211 |
| HR | 0.804 | 0.891 | 0.899 | 0.651 | 2.331 |
| LC | 0.830 | 0.775 | 0.776 | 0.689 | 1.790 |
| RC | 0.763 | 0.828 | 0.847 | 0.587 | 2.271 |
| SF | 0.829 | 0.849 | 0.856 | 0.688 | 2.103 |

Table 4 provides the Heterotrait-Monotrait (HTMT) ratio analysis for the measurement model, which assesses discriminant validity among the constructs (Heseler et al., 2015). As shown in Table 4, all of the HTMT values for the constructs were well below the threshold of 0.85. This meant that the constructs were sufficiently different (Gold et al., 2001). Specifically, the HTMT values ranged from 0.365 to 0.539, supporting the discriminant validity of the model's constructs.

**Table 4: HTMT Analysis for the Measurement Model**

| | DT | HR | LC | RC |
|---|---|---|---|---|
| DT | | | | |
| HR | 0.451 | | | |
| LC | 0.467 | 0.496 | | |
| RC | 0.510 | 0.511 | 0.466 | |
| SF | 0.469 | 0.451 | 0.539 | 0.365 |

## PLS Structural Model Assessment (Outer Model)

In PLS-SEM, $R^2$ was utilized to measure the degree to which a model fits the data. The $R^2$ value ranged from 0 to 1 (Chin, 2010). However, in the study of management behavior, the $R^2$ values were generally below 50%. This phenomenon is attributed to human behavior's inherent complexity and variability, which often involve numerous unobservable factors and influences that are difficult to quantify. As shown in Table 5, R-squared Values indicated that approximately 32.6% of the variability in the dependent variable can be explained by the independent variables in the model. The positive $Q^2$ values of 0.239 and 0.261 implied that the models had moderate prediction (Fornell & Cha, 1994). The value of F2 measures if an independent variable substantially impacts a dependent variable. The values of 0.020, 0.150, and 0.350 indicate the predictor variable's low, medium, or large effect in the structural model (Cohen, 1988). Based on Table 6, the value of F2 between 0.008 and 0.121 indicated a lower effect size.

**Table 5: The Structure Model Analysis**

| | R-square | $Q^2$predict | F-square |
|---|---|---|---|
| HR | 0.326 | 0.239 | |
| RC | 0.292 | 0.261 | |
| SF -> RC | | | 0.008 |
| LC -> RC | | | 0.068 |
| DT -> RC | | | 0.121 |
| SF -> HR | | | 0.033 |
| LC -> HR | | | 0.028 |
| DT -> HR | | | 0.021 |
| RC -> HR | | | 0.083 |

## The Path Coefficient

As shown in Table 6.0, The test results of H1 indicated that the relationship between strategy formulation and risk control capability in supply chain management was statistically insignificant (β=0.086, T-Statistic=1.060, P=0.289). This finding did not support previous research (Hutsaliuk et al., 2020). In the context of hospital resilience, this finding implied that the strategy formulation capability of hospital supply chain cooperation did not play an adequate role in risk control, and hospital supply chain risk control may rely more on other factors such as leadership and digital technology capabilities.

**Table 6: Path Coefficient of Inner Model**

| Hypothesis | Coefficient | β | Mean | SD | T | P | Result |
|---|---|---|---|---|---|---|---|
| H1 | SF -> RC | 0.086 | 0.089 | 0.081 | **1.060** | **0.289** | Reject |
| H2 | LC -> RC | 0.255 | 0.256 | 0.071 | 3.592 | 0.000 | Support |
| H3 | DT -> RC | 0.332 | 0.333 | 0.071 | 4.685 | 0.000 | Support |
| H4 | RC -> HR | 0.280 | 0.281 | 0.073 | 3.862 | 0.000 | Support |
| H5 | SF -> HR | 0.174 | 0.176 | 0.080 | 2.177 | 0.030 | Support |
| H6 | LC -> HR | 0.163 | 0.164 | 0.083 | 1.973 | 0.049 | Support |
| H7 | DT -> HR | 0.141 | 0.140 | 0.071 | 1.992 | 0.046 | Support |

The test results of H2 indicated that leadership in supply chain management had positive and significant effect on the risk control capability in public hospitals (β = 0.255, T-statistic = 3.592, P-value = 0.000). The finding that leadership is critical to navigating complex and uncertain environments is consistent with previous research (Hutsaliuk et al., 2020). In healthcare operations, management with extensive expertise and experience helps public hospitals improve robustness and adaptability during crises by integrating the supply chain.

The test results of H3 indicated a positive and significant effect on the relationship between digital technology capability and risk control capability in the supply chain management of public hospitals (β = 0.332, T-statistic = 4.685, P-value = 0.000). This finding is consistent with previous research (Ivanov & Dolgui, 2019). With the development of digital healthcare, hospitals are increasingly relying on advanced technologies such as big data and the Internet of Things. Applying this to hospital supply chain management can more effectively mitigate the risk of operational disruptions.

The results of H4 proved that risk control capability of supply chain management in public hospitals had significantly positive effects on hospital resilience ($\beta = 0.280$, $t = 3.862$, $P = 0.000$). This finding emphasized the critical role of effective risk management practices in improving hospital resilience, consistent with previous research (Brusset & Teller, 2017). This positive relationship suggested that public hospitals will be more resilient and recover quickly from disruptions by implementing strong risk control measures in their supply chains.

The test result of H5 supported the positive and significant effect on the relationship between supply chain strategy formulation capability and hospital resilience ($\beta=0.174$, $T=2.177$, $P=0.030$). This finding is consistent with previous literature (Hasan et al., 2021), which revealed that strategy formulation capability is essential in supply chain collaboration. Public hospitals can improve robustness, adaptability, and flexibility by adopting more comprehensive supply chain collaboration strategies, such as promoting external supply chain integration, policy development, and optimized processes.

The test results of H6 indicated a positive and significant relationship between supply chain leadership and hospital resilience ($\beta = 0.163$, $T = 1.973$, $P = 0.049$). This finding is consistent with previous studies (Kim et al., 2023; Southwick et al., 2017). Managers with extensive expertise and experience can improve hospital resource robustness, adaptability, and sustainability through internal integration and supply chain accountability.

The test results of H7 indicated that digital technology capabilities in supply chain management significantly and positively impacted hospital resilience ($\beta = 0.141$, $T = 1.992$, $P = 0.046$). This result is consistent with previous studies (Meng et al., 2022), which emphasized that by utilizing digital technology such as the Internet of Things and Big Data in the supply chain, compatibility, synergy, and innovation can be improved, thereby enhancing the robustness, sustainability of resource and service provision in public hospitals.

**Table 7: The Mediating Effect of the Structure Model**

| Hypothesis | β | Mean | SD | T-statistics | P values | VAR | Outcome |
|---|---|---|---|---|---|---|---|
| H7: SF -> RC -> HR | 0.024 | 0.024 | 0.023 | **1.025** | **0.306** | **0.121** | Reject |
| H8:LC -> RC -> HR | 0.071 | 0.072 | 0.029 | 2.451 | 0.014 | 0.303 | Support |
| H9: DT -> RC -> HR | 0.093 | 0.093 | 0.031 | 2.995 | 0.003 | 0.397 | Support |
| H4: SF -> HR | 0.198 | 0.200 | 0.078 | 2.535 | 0.011 | | |
| H5:LC -> HR | 0.234 | 0.237 | 0.083 | 2.839 | 0.005 | | |
| H5: DT -> HR | 0.234 | 0.233 | 0.067 | 3.495 | 0.000 | | |

Table 7 presents the mediation analysis results, indicating that the direct effect of strategic planning capability on hospital resilience had a coefficient of 0.198. When risk control capability is introduced as a mediating variable, the effect on the direct relationship decreases to 0.024. The variance accounted for (VAF) value, derived from the indirect effect coefficient relative to the total effect, is 0.121, suggesting that the mediation effect of risk control accounts for only 12.1% of the effect, which falls below the 20% threshold. This implies that the mediation effect is negligible. Thereby these findings contradict with previous research and did not support H8. (Xie et al., 2022).

The role of risk control capability as a mediating variable between leadership and hospital resilience was 30.30%, which ranged from 20% to 80%. Thus, it was interpreted as a partial mediator variable. Hence, H9 was supported. This finding is consistent with previous studies (Kim et al., 2023; Southwick et al., 2017; Xu & Liu, 2023). Lastly, the role of risk control capability as a mediator between digital technology capability and hospital resilience was 39.70%, which indicated that risk control partially mediated the relationship between digital technology and hospital resilience (Hair et al., 2019). The H10 was supported. This result is consistent with previous studies (Meng et al., 2022), which emphasized that the utilization of digital technology, such as the Internet of Things and big data in the supply chain can improve and prevent unforeseen risk and emergency decision-making, which can further strengthen the hospital's resilience.

## CONCLUSIONS

This study utilized the SEM-PLS to examine how the dynamic capabilities of public hospital supply chain management affect resilience in China. The results showed that leadership in supply chain collaboration positively impacted hospital resilience, with the impact of digital technology capability building being more significant. However, strategizing ability had no significant affect on the resilience of public hospital. Furthermore, risk control positively mediated the relationship between leadership, digital technology capability, and hospital resilience.

This study makes the following contributions: Firstly, the Dynamic Capability Theory bridges the theoretical gap between the dynamic capability of supply chain management and resilience in public hospitals, which provides valuable insights into the critical effect mechanisms of hospital resilience. In addition, this study extended the concepts of dynamic capabilities and resilience to the public healthcare sector in developing countries, which contribute to the healthcare resilience research of public hospitals in academia and practice.

However, due to time and space constraints, this study still had the following inherent limitations: First, this study adopted a cross-section approach to investigate the perspectives of public hospital managers and staff at a given time in this area, lacking observation of the development of resilience critical effect factors over the time. Secondly, the value of $R^2$ in this study was 0.326 and was accepted as it was below 50% in studies of managerial behavior. However, this reflected that some unobservable factors in this field needed further exploration. Thirdly, as an organizational-level study, this study only focussed on the perspectives of internal managers and employees in public hospitals.

The finding of this study supports management and decision-making in public hospitals. Based on the research result, public hospitals should select experienced and visionary managers, whose internal integration, strategic formulation, and crisis management abilities can help ensure the continuous operation of the medical supply chain in emergencies. Besides, policymakers should promote the integration of advanced digital technologies such as artificial intelligence, big data analytics, and blockchain to facilitate real-time monitoring, predictive demand planning, and better coordination of supplier resources. In addition, hospitals are encouraged to establish risk assessment frameworks, such as supplier diversification and risk management agreements, to prevent unexpected resource shortages.

In the future, research on healthcare supply chain management and resilience should incorporate time series analysis to explore the evolving dynamic capabilities of supply chain management over time. Additionally, this research will include a broader range of stakeholders, such as regulatory bodies, external suppliers, and patients, to further enrich the knowledge on dynamic capabilities and resilience in hospital supply chains.

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