

Li, Jin; Cho, Hyuksoo

Article

How enterprise resilience drives international collaboration under institutional barriers: Evidence from Chinese pharmaceutical export enterprises

East Asian Economic Review (EAER)

Provided in Cooperation with:

Korea Institute for International Economic Policy (KIEP), Sejong-si

Suggested Citation: Li, Jin; Cho, Hyuksoo (2025) : How enterprise resilience drives international collaboration under institutional barriers: Evidence from Chinese pharmaceutical export enterprises, East Asian Economic Review (EAER), ISSN 2508-1667, Korea Institute for International Economic Policy (KIEP), Sejong-si, Vol. 29, Iss. 4, pp. 415-453, <https://doi.org/10.11644/KIEP.EAER.2025.29.4.455>

This Version is available at:

<https://hdl.handle.net/10419/337540>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

How Enterprise Resilience Drives International Collaboration under Institutional Barriers: Evidence from Chinese Pharmaceutical Export Enterprises

Jin Li 

Chungnam National University
cpu82lijin@qq.com

Hyuksoo Cho 

Chungnam National University
hscho@cnu.ac.kr

In the context of rising geopolitical tensions and complex regulatory environments, Chinese pharmaceutical export enterprises face growing institutional barriers that hinder their participation in Global Value Chains (GVCs). Drawing on dynamic capability theory and contingency theory, this study examines how enterprise resilience—comprising anticipatory and adaptive capabilities—facilitates international collaboration under institutional pressure. Using survey data from 319 managerial respondents of Chinese pharmaceutical export enterprises and hierarchical regression analysis, the results show that both anticipatory and adaptive capabilities are positively associated with GVC participation and restructuring. Additionally, the empirical evidence partially supports the proposed moderating effects of institutional barriers—namely institutional distance, institutional uncertainty, and institutional stringency. While these barriers do not significantly affect the relationship between resilience and GVC participation, they selectively weaken its positive relationship with GVC restructuring. These findings suggest the conditional role of enterprise resilience in navigating complex institutional environments and offer preliminary insights for policymakers to improve institutional conditions and mitigate the constraining effects of institutional barriers.

Keywords: Chinese Pharmaceutical Enterprises, GVC Participation, GVC Restructuring, Enterprise Resilience

JEL Classification: F14, Q34, Q56

I. Introduction

In the VUCA era—characterized by Volatility, Uncertainty, Complexity, and Ambiguity—the Global Value Chain (GVC) is undergoing profound transformation

(Bennett and Lemoine, 2014). Geopolitical tensions are intensifying, and trade protectionism is on the rise globally. In particular, the escalating China–U.S. trade friction has accelerated trends such as “re-localization” and “de-Sinicization” in global supply chain arrangements (Liu and Deng, 2024; Luo and Wang, 2025). Against this backdrop, Chinese export enterprises face not only explicit pressure from rising tariff barriers but also deeper institutional barriers stemming from increasingly complex institutional environments. These challenges are especially pronounced in the pharmaceutical sector, which is highly reliant on international markets and subject to stringent compliance requirements (Qu et al., 2025). Specifically, Chinese pharmaceutical export enterprises are encountering increasingly stringent institutional scrutiny and policy restrictions from Western countries such as the United States and Europe. For instance, the U.S. continues to tighten technical licensing, certification standards, and export review processes for Chinese pharmaceutical products, while leveraging the Inflation Reduction Act (IRA) to promote the reshoring of key pharmaceutical manufacturing. At the same time, emerging economies are accelerating domestic substitution strategies for their industrial chains, exemplified by the Production-Linked Incentive (PLI) scheme aimed at supporting the development of their Active Pharmaceutical Ingredients (APIs) industry. In the context of overlapping external institutional barriers, for Chinese pharmaceutical export enterprises, how to maintain stable GVC participation and advance strategic GVC restructuring has become critical issues warranting in-depth investigation.

In recent years, academia has conducted extensive research on the relationship between institutional barriers and enterprises’ GVC participation and restructuring. Most of these studies are based on macro-level statistical data or enterprise-level secondary panel data, exploring the direct impact of institutional barriers on enterprises’ GVC participation or GVC restructuring (Handley and Limão, 2015; Kahiya, 2018; Nayyar et al., 2022; Korwatanasakul and Baek, 2021; Wang et al., 2019). In addition, existing literature has examined other key factors influencing GVC participation and restructuring, such as foreign direct investment (Chawla and Kumar, 2023; Li et al., 2021), economic policy (Pei and Su, 2025), economic structure (Van der Marel, 2015), industrial structure (Cieřlik et al., 2016), geopolitical risks (Qiao et al., 2024), and public health events (Cho and Kim, 2023). However, current research tends to focus on external and objective environmental variables. Few studies adopt an internal capability perspective to systematically explore how enterprises implement strategic adjustments and proactive responses under institutional barriers.

At the same time, studies on Chinese enterprises' GVC participation and restructuring mostly emphasize macro-level trends and seldom differentiate among specific industries (Wang et al., 2020; Qiao et al., 2024), such as the pharmaceutical export sector, which is highly sensitive to international regulations (Qu et al., 2025). Unlike most manufacturing exports that primarily undergo customs or quality inspections, pharmaceutical products are subject to full life-cycle supervision, covering production, documentation, and marketing authorization. Chinese pharmaceutical exporters must comply with multiple overlapping and stringent international regulatory systems, including EU GMP certification, EDQM CEP approval, and U.S. FDA registration and on-site inspection. Those regulatory systems considerably increase compliance costs and export timelines. For instance, *Jiangsu Hengrui Pharmaceuticals* spent nearly three years completing GMP certification, CEP application, and several rounds of technical revisions for a single API product to enter the European market. Even minor deviations in manufacturing or data management could trigger import alerts or product recalls. In 2018, *Zhejiang Huahai Pharmaceuticals* was temporarily banned by the FDA due to the valsartan impurity incident, leading to a 60% drop in U.S. exports. Overall, this multi-level and continuous regulatory regime renders institutional barriers in the pharmaceutical industry far more complex and persistent than in ordinary export sectors, posing greater challenges to enterprises' compliance and institutional resilience.

In view of the above research gaps, this study aims to explore the key driving factors that enable Chinese pharmaceutical export enterprises to effectively maintain stable participation in the GVC and promote strategic GVC restructuring under the pressure of institutional barriers. Contingency theory suggests that organizational performance is not determined by a single factor, but rather by the degree of fitness between internal capabilities and the external environment (Donaldson, 2001). In highly uncertain institutional environments, an enterprise's ability to respond to external shocks and sustain international collaboration and market stability often hinges on whether it possesses strong anticipatory and adaptive endogenous capabilities (Lin and Wu, 2014). Among various internal capabilities, enterprise resilience—as a form of dynamic capability—has attracted increasing academic attention in recent years (Conz and Magnani, 2020; Pal et al., 2014; Linnenluecke, 2017). Enterprise resilience reflects an organization's comprehensive ability to identify risks, absorb shocks, and make strategic adjustments when facing institutional uncertainty (Lengnick-Hall et al., 2011; Teece et al., 1997; Conz and Magnani, 2020). Existing studies have shown that enterprise resilience enhances risk management capacity and serves as a critical

foundation for achieving international collaboration and sustaining global operations (Chatterjee et al., 2024; Wang et al., 2023; Zhang et al., 2015). Therefore, this study argues that enterprise resilience is a key endogenous driver for Chinese pharmaceutical export enterprises to promote GVC participation and GVC restructuring in the face of institutional complexity.

However, the positive effects of enterprise resilience are not fully realized under all institutional environments. In highly heterogeneous contexts of international collaboration, institutional barriers may interfere with the functioning of internal capabilities through suppression mechanisms (Kahiya, 2018; Meyer et al., 2009). Therefore, this study argues that institutional barriers not only act as an external environmental factor directly influencing enterprises' international collaboration, but may also serve as a critical moderating variable in the relationship between enterprise resilience and enterprises' GVC participation and restructuring. Although some existing studies have explored the relationship between institutional environments and enterprise capabilities (Lin and Wu, 2014; Phillips et al., 2022), systematic analysis of how the interaction between institutional barriers and enterprise resilience affects enterprises' GVC participation and GVC restructuring remains limited, especially with regard to empirical research on Chinese pharmaceutical export enterprises.

Based on the above analysis, our study constructs an integrated research framework to investigate how enterprise resilience promotes enterprises' GVC participation and restructuring from the perspective of internal capabilities. At the same time, it introduces three dimensions of institutional barriers—Institutional Distance (ID), Institutional Uncertainty (IU), and Institutional Stringency (IS)—as moderating variables. After then, they are employed to reveal the boundary conditions of the effects of enterprise resilience under different external institutional environments. Accordingly, this study takes Chinese pharmaceutical export enterprises as the research subject and conducts an empirical investigation through questionnaire surveys. Specifically, measurement tools based on subjective perception are developed by referring to existing literature on core variable metrics. Then, a questionnaire survey is conducted, targeting persons in charge of export business in relevant enterprises to obtain firsthand data. Finally, empirical tests of the proposed hypotheses are carried out using reliability and validity testing and hierarchical linear regression analysis. The findings are expected to deepen the understanding of the interaction mechanisms between institutional environments and enterprise capabilities, enrich research on enterprise behavior in the context of GVC restructuring, and offer practical insights for

the stable development of international collaboration for Chinese enterprises under institutional risks.

II. Theoretical Literature and Research Hypothesis

1. International Collaboration

GVC participation serves as an important analytical framework for assessing how multinational enterprises engage in international collaboration (Gereffi et al., 2005). This framework emphasizes enterprises' cross-border involvement in various stages such as product design, production, and marketing, highlighting their roles and positions within the global value creation system (Chatterjee et al., 2024; Koopman et al., 2014). In recent years, driven by factors such as geopolitical tensions, technological transformations, and global pandemics, the GVC has undergone profound changes, which could be summarized in two key aspects. First, enterprises' level of GVC participation has exhibited significant dynamism; second, enterprises are actively engaging in GVC restructuring to cope with an ever-changing external environment (Liu et al., 2024; Luo and Wang, 2025; Korwatanasakul and Baek, 2021; Li et al., 2021). This study explores issues of international collaboration under institutional barriers from two dimensions: level of GVC participation and GVC restructuring.

(1) The level of GVC participation

The level of GVC participation reflects an enterprise's position and functional role within the GVC, as well as its degree of dependence on and contribution to global resource allocation. It is a key indicator for assessing the extent of an enterprise's internationalization (Koopman et al., 2014). By measuring the mode and depth of an enterprise's engagement across various stages of the GVC, one could reveal its capacity for integration within the global production network and its level of international collaboration (Johnson, 2018).

Existing research has measured the level of GVC participation from multiple dimensions. First, forward participation refers to whether an enterprise's exported intermediate goods are used by other countries for further production or export. It reflects the enterprise's "upstream" position in the GVC and serves as an important indicator of its ability to extend downstream along the value chain (Nana and Tabe-Ojong, 2025; Koopman et al., 2014). Second, backward participation measures the

proportion of imported intermediate goods used in the enterprise's production processes. This reflects the degree of global resource integration and the enterprise's dependence on upstream countries (Ji et al., 2022; Johnson, 2018). Third, participation breadth focuses on the distribution of an enterprise's export markets, such as the number and concentration of export destinations. It indicates the enterprise's spatial coverage and diversification capacity in global markets (Wang et al., 2022; Song and Cieřlik, 2023). Fourth, participation depth refers to the number and complexity of functional segments undertaken by the enterprise within the global division of labor—such as involvement in design, R&D, core component manufacturing, assembly, testing, and sales. It captures the enterprise's level of functional upgrading in the GVC (Kano et al., 2020; Asmussen et al., 2007). In addition, some studies assess the overall degree of embeddedness, evaluating an enterprise's systemic integration and collaboration depth within the GVC (Johnson, 2018). These multidimensional indicators reveal the embeddedness and value creation capacity in international collaboration, and lay a solid foundation for quantitatively assessing enterprise-level international cooperation under institutional barriers. Last, they provide a comprehensive view of an enterprise's level of GVC participation,

(2) GVC restructuring

Compared with the level of GVC participation, which primarily measures the depth of an enterprise's integration and its role within the existing GVC system, GVC restructuring focuses more on the adjustment of an enterprise's mode and structure of participation in the GVC (Milberg and Winkler, 2010; Liu et al., 2024). Specifically, GVC restructuring refers to the proactive or reactive reconfiguration of an enterprise's functional positioning and structural layout within the GVC, in response to external environmental shocks or internal strategic adjustments. The aim is to achieve multiple objectives such as risk avoidance, efficiency enhancement, or value capture (Song et al., 2021; Frederick and Gereffi, 2011; Fan et al., 2023).

According to Milberg and Winkler (2010), GVC restructuring can be classified into two types: vertical restructuring and horizontal restructuring. Vertical restructuring refers to functional shifts within an enterprise's position in the vertical division of labor in the GVC, such as moving into higher value-added segments or exiting lower value-added activities (Milberg and Winkler, 2010). For example, in response to increasingly stringent technical trade barriers in European and American markets (such as GMP certification and registration approvals) and the shrinking profit margins of intermediate

goods, Chinese pharmaceutical enterprises have gradually shifted from an export model focused on APIs toward formulation exports. Some enterprises even try to extend into higher value-added segments such as R&D, registration, and brand marketing. This type of vertical functional upgrading helps enterprises reduce dependence on low- and mid-end orders, enhancing their control and bargaining power within the GVC (Song et al., 2021). Horizontal restructuring, on the other hand, emphasizes structural adjustments in an enterprise's spatial distribution or collaborative network (Song et al., 2021). With the current backdrop of geopolitical tensions and tightening market access barriers in Europe and the United States, some Chinese pharmaceutical enterprises have actively adjusted their market strategies. They shift their export focus to emerging markets in Southeast Asia and Africa, which offer looser institutional environments and higher growth potential. At the same time, these enterprises strengthen partnerships with local companies to enhance their ability to adapt to global institutional heterogeneity (Qiao et al., 2024). In sum, GVC restructuring reflects enterprises' strategic adjustments through functional upgrading and market structure optimization in response to external environmental changes, serving as a critical pathway to enhancing global competitiveness and international collaboration capacity.

2. The Relationship between Enterprise Resilience and International Collaboration

(1) The concept and dimensions of enterprise resilience

Meyer (1982) is the first one to introduce the concept of “resilience” from natural sciences into the field of business management, using resilience to describe an organization's ability to maintain its core functions and structure in the face of external environmental changes and unexpected shocks. As research on the topic has evolved, scholars have defined enterprise resilience from various perspectives, including as an organizational trait, an adaptive process, an outcome of coping, or a capability (Duchek, 2020; Conz and Magnani, 2020; Liu and Yin, 2020). Among these, the capability perspective has received increasing attention, as it helps systematically explain how enterprises respond to external shocks through internal mechanisms, enabling dynamic adjustment and sustained development (Chatterjee et al., 2024).

From the perspective of dynamic capability theory, enterprise resilience is viewed as a comprehensive manifestation of key capabilities such as sensing threats, seizing opportunities, and reconfiguring resources when facing drastic environmental changes,

uncertain shocks, or systemic crises (Teece et al., 1997; Chatterjee et al., 2024). This capability enables enterprises to respond rapidly to change in highly uncertain environments, enhance adaptability, and achieve sustainable growth (Conz and Magnani, 2020). Specifically, from the anticipatory perspective prior to an event, enterprise resilience is reflected in an enterprise's alertness to potential threats, its preparedness, and early warning mechanisms—emphasizing proactive risk identification and prevention (Danes et al., 2009; Pal et al., 2014). From the responsive perspective during the event, resilience is demonstrated through an enterprise's ability to maintain operations and make dynamic adjustments amid disruptions (Sin et al., 2017). From the recovery perspective after the event, it emphasizes an enterprise's capacity for system restoration which is its ability to rebound from crises and rebuild operational systems (Linnenluecke, 2017; Gray and Jones, 2016). In summary, enterprise resilience is a comprehensive dynamic capability that spans the pre-, during-, and post-crisis stages. It is a critical capacity for enterprises to achieve sustainable development under conditions of high uncertainty.

To gain a deeper understanding of the connotation of enterprise resilience, scholars have explored its structural dimensions from various perspectives. Limnios et al. (2014) classified organizational resilience into resistance to change and adaptive learning capabilities, from the viewpoint of disturbance mitigation. Schriber et al. (2019) argued that in technologically turbulent environments, organizational resilience should encompass both redundancy and flexibility. Liang and Cao (2021) emphasized that organizational resilience consists of planning capability and adaptive capability. From a supply chain perspective, Pettit et al. (2013) divided resilience into anticipatory capability, adaptive capability, and recovery capability. In addition, Chowdhury and Quaddus (2017), drawing on dynamic capability theory, categorized organizational resilience into two dimensions: proactive capability, reactive capability.

Given the high level of institutional uncertainty and the challenges of cross-border operations faced by Chinese pharmaceutical export enterprises, this study adopts the dynamic capability framework proposed by Conz and Magnani (2020) and categorizes enterprise resilience. The enterprise resilience is described by two dimensions: anticipatory capability and adaptive capability. Anticipatory capability refers to an enterprise's ability to proactively identify potential threats, assess risk scenarios, and prepare responses before a crisis or shock occurs. Adaptive capability, on the other hand, refers to the enterprise's ability to flexibly adjust its strategies, reconfigure resource allocation, and rapidly resume operations after the occurrence of a crisis or

shock. The following sections would further explore how these two capabilities influence the GVC participation and GVC restructuring behaviors of Chinese pharmaceutical export enterprises under the impact of institutional barriers.

(2) The relationship between enterprise resilience and international collaboration

In the context of a highly uncertain institutional environment, the international collaboration landscape faced by Chinese pharmaceutical export enterprises has become increasingly complex (Qu et al., 2025). As a core dynamic capability for coping with external uncertainty, enterprise resilience provides early warning and adaptive support in international collaboration, and has become a vital safeguard for enterprises to effectively engage in cross-border cooperation (Conz and Magnani, 2020; Chatterjee et al., 2024). Therefore, this study investigates the impact of enterprise resilience—specifically its anticipatory capability and adaptive capability—on the international collaboration of Chinese pharmaceutical export enterprises, including both their level of GVC participation and GVC restructuring.

First, anticipatory capability could promote an enterprise's international collaboration. This capability refers to an enterprise's ability to identify potential threats, assess changes in the external environment, and prepare resources before a crisis or shock occurs (Danes et al., 2009; Chatterjee et al., 2024). Pettit et al. (2010) pointed out that by strengthening their sensing and forecasting capabilities, enterprises could improve their ability to coordinate responses to external uncertainty within complex supply networks. Wang et al. (2023) further found that forward-looking resilience helps enterprises enhance both innovation capacity and external collaboration efficiency. Similarly, Zhang et al. (2015) noted that enterprise resilience could support sustainable development through innovation, thereby enhancing enterprises' ability to engage in international collaboration under complex conditions. These findings suggest that anticipatory capability, as a key component of enterprise resilience, forms the foundation for improving international collaboration performance and adapting to changes in the value chain.

Based on this, the study argues that anticipatory capability enables Chinese pharmaceutical export enterprises to identify policy shifts, compliance risks, and changes in market demand within cross-border collaborations at an early stage. With conditions of high institutional uncertainty in the international environment, anticipatory capability allows them to formulate forward-looking response strategies. For example, when host countries adjust regulations related to drug approval, patent protection, or

export certification systems, enterprises with strong anticipatory capability could take action. With risk identification systems and early warning mechanisms, enterprises proactively adapt product standards and partnership configurations, thereby reducing institutional friction and collaboration barriers. Therefore, anticipatory capability not only supports enterprises in maintaining stable participation in the GVC, but also facilitates proactive engagement in either vertical or horizontal GVC restructuring (Conz and Magnani, 2020). Based on the above analysis, this study proposes the following hypotheses:

- H₁. Anticipatory capability is positively associated with international collaboration.
- H_{1a}. Anticipatory capability is positively associated with the level of GVC participation.
- H_{1b}. Anticipatory capability is positively associated with both vertical and horizontal GVC restructuring.

Second, adaptive capability is also a critical safeguard for the successful development of international collaboration. This capability refers to an enterprise's ability to rapidly integrate resources, adjust strategies, revise operational mechanisms, and restore organizational functions after a sudden crisis or external shock (Lengnick-Hall and Beck, 2005; Conz and Magnani, 2020). In the context of high institutional uncertainty, enterprises not only need forward-looking thinking but also the ability to respond quickly and adjust flexibly when actual shocks occur, in order to maintain stability in international collaboration (Limnios et al., 2014; Chatterjee et al., 2024).

Existing studies have shown that adaptive capability enhances the adaptability and coordination efficiency of multinational enterprises in turbulent environments. For example, Chowdhury and Quaddus (2017) pointed out that adaptive capability enables enterprises to resume operations quickly in unstable conditions and seize new opportunities, thereby promoting external collaboration and organizational innovation. Chatterjee et al. (2024) also emphasized that multinational enterprises with strong adaptive capability often possess more advanced global risk management and operational adjustment systems. And adaptive capability allowed them to promptly adapt their international layout and respond to changing collaboration environments, thus improving international collaboration performance.

For Chinese pharmaceutical export enterprises, adaptive capability is key to achieving multi-level adaptation and restructuring within GVC collaboration. Enterprises with strong adaptive capability could rapidly adjust supply chains and production plans in response to policy changes, technical barriers, or logistical disruptions abroad,

thereby enhancing their level of GVC participation. At the same time, adaptive capability drives enterprises to optimize upstream and downstream structures, improve product value-added, and promote vertical restructuring to reduce dependency on specific markets. Moreover, enterprises could adjust partnerships, expand into emerging markets, or develop alternative products to build more resilient horizontal cooperation networks, thus achieving horizontal restructuring. Based on the above analysis, this study proposes the following hypotheses:

H₂. Adaptive capability is positively associated with international collaboration.

H_{2a}. Adaptive capability is positively associated with the level of GVC participation.

H_{2b}. Adaptive capability is positively associated with both vertical and horizontal GVC restructuring.

3. *The Moderating Effect of Institutional Barriers*

(1) The concept and dimensions of institutional barriers

Institutional theory suggests that organizational behavior and strategic choices are deeply influenced by the institutional environment in which they operate (Kahiya, 2018; Dacin et al., 2002). In the field of international trade, this theory has become an important analytical framework for explaining the international institutional environments faced by multinational enterprises and their pathways to international collaboration (Peng et al., 2008; Meyer et al., 2009). Relevant studies have pointed out that when enterprises enter international markets and engage in cross-border collaboration, they often encounter the “regulative components” of the host country’s institutional environment, including legal systems, certification regimes, registration procedures, and administrative processes (Berry et al., 2010; Nayyar et al., 2022). On the one hand, these institutional arrangements provide stability and regulatory assurance; on the other hand, they may also create institutional friction and compliance barriers, limiting enterprises’ market entry and scope for international collaboration (Welter and Smallbone, 2011; Whitelock and Jobber, 2004). Against this backdrop, scholars have gradually defined these institutional elements that impose substantive constraints on cross-border operations as institutional barriers—obstacles within the institutional environment that hinder the functioning of market selection mechanisms (Kahiya, 2018).

Existing studies have identified three main types of Institutional Barriers. The first

is institutional distance (ID), which refers to structural inconsistencies between countries in terms of regulatory frameworks, administrative procedures, and certification standards, such as minimum product quality requirements, localization rules, and approval process differences (Berry et al., 2010). The second type is institutional stringency (IS). This occurs when importing countries impose significantly stricter standards than exporting countries in areas such as technology, safety, or environmental protection, and rigorously enforce them. These heightened standards often become invisible market access barriers, making it difficult for exporting enterprises to comply or find alternative pathways (Levchenko, 2007; Antoniou et al., 2024). The third type is institutional uncertainty (IU). This is characterized by frequent changes in policies, unclear regulatory timelines, and ambiguous regulatory directions. Such uncertainty undermines enterprises' ability to develop stable international collaboration plans and often compels them to postpone or revise their international market strategies (Handley and Limão, 2015; Skiti, 2020).

In summary, institutional barriers—embodying the growing complexity of the global institutional environment—have become critical institutional constraints on enterprises' international collaboration and deep engagement in the GVC. Building on existing research, this study defines institutional barriers as the systemic institutional obstacles encountered by Chinese pharmaceutical export enterprises in the process of international collaboration, specifically in the form of institutional distance, institutional uncertainty, and institutional stringency.

(2) The moderating role of institutional barriers

Contingency theory posits that enterprise performance is not solely determined by internal capabilities, but rather depends on the degree of fitness between those capabilities and the external environment in which the enterprise operates (Donaldson, 2001). In the context of international collaboration, even enterprises with strong enterprise resilience may find their effectiveness constrained by the surrounding institutional environment (Meyer et al., 2009). As a key manifestation of the international institutional environment, institutional barriers may affect the impact of enterprise resilience by altering the feasibility boundaries of enterprise actions and increasing the cost of resource allocation, thereby weakening the enterprise's institutional adaptability (Kahiya, 2018). Therefore, this study focuses on the moderating role of institutional barriers—including institutional distance, institutional uncertainty, and institutional stringency—in the relationship between enterprise

resilience and international collaboration.

First, for Chinese pharmaceutical export enterprises, institutional distance refers to structural discrepancies with host countries in areas such as pharmaceutical regulatory systems, quality certification standards, and legal enforcement mechanisms. These differences often intensify compliance challenges and raise institutional adaptation costs, leading to greater procedural obstacles and institutional friction in cross-border collaboration (Berry et al., 2010). In target markets with significant institutional incompatibility, even enterprises with strong anticipatory capability may struggle to accurately identify key risks due to information asymmetry and misinterpretation of institutional norms. At the same time, deep-rooted structural differences may limit enterprises' ability to flexibly adjust strategies and processes, thereby constraining the effectiveness of their response mechanisms and weakening the positive impact of enterprise resilience on international collaboration (Berry et al., 2010; Nayyar et al., 2022). Based on this, the following hypothesis is proposed:

H₃. Institutional distance negatively moderates the relationship between enterprise resilience and international collaboration.

H_{3a}. Institutional distance negatively moderates the relationship between anticipatory capability and international collaboration.

H_{3b}. Institutional distance negatively moderates the relationship between adaptive capability and international collaboration.

Second, institutional uncertainty is often manifested in frequent adjustments to drug approval systems in foreign markets, shifting policy orientations, and a lack of clarity in technical specifications and certification standards. Such uncertainty increases decision-making ambiguity and execution risks for enterprises engaged in international collaboration (Handley and Limão, 2015; Wang et al., 2022). Under these conditions, even enterprises with strong anticipatory capability may misjudge future policy trends due to institutional volatility, thereby undermining their strategic foresight. At the same time, institutional uncertainty may restrict enterprises' room for adjustment and reduce their flexibility in responding to sudden changes, which in turn weakens the positive impact of adaptive capability on international collaboration performance (Henisz and Delios, 2001). Based on this, the following hypotheses are proposed:

H₄. Institutional uncertainty negatively moderates the relationship between enterprise resilience and international collaboration.

H_{4a}. Institutional uncertainty negatively moderates the relationship between anticipatory

capability and international collaboration.

H_{4b}. Institutional uncertainty negatively moderates the relationship between adaptive capability and international collaboration.

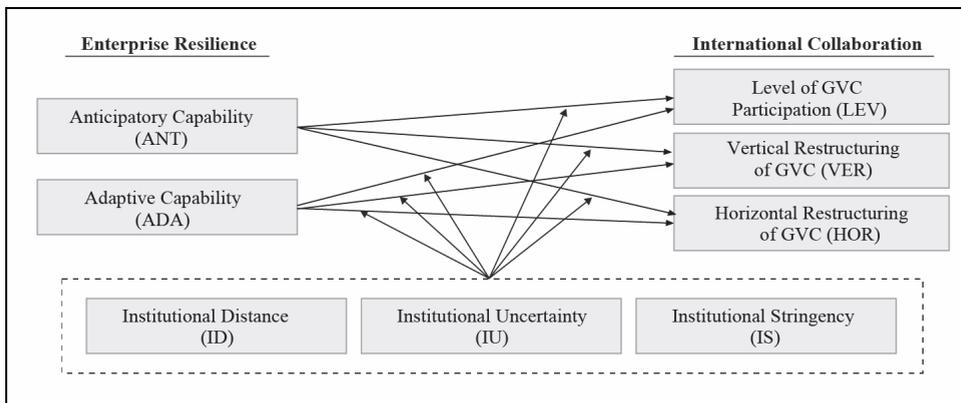
Finally, institutional stringency is typically reflected in host countries setting high regulatory thresholds in areas such as pharmaceutical quality control, registration and approval procedures, and environmental standards, accompanied by strict supervision and enforcement mechanisms. Such high-standard institutional arrangements significantly increase enterprises' compliance costs and trial-and-error risks, thereby constituting major barriers to market entry (Levchenko, 2007; Antoniou et al., 2024). Under these circumstances, even enterprises with strong anticipatory capability may find it difficult to implement forward-looking strategic adjustments due to the overly stringent institutional environment. Meanwhile, the rigid nature of strict regulations may further constrain enterprises' ability to flexibly adjust their operational strategies, thereby weakening the effectiveness of adaptive capability in complex environments. Based on this, the following hypotheses are proposed:

H₅. Institutional stringency negatively moderates the relationship between enterprise resilience and international collaboration.

H_{5a}. Institutional stringency negatively moderates the relationship between anticipatory capability and international collaboration.

H_{5b}. Institutional stringency negatively moderates the relationship between adaptive capability and international collaboration.

Figure 1. Research Model



III. Research Methodology

1. Measurement

The core research question of this study was to examine, from the perspective of internal enterprise capabilities, how Chinese pharmaceutical export enterprises leverage enterprise resilience to promote their participation in and restructuring of GVCs under institutional barriers. This question concerned managers' perceptions and responses to external institutional environments. Therefore, relying solely on macro-level objective data was insufficient to reveal the actual mechanisms of enterprise-level responses. In cross-disciplinary research between economics and management, perceptual measures were widely adopted and shown to effectively capture enterprises' experiences and cognitions in responding to institutional environments (Dess and Robinson, 1984; Lin and Wu, 2014; Zakery and Saremi, 2025). Following this logic, this study employed a perceptual survey approach and measurement instruments which were carefully designed by drawing on established indicators from the existing literature to ensure scientific rigor and validity (see Appendix Table A1).

The research model incorporated four core constructs: institutional barriers, enterprise resilience, the level of GVC participation, and GVC restructuring. Among these, enterprise resilience has well-established measurement scales in existing literature. Drawing on Parker and Ameen (2018), Pettit et al. (2013), Chowdhury and Quaddus (2017), this study operationalized enterprise resilience through two dimensions—anticipatory capability and adaptive capability—and developed an 8-item measurement instrument assessed via a five-point Likert scale.

In contrast, prior research on institutional barriers, GVC participation, and GVC restructuring predominantly relied on objective data (e.g., trade indices) for measurement, and lacked widely validated perceptual scales. To address this gap, this study followed classical guidelines for scale development (DeVellis and Thorpe, 2021; Netemeyer et al., 2003) and strictly adhered to their procedures. First, key indicators for each construct were systematically derived from the existing literature to build an initial pool of items. Second, the research team applied the Delphi method to purify the scale, inviting five international business executives from Chinese pharmaceutical export enterprises and three academic experts in GVCs to participate in multiple rounds of review and revision. Third, after finalizing the questionnaire, a pilot survey was conducted with 29 international business managers from Chinese pharmaceutical

export enterprises to further refine item wording and enhance the readability and comprehensibility of the scale.

Specifically, institutional barriers were categorized into three dimensions: institutional distance, institutional uncertainty, and institutional stringency. The measurement items were adapted from established studies (e.g., Berry et al., 2010; Levchenko, 2007; Handley and Limão, 2015). Each dimension was operationalized with four items and assessed on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), capturing the extent of institutional obstacles perceived by enterprises in their export activities.

The operationalization of GVC participation was based on indicators widely used in the economics literature (Johnson, 2018; Asmussen et al., 2007; Kano et al., 2020). Perceptual survey items were developed across six dimensions: forward participation, backward participation, participation intensity, participation breadth, overall embeddedness, and export volume dynamics. Respondents evaluated changes in their enterprise's GVC participation over the past three years on a five-point ordinal scale (1 = Significant Decrease to 5 = Significant Increase), capturing perceived shifts in global production network integration.

For GVC restructuring, two single-item measures were employed to evaluate vertical and horizontal restructuring, respectively. This decision was based on two considerations. First, our preliminary interviews with executives of Chinese pharmaceutical export enterprises revealed substantial heterogeneity in restructuring behaviors (e.g., some enterprises upgraded to R&D functions while others divested production units), making it difficult to capture such variations using standardized multi-item scales. Second, prior research indicated that when measuring specific, observable phenomena to which respondents have direct operational knowledge, single-item measures could effectively substitute for multi-item scales without a significant loss of validity (Diamantopoulos et al., 2012). In perceptual questions such as whether an enterprise engaged in GVC restructuring, single-item measures offered advantages in simplicity and directness. Accordingly, drawing on objective indicators proposed in prior studies (Milberg and Winkler, 2010; Song et al., 2021; Qiao et al., 2024) and incorporating the key characteristics of enterprises' export business restructuring, this study developed two representative single-item measures to assess vertical and horizontal restructuring. Both items were evaluated using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

2. Sample and Data Collection

This study targeted international business managers of Chinese pharmaceutical export enterprises as primary survey respondents. To ensure industry-specific relevance and sample representativeness, a non-probability sampling approach was adopted, integrating purposive sampling with convenience sampling strategies. The questionnaire was administered on-site at “CPHI & PMEC China 2025” (the 23rd World Pharmaceutical Raw Materials China Expo & 18th World Pharmaceutical Machinery, Packaging Equipment, and Materials China Expo).

As one of the most influential comprehensive exhibitions in the global pharmaceutical industry, CPHI & PMEC China 2025 was held at the Shanghai New International Expo Center from June 24 to 26, 2025, attracting over 3,500 exhibitors and nearly 100,000 professional visitors worldwide. The event covered the entire pharmaceutical supply chain—spanning APIs, biopharmaceuticals, traditional Chinese medicines, pharmaceutical equipment, international trade, contract manufacturing, and packaging materials—demonstrating broad industry representativeness. Moreover, the exhibitor composition reflected a multi-tier industrial structure which included large state-owned and listed pharmaceutical enterprises, medium-sized manufacturers, and innovative SMEs. The exhibition gathered a significant number of executives and business leaders from Chinese pharmaceutical manufacturing exporters with active international market participation, providing this study with a precisely targeted and highly efficient survey population.

During implementation, the research team utilized *Jianshu*, a leading Chinese online data collection platform, to convert the paper-based questionnaire into a QR code link, and prepared an announcement explaining the survey protocol in advance. On-site at the exhibition, researchers employed face-to-face communication to introduce the study background and completion instructions to eligible corporate representatives, inviting them to scan the QR code for online participation. The survey spanned three consecutive days, yielding 451 completed questionnaires. Following data cleaning and screening (including exclusion of questionnaires with logical inconsistencies, abnormal completion times, or excessive missing values), 319 valid questionnaires remained as the final analytical sample. Considering enterprise size, age, and export product type, the sample adequately reflects the diversity and representativeness of China’s export-oriented pharmaceutical industry. Detailed sample characteristics are presented in Table 1.

Table 1. The Basic Statistics Information of Sample (N=319)

Items		Freq.	%
Position	High officer	44	13.8
	Middle officer	186	58.3
	Manager	89	27.9
work experience	Less than 5 years	86	27.0
	5-10 years	148	46.4
	10 years and above	85	26.6
Enterprise Type	State owned	42	13.2
	Private owned	251	78.7
	Joint venture	26	8.2
Enterprise Size	Less than 100	46	14.4
	100-500	127	39.8
	500 or more	146	45.8
Enterprise Age	Less than 10 years	42	13.2
	10 years and above	277	86.8
Export Region	Developed countries	132	41.4
	Emerging Asian Nations and Peripheral Nations	43	13.5
	Mixed Nations	144	45.1
Export Product Type	APIs	77	24.1
	Dosage	68	21.3
	pharmaceutical-related material and machinery	56	17.6
	Others	71	22.3
	Mixture	47	14.7
Export Value	Below 5 million US dollars	45	14.1
	5-20 million US dollars	161	50.5
	Above 20 million US dollars	113	35.4

Notes: "Others" category under Export Product Type includes intermediates, excipients, and other materials used in pharmaceutical production, as well as export-related services (e.g., CMO/CDMO).

IV. Data Analysis

1. Common Method Bias

Given that this study collects data through self-reporting, there may exist common method bias that could undermine the validity of the research. Therefore, Harman's single-factor analysis was conducted using SPSS 24.0 statistical software to examine

the issue of common method bias. Factor analysis was performed on all items in the questionnaire, revealing that the eight extracted factors collectively explained 70.752% of the total variance, with the largest proportion of explained variance being 14.515%. This is significantly lower than the 50% threshold recommended by Podsakoff et al. (2003), indicating that common method bias does not pose a serious threat to the research findings.

2. Reliability and Validity Testing

This study employed SmartPLS 4.0 statistical software to assess the reliability and validity of the measurement model. During the initial reliability and validity assessment, three items—IU2, ANT4, and LEV1—were excluded because their factor loadings were below 0.6, failing to meet the minimum threshold. Among the remaining items, although the factor loading of IU3 was slightly below 0.7 (at 0.627), it remained within an acceptable range, while all other items exhibited loadings greater than 0.7, indicating strong explanatory power and representativeness of each item in relation to its respective latent variable. Furthermore, the average variance extracted (AVE) values for all latent variables ranged from 0.573 to 0.698, exceeding the critical threshold of 0.5 and thereby demonstrating satisfactory convergent validity of the measurement instrument (see Table 2).

The results of the discriminant validity analysis for the variables are presented in Table 3. According to the Fornell-Larcker criterion, the square root values of the AVE for all latent variables are greater than their inter-correlations with other latent variables, indicating that the measurement model exhibits satisfactory discriminant validity (Fornell and Larcker, 1981). In terms of internal consistency, except for anticipatory capability, whose Cronbach's α coefficient is slightly below 0.7 (at 0.623), the Cronbach's α coefficients for all other latent variables surpass the widely accepted threshold of 0.7. Additionally, the composite reliability (CR) values for all latent variables exceed 0.7, further demonstrating good internal consistency among the variables (Hair et al., 2011) (see Table 2).

Table 2. Measurement Properties

Latent variable	Item	Factor loading	Cronbach' α	CR	AVE
Institutional Distance (ID)	ID1	0.793	0.847	0.893	0.677
	ID2	0.902			
	ID3	0.826			
	ID4	0.764			
Institutional Uncertainty (IU)	IU1	0.800	0.746	0.833	0.630
	IU3	0.627			
	IU4	0.926			
Institutional Stringency (IS)	IS1	0.809	0.836	0.887	0.661
	IS2	0.789			
	IS3	0.831			
	IS4	0.823			
Anticipatory Capability (ANT)	ANT1	0.767	0.623	0.798	0.569
	ANT2	0.762			
	ANT3	0.734			
Adaptive Capability (ADA)	ADA1	0.815	0.752	0.843	0.573
	ADA2	0.815			
	ADA3	0.714			
	ADA4	0.733			
Level of GVC Participation (LEV)	LEV2	0.706	0.890	0.920	0.698
	LEV3	0.722			
	LEV4	0.907			
	LEV5	0.911			
	LEV6	0.905			
Vertical restructuring	VER	1.000			
Horizontal restructuring	HOR	1.000			

Table 3. Discriminant Validity Test (Fornell and Larcker Criteria)

Latent variable	Mean	SD	ID	IU	IS	ANT	ADA	LEV	VER	HOR
Institutional Distance	4.106	0.766	0.823							
Institutional Uncertainty	3.901	0.836	0.568	0.794						
Institutional Stringency	4.228	0.730	0.612	0.596	0.813					
Anticipatory Capability	4.183	0.523	0.104	0.125	0.067	0.754				
Adaptive Capability	4.170	0.520	0.074	0.101	0.098	0.537	0.757			
GVC Participation	3.288	0.971	-0.124	-0.206	-0.259	0.159	0.233	0.836		
Vertical Restructuring	3.765	1.063	0.070	0.050	-0.051	0.258	0.258	0.237	1	
Horizontal Restructuring	4.135	0.903	0.027	0.084	0.071	0.537	0.378	0.140	0.364	1

Notes: Diagonal represents the square root of the AVE; while below the diagonal the correlations between factors are represented.

3. Hypothesis Testing

(1) Analysis of main effects

This study utilized SPSS 24.0 statistical software and employed a hierarchical regression model to test the research hypotheses. In the regression analysis, enterprise type, enterprise size, enterprise age, export region, export product type, and export volume were included as control variables in the model. All control variables were processed as dummy variables, with the specific settings as follows: “Private enterprise” was used as the reference category for enterprise type, “Over 500 employees” for enterprise size, “Over 10 years” for enterprise age, “Mixed regions” for export region, “Comprehensive category” for export product type, and “Over \$20 million” for export volume.

Given that all data were collected through a questionnaire survey at a single time point, there was a potential risk of common method bias. Therefore, prior to hypothesis testing, this study conducted a multicollinearity test. The results revealed that the variance inflation factors (VIFs) for all variables ranged from 1.036 to 2.155, below the threshold of 5.0 recommended by Hair et al. (2011), indicating the absence of linear multicollinearity issues in this study. Additionally, to ensure comparability across variables and mitigate the influence of scale differences, this study reported standardized regression coefficients (β) derived from the hierarchical regression models. These standardized coefficients allow for the assessment of relative effect magnitudes between predictors.

Hypothesis 1 examined the relationship between anticipatory capability and international collaboration. The results, as shown in Table 4, indicated that anticipatory capability was significantly and positively associated with the level of GVC participation (Model 1, $\beta = 0.139$, $p < 0.05$), horizontal restructuring (Model 5, $\beta = 0.296$, $p < 0.01$), and vertical restructuring (Model 5, $\beta = 0.239$, $p < 0.01$). Therefore, Hypothesis 1 was supported. Hypothesis 2 investigated the relationship between adaptive capability and international collaboration. The results, presented in Table 5, revealed that adaptive capability was significantly and positively associated with the level of GVC participation (Model 1, $\beta = 0.249$, $p < 0.01$), horizontal restructuring (Model 5, $\beta = 0.326$, $p < 0.01$), and vertical restructuring (Model 9, $\beta = 0.213$, $p < 0.01$). Hence, Hypothesis 2 was supported.

In terms of association strength, the standardized coefficients ($\beta = 0.139\sim 0.326$) across both anticipatory and adaptive capabilities indicated moderate-to-strong

relationships according to the conventions of Cohen (1988). These results suggested that enterprise resilience—manifested through foresight and adaptability—was meaningfully associated with enterprises' participation and restructuring within GVCs.

(2) Analysis of moderating effects

To examine the moderating effect of institutional barriers on the relationship between enterprise resilience and international collaboration, this study constructed interaction terms between the independent and moderating variables. Then the interaction terms were incorporated into the hierarchical regression model. Prior to formal model construction, both the independent and moderating variables were mean-centered. In addition, to ensure the robustness of the regression results, multicollinearity was further examined after the inclusion of the interaction terms. The VIF values for all interaction terms ranged between 1.032 and 2.149, which were below the commonly accepted threshold of 5.0 (Hair et al., 2011), indicating no serious multicollinearity problems. The analysis results are presented in Tables 4 and 5.

Hypothesis 3 examined the moderating effect of institutional distance. As shown in Table 4, institutional distance significantly and negatively moderated the relationship between anticipatory capability and vertical restructuring (Model 10, $\beta = -0.123$, $p < 0.05$). However, its moderating effects on GVC participation (Model 2, $\beta = -0.097$, $p > 0.05$) and horizontal restructuring (Model 6, $\beta = -0.081$, $p > 0.05$) were not significant. Table 5 indicated that institutional distance significantly and negatively moderated the relationship between adaptive capability and horizontal restructuring (Model 6, $\beta = -0.112$, $p < 0.05$), but its moderating effects on GVC participation (Model 2, $\beta = -0.053$, $p > 0.05$) and vertical restructuring (Model 10, $\beta = -0.085$, $p > 0.05$) were not statistically significant. Therefore, Hypothesis 3 was partially supported. Hypothesis 4 examined the moderating effect of institutional uncertainty. As shown in Table 4, institutional uncertainty significantly and negatively moderated the effect of anticipatory capability on horizontal restructuring (Model 7, $\beta = -0.121$, $p < 0.05$) and vertical restructuring (Model 11, $\beta = -0.111$, $p < 0.05$), but its moderating effect on GVC participation was not significant (Model 3, $\beta = -0.103$, $p > 0.05$). Similarly, Table 5 showed that institutional uncertainty significantly weakened the positive relationship between adaptive capability and horizontal restructuring (Model 7, $\beta = -0.157$, $p < 0.01$) and vertical restructuring (Model 11, $\beta = -0.117$, $p < 0.05$), while its moderating effect on the GVC participation pathway was not significant (Model 3, $\beta = 0.007$, $p > 0.05$). Therefore, Hypothesis 4 was partially supported.

Table 4. Results of Hierarchical Regression Analysis (Anticipatory Capability)

Latent Variable	Level of GVC Participation				Horizontal Restructuring				Vertical Restructuring			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
<i>Enterprise Type</i>												
SOE	-0.016	0.000	-0.026	-0.028	0.047	0.044	0.049	0.047	0.096	0.093	0.100	0.093
JV	-0.062	-0.072	-0.054	-0.065	0.053	0.051	0.051	0.053	-0.015	-0.017	-0.018	-0.016
<i>Enterprise Size</i>												
ES	0.083	0.081	0.086	0.040	-0.195**	-0.198**	-0.193**	-0.157*	0.041	0.036	0.042	0.041
EM	0.067	0.052	0.075	0.045	0.025	0.016	0.020	0.021	0.010	-0.003	0.004	0.002
<i>Enterprise Age</i>												
AGE	-0.012	-0.019	-0.015	-0.021	-0.001	-0.002	0.003	-0.022	0.009	0.008	0.013	0.000
<i>Export Region</i>												
RD	-0.081	-0.073	-0.064	-0.060	-0.122*	-0.121*	-0.124*	-0.135*	-0.017	-0.017	-0.022	-0.016
REP	-0.142*	-0.144*	-0.136*	-0.136	-0.079	-0.087	-0.099	-0.087	-0.044	-0.057	-0.064	-0.045
<i>Export Product Type</i>												
PR	-0.024	-0.046	-0.058	-0.048	-0.018	-0.015	-0.009	-0.013	-0.030	-0.020	-0.017	-0.035
PF	0.065	0.056	0.045	0.058	0.072	0.072	0.083	0.071	0.142	0.144	0.155*	0.140
PD	0.001	-0.005	-0.019	-0.013	-0.017	-0.016	-0.001	-0.012	-0.003	0.000	0.014	-0.005
PO	0.043	0.019	0.020	0.011	-0.038	-0.044	-0.037	-0.048	-0.018	-0.023	-0.013	-0.029
<i>Export Value</i>												
EV_L	-0.088	-0.095	-0.102	-0.084	0.049	0.050	0.058	0.062	-0.164*	-0.159*	-0.153*	-0.159*
EV_M	-0.145	-0.135	-0.142	-0.118	0.068	0.069	0.061	0.061	-0.036	-0.037	-0.043	-0.030

Table 4. Continued

Latent Variable	Level of GVC Participation				Horizontal Restructuring				Vertical Restructuring			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ANT	0.139*	0.125*	0.148*	0.143*	0.296***	0.277***	0.276***	0.293***	0.239***	0.208***	0.219***	0.239***
ID		-0.117***				0.004				0.026		
ANT×ID		-0.097				-0.081				-0.123*		
IU			-0.172**				0.023				0.043	
ANT×IU			-0.003				-0.121*				-0.111*	
IS				-0.233***				0.059				-0.046
ANT×IS				-0.064				-0.147**				-0.062
R ²	0.027	0.044	0.05	0.083	0.149	0.150	0.158	0.165	0.098	0.106	0.104	0.099
ΔR ²		0.022	0.028	0.059		0.006	0.013	0.02		0.014	0.012	0.007
ΔF-value	1.638*	3.719***	4.676**	10.2***	4.991***	1.11	2.511*	3.854*	3.455***	2.502*	2.145*	1.165*

Notes: SOE = State-Owned Enterprise; JV = Joint Venture; ES = Enterprise Size < 100; EM = Enterprise Size 100-500; AGE = Enterprise Age; RD = Region: Developed; REP = Region Emerging & peripheral; PR = Product: Raw; PF = Product Finished; PD = Product Device; PO = Product Other; EV_L = Export Value < 5 million USD; EV_M = Export Value 5-20 million USD; ANT = Anticipatory Capability; IU = Institutional Distance; IU = Institutional Uncertainty; IS = Institutional Stringency; “x*” = Interaction term (e.g., ANT × ID).

Table 5. Results of Hierarchical Regression Analysis (Adaptive capability)

Latent Variable	Level of GVC Participation			Horizontal Restructuring					Vertical Restructuring			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
<i>Enterprise Type</i>												
SOE	-0.024	-0.032	-0.035	-0.038	0.034	0.029	0.027	0.026	0.086	0.083	0.083	0.080
JV	-0.089	-0.100	-0.081	-0.093	0.023	0.018	0.018	0.023	-0.034	-0.036	-0.039	-0.035
<i>Enterprise Size</i>												
ES	0.129	0.132	0.133	0.078	-0.158*	-0.157*	-0.154*	-0.123	0.057	0.056	0.059	0.055
EM	0.054	0.048	0.061	0.033	0.011	0.010	0.011	0.017	0.002	0.002	0.001	-0.002
<i>Enterprise Age</i>												
AGE	-0.023	-0.028	-0.027	-0.026	-0.005	-0.003	-0.001	-0.027	0.011	0.013	0.014	0.002
<i>Export Region</i>												
RD	-0.078	-0.075	-0.060	-0.052	-0.119*	-0.129*	-0.133*	-0.129*	-0.016	-0.025	-0.029	-0.013
REP	-0.139*	-0.133*	-0.132*	-0.128*	-0.080	-0.085	-0.095	-0.072	-0.047	-0.052	-0.059	-0.041
<i>Export Product Type</i>												
PR	-0.041	-0.069	-0.077	-0.065	-0.046	-0.044	-0.038	-0.030	-0.050	-0.044	-0.039	-0.051
PF	0.061	0.056	0.039	0.055	0.071	0.082	0.087	0.077	0.144	0.154*	0.158*	0.144
PD	0.015	0.013	-0.006	0.002	0.002	0.012	0.014	0.017	0.009	0.018	0.021	0.011
PO	0.069	0.053	0.047	0.042	-0.003	0.001	-0.007	-0.004	0.006	0.012	0.006	-0.002
<i>Export Value</i>												
EV_L	-0.057	-0.064	-0.072	-0.056	0.066	0.074	0.070	0.074	-0.161*	-0.154*	-0.156*	-0.158*
EV_M	-0.129*	-0.122*	-0.125*	-0.100	0.088	0.081	0.073	0.079	-0.023	-0.030	-0.035	-0.018

Table 5. Continued

Latent Variable	Level of GVC Participation				Horizontal Restructuring				Vertical Restructuring			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
ADA	0.249***	0.248***	0.261***	0.259***	0.326***	0.306***	0.307***	0.310***	0.213***	0.197**	0.198**	0.210***
ID		-0.114*				0.026				0.043		
ADA×ID		-0.053				-0.112*				-0.085		
IU			-0.179**				0.038				0.055	
ADA×IU			0.007				-0.157**				-0.117*	
IS				-0.251***				0.045				-0.054
ADA×IS				-0.018				-0.125*				-0.050
R ²	0.061	0.072	0.086	0.116	0.155	0.161	0.173	0.164	0.082	0.083	0.09	0.082
ΔR ²		0.017	0.03	0.059		0.011	0.023	0.014		0.007	0.013	0.006
ΔF-value	2.464**	2.952*	5.191**	10.61***	5.172***	2.138*	4.357**	2.617*	3.025***	1.206	2.354*	0.994

Notes: SOE = State-Owned Enterprise; JV = Joint Venture; ES = Enterprise Size < 100; EM = Enterprise Size 100-500; AGE = Enterprise Age; RD = Region: Developed; REP = Region Emerging & peripheral; PR = Product: Raw; PF = Product Finished; PD = Product Device; PO = Product Other; EV_L = Export Value < 5 million USD; EV_M = Export Value 5-20 million USD; ADA = Adaptive Capability; ID = Institutional Distance; IU = Institutional Uncertainty; IS = Institutional Stringency; “x” = Interaction term (e.g., ADA × ID).

Hypothesis 5 focused on the moderating effect of institutional stringency. As shown in Table 4, institutional stringency significantly and negatively moderated the effect of anticipatory capability on horizontal GVC restructuring (Model 8, $\beta = -0.147$, $p < 0.01$), while its moderating effects on the relationships between anticipatory capability and GVC participation (Model 4, $\beta = -0.064$, $p > 0.05$) and vertical restructuring (Model 12, $\beta = -0.062$, $p > 0.05$) were not significant. Similarly, Table 5 indicated that institutional stringency significantly and negatively moderated the effect of adaptive capability on horizontal GVC restructuring (Model 8, $\beta = -0.125$, $p < 0.01$), but showed no significant moderating effect on the relationships with GVC participation (Model 4, $\beta = -0.018$, $p > 0.05$) and vertical restructuring (Model 12, $\beta = -0.050$, $p > 0.05$). Therefore, Hypothesis 5 was partially supported.

V. Discussion and Implications

1. Discussion of the Findings

Drawing on dynamic capability theory and contingency theory, this study examined the relationships between enterprise resilience and international collaboration among Chinese pharmaceutical export enterprises under institutional barriers. The main findings are as follows:

First, enterprise resilience was significantly and positively associated with the level of GVC participation, as well as with both vertical and horizontal GVC restructuring, whether in the form of anticipatory and adaptive capabilities. This finding echoes the perspectives of Lengnick-Hall et al. (2011), Conz and Magnani (2020), and Chatterjee et al. (2024), who argue that enterprise resilience enhances organizations' abilities to sense, absorb, and adapt in the face of environmental uncertainty. This suggests that for Chinese pharmaceutical export enterprises, resilience capabilities characterized by foresight and flexibility are particularly critical under the growing complexity of the international institutional environment. Such capabilities enable enterprises to effectively identify and mitigate cross-border institutional risks in advance, while optimizing resource allocation, market positioning, and collaboration mechanisms ahead of time. By strengthening environmental adaptability, enterprises could not only maintain stable embeddedness within GVC but also provide sustained momentum for the strategic restructuring of international collaboration networks.

Second, none of the three types of institutional barriers—institutional distance, institutional uncertainty, or institutional stringency—significantly moderated the relationships between anticipatory or adaptive capabilities and GVC participation. This indicates that institutional barriers exert limited constraints on the existing level of GVC participation among Chinese pharmaceutical exporters. GVC participation reflects a stable and path-dependent embeddedness in the global pharmaceutical value chain. Chinese enterprises have established international networks through API supply, generic drug exports, and OEM cooperation, supported by accumulated market reputation, quality systems, and international certifications (e.g., CEP, EDQM). Thus, even under high institutional disparity or policy uncertainty, enterprises with strong anticipatory and adaptive capabilities are able to sustain stable participation in GVCs.

Third, different types of institutional barriers exhibited distinct moderating effects on the relationship between enterprise resilience and GVC restructuring. Compared with participation, GVC restructuring involves strategic adjustments to global collaboration, including resource reconfiguration and network reorganization, which are more sensitive to institutional environments (Pei and Su, 2025; Nayyar et al., 2022).

Specifically, institutional distance showed path-selective constraints. It weakened the relationship between anticipatory capability and vertical restructuring but not horizontal restructuring, and weakened the relationship between adaptive capability and horizontal restructuring but not vertical restructuring. Vertical restructuring emphasizes internal value-chain integration, such as extending from API production to formulation manufacturing. When cross-country regulatory differences are large, enterprises' foresight could not easily be translated into actionable restructuring due to limited institutional compatibility. In contrast, horizontal restructuring focuses on cross-border collaboration and relies on enterprises' communication flexibility. Institutional distance increases coordination frictions and trust costs, weakening adaptive capability in horizontal cooperation. Yet, Chinese pharmaceutical enterprises' accumulated institutional familiarity and compliance routines help buffer these negative effects, producing differentiated moderating outcomes.

Institutional uncertainty negatively moderates all restructuring paths. The pharmaceutical industry depends on regulatory transparency and trade stability, while frequent policy changes—such as reforms in drug review or API export controls—undermine enterprises' ability to anticipate policy directions. This volatility reduces confidence and investment in restructuring, making institutional uncertainty a pervasive obstacle.

Institutional stringency mainly constrains horizontal restructuring but not vertical restructuring. Strict regulatory requirements (e.g., GMP, environmental standards, technology transfer controls) reduce enterprises' flexibility and increase compliance costs. By contrast, vertical restructuring usually relies on long-term, stable supply-chain and technological relationships, which exhibit stronger institutional adaptability and are less affected by regulatory intensity.

2. Theoretical Contributions

This study extends the existing literature in several important ways. First, by adopting a dynamic capability perspective, it systematically explores how enterprise resilience drives strategic adjustment and proactive responses under the pressure of institutional obstacles. Furthermore, it expands the applicability of dynamic capability theory in the field of international business. While prior research has predominantly focused on the influence of external objective environments on GVC participation and restructuring (Nayyar et al., 2022; Korwatanasakul and Baek, 2021; Wang et al., 2019), limited attention has been given to the driving role of enterprises' endogenous capabilities in these processes. Through empirical analysis, this study found that both anticipatory and adaptive capabilities significantly and positively influenced the level of GVC participation and restructuring pathways. These findings validate the critical role of enterprise resilience in maintaining global embeddedness and enabling international strategic adjustments under institutional uncertainty. And they also enrich the theoretical understanding of the mechanisms through which enterprise resilience operates.

Second, this study refined and systematically examined the moderating mechanisms through which institutional barriers affect the pathways of enterprise resilience, thereby extending the scope of institutional theory and contingency theory in the context of international collaboration. Specifically, institutional barriers were categorized into three dimensions: institutional distance, institutional uncertainty, and institutional stringency. The study identified significant inhibitory effects of these barriers on the relationship between enterprise resilience and GVC restructuring, while finding no significant moderating effects on the relationship between enterprise resilience and GVC participation. These findings reveal the boundary conditions under which the institutional environment constrains the transformation of enterprises' strategic capabilities. Meanwhile it also deepens the theoretical understanding of how institutional

complexity selectively interferes with enterprises' internationalization pathways.

Third, by focusing on Chinese pharmaceutical export enterprises, this study addressed a gap in the literature regarding the response mechanisms of highly regulated and externally dependent industries under global institutional shifts. In contrast to prior studies that relied primarily on macro-level, multi-industry panel data to conduct trend-based analyses (Wang et al., 2022; Qiao et al., 2024), this study emphasized industry-specific characteristics and micro-level mechanisms. By concentrating on the pharmaceutical industry and developing perception-based measurement tools alongside the collection of first-hand survey data, the study provided an in-depth examination of international collaboration mechanisms under institutional barriers. This research contributes to a deeper understanding of how different industries respond differently to institutional disruptions, offering valuable support for both theoretical advancements and practical strategies in industry-specific studies within the broader context of GVC restructuring.

3. Practical Implications

The findings of this study provide important implications for both Chinese pharmaceutical export enterprises and economic policymakers. Coordinated efforts from both sides are essential to ensure the stability and sustainability of international collaboration.

For enterprises, the results highlighted two key priorities. First, enterprises should reinforce resilience by establishing organizational mechanisms focused on anticipatory and adaptive capacities. This include setting up international marketing department as an overseas monitoring system by forming emergency decision-making teams and promoting flexible supply chain configurations. Such departments enable enterprises to identify policy risks, plan proactively, and adjust rapidly. Second, enterprises should adopt differentiated approaches to maintaining and restructuring global collaboration. Existing GVC participation, grounded in established networks, is relatively stable and could progress incrementally. By contrast, GVC restructuring—such as entering new markets or reshaping cooperation networks—requires careful assessment of institutional distance, uncertainty, and stringency. Enterprises also need tailored compliance and entry strategies.

For economic policymakers, the results underscore their crucial role in shaping the external institutional environment for enterprises' internationalization. Proactive

measures in institutional design and policy support are required to ease the constraints imposed by institutional barriers. First, to reduce institutional uncertainty, policymakers in importing countries should enhance regulatory transparency and predictability by establishing clear approval procedures, setting explicit timelines, publishing policy roadmaps in advance, and ensuring consistent enforcement. Second, to alleviate compliance burdens under stringent regulations, the China government should provide compliance training and technical assistance programs, and subsidize part of certification costs. These measures would help enterprises adapt more efficiently to the high standards of importing countries. Third, to narrow institutional distance, policymakers should promote regulatory cooperation and standards harmonization with major trading partners. Initiatives such as convergence of international certification standards would reduce duplication in compliance requirements, thereby improving the institutional adaptability and efficiency of Chinese pharmaceutical exporters.

4. Limitations and Future Directions

Despite the theoretical contributions and empirical validation achieved in this study, several limitations remain that warrant further exploration in future research. First, this study did not distinguish institutional barriers across different export destinations (e.g., the U.S., EU, or regional markets). The interview and survey results revealed that many Chinese pharmaceutical exporters operate across multiple regions simultaneously, making such differentiation statistically unfeasible. Future research could conduct multi-group or country-level analyses to examine how institutional barriers differ across export destinations and how these differences influence enterprises' GVC participation and restructuring behaviors. Second, the measurement of key constructs relies primarily on perceptual survey data collected from managerial respondents. While this approach is consistent with established practices in economics and international business research and aligns with the research question, it may introduce potential subjectivity. Future studies could triangulate perceptual measures with objective trade data (e.g., enterprise-level export records, customs statistics) or policy indicators to enhance robustness. Multi-source data collection—such as combining managerial surveys with expert assessments—could further strengthen measurement validity. Finally, this study employed two single-item measures to capture vertical and horizontal GVC restructuring. While this approach offers simplicity and clarity in measuring specific and observable enterprise behaviors, it also limits the ability to

assess internal consistency and multidimensional validity. Future research could develop multi-item scales to more comprehensively capture the complex nature and varying degrees of GVC restructuring across enterprises.

REFERENCES

- Antoniou, F., Hatzipanayotou, P. and N. Tsakiris. 2024. "Regulatory stringency and emission leakage mitigation." *Environmental and Resource Economics*, vol. 87, pp. 1407-1424.
- Asmussen, C. G., Pedersen, T. and B. Petersen. 2007. "How do we capture 'Global Specialization' when measuring firms' degree of globalization?" *Management International Review*, vol. 47, pp. 791-813.
- Bennett, N. and G. J. Lemoine. 2014. "What a difference a word makes: Understanding threats to performance in a VUCA world." *Business Horizons*, vol. 57, no. 3, pp. 311-317.
- Berry, H., Guillén, M. F. and N. Zhou. 2010. "An institutional approach to cross-national distance." *Journal of International Business Studies*, vol. 41, pp. 1460-1480.
- Chatterjee, S., Chaudhuri, R., Vrontis, D., Dana, L.-P. and D. Kabbara. 2024. "Developing resilience of MNEs: From global value chain (GVC) capability and performance perspectives." *Journal of Business Research*, vol. 172.
- Chawla, I. and N. Kumar. 2023. "FDI, international trade and global value chains (GVCs): India's GVC participation, position and value capture." *Asia and the Global Economy*, vol. 3, no. 2.
- Cho, H. and S.-K. Kim. 2023. "Impact of Government Response to COVID-19 on the Role of GVC and Transportation." *Journal of Korea Trade*, vol. 27, no. 2, pp. 22-46.
- Chowdhury, M. M. H. and M. Quaddus. 2017. "Supply chain resilience: Conceptualization and scale development using dynamic capability theory." *International Journal of Production Economics*, vol. 188, pp. 185-204.
- Cieślík, E., Biegańska, J. and S. Środa-Murawska. 2016. "The intensification of foreign trade in post-socialist countries and their role in global value chains." *Acta Oeconomica*, vol. 66, no. 3, pp. 465-487.
- Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences (2nd edition)*. N.Y.: Routledge. <https://doi.org/10.4324/9780203771587>
- Conz, E. and G. Magnani. 2020. "A dynamic perspective on the resilience of firms: A systematic literature review and a framework for future research." *European Management Journal*, vol. 38, no. 3, pp. 400-412.
- Dacin, M. T., Goodstein, J. and W. R. Scott. 2002. "Institutional Theory and Institutional Change: Introduction to the Special Research Forum." *Academy of Management Journal*, vol. 45, no. 1, pp. 43-56.
- Danes, S. M., Lee, J., Amarapurkar, S., Stafford, K., Haynes, G. and K. E. Brewton. 2009.

- “Determinants of family business resilience after a natural disaster by gender of business owner.” *Journal of Developmental Entrepreneurship*, vol. 14, no. 4, pp. 333-354.
- Dess, G. G. and R. B. Robinson Jr. 1984. “Measuring organizational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit.” *Strategic Management Journal*, vol. 5, no. 3, pp. 265-273.
- DeVellis, R. F. and C. T. Thorpe. 2021. *Scale Development: Theory and Applications (5th edition)*. Sage Publications.
- Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P. and S. Kaiser. 2012. “Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective.” *Journal of the Academy of Marketing Science*, vol. 40, pp. 434-449.
- Donaldson, L. 2001. *The Contingency Theory of Organizations*. Sage Publications. <https://doi.org/10.4135/9781452229249>
- Duchek, S. 2020. “Organizational resilience: a capability-based conceptualization.” *Business Research*, vol. 13, pp. 215-246.
- Fan, Z., Peng, S. and W. Hu. 2023. “How does the regional comprehensive economic partnership affect the restructuring of global value chains?” *China & World Economy*, vol. 31, no. 3, pp. 140-172.
- Fornell, C. and D. F. Larcker. 1981. “Evaluating structural equation models with unobservable variables and measurement error.” *Journal of Marketing Research*, vol. 18, no. 1, pp. 39-50.
- Frederick, S. and G. Gereffi. 2011. “Upgrading and restructuring in the global apparel value chain: why China and Asia are outperforming Mexico and Central America.” *International Journal of Technological Learning, Innovation and Development*, vol. 4, no. 1-3, pp. 67-95.
- Gereffi, G., Humphrey, J. and T. Sturgeon. 2005. “The governance of global value chains.” *Review of International Political Economy*, vol. 12, no. 1, pp. 78-104.
- Gray, D. and K. F. Jones. 2016. “Using organizational development and learning methods to develop resilience for sustainable futures with SMEs and micro businesses: The case of the business alliance.” *Journal of Small Business and Enterprise Development*, vol. 23, no. 2, pp. 474-494.
- Hair, J. F., Ringle, C. M. and M. Sarstedt. 2011. “PLS-SEM: Indeed a Silver Bullet.” *Journal of Marketing Theory and Practice*, vol. 19, no. 2, pp. 139-152.
- Handley, K. and N. Limão. 2015. “Trade and investment under policy uncertainty: theory and firm evidence.” *American Economic Journal: Economic Policy*, vol. 7, no. 4, pp. 189-222.
- Henisz, W. J. and A. Delios. 2001. “Uncertainty, imitation, and plant location: Japanese multinational corporations, 1990-1996.” *Administrative Science Quarterly*, vol. 46, no. 3, pp. 443-475.
- Ji, X., Liu, Y., Wu, G., Su, P., Ye, Z. and K. Feng. 2022. “Global value chain participation and

- trade-induced energy inequality.” *Energy Economics*, vol. 112. <https://doi.org/10.1016/j.eneco.2022.106175>
- Johnson, R. C. 2018. “Measuring global value chains.” *Annual Review of Economics*, vol. 10, pp. 207-236.
- Kahiya, E. T. 2018. “Five decades of research on export barriers: Review and future directions.” *International Business Review*, vol. 27, no. 6, pp. 1172-1188.
- Kano, L., Tsang, E. W. K. and H. W. Yeung. 2020. “Global value chains: A review of the multi-disciplinary literature.” *Journal of International Business Studies*, vol. 51, pp. 577-622.
- Koopman, R., Wang, Z. and S.-J. Wei. 2014. “Tracing value-added and double counting in gross exports.” *American Economic Review*, vol. 104, no. 2, pp. 459-494.
- Korwatanasakul, U. and Y. Baek. 2021. “The effect of non-tariff measures on global value chain participation.” *Global Economic Review*, vol. 50, no. 3, pp. 193-212.
- Lengnick-Hall, C. A. and T. E. Beck. 2005. “Adaptive fit versus robust transformation: How organizations respond to environmental change.” *Journal of Management*, vol. 31, no. 5, pp. 738-757.
- Lengnick-Hall, C. A., Beck, T. E. and M. L. Lengnick-Hall. 2011. “Developing a capacity for organizational resilience through strategic human resource management.” *Human Resource Management Review*, vol. 21, no. 3, pp. 243-255.
- Levchenko, A. A. 2007. “Institutional quality and international trade.” *Review of Economic Studies*, vol. 74, no. 3, pp. 791-819.
- Li, X., Zhou, W. and J. Hou. 2021. “Research on the impact of OFDI on the home country’s global value chain upgrading.” *International Review of Financial Analysis*, vol. 77.
- Liang, F. and L. Cao. 2021. “Linking employee resilience with organizational resilience: the roles of coping mechanism and managerial resilience.” *Psychology Research and Behavior Management*, vol. 14, pp. 1063-1075.
- Limnios, E. A. M., Mazzarol, T., Ghadouani, A. and S. G. M. Schilizzi. 2014. “The resilience architecture framework: four organizational archetypes.” *European Management Journal*, vol. 32, no. 1, pp. 104-116.
- Lin, Y. and L.-Y. Wu. 2014. “Exploring the role of dynamic capabilities in firm performance under the resource-based view framework.” *Journal of Business Research*, vol. 67, no. 3, pp. 407-413.
- Linnenluecke, M. K. 2017. “Resilience in business and management research: A review of influential publications and a research agenda.” *International Journal of Management Reviews*, vol. 19, no. 1, pp. 4-30.
- Liu, Y., Tang, T., Ah, R. and L. Luo. 2024. “Has digital technology promoted the restructuring of global value chains? Evidence from China.” *Economic Analysis and Policy*, vol. 81, pp. 269-280.
- Liu, Y. and J. Yin. 2020. “Stakeholder relationships and organizational resilience.” *Management and Organization Review*, vol. 16, no. 5, pp. 986-990.

- Liu, Z. and Y. Deng. 2024. "Does Sino-US trade friction hurt corporate resilience? Evidence from Chinese enterprises." *Journal of International Trade & Economic Development*, vol. 34, no. 6, pp. 1309-1332.
- Luo, C. and N. Wang. 2025. "US-China trade frictions and supply chain reconstruction: Perspective from indirect links." *Journal of International Money and Finance*, vol. 151.
- Meyer, A. D. 1982. "Adapting to environmental jolts." *Administrative Science Quarterly*, vol. 27, no. 4, pp. 515-537.
- Meyer, K. E., Estrin, S., Bhaumik, S. K. and M. W. Peng. 2009. "Institutions, resources, and entry strategies in emerging economies." *Strategic Management Journal*, vol. 30, no. 1, pp. 61-80.
- Milberg, W. and D. Winkler. 2010. "Trade crisis and recovery: Restructuring of global value chains." World Bank Policy Research Working Paper, no. 5294. <https://doi.org/10.1596/1813-9450-5294>
- Nana, I. and M. P. Tabe-Ojong Jr. 2025. "Global value chain participation and economic growth in Africa." *Applied Economics*. <https://doi.org/10.1080/00036846.2025.2470439>
- Nayyar, R., Mukherjee, J. and S. Varma. 2022. "Institutional distance as a determinant of outward FDI from India." *International Journal of Emerging Markets*, vol. 17, no. 10, pp. 2529-2557.
- Netemeyer, R. G., Bearden, W. O. and S. Sharma. 2003. *Scaling Procedures: Issues and Applications*. Sage Publications.
- Pal, R., Torstensson, H. and H. Mattila. 2014. "Antecedents of organizational resilience in economic crises—an empirical study of Swedish textile and clothing SMEs." *International Journal of Production Economics*, vol. 147, no. part B, pp. 410-428.
- Parker, H. and K. Ameen. 2018. "The role of resilience capabilities in shaping how firms respond to disruptions." *Journal of Business Research*, vol. 88, pp. 535-541.
- Pei, R. and Z. Su. 2025. "Key Success Factors for Export Structure Optimization in East Asian Countries Through Global Value Chain (GVC) Reorganization." *Systems*, vol. 13, no. 1. <https://doi.org/10.3390/systems13010022>
- Peng, M. W., Wang, D. Y. L. and Y. Jiang. 2008. "An institution-based view of international business strategy: A focus on emerging economies." *Journal of International Business Studies*, vol. 39, no. 5, pp. 920-936.
- Pettit, T. J., Croxton, K. L. and J. Fiksel. 2013. "Ensuring supply chain resilience: development and implementation of an assessment tool." *Journal of Business Logistics*, vol. 34, no. 1, pp. 46-76.
- Pettit, T. J., Fiksel, J. and K. L. Croxton. 2010. "Ensuring supply chain resilience: development of a conceptual framework." *Journal of Business Logistics*, vol. 31, no. 1, pp. 1-21.
- Phillips, W., Roehrich, J. K., Kapletia, D. and E. Alexander. 2022. "Global value chain reconfiguration and COVID-19: Investigating the case for more resilient redistributed models of production." *California Management Review*, vol. 64, no. 2, pp. 71-96.

- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. and N. P. Podsakoff. 2003. "Common method biases in behavioral research: A critical review of the literature and recommended remedies." *Journal of Applied Psychology*, vol. 88, no. 5, pp. 879-903.
- Qiao, X. Y., Li, X. Y. and H. L. Zhu. 2024. "Study on the effect of trade frictions against China on the Restructuring of Global Value Chains under the New Pattern of Dual Circulation." *Management Review*, vol. 36, no. 2, pp. 27-39. http://123.57.61.11/jweb_gpl/CN/Y2024/V36/I2/27 (in Chinese)
- Qu, H., Ding, Z., Ahlstrom, D., Wu, C. and H. H. Cai. 2025. "When I have to versus when I am able to: Behavioral and resource explanations for firms' international expansion via exporting." *International Business Review*, vol. 34, no. 1.
- Schriber, S., Bauer, F. and D. R. King. 2019. "Organisational resilience in acquisition integration—Organisational antecedents and contingency effects of flexibility and redundancy." *Applied Psychology – An International Review*, vol. 68, no. 4, pp. 759-796.
- Sin, I. S.-M., Musa, N. A. and K. Y.-N. 2017. "Building business resilience through incident management body of knowledge (IMBOK™): The amalgamated framework for total resilient capability." *Global Business & Finance Review*, vol. 22, no. 1, pp. 38-50.
- Skiti, T. 2020. "Institutional entry barriers and spatial technology diffusion: Evidence from the broadband industry." *Strategic Management Journal*, vol. 41, no. 7, pp. 1336-1361.
- Song, T. and A. Cieřlik. 2023. "The role of global value chain participation in geographic concentration by export destinations: Empirical evidence from Chinese firm-level data." *Eurasian Geography and Economics*, vol. 64, no. 5, pp. 629-660.
- Song, Y., Sun, H. and R. Zhang. 2025. "The effect of global value chain governance on organizational resilience: A configurational approach." *Thunderbird International Business Review*, vol. 67, no. 4, pp. 513-530.
- Song, Y., Yu, C., Hao, L. and X. Chen. 2021. "Path for China's high-tech industry to participate in the reconstruction of global value chains." *Technology in Society*, vol. 65.
- Teece, D. J., Pisano, G. and A. Shuen. 1997. "Dynamic capabilities and strategic management." *Strategic Management Journal*, vol. 18, no. 7, pp. 509-533.
- Van Der Marel, E. 2015. "Positioning on the global value chain map: Where do you want to be?" *Journal of World Trade*, vol. 49, no. 6, pp. 915-949.
- Wang, L., Yue, Y., Xie, R. and S. Wang. 2020. "How global value chain participation affects China's energy intensity." *Journal of Environmental Management*, vol. 260.
- Wang, S., Li, Y., Nadeem, M. and M. Altaf. 2023. "Global value chains embeddedness for the energy efficiency: A panel data approach with country-level decomposition." *Sustainability*, vol. 15, no. 6.
- Wang, X., Liu, Z., Lv, Y. and C. Zhao. 2019. "Trade barriers and participation in the global value chain: An empirical study based on anti-dumping toward China." *China & World Economy*, vol. 27, no. 2, pp. 86-106.
- Wang, X., Wu, H., Li, L. and L. Liu. 2022. "Uncertainty, GVC participation and the export of

- Chinese firms.” *Journal of Economic Surveys*, vol. 36, no. 3, pp. 634-661.
- Welter, F. and D. Smallbone. 2011. “Institutional perspectives on entrepreneurial behavior in challenging environments.” *Journal of Small Business Management*, vol. 49, no. 1, pp. 107-125.
- Whitelock, J. and D. Jobber. 2004. “An evaluation of external factors in the decision of UK industrial firms to enter a new non-domestic market: An exploratory study.” *European Journal of Marketing*, vol. 38, no. 11-12, pp. 1437-1455.
- Zakery, A. and M. S. Saremi. 2025. “The role of dynamic capabilities in internationalization performance of technology-based firms in Iran.” *Journal of the Knowledge Economy*, vol. 16, no. 1, pp. 453-477.
- Zhang, X., Miller-Hooks, E. and K. Denny. 2015. “Assessing the role of network topology in transportation network resilience.” *Journal of Transport Geography*, vol. 46, pp. 35-45.
-

First version received on August 26, 2025

Peer-reviewed version received on October 15, 2025

Final version accepted on December 7, 2025



© 2025 EAER articles are distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, and provide a link to the Creative Commons license.

APPENDIX

Table A1. Summary of the Instruments with Sources

Variables	Items	Source
Institutional Distance	ID1. There are marked differences between China and other countries in terms of regulatory framework structures (e.g., drug registration and approval processes).	Peng et al. (2008); Berry et al. (2010); Levchenko (2007)
	ID2. There are significant differences among countries in certification and regulatory procedures (e.g., production process audits and quality management processes).	
	ID3. There are notable disparities among countries in pharmaceutical technical standards (e.g., drug testing methods and stability testing).	
	ID4. There are differences between the supporting requirements for market access in various countries (such as clinical trials, product labeling, packaging methods, etc.) and China's standards.	
Institutional Uncertainty	IU1. The import and export policies of the target countries change frequently.	Skiti (2020); Handley and Limão (2015); Berry et al. (2010); Nayyar et al. (2022); Peng et al. (2008)
	IU2. The implementation timelines and details of regulations in the target countries often undergo frequent changes.	
	IU3. There is inconsistency in the enforcement standards of regulations by government departments in the target countries.	
	IU4. The current trade conflicts have introduced significant uncertainty to the institutional environment and business activities.	
Institutional Stringency	IS.1 The technical, safety, or environmental standards in certain export target countries are significantly higher than those in China.	Levchenko (2007); Skiti (2020); Antoniou et al. (2024)
	IS2. The regulatory authorities in certain export target countries are extremely stringent in enforcing regulations.	
	IS3. Stringent institutional requirements have restricted the possibility of our products entering certain international markets.	
	IS4. We need to allocate substantial resources to meet the stringent certification and regulatory requirements of export countries.	
Level of GVC Participation (LEV)	LEV1. In recent years, how has the situation changed regarding foreign customers using the company's exported products for further processing or entrepôt trade (forward participation)?	Johnson (2018); Asmussen et al. (2007); Kano et al. (2020)
	LEV2. In recent years, what changes have occurred in the imported raw materials or intermediate products used by the company during its production process? (Backward participation)	

Table A1. Continued

Variables	Items	Source
	LEV3. In recent years, what changes have occurred in the specific stages of the international market division of labor (such as assembly, production, design, R&D, sales, etc.) in which the company participates? (Depth of participation)	
	LEV4. What changes have occurred in the company's export business volume in certain countries or regions? (Breadth of participation)	
	LEV5. Overall, how has the company's level of participation in international market operations changed in recent years? (Overall GVC embeddedness)	
	LEV6. Overall, how has the company's total export trade volume changed in recent years?	
Vertical GVC Restructuring	VER. Our company has made vertical adjustments to the value chain structure of its export business (e.g., increasing investment in high-value-added segments, reducing exposure to high-risk segments, and outsourcing certain production processes).	Milberg and Winkler (2010); Song et al. (2021)
Horizontal GVC Restructuring	HOR. Our company has conducted horizontal optimization of its overseas market layout (e.g., adjusting the export market structure, expanding the network of overseas subsidiaries, and restructuring supply chain partnerships).	
Anticipatory Capability	ANT1. Our company is capable of proactively identifying international policy or regulatory changes that may impact export operations.	Parker and Ameen (2018); Pettit et al. (2013); Chowdhury and Quaddus (2017)
	ANT2. Our company demonstrates strong risk awareness and is highly sensitive to capturing change signals in the export environment.	
	ANT3. Our company maintains a high level of risk awareness, enabling it to swiftly detect and respond to changing signals in the export environment.	
	ANT4. Our company consistently maintains a high degree of vigilance toward changes in the external institutional environment.	
Adaptive Capability	ADA1. Our company can handle impacts from international institutional changes.	
	ADA2. Our company can keep international supply chains continuous and cooperative.	
	ADA3. Our company can quickly restore normal operations.	
	ADA4. Our company can reorganize resources and make new business continuity plans.	