

Strategic coupling and institutional innovation in times of upheavals: the industrial chain chief model in Zhejiang, China

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For regions that are deeply integrated into the global economy, the question of how to remain competitive and resilient in times of uncertainty is a key concern. While strategic coupling is a useful concept for understanding local-global economic dynamics, the idea that a region can simultaneously couple into multiple production networks organised at different spatial scales and that regional actors can increase their autonomy by creatively combining different coupling scenarios has been little explored. This paper explores how regional institutional innovations can facilitate such multiple couplings. We focus on the industrial chain chief model in China's Zhejiang province, which emerged against the backdrop of the U.S.-China trade war and the COVID-19 pandemic. We argue that this institutional innovation offers a different way of thinking for regions that have long been exposed to the influence of globalisation, and that it increases the agency of local actors in global production networks.

Keywords: strategic coupling, industrial chain, China, globalisation, institutional innovation

JEL classification: O18, R11

Introduction

Regions today are facing two fundamental challenges. First, accelerated globalisation has meant that regions are increasingly exposed to the influence of extra-regional economic dynamics. And the global division of labour, which occurs for reasons of cost reduction, has led to various shifts in global production/innovation patterns over the last decades (Dicken, 2015). While such

global shifts have opened up opportunities for many regions of the world, they also pose significant challenges for other regions suffering from increased production costs, weakened innovation capacity, and depleted natural resources (Coe and Hess, 2011). Second, partly related to increasing globalisation, regions are now increasingly exposed to crises of all kinds, ranging from natural disasters, terrorism, wars, financial

crises to pandemics and other public emergencies. Due to increasing globalisation and accelerating mobility of goods and human capital, such crises appear to be increasingly contagious, with their effects quickly felt by actors in other parts of the world. The question of how regions can respond and adapt quickly in the context of such dual challenges to remain resilient and robust is obviously a thorny one, for which clear solutions have not yet been provided.

Rooted in the global production networks (GPN) literature, strategic coupling highlights that regions and clusters may gain developmental opportunities and realise value creation, enhancement and capture, by providing regional assets needed by global lead firms (Coe et al., 2004; Hassink, 2021; MacKinnon, 2012; Yeung, 2009a). While this perspective is indeed helpful to explain economic dynamics in certain sectors (e.g., apparel, electronics, computer, automotive, etc.) and different regions or countries (e.g., Asian Tigers), relatively little has been said about the impact of fundamental disruptions and crises on GPN reconfiguration and strategic coupling (Bryson and Vanchan, 2020; Yeung, 2021a). Moreover, conventional conceptualisation of strategic coupling, in which a region, based on its assets and institutions, is suggested to couple with a global leading firm based in the North, is problematic (for a similar argument see Fu and Lim, 2022), because it limits the scope of agency to local actors.

Against this background, this paper argues that shocks and crises may provide regions with windows of opportunity to change their coupling modes with the global lead firms, and they may also enable multiple couplings of a region to various production networks organised at different scales (i.e., regional, national, supranational and global production networks), if leveraged properly. However, in order to facilitate such multiple couplings in a region, institutional innovations and/or adaptations at the regional level are needed, as regional institutions are a crucial factor influencing the couplings between a region and lead firms (Coe et al., 2004).

In the remainder of the paper, we will show how institutional innovations can enable multiple coupling possibilities of a region that has long been integrated into the global economy. Specifically, we will examine the Industrial Chain Chief Model (ICCM) proposed by Zhejiang Province against the backdrop of the U.S.-China trade war and the COVID-19 pandemic, and its implementation in two Economic Development Zones (EDZs) characterised by different levels of GPN integration.

The paper proceeds as follows. ‘Regional development in times of uncertainty’ reviews the current state of research on strategic coupling and institutional innovations in times of uncertainty. ‘Regional development and provincial guidelines in ICCM in Zhejiang’ presents the background of the cases studied and introduces the ICCM working mechanism at the provincial level. ‘Research design and methods’ clarifies the research design and methods. ‘Industrial Chain Chief Model in Zhejiang: two examples’ elaborates the implementation of ICCM in two pilot programs in Wenzhou and Taizhou. ‘Theorising ICCM from an economic-geographic perspective’ then theorises the ICCM from an economic-geographic perspective. The last section concludes.

Regional development in times of uncertainty

Regions today are increasingly integrating into production networks and value chains organised by multinational corporations (Henderson et al., 2002). Such involvement in globalisation has brought enormous benefits to regions, especially in emerging economies, by allowing them to participate in the global division of labour and thus to extract value from serving global markets (Coe et al., 2004). However, such deep integration into the global economy has its downsides as well. Regions are now much more vulnerable to the occurrence of shocks and crises in other parts of the world, as the intertwined and interdependent relationships

between different parts of the global economy and the increasing interconnectedness of the world have made crises more contagious and have far-reaching effects (He et al., 2021). This section carefully examines strategic coupling as a key concept for understanding regional development under the influence of globalisation, as well as the relevance of regional institutional innovation in times of uncertainty.

Regional development in times of globalisation: strategic coupling as a heuristic?

Over the past two decades, the global production network (GPN) perspective, alongside the parallel perspective of the global value chain (GVC) or global commodity chain (GCC), has emerged as an influential approach to understanding how regional development is influenced by the global economy and its dynamics (Coe et al., 2004; Coe and Yeung, 2015; Henderson et al., 2002; Hess and Yeung, 2006). One of the key contributions of the GPN research has been to (re)conceptualise regional development as a process of strategic coupling between regional assets and the strategic needs of lead firms in GPNs (Coe et al., 2004; Coe and Yeung, 2015). Yeung (2009b, p.213) defines strategic coupling as ‘the dynamic processes through which actors in cities and/or regions coordinate, mediate, and arbitrage strategic interests between local actors and their counterparts in the global economy.’ According to this conception, regional assets in the form of specific kinds of technology/knowledge, organisation, and territory-specific elements such as natural resources, provide an important resource for regional development when used by regional institutions to complement the strategic needs of a global lead firm situated within a GPN.

Recent thinking on strategic coupling has evolved in several ways (Coe and Yeung, 2019; Van Grunsven and Hutchinson, 2016). First, it is increasingly recognised that regions can

couple to GPNs in multiple ways, depending on the intentions of global lead firms, as well as the local conditions of the host regions (Nilsen, 2017). In terms of understanding key actors that are important for strategic coupling, in addition to the prominent role of the global lead firms, local actors, especially the state and local firms also have major roles in the strategic coupling processes (Gao et al., 2017; Kleibert, 2014; Liu and Yang, 2013; Zhu and He, 2016). In the context of emerging economies, Zhu and He (2016) argue that it is especially important to take into account the role of local governments, as they often get involved in shaping the regional economy, as planners, developers and policy-makers.

Second, inspired by the evolutionary turn in economic geography, authors have sought to demonstrate how strategic coupling is a dynamic and evolutionary process, including not just strategic coupling, but also decoupling and recoupling (MacKinnon, 2012; Yeung, 2015). These studies examined the relationship between strategic coupling and different types of regions. MacKinnon (2012), for example, connects coupling, decoupling and recoupling processes to dynamic regional hotspots in North America and Western Europe, old industrial regions, and East Asian growth regions, respectively. In a similar vein, in the GPN 2.0 theorising, Coe and Yeung (2015) differentiated between indigenous coupling, functional coupling and structural coupling for core, emerging and peripheral regions, respectively. Empirically, many of the studies are (still) focusing on coupling creation between a region and a global lead firm (e.g., Dawley et al., 2019; Gao et al., 2017; Kleibert, 2014; Yang, 2009; Yeung, 2009a), highlighting the agency of local actors (especially the role of local state and institutions) in making such strategic coupling happen. However, there has been growing empirical evidence that decoupling and recoupling also occur in regions. Horner (2014), for example, helpfully distinguishes between structural and strategic modes of decoupling. In examining the

transformation of the cross-border production networks of the computer industry driven by Hong Kong and Taiwan-based TNCs in China, [Yang \(2013\)](#) suggests that regional path developments of the computer industry in China have been reshaped by TNCs' decoupling from source regions in coastal China and recoupling with inland provinces. Recently, more efforts have been made to connect strategic coupling with other key notions in evolutionary economic geography, to better understand regional economic development and to make GPNs more dynamic. [Boschma \(2022\)](#), for instance, examines what the evolutionary approach may offer to the overarching GVC/GPN literature. [Van Grunsven and Hutchinson \(2016\)](#) explore the evolutionary concepts of adaptiveness, adaptation and resilience in profiling the strategic coupling of southern Malaysia with the global electronics industry, while [Yeung \(2021a\)](#) and [MacKinnon et al \(2019\)](#) connect strategic coupling to the regional diversification and path development discussion, respectively.

While the aforementioned development in the strategic coupling literature has provided extensive insights into understanding regional development in the global economy, a key problem we see with the strategic coupling concept is its emphasis on the coupling between a host region and a single lead firm. While the phenomenon of a region integrating itself into the production network dominated by a single lead firm is not rare, in reality it is more often the case that a region is embedded in several production networks organised at different spatial levels, ranging from the global to the local. Such multiple couplings between a region and various production networks, however, has received little attention in the GPN literature. Closely related to this, the evolutionary thinking of strategic coupling tends to regard coupling, decoupling and recoupling as sequential ([MacKinnon, 2012](#)) which largely overlooks the fact that those dynamics might happen simultaneously, given that a region is often embedded in multiple production networks.

Another problem we see with the strategic coupling literature is that it is primarily concerned with GPN configurations and strategic coupling in normal times. Therefore, relatively little has been said on the impact of fundamental disruptions and crises and related globalisation in reverse on GPN reconfigurations and strategic coupling, and the role of both firms and non-firm actors therein ([Yeung, 2021b](#))¹. As pointed out by [Wei \(2010, 2011\)](#), GPN scholars' efforts to account for regional development from a strategic coupling perspective often encounter problems of situatedness and specificity, especially in times of uncertainty. [Bryson and Vanchan \(2020\)](#), also criticise the GPN work for being unable to analyse the new kinds of value and risk as revealed by the COVID-19 pandemic.

More prominently, until recently, very little attention has been paid to regional institutional responses or innovations to abrupt changes in places where there is a long history of GPN integration ([Nagy et al., 2021](#); [Urso et al., 2021](#)). This is an important gap as place-specific institutions are important factors in making strategic coupling happening ([Coe et al., 2004](#)). Therefore, when a crisis hits, whether or not regional institutions can respond and adapt themselves quickly to counterbalance the negative impacts of the crises on the coupling between a region and a GPN, is key to account for the resilience of the focal region ([Evenhuis, 2016](#); [Urso et al., 2021](#)). In the next subsection, the literature on regional institutional reactions to abrupt changes will be examined.

Regional institutional responses and innovations in times of uncertainty

Institutional stability and changes are important factors to consider when analysing regional economic performance ([Bathelt and Glückler, 2014](#); [Evenhuis, 2017a](#); [Rodríguez-Pose and Storper, 2006](#)). Especially in times of uncertainty, institutional reactions and innovations play fundamental roles in determining

the outcome of crises in different contexts (Bristow and Healy, 2014; Cabana et al., 2021; Hu and Yang, 2019). An institution-focused analysis enables scholars to identify local agents that are active in coping with the crisis, and to get a deeper understanding of crisis-related processes beyond the realm of market relations (Christophers, 2015; Evenhuis, 2017a, 2017b; Nagy et al., 2021). In regions where there is a long history of GPN integration, institutional responses to crises to enable the focal region to adapt and switch swiftly between production networks organised at different scales (regional, national, supranational and global production networks), for example, multiple couplings between a region and various production networks, are extremely important for the overall regional economic development. In this regard, potential institutional innovations may involve disrupting the old regulative systems that do not work, adjusting and maintaining the regional support systems to better meet the needs of the local firms, and/or creating new institutions to enable different coupling possibilities both in the short- and long-run (Bathelt and Glückler, 2014; van Grunsven and Hutchinson, 2016). Specific policy measures or new ‘ways of doing’ to mitigate the negative region-nation-globe economic and social dynamics, or the formation of new institutions to facilitate regional economic actors’ ability to reconfigure the economic activities in their region are often observed in times of crises (Cabana et al., 2021; Urso et al., 2021). One important aspect related to this is that such institutional responses and innovations usually require the joint effort of different interest groups (Cabana et al., 2021; Nagy et al., 2021). The institutional entrepreneurs that are active in creating, maintaining and disrupting certain institutional forms may come from industry, government or other social groups (Grillitsch and Sotarauta, 2020). Furthermore, such institutional responses and innovation often requires a mix of competencies (e.g., political, operational and analytical) and resources (systemic, organisational and

individual) (Cabana et al., 2021), and they may produce both short-term and long-term, as well as intended and unintended, consequences (Glückler and Lenz, 2016; Grillitsch et al., 2021).

It is also important to differentiate between ‘mechanisms’ and ‘patterns’ of institutional change in times of uncertainty (Evenhuis, 2017a). According to Evenhuis (2016), mechanisms refer to the *processes* through which actors drive institutional change, while patterns are the different *configurations* that institutional change may come to exhibit. With regard to mechanisms, the author distinguishes between three broad types including: 1) institutional change through reinterpretation and subversion from below (bottom-up); 2) institutional change by decree (top-down); and 3) institutional change through mutual consent between actors. Such mechanisms may give rise to various patterns of institutional change including layering, conversion, drift, displacement, exhaustion, recombination, churning, etc. (Evenhuis, 2016; Streeck and Thelen, 2005).

All in all, it is clear that strategic coupling is a useful heuristic to understand regional economic dynamics in times of globalisation. However, so far only limited attention has been paid to exploring how regions that have long been inserted into the GPNs develop institutional innovations in order to facilitate their multiple couplings with different production networks during and after crisis. Against this background, in the remainder of the paper, we will show an institutional innovation/reaction—the ICCM, which takes into account the multiple strategic coupling possibilities in the context of China’s Zhejiang Province in light of the U.S.-China trade war and the current COVID-19 pandemic.

Regional development and provincial guidelines of ICCM in Zhejiang

Regional development in Zhejiang: contexts and backgrounds

Zhejiang is a coastal province in China (Figure 1) that has experienced rapid economic growth since

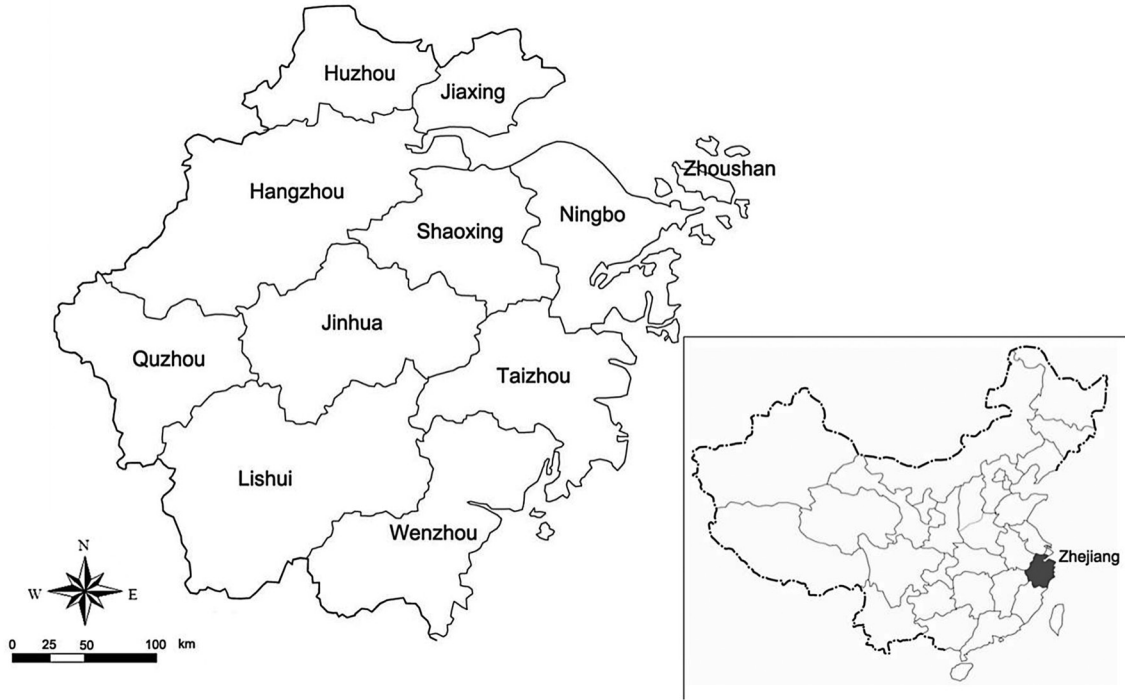


Figure 1. Location and administrative divisions of Zhejiang province, China.

reform and is known for its private enterprise-based Wenzhou model (Bellandi and Lombardi, 2012; Wu et al., 2015). It often ranks first among the provinces in various indicators of the overall strength of the private sector in China (Wu et al., 2015). In terms of the impact of GPN, regions and industries vary greatly in the extent to which they are exposed to the effects of globalisation. Some clusters (e.g., eye-wear, apparel, socks and hardware) have long inserted themselves as suppliers or original equipment manufacturers into the GPNs of brand-name companies based in Western countries and are therefore more sensitive to global market dynamics and international disruptions. In contrast, other clusters and industries (e.g., the pharmaceutical clusters) are less subject to the influences of TNCs, both in terms of production and innovation.

In the last forty years, the booming of Zhejiang's economy was accompanied by

the formation of three clusters: the emerging coastal Wenzhou-Taizhou cluster, the central Zhejiang cluster and the traditional Hangzhou-Shaoxing-Ningbo cluster (Wei and Ye, 2004).

In terms of state-business relations, because of the tradition of private capitalism and the strong influence of business, the Zhejiang governments tended to take a benevolent attitude toward private enterprises. Local governments have been very active in facilitating domestic and global networks, promoting urbanisation and economies of scale. In recent decades, there has been a shift in the perception of the role of governments, i.e., from 'non-interventionist governance' (Wenzhou model) in the 1980s to 'moderately active governance' (Yiwu model) in the 1990s to more recent 'active effective governance' (Hangzhou model) (Hu, 2018).

Despite tremendous growth, companies in the Wenzhou-Taizhou region are currently struggling to improve their ability to move

up the value chain. In labour-intensive industries such as textiles and apparel, global buyers tend to look for alternative suppliers and cheaper production sites to reduce costs (Zhu and He, 2016). A lack of innovation capability in knowledge-intensive industries is also hindering the further development of the regional economy. The need to improve innovation capability has been increasingly emphasised by industry players in order to survive cutthroat competition (Wu et al., 2018). In particular, the recent U.S.-China trade war and the ongoing COVID-19 pandemic have exposed the problems of many industrial clusters in Zhejiang, such as low value-added, weak innovation capability, heavy reliance on polluting production, etc. In this regard, the efforts of enterprises and non-economic actors (governments) to improve the value chain seem to be extremely important. The emergence of the ICCM in Zhejiang can be seen as one of the efforts of local actors to find better development opportunities in times of uncertainty.

Provincial-level guidelines of ICCM in Zhejiang

The ICCM is an institutional innovation that was proposed to address the challenges of regional industrial chain adaptation in times of uncertainty. Based on the expectation that the intensified global political tensions, as exemplified by the U.S.-China trade war, would most likely lead to increased disintegration and decoupling of global value chains, the Zhejiang Department of Commerce (DoC) issued a concrete guideline on ‘Suggestions on The Pilot Work in Implementing Industrial Chain Chief Model in Economic Development Zones’ (hereafter, Document 1) in August 2019, with the aim of strengthening, integrating and replenishing the local industrial chains in order to secure key products supply and achieve self-sufficiency. Since its publication, this guide has been implemented in many Economic Development Zones (EDZs) in Zhejiang, and

has helped to create the awareness of chain-like thinking in the coordination and integration of co-located enterprises. In early 2020, the outbreak of the Covid-19 pandemic led to severe fragmentations of many of the GVCs. EDZs in Zhejiang have been subject to different degrees of influence, depending on their dependence on export markets and foreign investments. In this context, the DoC issued a second document on ‘Notice on Further Implementing the Industry Chain Chief Model to Promote the Resumption of Production’ (hereafter Document 2), in order to support the resumption work in the EDZs during and after the pandemic. Although the ICCM was proposed against the backdrop of the U.S.-China trade war and the pandemic, the DoC also aims to make it a relevant working mechanism for regional industrial/cluster upgrading in the long run. As one key officer from the DoC claimed,

‘...we do not want our approach to be short-lived only during the crisis period... rather, we hope to turn it into a long-term effective mechanism that can also guide our work on industry upgrading in Economic Development Zones.’ (Government 2)

According to Documents 1 and 2, the main guidelines of the ICCM can be summarised as follows:

- Each EDZ in Zhejiang was required to identify an industrial chain with ‘strong characteristics, high international competitiveness and a comprehensive innovation support system’.
- In order to take advantage of the social capital of key officers in the specific regions, it was recommended that the main leaders of the territory where the EDZ is located, would play the role of ‘chain chiefs’, who aggregate and connect previously unconnected resources to serve the needs of the identified local industry. Key regional enterprises are supposed to be allocated the role of ‘chain owners’, who are supposed to be the main actors implementing value chain adjustment

and reconfiguration. Furthermore, directors of intermediaries, such as industry associations, are expected to play the role of ‘chain mentors’, who coordinate and interact directly with different enterprises along the identified industrial chain.

- Chiefs, owners and mentors should work together based on a set of shared goals and working mechanisms to increase the resilience of the local industry in highly uncertain times.
- The ICCM should be problem-oriented, aiming to solve challenges such as value chain ruptures, lack of directionality, low-value capture, low innovation capacities, and untargeted business-attraction strategies.

Under the guidance of the DoC’s ICCM Documents, many of the EDZs in Zhejiang specified their Pilot Programs in 2020. Two of them (the ICCM in the eyewear industry in Wenzhou and pharmaceutical industry in Taizhou) will be examined in greater detail after we introduce our research design and methods.

Research design and methods

This study applies a comparative case study approach (Eisenhardt, 1989, 2021; Yin, 2018). The selected cases include the eyewear industry in Ou Hai, Wenzhou and the pharmaceutical industry in Xianju, Taizhou, representing the ‘buyer-driven’ and the ‘producer-driven’ value chain (Gereffi, 1994), respectively. The former is characterised by low entry barriers (Gereffi, 2001), powerful retailers or brand name owners dominating the high-value added segments of the value chain by controlling the distribution, marketing and sales activities, while the most labour-intensive stages of the production process are relocated to regions with the most abundant and productive low-cost labour. In contrast, the latter has high entry barriers as its products require capital- and technology-intensive inputs supported by economies of

scale and its chain is mostly coordinated by powerful producers. The eyewear industry in Wenzhou is characterised by strong integration into the GVC dominated by Western brand names, operating in the most labour-intensive stages of the production process. In contrast, the pharmaceutical industry in Taizhou has been characterised by basic chemicals and intermediate suppliers to the global lead firms, with weak innovation collaborations and spillovers. Due to such different industry characteristics, we expect the focus of value chain reconfiguration to differ between the two industries in times of uncertainty. While a buyer-driven industry may focus more on new market exploration and expansion during/after a crisis, a producer-driven industry can focus more on value creation by improving the R&D capabilities of the relevant firms. Furthermore, the two selected industries are the most typical example of industries threatened by global trade uncertainty and under strong pressure to modernise in China’s coastal regions. Geographically, both selected industries are located in the emerging Wenzhou-Taizhou region, the representatives of the Wenzhou model. In that model, the production environment was organised based on the division of labour among independent producers specialised in one phase or one component of the final product, resulting in the ‘one township, one product’ feature observed in these towns (Bellandi and Lombardi, 2012).

This study is based on a mixed-method of in-depth interviews, analysis of media articles, and participation in conferences and forum discussions. First, 21 interviews were conducted in Zhejiang between August 2020 and January 2021 (see Table 1). We first approached a key official at the Zhejiang DoC to express our research interest, and with the introduction of this gatekeeper, we were able to access different actor groups both at the provincial and the county/district-level. We then conducted field trips to the two selected EDZs in Ou Hai district (Wenzhou) and Xianju county (Taizhou)

Table 1. Basic information of the interviewees

Interviewees	Functions
Provincial level governmental departments	
Department of Commerce of Zhejiang Province (Government 1)	Division of Economic Development Zones, director
Department of Commerce of Zhejiang Province (Government 2)	Division of Economic Development Zones, sector member 1
Department of Commerce of Zhejiang Province (Government 3)	Division of Economic Development Zones, sector member 2
Department of Commerce of Zhejiang Province (Government 4)	Division of Foreign Exchange, sector member
Glasses value chain, Ouhai, Wenzhou	
Ouhai Economic Development Zone Management Committee (Ouhai 1)	Director of Business Attraction
Ouhai Glasses Industry Association (Ouhai 2)	Deputy director
Hengda Optics (Ouhai 3)	Marketing director
Kaadas (Ouhai 4)	PR manager
ZonZen (Ouhai 5)	Senior manager
Tongda (Ouhai 6)	Senior engineer
Pharmaceutical value chain, Xianju, Jinhua	
Xianju Economic Development Zone Management Committee (Xianju 1)	Director
Xianju Economic Development Zone Management Committee (Xianju 2)	Deputy Director
Xianju pharmaceutical Industry Association (Xianju 3)	Director
Zhejiang Xianju Pharmaceutical (Xianju 4)	Marketing manager
Starry Pharmaceutical (Xianju 5)	PR member
Zhejiang XinNong Chemical (Xianju 6)	Engineer
Experts	
Zhejiang Gongshang University (Expert 1)	Professor in Management
Zhejiang University (Expert 2)	Professor in Regional Economics
Zhejiang Planning Institute (Expert 3)	Senior planner
Zhejiang Business Research Association (Expert 4)	Executive Chairman

respectively. We used snowball sampling to further recruit interviewees who could potentially contribute to our study by asking the key persons in the two EDZs for referrals. In addition to these site visits, interviews were also conducted with provincial government officials and scholars and experts from various organisations. The interviews mainly focused on 1) the influence of the trade war and COVID-19 on local industrial activities, 2) the challenges and problems in industrial upgrading and 3) the interpretation of the rationale for ICCM by different levels of policy makers, implementers and relevant enterprises.

In addition to this first-hand data collection, application materials for the ICCM pilot

program were provided to us by the two focal EDZs. In these application documents, detailed information about the EDZs, the key companies and their positions in the GPNs/GVCs, and the proposed working mechanism and operationalisation of ICCM were outlined by the management committee of the respective EDZs. In addition, the first author attended the '2020 China Development Zone Industry Chain Roadshow' and 'Industrial Chain Chief Model Forum' organised by the Zhejiang DoC in December 2020. Data collected from these different sources were triangulated, compared, intensively interpreted and discussed by the authors to produce robust results.

The data analysis started with the coding process. A three-level coding process was applied to the interview transcripts (Gioia et al., 2013). In the first stage, open coding was conducted in order to group together relevant themes from the interview transcripts. Then, the first-order primary codes were determined by comparing the results from open coding. In the second stage, the primary codes were compared and merged into axial codes (e.g., value chain disentangling, GVC diagnosis and value capture evaluation). After that, we merged the axial codes into theoretical accounts (i.e., theoretical codes, e.g., analysis of the value chain). The emerging narratives of the relevant value chain analysis and ICCM in both cases were then triangulated with secondary data and grey literature. This overarching scheme also serves as the structure to empirically organise the storylines of the two selected cases, as we show in ‘Industrial Chain Chief Model in Zhejiang: two examples’.

Industrial Chain Chief Model in Zhejiang: two examples

The ICCM in the eyewear industry, Ou Hai, Wenzhou

Development zone introduction

Ouhai EDZ was founded in October 1992 and approved as a provincial-level economic development zone by the People’s Government of Zhejiang Province in August 1994. There are more than 500 eyeglasses enterprises in the zone (all are privately owned), employing more than 60,000 people. From 2016 to 2019, Ouhai EDZ has added 36 innovative R&D institutions, including five eyeglass-related R&D centres and 1 technology centre. There are 59 above-scale industrial enterprises, among which seven had an industrial output value of over 100 mn yuan in 2019. Within the EDZ, there are 15 foreign enterprises, and 150 of the local firms are focused on foreign

trade. Around 90% of the glasses produced in Ouhai are sold to the European Union, South America and the United States. Leading local enterprises include oKo, Tongda, Topsight and Squacy Smart, specialising in multiple types of glasses.

Analysis of the Value Chain

Value chain disentangling

The value chain of the eyeglasses industry consists of upstream raw material production, midstream lens and frame production and downstream distribution and services (Figure 2). There are also closely related industries such as case packaging, testing equipment, etc. The upstream chemical and raw material producers for the eyeglasses industry are general chemical plants (providing parts such as screws, hinges, temples, rims, bridges, nose pads, pad arms, etc.) (Ouhai 4).

The midstream lens and frame design and production is the most profitable segment of the value chain. As an important part of eyeglasses, frames play a major role in supporting lenses and aesthetics, and frames in different shades, styles and materials have gradually transformed eyeglasses products from instrumental necessities to fashion goods. The ideal lens should not only have perfect optical properties, but also be UV-absorbing, impact-resistant and thin and light (Ouhai 1).

In terms of the downstream consumption segment, eyeglasses are semi-medical and experiential goods (Ouhai 4), consumers have a strong demand for experience before placing an order, so offline retail stores are the main sales channels, including large supermarkets, brand stores, hospitals, vision correction centres, etc. (Ouhai 5). With the development of the e-commerce, the online-to-offline (O2O) model has gradually emerged in the eyeglasses market in recent years, and the new retail model of ‘online + offline’ comprehensive services has taken shape lately (Ouhai 2).

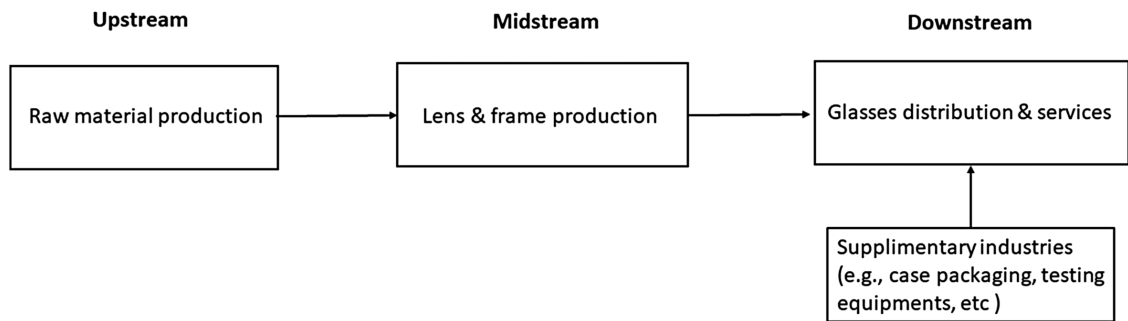


Figure 2. *The eyeglasses value chain.*

GVC diagnosis and value capture evaluation

In terms of its position in the GVC, ‘most of the Ouhai-based enterprises mainly produce low-cost, low-price and low value-added eyeglasses’ (Ouhai 1). The main enterprises in the region, such as oKo, Tongda, Tornado, all serve as Original Equipment Manufacturers (OEMs) for western brand firms, relying heavily on orders from foreign markets, although in recent years, some efforts have also been made in cultivating own brands in the region. The local glasses industry exhibits problems such as weak capacities in brand building, relatively weak R&D and design capabilities and a shortage of talent and designers (Ouhai 2, 3, 4).

Increasingly, rising material prices and labour costs in Ouhai have caused the local advantages of eyewear production as a labour-intensive industry to dwindle (Ouhai 1). In addition, many of the local enterprises are heavily dependent on export markets, making the local industry more vulnerable to global market disruptions. Since the international financial crisis in 2008, the general downturn in the eyewear sales market in Europe and the United States, especially in the luxury eyewear market, has been clearly felt by local enterprises (Ouhai 2). In addition, the trade war between the United States and China, as well as the impact of the global COVID-19 pandemic, have posed significant challenges to the local industry over the past year and a half (Ouhai 1, 3).

‘...problems such as the decline in foreign trade orders, delivery delays, hampered international distribution logistics, etc. have severe consequences for the business of many companies here.’ (Ouhai, 2).

In addition, the shift from export markets (which were shrinking) to domestic markets (which were growing stably) was not easy during the pandemic period, as it was extremely difficult for OEMs to establish their reputation as brand names in an already highly competitive market (Ouhai 3).

ICCM in Ouhai

In order to increase the resilience of the local industry to the potentially threatening effects of the crises and to facilitate industrial upgrading to create and achieve higher value in the post-crisis period, the Ouhai EDZ has defined its ICCM for the eyewear industry. It contains a clear division of labour between enterprises and the government, the main objectives to be achieved, and the specific strategies and actions to be taken by relevant stakeholders.

Main goals and division of labour

‘The overall goal of ICCM in Ouhai is to strengthen the long-term resilience of the local industry in order to reinforce the Ouhai eyewear cluster as the “capital of China’s eyewear industry”’ (Ouhai 1).

Based on this goal, the project focuses on three main objectives: Replenishment, strengthening and optimisation of the industrial chain to realise industrial upgrading and transformation. With the construction of the Zhejiang Eyeglasses Industry Innovation Service Complex, local stakeholders aim to further improve the innovation ability, intellectual production capabilities and clustering level of the co-located eyeglasses enterprises, ultimately promoting famous brands and well-known enterprise groups in the EDZ.

As for the division of labour, several chain chiefs with influential positions in the government are appointed to provide the resources needed for industrial upgrading and transformation. Ou Hai County Party Committee Secretary, Wang Zhenyong, and county governor, Zeng Ruihua, have been appointed general chain chief and chain chief respectively to supervise and guide the industrial chain upgrading and modernisation. The secretary of the Ou Hai EDZ Party Committee, Xu Jianyu, is the deputy chain chief in charge of the specific affairs. In addition, various government departments within the county have been assigned different tasks. As for the value chain owners, the leading regional enterprises such as Tongda, oKo, Topsight, Tornado, Squacy Smart, BD, Zhengda, Hengda, CARA, etc. are expected to actively adjust and transform their supply relationships to improve the overall resilience of their production networks. The director of the Management Committee of EDZ Ou Hai, Chen Hanyan, has been appointed as the mentor of the chain, to deal with local enterprises on a daily basis and fully comprehend the problems and challenges of the industry.

State and firm strategies and actions

Targeted measures and strategies are required to achieve the above objectives. Specifically, such measures target three key aspects, including value enhancement and capture, value chain adaptation and market formation.

Value enhancement and capture

In order to increase and capture value, companies (i.e., chain owners) strive to cultivate indigenous innovation capabilities, train and attract talents, build a common technological innovation platform, and increase the level of digitalisation of their own companies (Ou Hai 3 5 and 5). In addition, local authorities and officials (e.g., chain chiefs) provide services and promote regional innovation in areas such as talent attraction (providing better living and working conditions, establishing an eyeglass academy and business incubator, organising professional skills competitions and start-up competitions) and providing funding during the crisis (offering interest-free loans, subsidies, rent waivers, etc.) (Ou Hai 1). Furthermore, the industry association is expected to strengthen its role as a coordinator to encourage enterprises in the industry to strengthen cooperation and joint ventures, and explore the mode of 'multi-factory alliance' to strengthen networks among co-located firms (Ou Hai 2). Through the association platform, the industry aims to achieve the exchange of information and resources, change the traditional resource allocation model to enable the sharing of machinery and equipment, booths and production lines, and the construction of common technology platforms, etc. (Ou Hai 1, 2). The local government is also encouraging local enterprises to acquire global tier-one brand names in the form of government-enterprises-association cooperation to localise the global brand names and leverage the value created by these leading enterprises in the region.

'Ou Hai-based enterprises are now gradually moving to project-based cooperation with international brands, while vigorously cultivating their own brands and constantly improving complementary industrial chains' (Ou Hai 3).

The local government is also actively soliciting relatively mature enterprises from Shenzhen,

Hong Kong and Taiwan to locate in Ouhai. Finally, the three relevant parties are focusing on advancing the local industry by introducing smart glasses manufacturing. Here, high hopes are pinned on 5G technologies to fully promote digitalisation and intelligence (Ou Hai Pilot Program, 2020).

Value chain adaptation

Value chain adaptation is another area where different stakeholders can work together. In the context of ICCM, such value chain adjustment has both short-term and long-term dimensions. 'During the COVID-19 crisis, local production was significantly disrupted, first by the Chinese government's lockdown measures and later in other parts of the world' (Ou Hai 3). As a result, local authorities and associations had to make efforts to help enterprises to coordinate the supply of raw materials and key parts at different spatial levels. As an example, a company in the region manufactures mid- to high-end optical eyewear, and its supplier for frames and lenses is located in Japan. Due to international logistics disruptions, the company's supply chain was severely disrupted. After finding out about the problems, local officials and the association turned to another industrial park in Guangdong to ask for temporary supply of critical parts (Ou Hai 2).

'This type of temporary replacement of global suppliers with domestic ones was not uncommon in many industries in Zhejiang during the pandemic.' (Expert 3).

Moreover, such supply chain restructuring also occurred at the local level, as inter-provincial transportation was also disrupted for a period of time (Government 3). Such short-term supply chain restructuring also showed the vulnerability of the just-in-time logic prevalent in the modern GVC configuration (Expert 2). However, it is less clear to what extent firms in Ou Hai's eyewear industry will resort to the

just-in-case logic in the long run (i.e., more redundancy, more substitute suppliers, etc.), as this implies higher costs for local firms, thus weakening their competitiveness in the market (Ou Hai 6). In addition,

'...some small companies in Ou Hai that used to be OEMs for global companies have become OEMs for domestic companies based in Guangdong, Jiangsu, and other places in China, as shrinking demand in the Western market during the pandemic has greatly reduced orders from abroad.' (Ou Hai 1).

Again, only time will tell if such decoupling is a short-term phenomenon or if it will become something permanent.

Market formation

In terms of market formation, as mentioned above, the local industry has suffered from declining demand in the more mature markets in the global North since the financial crisis of 2008. In order to cope with the shrinking market in the global North and strengthen its competitiveness in the emerging and developing markets in the South, local players have adopted various strategies and measures. First of all, the development of e-commerce platforms (both at home and abroad) has led to fundamental changes in the marketing mode of the traditional manufacturing industry (Ou Hai 2). Ou Hai-based eyewear companies are now using various marketing channels such as networked retail 'offline + online', 'internet celebrity marketing' or 'live streaming commerce' (Ou Hai 2, 4, 6). In addition, many domestic companies have used the 'Belt and Road Initiative' to reach markets in the less developed countries in Southeast Asia and Africa, where demand for sunglasses and fashionable optical products is expected to increase (Expert 2). Many companies are also using the pandemic to specialise in high value-added niche markets and cultivate their own brands at

home and abroad (Ouhai 3). In addition, some companies also see product diversification (e.g., from traditional glasses to Augmented Reality (AR)/Virtual Reality (VR) glasses) as a potential growth opportunity (e.g., the Artificial Intelligence (AI)+AR smart glasses used in the COVID-19 pandemic for remote assistance, accurate recognition, and touchless interaction). During the pandemic, efforts have been made on the part of the government to organise online events to expand marketing channels for local companies.

ICCM in the pharmaceutical industry, Xianju, Taizhou

Development zone introduction

The pharmaceutical industry is one of the most research-intensive industries in the world. After more than six decades of development, Xianju has specialised in the production of steroidal drugs and intermediates, and has become the largest steroidal pharma manufacturing base in China. In 2019, the region's steroidal drug industry reached a production value of 7.377 bn yuan, an increase of 21.88% from 2016. In addition, the export value of the steroidal medicine industry in the EDZ was 2.158 bn yuan, with an average annual growth rate of 17.9% over the past four years, accounting for about 40% of the export volume of similar products in China (Xianju Pilot Program, 2020). Four local enterprises have been listed

on the stock market, and more than 5,000 employees have been hired in the whole industry chain (Xianju ICCM Pilot Program, 2020). In terms of innovation capacity, R&D expenditure of steroid pharmaceutical enterprises in the development zone reached 350 mn yuan in 2019, with an average annual growth of 13.7% over the past four years. There are 12 national high-tech enterprises in the EDZ, and local leading enterprises include Zhejiang Xianju Pharmaceutical, Starry Pharmaceutical and Junye Pharmaceutical (Xianju ICCM Pilot Program, 2020).

Analysis of the value chain

Value chain disentangling

The pharmaceutical value chain comprises several segments (Figure 3). The first is the production of basic chemicals such as diosgenin, phytosterol and other chemicals. These basic chemicals are then synthesised into extracts and intermediates that are used in active pharmaceutical ingredients (APIs). APIs are the main components of a drug that produce an effect. After that, substances known as excipients are combined with the APIs to transform a drug into a final pharmaceutical product (FPP) that is in a consumable form. Depending on their added value, APIs and FPPs can be classified into different types. For example, APIs can be divided into bulk APIs, specialty APIs and patented API, with patented APIs generating the

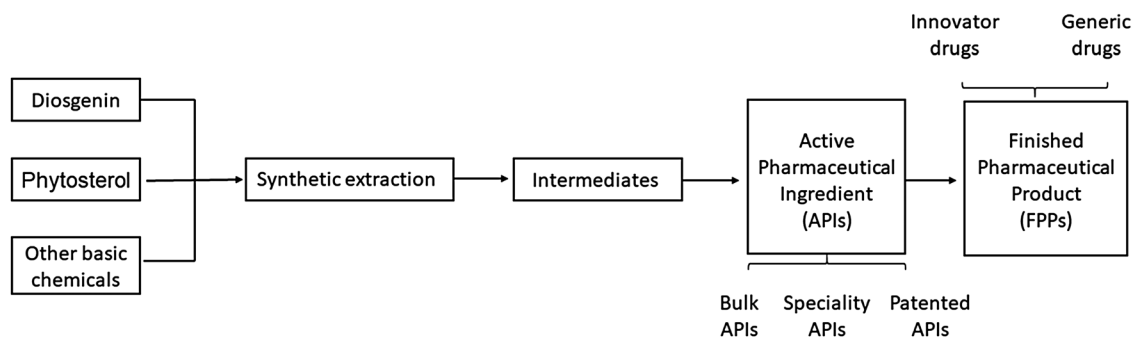


Figure 3. *The pharmaceutical value chain.*

greatest profit and bulk the least. In the case of FPPs, a distinction could also be made between innovator drugs and generics. While the former refers to newly manufactured drugs that enjoy patent protection (up to 20 years) and substantial profit margins, the latter refers to drugs manufactured from the same active ingredients when the patent expires. Generic drugs are cheaper because their manufacturers do not have to prove their efficacy and safety through clinical trials, as these are also conducted by innovators.

GVC diagnosis and value capture evaluation

Due to relatively weak R&D capabilities, much of the pharmaceutical production in Xianju is in the form of raw materials and intermediates used by downstream pharmaceutical companies.

‘The pharmaceutical industry in Xianju has long been limited to low- to medium-value-added activities, such as the provision of basic medicals and ingredients for international and domestic lead firms, without much knowledge transfer from those key buyers.’ (Xianju 3).

Although there are some important local companies specialising in APIs, most of their products are bulk APIs, while there are few specialty APIs (Xianju 2). Therefore, the overall value added is limited, and competition in the market is fierce. In addition, in the field of FPP production, there are only two local companies—Xianju and Starry—which have managed to produce some generic drugs (Xianju 1). The overall weak innovation capacity of local companies remains one of the main bottlenecks to a breakthrough in FPP manufacturing.

When asked about the impact of the COVID-19 pandemic, respondents said that despite the short-term challenges the COVID-19 pandemic posed to the overall healthcare sector (Xianju 3, 4), *‘demand for innovative and effective therapies continues to drive long-term growth’* (Xianju

6). Respondents indicate that local companies’ supply chains have remained largely stable during the pandemic. On the one hand, upstream raw material suppliers are primarily large domestic manufacturers of basic chemical products, and there is not much risk of supply disruption as the pandemic in China was well controlled shortly after its outbreak in Wuhan (Xianju 1). On the other hand, major local companies have established extensive cooperative relationships with well-known downstream pharmaceutical companies at home and abroad, such as MSD, Merck, Hengrui Pharmaceutical, etc., hence the sales market was not severely influenced. Although some companies’ export market has been affected to some extent due to transportation disruptions, this has not led to a comprehensive adjustment of the supply chain as the pandemic situation improves (Xianju 4, 5). However, from a value chain perspective, it is very difficult to break the existing value capture patterns, which are dominated by the world’s leading companies (Xianju 1, 3, 5). Most local companies are small and therefore have little ability to compete directly with their global or domestic competitors in terms of R&D spending and capabilities.

ICCM in Xianju

In order to facilitate the upgrading of local industry and free local enterprises from low value-added activities in the post-crisis period, Xianju EDZ has developed its ICCM in the pharmaceutical industry.

Main goals and division of labour

The development goal of Xianju medicine industry is to build competencies in the whole value chain of *‘key intermediates—speciality APIs—high-value FPP’* (Xianju Pilot Program, 2020). The focus is on strengthening the existing intermediates and API production, scaling up the production of high-value FPP and building a new value chain for innovative drugs, such as high value-added biopharmaceuticals. In terms of strengthening existing intermediates and

API production, efforts have been made to further improve the controllability of core technology and supply chain stability of key medical intermediates, increase the proportion of green products in bulk APIs and achieve significant breakthroughs in higher value-added specialty APIs. In scaling up high-value FPPs, the focus is on realizing 'APIs+FPPs' upgrading by supporting large-scale mergers and acquisitions of leading local companies on the one hand, and launching and developing generics whose patent protection has recently expired on the other. Finally, in building new value chains for emerging biopharmaceuticals, it is acknowledged that the site does not have all the prerequisites needed to create such a new pathway due to the high-tech, high-investment and high-risk characteristics of biopharmaceutical products. Therefore, a dual innovation strategy of 'innovation in central cities and production in Xianju' has been promoted. Specifically, Xianju has established innovation enclaves (i.e., R&D centres) in Shanghai and Hangzhou, the two central cities of pharmaceutical development in China, to benefit from knowledge spillover there (Xianju 2). Efforts have also been made at the local level to attract promising projects with high market demand, good development prospects and urgent clinical needs.

The ICCM in the Xianju pharmaceutical industry is under the direct management of the county governor, Lin Hong, who acts as the chief of the chain and pools all kinds of resources required for local industrial upgrading. The Xianju EDZ, together with many other county-level departments, is the main body for the execution and implementation of the ICCM pilot program. Chain owners, i.e., leading local enterprises such as Xianju and Starry, are expected to strengthen their R&D capabilities and move up the value chain for higher profit. They are also expected to further integrate their production networks in Xianju to increase the knowledge spillover and innovation performance of the local industry as a whole. Finally, the President of the Xianju Pharmaceutical

Industry Association has been appointed as the chain mentor of the ICCM, and an expert advisory committee, composed of well-known domestic and foreign scholars, technical experts, well-known entrepreneurs, think tanks and other institutions, has been established to provide suggestions to local players.

State and firm strategies and actions *Value enhancement and capture*

The occurrence of the 'patent cliff,' i.e., the potential sharp decline in revenue following the expiration of a company's patent for one or more leading products, has created opportunities and impetus for continued rapid growth in the generics market (Xianju 3). For Xianju-based pharmaceutical companies, this represents a potential opportunity for value enhancement. To realise value enhancement and capture, equal attention has been paid to improving indigenous capabilities and introducing exogenous anchor tenants. On the one hand, Xianju enterprises (i.e., chain owners) invest more in improving their own innovation capabilities, training and attracting talents, etc. (Xianju 4, 5, 6). It is argued that

'...continuously enriching and expanding product lines and expanding market size is the only way to stay competitive in the market' (Xianju 5).

On the other hand, high hopes are set on exogenous linkages and connections to improve local value creation. Emphasis is placed on the introduction of downstream high-end drug and FPP manufacturers making targeted investments, as well as attracting a number of well-known domestic and foreign pharmaceutical companies and overseas returnees to enable local innovation breakthroughs (Xianju 2, 3). Following the two innovation enclaves in Shanghai and Hangzhou, the Xianju government also plans to organise ten joint R&D demonstration projects each year. Emphasis is also placed on technologies such as Big Data

and artificial intelligence to reduce costs and increase the speed of drug development (Xianju 5). To facilitate value enhancement and capture, the local government and officials also support leading local listed companies to take advantage of the capital market and conduct ‘cross-regional and overseas mergers and acquisitions, patent introduction, and investment co-operation’ (Xianju 3).

Value chain adaptation

Pharmaceuticals is a highly globalised industry (Horner, 2014). Although Xianju is the main site for steroid APIs production in China, there is no international company in the region yet (Xianju Pilot Program, 2020). ‘Although the pandemic has not caused serious disruptions in the production networks of local companies, local industry has come under severe pressure due to the absence of key players in the downstream high-end segments of the value chain in our county’ (Xianju 3). Therefore, the main goal of Xianju-based actors in terms of value chain adjustment is to attract leading enterprises from home and abroad to the region. To realise this goal, Xianju EDZ has carefully compiled a panoramic map of the steroidal medicine industry chain that comprehensively shows the distribution of leading enterprises, key platforms, and well-known research institutes at home and abroad (Xianju Pilot Program, 2020). Based on a deep understanding of the local conditions, relevant stakeholders also calculate the degrees of match between these external organisations and Xianju’s industrial development, and thus carry out ‘targeted business attraction’. Moreover, local stakeholders also continuously innovate their business recruitment models. For instance, through the matchmaking of local export-oriented enterprises, and by holding international pharmaceutical conferences, exhibitions and forums, the Xianju EDZ is now negotiating with some multinational pharmaceutical companies to locate part of their production in the region (Xianju 2). The local

business attraction team also targets a number of Indian, American, European, and Japanese firms to carry out contract manufacturing in Xianju (Xianju 1).

Market formation

In terms of market development, the local government encourages enterprises to continuously optimise their product export structure and strengthen their competitiveness in emerging and developing markets (Xianju 2). At the same time, local enterprises also aim to improve their ability to export more value-added specialty drugs to more demanding markets. Nowadays, export-oriented local companies also actively participate in international pharmaceutical industry forums and other exchange activities to gain access to new products, key technologies, production licenses and distribution channels, and other information that will strengthen their ability to enter foreign markets (Xianju 3, 6). Considering the ageing population and the increasing improvement of the healthcare system in China, Xianju-based companies also aim to increase their market share in the domestic market by developing and launching more generic drugs. In addition, the COVID-19 pandemic can be seen as the opportunity of the century for biopharmaceutical developments, as it could increase the demand for prescription biopharmaceutical drugs and vaccines, thus boosting the development of the biotechnology industry. In this context, Xianju-based players are actively seeking biotech contract manufacturing at home and abroad (Xianju 3).

Theorising ICCM from an economic-geographic perspective

Based on the analyses above, we will now theorise the ICCM in Zhejiang from an economic-geographic perspective. We focus on two key aspects, namely, the relevance of strategic coupling and the role of regional institutional

innovation for multiple couplings in times of uncertainty.

Production network reconfiguration: moving beyond classic strategic coupling perspective

In terms of applying strategic coupling concept in explaining Zhejiang’s regional industrial development and upgrading in times of uncertainty, we share the criticism of previous scholars (e.g., Wei, 2010, 2011), that the classic strategic coupling perspective alone cannot fully explain regional economic adaptation in times of uncertainty. As has been shown in the cases of Ouhai and Xianju, their value chain reconfigurations are not solely dependent on TNCs/MNCs. On the contrary, regional upgrading can be realised through introducing and cultivating production networks that are organised at different spatial scales ranging from the global (i.e., the GPN of another global lead firm), to the supranational (i.e., Asian production networks), and the national and subnational levels. In addition, large home market as well as booming emerging markets (e.g., countries along the Belt and Road Initiatives) also offer significant potential for different coupling possibilities, as has been reported in the two studied cases. Therefore, we argue here that

the conventional strategic coupling proposition (left half of Figure 4, adapted from Coe et al., 2004) needs to be revised in the context of China and many emerging economies in times of uncertainty (right half of Figure 4). This implies that regions should go beyond the concept of single strategic coupling (i.e., a region integrates into the production network of a single leading firm) that is prevalent in the GPN literature and look for opportunities for multiple couplings into different production networks organised at different spatial levels. Such multiple couplings are often the aggregated result of coupling, decoupling and recoupling taking place simultaneously.

Our two case studies have provided some initial insights on how such multiple couplings may be possible. In the case of Ouhai, which is characterised by a deep integration into an established GPN (led by brand names based in industrialised countries) and a strong focus on mature markets (North America, Europe), the directions of adaptation are to shift to domestic and other emerging/developing markets along the ‘Belt and Road Initiative’. In contrast, the Xianju pharmaceutical industry is characterised by a low position in the global pharmaceutical industry and weak R&D capabilities in the downstream FPP production. The direction

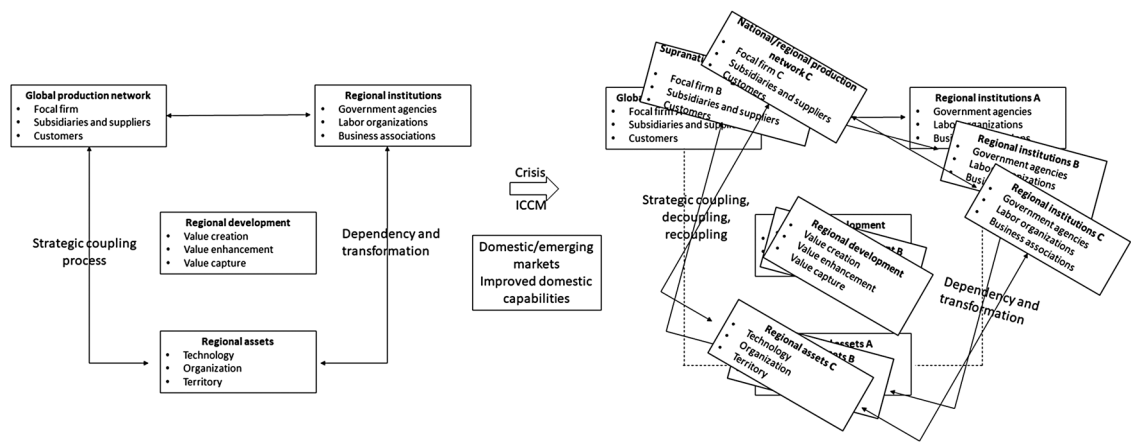


Figure 4. Reconceptualizing coupling in times of uncertainty.

of adaptation, therefore, is to attract leading domestic and foreign (both in developed and emerging countries such as India) players to the locality. This reconceptualisation is important, as it broadens the scope of agency for local actors in host regions. While inserting into the GPNs that are organised by global lead firms could potentially bring developmental opportunities for emerging and developing regions, it is not the only way in which regional industries could realise their upgrading and resilience-building goals (Fu and Lim, 2022; Wei and Liao, 2013; Zhou, 2008). This reconceptualisation also has implications for the discussion of regional development in the post-crisis world, as it provides more development scenarios (i.e., multiple recoupling possibilities) that a region could consider based on regional preconditions as well as global, supranational, national and subnational industrial dynamics. The idea that multiple strategic couplings can happen simultaneously and regional actors can increase their autonomy in the global economy by creatively combining different coupling scenarios is an important lesson that different regions can learn from the ICCM in Zhejiang.

Regional institutional innovation in times of uncertainty

Although it was initially proposed by the DoC in Zhejiang, the ICCM is an institutional innovation that features a mutual consent between actors (i.e., a mutual consent institutional innovation according to Evenhuis, 2017a). Institutional responses and innovation are important for regional economic reconfiguration in times of uncertainty (Evenhuis, 2017a). Particularly for regions linked to global lead firms through GPNs, whether or not a region can find effective institutional solutions to address crisis-induced fractures and enable regions to embark on multiple couplings with various production networks organised at different scales, is critical to the development of the focal region. The ICCM, by its very nature, is

an institutional innovation aimed at addressing such (expected) fracture problems. However, it is more than that: as our empirical work has shown, it can potentially be used as an effective approach to facilitate regional upgrading both during and after the crisis if operated properly. The working mechanism of the ICCM is illustrated in Figure 5.

The overall goals of the ICCM set by local actors for the regional economy and value chains include strengthening the weak segments of existing activities, extending the value chains, replenishing the missing pieces and building new chains and networks with higher value added (Figure 5). In order to achieve such goals, different actors need to be involved. The two ICCM pilot programs examined in this paper have clearly stated the division of labour amongst different actors according to their resources endowments and capabilities. In this regard, governments/officials, businesses and intermediaries are assigned the roles of aggregators (chain chiefs), adaptors (chain owners) and coordinators (chain mentors), respectively. The state is particularly important,³ not only because of its considerable resources and powers in various fields (financial, legal, symbolic, and intellectual), but also because of its unique position in facilitating networks and interactions and transforming institutions that work. Firms, on the other hand, are the main adaptive agents in times of crisis. Such a clear division of labour is helpful for coordinating the different groups of actors, as each actor involved understands the role of the other and knows who and where to turn to when new problems arise.

The different roles assigned to the various groups of actors are also relevant to the core of the ICCM, i.e., the specific strategies and actions in the processes of value enhancement and capture, value chain adaptation and market formation. Importantly, there needs to be a consensus among the involved parties that companies should be the main actors adapting their activities in times of uncertainty. Ultimately, it is the aggregate capabilities of individual

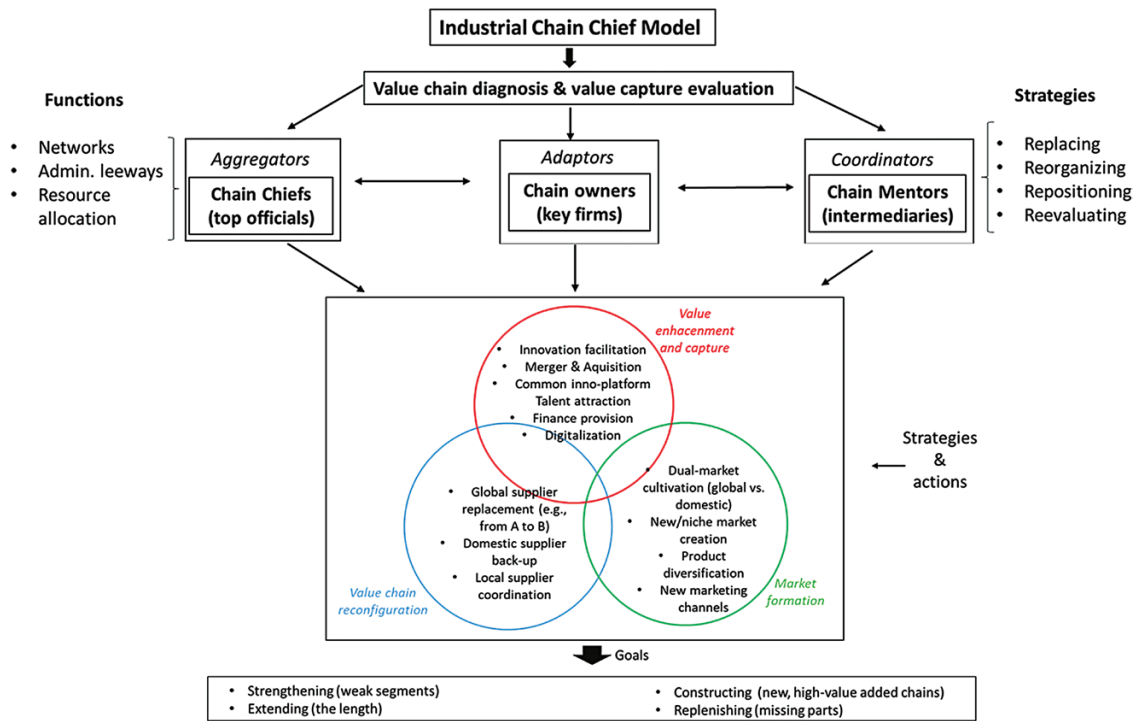


Figure 5. ICCM working mechanism.

companies in the areas of innovation (and thus value creation and capture), reconfiguration of the value chain and formation of new markets that determine whether or not a regional industry can be successfully transformed. The state, on the other hand, should support and facilitate this adaptation and transformation, but not intervene directly in the economic activities of companies. As shown in the case of Ouhai eyeglasses industry, the supportive role of the regional state was very important for the short-term recovery, as politicians could use their networks and resources to restart local production as soon as possible. Local governments can also provide services and important resources such as funding and social capital, and facilitate collaborations. However, in the long-run, it is firms' innovative capabilities that really matter to the development of the regional economy.

Overall, the mechanisms by which the ICCM leads to a broadening of the playing field (see

Figure 4) and an increase in the scope of action of local actors in developing linkages between their region and production networks (Figure 5) can be summarised as follows: The ICCM model emphasises the agency of local actors and leads to stronger linkages and better coordination among these local actors (e.g., local politicians, key companies, and intermediary organisations), which in turn contributes to better coordinated and targeted 'policies and actions' when it comes to attracting outside investors and leading companies. In addition, the ICCM encourages regions to look for alternative production networks organised by companies from the region, within China, and from other emerging or developing economies, and to seek promising new markets (i.e., domestic or emerging) to diversify their embeddedness in different production networks, rather than continuing to depend on existing world lead firms and the markets that regions have been

serving for decades. The expected outcome, of course, is that local actors will have more control over their region's integration into different production networks.

Critical appraisal

While such efforts by regional actors to break new ground in times of uncertainty are to be applauded, it is equally important to recognise that many such institutional innovations which emerge in times of uncertainty are complicated and spontaneous, and thus can have unintended consequences (Glückler and Lenz, 2016; Grillitsch et al., 2021). A thorny issue related to the ICCM is the balance between market forces and government intervention with respect to the construction of supply chains by local key firms. The long-established spatial distribution of global production networks is the result of market forces (Coe et al., 2004). Although the ICCM clearly shows that local authorities and key businesses are eager to gain more autonomy/control over the parts of the GPNs that are embedded in their region, the success of such efforts is not guaranteed. While no particularly critical voices were raised on this issue in our interviews with local stakeholders, some scholars and experts have expressed concern about 'wrong decisions' made by key stakeholders (Wang, 2021). Therefore, questions such as 'How can the likelihood of key decision makers making wrong decisions be reduced?' and 'What are the effective mechanisms to prevent government overregulation?' need to be asked systematically before other regions emulate this approach. In addition, conflicts and asymmetric power relations are also likely to arise in the prioritisation of which regional industrial chains to select for such ICCM implementation. Implementing ICCM in a region also places high demands on regional institutional capacity and quality of governance (Rodríguez-Pose and Zhang, 2020). In other words, ICCM will not function effectively in regions where government effectiveness and

accountability are low, corruption rates are high and property rights protection is weak (Rodríguez-Pose and Di Cataldo, 2015). While we assumed that the two selected 'buyer-driven' and 'producer-driven' local industries should have different emphases in reconfiguring their value chains in times of uncertainty due to the different challenges they encounter, we, however, did not find much difference in the ICCM specified in the two EDZs in terms of where the focus of the ICCM should be placed. Rather, both cases seem to highlight generic strategies and actions (i.e., value chain reconfiguration, value creation and capture and market formation). The question of how to combine the general features of ICCM with region-specific contexts to develop tailored ICCM for different regions (Gong and Hassink, 2020) will remain a key challenge for local implementers.

Conclusion

For regions that are deeply integrated into the global economy, the question of how to remain competitive and resilient in times of uncertainty is a key concern. Through a careful examination of the ICCM working mechanism in Zhejiang province and its specification in two EDZs with different degrees of integration into the existing GPNs, this paper argues that the conventional conceptualisation of strategic coupling, in which a region is suggested to couple with a global lead firm based in the North, is problematic. Namely, it limits the scope of agency for local actors. Looking more closely at the directions of value chain adjustment of the eyewear industry in Wenzhou and the pharmaceutical industry in Taizhou, it is clear that the scope of action for local actors is much larger than the conventional thesis of strategic coupling would suggest. Regional actors can not only insert themselves into a fixed GPN, but also proactively reconfigure and reshape production networks on several levels, from the global (insertion into another GPN) to the

supranational (introduction of inter-national production networks) to the national/regional level (cultivation of domestic production networks). Moreover, the discussion on regional institutional innovations/reactions in times of uncertainty is especially relevant for regions that have long been integrated into GPNs, and thus deserves more attention. Overall, the ICCM pilot programs, as an institutional innovation, are highly relevant to other regions, as they provide new thinking about the division of labour among different regional stakeholder groups, as well as the goals, directions and strategic actions needed by different stakeholders in reshaping the regional economy. However, as noted above, special care must be taken when applying such an emerging approach to other regions, as there are many difficult issues that must be balanced and carefully considered before the ICCM can be effectively implemented. All in all, the idea of combining strategic coupling and regional institutional innovations in times of uncertainty should be promoted in future regional development research, especially for regions that have long been subject to the influence of globalisation.

Endnotes

¹ The GVC literature has paid more attention to the impact of such crises and disruptions on

certain GVCs (i.e. the resilience of GVCs), however, they usually focus on the national or global scale (e.g., Cattaneo et al., 2010; Gereffi, 2020; Jüttner and Maklan, 2011), and relatively less has been said on regional actors' reaction to such ruptures, even less so on regional institutional reactions. Although there is an emerging literature on the effects of COVID-19 on clusters (Boehme et al., 2021; Mendoza-Velázquez and Rendón-Rojas, 2021; Shin et al., 2021), that literature does pay little attention to regional actors' reactions.

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