

Research on the Development Path of International Supply Chain Hub City Based on the Manufacturing Industry in Chengdu



Qi Jiang^{1,*}, Yutao Gan¹ & Xin Deng¹

¹Southwest Jiaotong University Hope College, China

Abstract: Chengdu, following China's development vision, endeavors to evolve into an international supply chain hub centred on manufacturing. By developing an all-encompassing logistics hub that bridges domestic and global supply chains, it aims to facilitate seamless transactions and goods circulation, exemplified by the China-Europe Railway Express project. Bolstering its status as a national logistics hub of multiple types-land port, airport, production and trade services-Chengdu supports advanced manufacturing industries, including electronics, equipment, pharmacy, new materials, and green food. Despite modest trade volumes compared to leading cities, its foreign investment in manufacturing exceeds and foreign trade has grown significantly. To enhance its position, Chengdu must deepen the integration of logistics with manufacturing, leverage its regional connections, especially with the US, Europe and Asian neighbors, and learn from best practices in logistics hub development. The city's journey towards becoming an international supply chain hub requires continuous improvement in infrastructure, strategic alignment, and fostering an environment conducive to global commerce.

Keywords: Chengdu; International supply chain hub city; logistics hub; manufacturing

1. Introduction

According to the official document of Chengdu's long-term development vision, to build an efficient modern circulation system, Chengdu will be oriented towards the needs of enterprises, create an international supply chain hub, and provide enterprises with integrated logistics supply chain services from domestic to international ends, production ends, and sales ends. Chengdu is committed to accelerating the construction of the Chengdu International Supply Chain Hub for China-Europe Railway Express. The development of advanced manufacturing industry is also mentioned in this document. Besides, to promote the deep integration of logistics with the three industries, we will strengthen the supply chain logistics system of the advanced manufacturing industry. There are development goals to promote the deep integration of the modern logistics industry with the advanced manufacturing industry, promote the application and construction of production service-oriented national logistics hubs, and build an advanced manufacturing

supply chain system supported by key industries such as electronic information, equipment manufacturing, pharmaceutical health, new materials, and green food. It can be seen that building Chengdu into an international supply chain hub for the manufacturing industry is in line with the development direction of Chengdu's economic and comprehensive transportation and logistics industry, and it is also an important goal in the plan of the year 2021 to 2025.

Another document about the logistics hub construction plan of China also indicates that Chengdu will be an important city in the future national hub construction layout. Building a good national logistics hub lays a solid foundation for exploring how Chengdu will develop into an international supply chain hub city.

2. Literature Review

There are few research literature on international supply chain hub cities in China. Sun and Li (2018) proposed the concept of "international supply chain hub cities", studying the conceptual and characteristic differences between supply chain node cities and supply chain hub cities. Zhang (2018) analyzed the value and function of Guangzhou in the

Corresponding Author: Qi Jiang
Southwest Jiaotong University Hope College, China
Email: 542004265@qq.com

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global supply chain from the perspective of the global supply chain system, and proposed countermeasures and suggestions for Guangzhou to build a hub node of the global supply chain system. Xiang et al. (2020) analyzed the feasibility and inevitability of Hainan Free Trade Port becoming an international supply chain hub and proposed suggestions from the perspective of “industry+trade+finance+logistics”. More domestic research literature focuses on international logistics hubs. Li et al. (2020) deeply explored the concept and connotation, functions and characteristics of production service-oriented national logistics hubs, as well as their development mechanisms and models. Chen et al. (2020) deeply interpreted the concept, connotation and characteristics of port-based national logistics hubs, analyzed their functions from various aspects, and proposed construction models. Li et al. (2021) redefined the concept of airport-type national logistics hubs, conducting a systematic analysis of their features and introducing fresh perspectives on the development mechanisms and principles of these hubs. Li et al. (2022) proposed countermeasures and suggestions for the innovative development of logistics hub cities by taking Dazhou as an example. Tian and Huang (2020) proposed the operational mechanism of innovative development of supply chain hub cities, and put forward suggestions for innovative development of various levels of supply chain hub cities.

There are few studies on the definition of supply chain hubs abroad, and they focus on the construction of international logistics ports. Wang and Cheng (2009) studied the challenges of Hong Kong's transformation from a freight hub city to a global supply chain management center based on the value chain. Foreign research focuses more on the research on the location and construction of global logistics hubs. Yang and Chen (2016) compared the competitiveness of three major international hub ports in Northeast Asia and proposed 20 evaluation criteria for global logistics hub ports in five dimensions. Lee and Yang (2003) proposed a development strategy for how to build Incheon Airport in South Korea into a super hub integrating transportation, logistics, and international business. Lee et al. (2009) used SWOT and multi-factor decision analysis methods to construct a method for selecting the location of global logistics hubs.

It can be seen that there is a wealth of research on logistics hubs both domestically and internationally, but there is a lack of research on supply chain hubs, and there is little research on

individual cities and analysis of the impact on specific industries. In the context of economic globalization, Chengdu currently ranks among the top in China as an international logistics hub. However, there is still a lack of corresponding construction in the role of an international supply chain hub. So it is of great significance to study how Chengdu can become an international supply chain hub city, especially its impact on Chengdu's manufacturing industry.

3. Methodology

This research mainly investigates Chengdu's current economic status, Chengdu's logistics hub development based on international supply chain hub development, and analyzes especially the current development of Chengdu's manufacturing industry. According to the current status, this research comes out with some suggestions for Chengdu to develop into an international supply chain hub city.

4. Empirical Analysis

4.1. Overall of Chengdu's economy

Chengdu, the capital city of Sichuan Province in southwestern China, has been regarded as a new first-tier city since 2013. The regional Gross Domestic Product (GDP) for Chengdu grew from 147.08 billion US dollars in 2013 to 309.5 billion dollars in 2022, an increase of 2.1 times.

In terms of the scale of foreign investment utilization, the actual total amount of foreign investment in Chengdu fluctuated in recent ten years from 2013 to 2022, with a cumulative total of 88.37 billion US dollars, specially for manufacturing is 25.57 billion US dollars (Figure 1), which in comparison with other top cities in Figure 4. In terms of foreign trade scale, the total import and export volume of Chengdu increased from 50.58 billion US dollars in 2013 to 125.34 billion US dollars in 2022, an increase of 2.48 times (Figure 2).

In a horizontal comparison, the overall scale of Chengdu's trade flows is relatively small, lagging behind cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Suzhou, Chongqing, and China's Hong Kong SAR (Figure 3). The proportion of Chengdu's foreign trade volume in the national total has increased from 1.22% in 2013 to 2.00% in 2022, reflecting growth in Chengdu's role in the national foreign trade development, although its dominant position still needs to be strengthened.

The distribution of foreign trade flows can to some extent reflect Chengdu's regional connections within the global supply chain system. The main

regions for Chengdu’s foreign trade imports and exports are Asia, North America, and Europe. The largest import markets in descending order are the United States, China’s Taiwan Province, South Korea, Vietnam, and Japan, while the top export destinations

in descending order are the United States, Malaysia, Vietnam, the Netherlands, and China’s Hong Kong SAR. This indicates that the primary directions of Chengdu’s international trade are towards the United States and neighboring Asian countries.

Figure 1. Actual Foreign Investment of Chengdu (2013-2022)

[Source: Chengdu Statistical Yearbook 2012-2023]

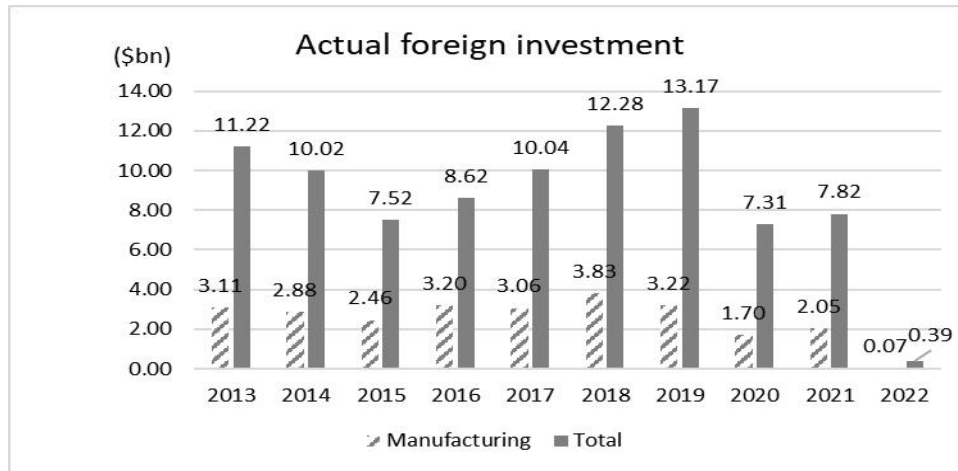


Figure 2. Total Value of Import and Export of Chengdu (2013-2022)

[Source: Chengdu Statistical Yearbook 2012-2023]

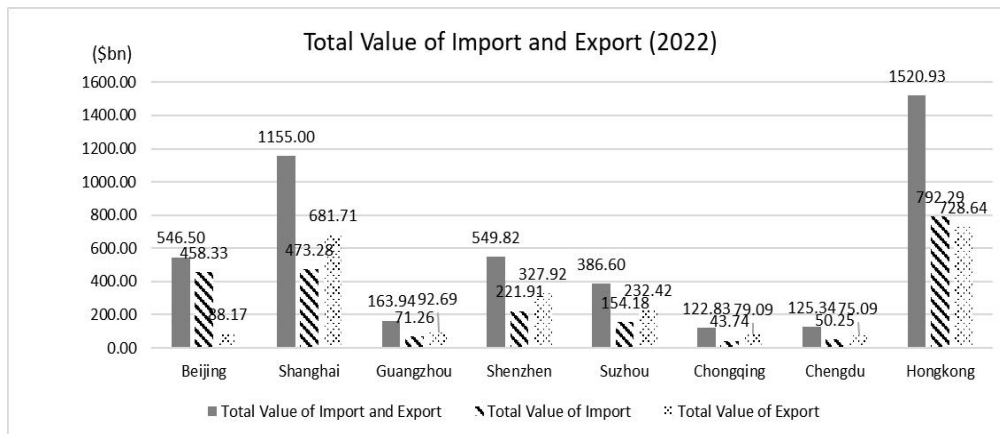


Figure 3. Foreign Trade Situation of Chengdu and Other Major Domestic Cities (2022)

[Source: Chengdu, Beijing, Shanghai, Suzhou, Chongqing, Guangzhou, Shenzhen, Hong Kong (China) Statistical Yearbook 2023]

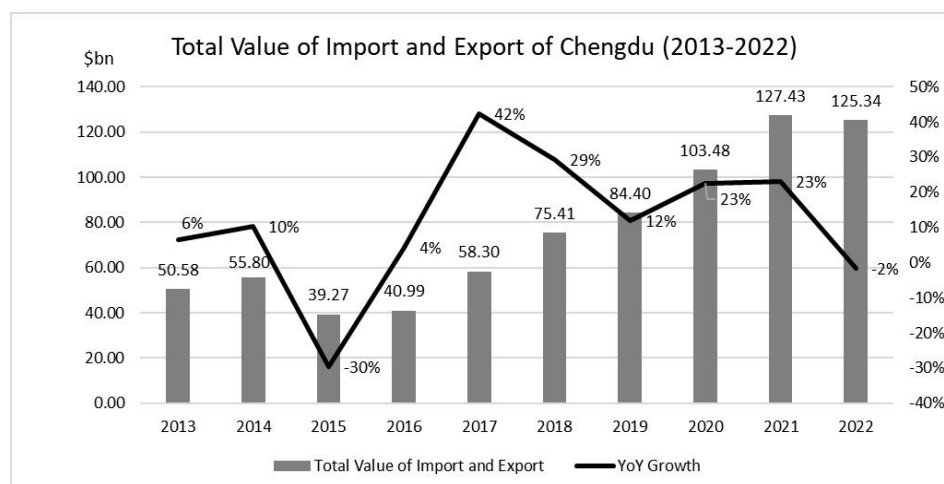
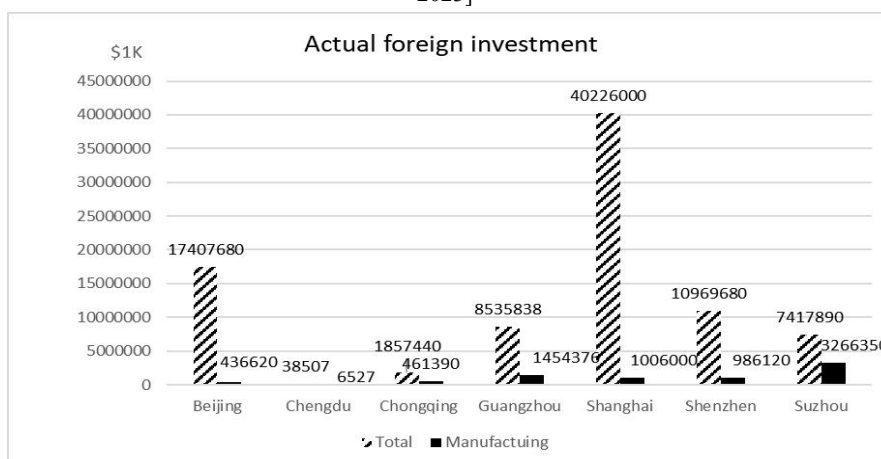


Figure 4. Actual Foreign Investment of Major Cities (2022)

[Source: Chengdu, Beijing, Shanghai, Suzhou, Chongqing, Guangzhou, Shenzhen, Hong Kong (China) Statistical Yearbook 2023]



4.2. Global logistics hub development of Chengdu

In the national plan for logistics hub construction, Chengdu is one of the national logistics hub cities, mainly developing land-port type, airport-type, production-oriented service type, and trade and business service-oriented type.

To develop a land-port logistics hub, Chengdu mainly developed an international railway port, named Chengdu International Rail Port. The freight system of it has developed a “one-main-multiple-secondary” structure, where the Chengdu Railway Container Center Station serves as the primary hub, supported by auxiliary ports including the Dawan Town Station, Huaizhou New City Station, the South Cargo Airport Terminal Station, and the Huangxu Station in Deyang. It has a “7+11+5” international logistics framework that includes seven international trunk railways, eleven domestic trunk railways, and five regional branch railways.

For the airport-type logistics hub development, Chengdu Air Hub has two international airports, Tianfu International Airport (TFU) and Shuangliu International Airport (CTU), covering a total land area of 9.83 square kilometers. It systematically integrates four fundamental functions: trunk airline transportation, regional distribution and delivery, multi-modal transshipment, and international logistics services, along with eleven extended functions, including cold-chain logistics, cross-border e-commerce, express logistics, aircraft materials logistics, and pharmaceutical logistics. As of the end of 2022, the Chengdu Air Hub had handled approximately 590,000 tons of air cargo throughput.

The Chengdu Production-Oriented National Logistics Hub is established according to the national

layout and construction plan for logistics hubs, with the aim of reinforcing Chengdu’s role as a core city in the western region and a strategic fulcrum in the national logistics framework. This type of logistics hub focuses on providing efficient and integrated logistics services to the manufacturing sector, closely intertwining logistics processes with production activities, thus reducing corporate costs and enhancing production efficiency, while fostering the development of industrial clusters. The construction of it encompasses improvements to infrastructure, integration of logistics resources, promotion of logistics technology innovation and informatization, as well as optimization of supply chain management. Typically, it consists of multiple logistics parks, warehousing centers, distribution centers, and multi-modal transport facilities, offering convenient cargo consolidation, storage, sorting, distribution, processing, and information services to both domestic and international enterprises. This further strengthens Chengdu’s ability to radiate internally to the southwestern region and externally connect with international markets.

The Chengdu Business Services-Oriented National Logistics Hub is a strategic logistics center designed to facilitate commercial activities and enhance logistical efficiency for businesses operating in the region and internationally. This type of hub specializes in providing extensive logistics services tailored to meet the demands of large-scale trade and consumption activities, serving as a critical juncture for the distribution, storage, transfer, and value-added services related to goods traded domestically and abroad. By leveraging its geographical location, existing infrastructure, and market access, this hub plays a pivotal role in connecting different modes of transportation to create a seamless multi-modal

logistics network. It supports local, nationwide and international trade flows, contributing to the overall economic development and competitiveness of the region. In practice, such a logistics hub would typically include state-of-the-art warehousing facilities, wholesale markets, bonded zones, cold-chain logistics, and specialized areas catering to the needs of large professional markets and urban consumer markets. Integrating these elements, can foster an environment conducive to the growth of commerce and help streamline the flow of goods throughout the supply chain, ultimately bolstering the city's standing as a key player in the global marketplace.

4.3. Manufacturing industry of Chengdu

For the manufacturing industry, there are 32 industrial parks in Chengdu. They interact with 2 main international airports TFU and CTU, and 1 international railway port Chengdu International Railway Port, which can help to transport around the world. Till the end of 2022, there are 4391 industrial companies in Chengdu, which contribute around 283 billion US dollars in gross operating revenue. The major industrial products include steel products, crude steel, mobile communications handheld devices, electricity generation, chemical fibers, synthetic detergent, cigarettes, beverage alcohol, soft drinks, compound feed mixtures and chemical pharmaceuticals raw medicines.

5. Conclusions

From the overall economic status, the total value of imports and exports of Chengdu is still far below other international supply chain cities, like China's Hong Kong SAR, Beijing, Shanghai, or other manufacturing cities like Suzhou. Chengdu is still in its growth into an international city, not only in its overall economy as well as its supply chain. Besides, as we can see in **Figure 4** foreign investment in Chengdu is far below that in other cities, especially in manufacturing. Those, to build an international supply chain hub city still need more investment. Therefore, a better infrastructure can attract more investors across the world.

Currently, Chengdu is still on its way to building different types of logistics hubs. We can tell that for four kinds of transportation modes, Chengdu as an inland city has its limitations in building water transport. So Chengdu's logistics supply capacity needs to expand.

For the manufacturing industry, Chengdu now has some industrial parks, but still far from a manufacturing city. Developing a

production-oriented service-type logistics hub can help its growth from end to end. However, Chengdu's production-oriented service type logistics hub is still expanding from basic conditions, such as reliable economy and developed transportation. So first of all, it needs the manufacturing enterprises, logistics enterprises and government departments to lead.

As a result, there are some suggestions for Chengdu to become an international supply chain hub city.

(1) Attracting Investment: To attract more investment for both logistics and manufacturing, which can prompt the development of industries by driving the aggregation of key elements such as trade flow, logistics, information flow, capital flow, and human flow.

(2) Infrastructure Strengthening: Continue enhancing its transportation infrastructure, including air, rail, and road networks, to facilitate seamless logistics and efficient movement of goods between domestic and international destinations.

(3) Developing Multi-modal Transport: By leveraging platforms such as the China-Europe Railway Express (Chengdu) to increase connectivity with key markets in Asia, Europe, and beyond, making it a critical node in the Belt and Road Initiative, which addresses the deficiencies of inadequate water transport options.

(4) Logistics Efficiency Improvement: Improving logistics supply capacity, and streamlining logistics operations by reducing costs, improving efficiency through advanced technology and modern systems, aiming to become a vital distribution center for international production factors, information resources, and logistics.

(5) Improving Logistics Financial System: Good supply chain financial services can not only solve the financing problems of small and medium-sized enterprises, and promote stable and in-depth cooperation between enterprises, but also drive the continuous expansion of the scale of the production service-oriented national logistics hub.

(6) Policy Support and Innovation: Implementing supportive policies and fostering innovation to nurture a business-friendly environment conducive to multinational corporations and SMEs operating in various sectors, thus deepening participation in global supply chains.

In summary, Chengdu's approach to becoming a global supply chain hub city encompasses broad-based economic diversification, infrastructure upgrades, strategic international partnerships, and

innovative policy frameworks that collectively contribute to its integration into the world's economic fabric.

However, this research still has some limitations, it takes an overview of Chengdu's logistics hub development and its manufacturing status, but lacks the analysis of their combinations and distinctions, especially from a quantitative point of view. For further study, it's better to define indicators for the logistics industry and manufacturing sector, and establish a model to analyze a city's completeness of the manufacturing supply chain system. Besides, this modal could be applied to all kinds of cities that would like to build an international supply chain hub.

Conflict of Interest

The authors declare that they have no conflicts of interest to this work.

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