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Name: Zhaonan Zhang

Supervisor: Ronald Wall

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The Story behind the Hu-Line: FDI and City Competitiveness Analysis of 54 Chinese Major Cities

Zhaonan Zhang

P.R. China

Supervisor: Dr. Ronald Wall

Summary

In China, cities in the eastern coastal area are performing better than those in the rest according to the Chinese "Annual Report on Urban Competitiveness 2011". The main objective of this thesis is to identify the specific location factors attracting foreign investments in the coastal and inland areas of China. In order to achieve this aim, FDI networks need to be established between Chinese and foreign cities aiming to seek powerful FDI receivers. More FDI relations would point to an existing attractive quality, or location factor, for investors. Thus, after ensure the relations between FDI and location factors, the determinant factors can be identified.

The type of this research is exploratory in nature. A quantitative approach is introduced in this thesis and the methods involved analyses existing database by two analytical software *Ucinet* and *SPSS*. Secondary data are collected from "FDImarkets.com Database", Chinese "Annual Report on Urban Competitiveness 2011" and "China City Statistical Yearbook 2003-2011". FDI networks will be established for six regions of China by using the *Ucinet*. From this procedure, regional star cities (sample cities) will be identified. At last, multiple regression models in the "SPSS" will be applied for addressing which location factors of the sample cities are determinant for foreign investments in coastal area and inland area respectively.

After the analyses, 54 regional star cities are identified. For the coastal cities, two first-class location factors play dominant in driving FDI, which are talent competitiveness and openness competitiveness. Determinant second-class location factors under the talent and openness competitiveness are resulted as human resource scale, status of labour market and humanities openness. For the inland cities, three first-class location factors are driving foreign investments, which are talent competitiveness, openness competitiveness and comprehensive location competitiveness. The most important second-class location factor under these three first-class indicators is the natural location convenient degree. Both the talent and openness competitiveness function most in attracting foreign investments in the coastal and inland areas.

In terms of research findings' illustrations, the talent competitiveness reflects the quality and quantity of labour force which also determines the market size, while, the openness competitiveness indicates the economic, social and cultural relations with regions and nations. According to the results of the second-class indicators analyses, it shows that foreign enterprises focus more on the total scale of labour, the number of high-quality labours and cultural proximity. However, for the inland cities, natural location convenient degree is the only key factor, which is explained as whether a better vantage point a city locates among the urban agglomerations and the distance a city away from lakes, rivers or seas. With regard to the undeveloped Chinese cities, the above determinant location factors need to be improved so as to attract more foreign investments.

Keywords: China, inland cities, coastal cities, FDI, location factors.

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Abbreviations

FDI: Foreign Direct Investment

HK : Hong Kong

LQ: Location Quotient

MduCG: Municipality directly under the Central Government

ME: Million Euros

MNE: Multinational Enterprise

OECD: Organisation for Economic Co-operation and Development

VIF: Variance Inflation Factor

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Chapter 1: Introduction

This chapter offers the background story for this thesis, covering unbalanced development in China under the famous Hu-Line. It outlines the specific situation in China's economic development in the problem statement. The main research objective will be addressed in this chapter, as well as the research questions. The significance, scope and limitations of this research will also be discussed.

1.1 Background

In China there is a magic line called the *Hu Line*, also called the *Heihe-Tengchong Line*; it begins in the border city, Heihe, in northeast Heilongjiang province and ends in Tengchong County, on the southwest border, in Yunnan province. The area east of the line (marked red in figure 1) accounts for 43.18 percent of China's total land area, 93.77 percent of the total population, and 95.70 percent of the total GDP. The remaining area west of the line is larger, covering 56.82 percent of the total land area, but hosts only 6.23 percent of the population, and produces 4.3 percent of the total GPD (National Bureau of Statistics of China, 2000). Despite being drawn in 1934 by Hu Huanyong for the *Distribution of China's Population*, the proportions remain unchanged: at that time, the east accounted for about 96 percent of the total population, and the west for about 4 percent. Nowadays, the area east of the *Hu Line* is considered more developed, consisting of most of northeast China, the Bohai coastal region, the middle territory and some of southwest China, and the whole of southeast China. The remaining part, known as the Big Northwest, is considered to be underdeveloped.

Figure 1: the Hu-Line

Source: (Lew, 2007)

In 1978, China implemented a significant policy- *reform and open*- and opened its gates to foreign investors; the east prospered the most as a result. Guangdong and Fujian, two southeast coastal provinces, were the first to experience the effect of these new policies in conducting foreign economic activities. One year later, in July 1979, four coastal cities- Shenzhen, Zhuhai, Shantou and Xiamen- located opposite of Hong Kong and Taiwan in southeast China, formed a special economic zone known for attracting foreign investment and offering advanced technology and management studies. By April 1984, another 14

coastal cities opened up to the world. The Bohai coastal region, Yangtze river delta, Pearl river delta, and Minjiang delta were successively opened, to form into a coastal economic zone in the coming couple of years[1]. Since then, coastal China has witnessed significant growth in both living standard and economic development. Foreign direct investment (FDI) played a key role in China's 30 years' *reform and open* policy, bringing in the capital, enhancing spill over effectiveness, generating millions of job opportunities, and also strengthening China's ties with the world economy. Today, more cities and regions have opened up to foreign firms and foreign investment, and the coastal area, rather than the mainland, has been chosen as the destination market. The success of the *reform and open* policy proved itself contagious, affecting the southwest, middle, northeast and northwest of China. The topography allowed for an extensive transportation network that made the transfer of capital, labour, technology and skill more effective.

According to the 2006 five-year plan for the national economy and social development of China, a regional development strategy has been implemented that includes four important economic regions. The northeast region- Heilongjiang, Jilin, Liaoning and northeast part of Inner Mongolia (illustrated in pink in figure 2) - is developed under the *Northeast Area Revitalization Plan*. The Eastern Coastal region (marked in beige) is the most developed in China, covering Beijing, Tianjin and Shanghai three MduCGs, and provinces like Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan. This region is also the main scene for China's economic and political reform, especially the Guangdong province. Middle, or Central China (marked in light orange) consists of six provinces- Shanxi, Henan, Anhui, Hubei, Hunan and Jiangxi-, which are undergoing the *Rise of Central China Plan*. The remaining area (marked in light red) is the largest, general western area of China, which consists of 11 provinces, or autonomous regions, and one MduCG Chongqing. A *develop-the-west* strategy has been running in this area since 2003.

Figure 2 China's Economic Regions
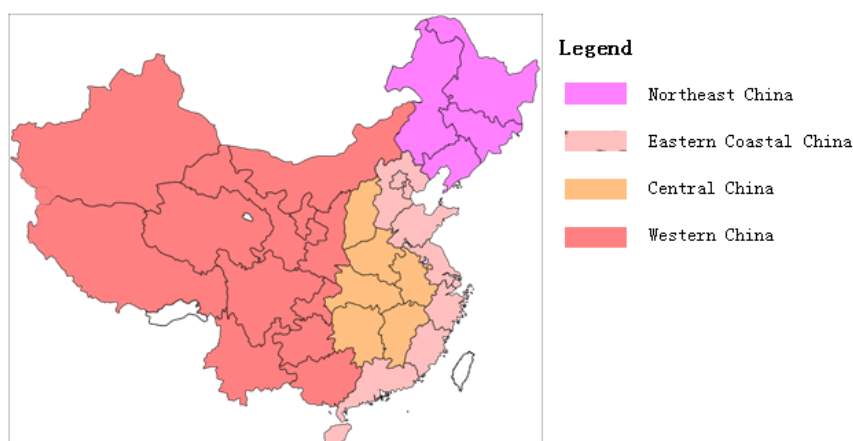
Source: Zhaonan, 2012

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[1] http://www.gov.cn/jrzg/2008-11/24/content_1158273.htm

The distribution of China's Economic Regions perfectly illustrates the Hu-Line; one can easily distinguish between the more developed east from the less developed west.

From the inception of the *reform and open* policy in 1978 to the year 2011, China's GDP per capita had increased from $225 to $5,000. In 2010, China surpassed Japan in total GDP, becoming the second largest economic powerhouse in the world. By 2011, 50 percent of China's total population resided in cities, which was 30 percent more than in 1978 (China Statistics Year Book, 2011). China was the second largest destination market, attracting global FDI disguised as 1,158 foreign projects in 2010, 13 percent more than in 2009. The 2010 investment package injected $77.17 billion into the Chinese economy, generating 305,615 jobs. Financial services, industrial machinery, equipment and tools, and software and IT were the top sectors for FDI in China in 2010 (FDI Global Outlook Report, 2011). Living standards have increased considerably, especially in the east due to the catalyst that was the *reform and open* policy.

Figure 3 Deng Xiaoping- the mastermind behind the *reform and open* policy in China.

(Source:(Anon.,) http://www.hntbm.com/zhuanti/ys/index.html)

The southeast coast, after 30 years of reformation and openness, saw more and more foreign enterprises build plants and invest in China. Such investment projects have been regarded as engines of local economic development, since they are considered to be the thread linking cities through capital, knowledge and skill. The Chinese government adopted "enhancing the ability to attract foreign direct investment" as a constant policy and an imperative indicator of government officers' performance. The success experienced in east coastal China could not have been achieved without the spill over effects of FDI.

The 2011 Chinese Urban Competitiveness Report indicates that the top 80 cities of China are located on the coast, and that only a few are from the surrounding regions of the *Hu-line*. As pioneers of the *reform and open* policy, coastal cities kept receiving FDI for decades, developing faster, and becoming noteworthy competitors within China and the global market.

1.2 Problem Statement

In China, according to public opinion, the term *large city* is an important indicator when assessing a city's development level; *large* implies a larger land area and a bigger population. In Heilongjiang province in northeast China, Harbin is the province's leading capital city, and is referred to as a *large city*, ranking 41st in the 2011 Chinese Urban Competitiveness Report. As the second largest city in Heilongjiang province, Qiqihaer ranked 200th, which surprised its residents. In the nearby province Jilin, the situation is similar: the *large city* Changchun, also a province capital, ranked 39th, and other large cities in Jilin ranked far lower. From the annual report, it is easily deduced that in northeast China, the term *large cities* does not refer to competitive cities. Tables turn in other parts of China: in the coastal provinces, capital cities are not the only dominant ones within their domain. Among the top 80 cities, Shenzhen ranked 4th, Qingdao 11th, Foshan 12th, Dongguan 14th, Suzhou 15th, Wuxi 17th, Xiamen 22nd, Baotou 27th(Ni, 2011), and so forth - none of which are province capitals. Ipso facto, in the coastal area of China, cities other than the province capitals are significant competitive. Through the analysis of different factors attracting FDI in the coastal and other provinces of China, the question of why coastal cities perform better than others can be answered.

1.3 Research objectives:

The main objective of this research is to identify different location factors that attract investment in different regions of China. Thus, a FDI network needs to be developed for different regions of China- the northeast, northwest, the Bohai coast, middle (or central), the southeast and southwest- so as to find out regional star cities that attract more FDI. More FDI lines to a specific node would point to an existing attractive quality, or location factor, for investors. Selected powerful cities will be closely examined in terms of the relationship between their location factors and investment projects, highlighting important lessons for the lesser-developed Chinese cities to learn.

Therefore, the specific objectives are:

✓ To design FDI networks for six different regions of China, so as to identify regional star cities, which attract considerably more FDI.

✓ To define the location factors of those powerful cities, and highlight the factors responsible for attracting investment in different regions.

1.4 Research questions:

Main Question:
What are the different location factors attracting investment to major cities in different regions of China?

Sub-questions:
1. What is the network of Chinese cities attracting FDI? Which cities are more powerful in different regions, and in China as a whole?
2. What are the location factors of star cities, and which location factors are most dominant in attracting investment to those cities in different regions of China?

1.5 Significance of the study

It is important to find out, for different regions, what the FDI network looks like, so as to show directly who are the national stars, the regional stars and the local stars; and, also pinpoint the competitive cities of each of the six regions. It will indicate a suggestion for local policy makers to consider in realizing which sectors of my province possess comparative advantages over other and which not. Through the analysis of different cities in six different regions, the location factors attracting the FDI will be identified. To those underdeveloped cities or lower ranking cities or even developed cities, advices and recommendations will be presented on which location factors need to be focused so as to become more competitive.

1.6 Scope and limitations

For this study, only 54 major cities out of 285 are selected for the sample size, which cannot reflect the total trends. All of the 54 major cities were ranked among the top 80 in 2011 Chinese Urban Competitiveness Report, which ignores the relevant data for smaller or less developed cities. The detailed data concerning location factors was collected between 2010 and 2011, which means that the real status could vary at present. All of the FDI data was collected from FDI.markets.com; and it is important to note that there were a few non-specified investments in the data set.

Chapter 2: Literature Review

This chapter provides the existing concepts and theories that are relevant to the research questions, and will guide this study. The chapter begins with the definition of location factors under urban competitiveness. In this part, different urban competitiveness measurement models are introduced, aiming at identifying location factors serving as indicators for highlighting differences among cities. In addition to that, network theory will be explained through literature on factors driving FDI, multinationals firms, and location choices, territorial competition and complementarity for foreign investment, and the contemporary world city system. Finally, a conceptual framework will be established by linking the theories together. The main objective of this chapter is to obtain affluent knowledge on the research topic in order to correctly analyse the correlation between location factors and FDI inflows in China.

2.1 Location Factors under Urban Competitiveness

Urban competitiveness is a general measuring tool for cities. Under rapid economic growth, fresh new technology and innovation, and complicated political and cultural influences, the context of urban competitiveness varied gradually, indicating that the sub-factors that constitute city competitiveness are also changing. By investigating different urban competitiveness models at different times, a good understanding of location factors composing urban competitiveness can develop.

2.1.1 Absolute Advantages, Comparative Advantages and Factor Endowments

Throughout commodity-based economic development, competition among cities is revealed in a nexus of trade. In the past, competitiveness theories revolved around visible goods for which the cost of the production is the dominant factor affecting a city's or a county's competitiveness.

In 1776, Adam Smith introduced the concept of *absolute advantage*. He wrote: "If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage" (Smith, 1937. pp. 478). His theory suggests that each country has its own advantage in producing a particular good. The cost for producing this certain good will absolutely decrease if the country produces on a large-scale according to its absolute producing ability. Trade then occurs between countries, increasing the productivity of each country, its profits and, consequently, its wealth.

David Ricardo discusses *comparative advantage* in his book *The Principles and Political Economy and Taxation* (1817), arguing that since capital and labour cannot flexibly shift or transfer among countries absolute advantage cannot be set as the fundamental principle of the international division of labour and trade- comparative advantage can. *Opportunity cost*- the cost at which one produces measured by the value of products one gives up- is the major factor that impacts comparative advantage, and therefore, determines the mode of production (Ruffin, R. J., 2002). The term comparative advantage is closer to reality than absolute

advantage, explaining, to a certain extent, how undeveloped countries enter the international division of labour and trade.

The *factor endowments* theory was conceived by Heckscher and Ohlin (1933), defining factors of production as land, labour and capital (Franson, J., 2012). The difference in factors of production determines the division of the international labour and trade. Comparative advantage can be obtained through abundance in one or more of these factors. Capital-abundant countries can establish capital-intensive industries and labour-intensive industries can be built in labour-abundant countries thus balancing every factor-typed country in international trade.

2.1.2 Michael Porter's Diamond Theory

This theory was developed to determine why particular industries in one country become successfully competitive in the world market and others do not. The certain industrial competitiveness of a country is determined by four factors, (1) factor conditions, (2) demand conditions, (3) related and supporting industries and (4) the strategy, structure of the firm and performance of the rivalries. Except those four elements, chance and government, two variables are existing out of firm's control (Porter, 1990). The detailed relations are as below.

Figure 4 Porter's Diamond Theory
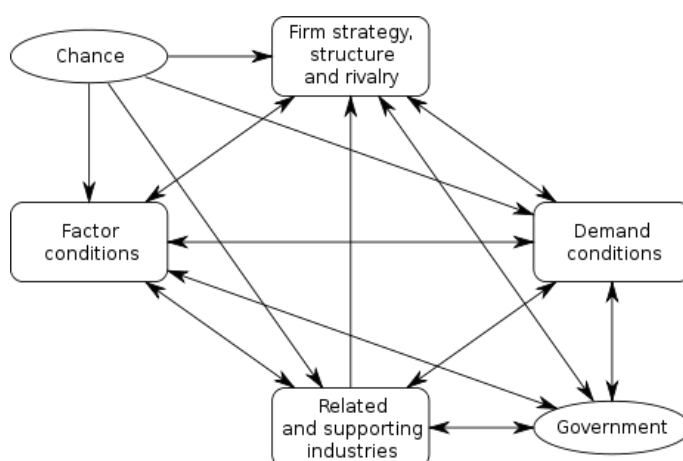
Source: (Porter, 1990. pp. 127)

Factor conditions contain human resources, natural resources, knowledge resources, capital resources and infrastructure. Demand conditions are mainly reflected through demand of home market. The performance of the related and supporting industries supports the firms' competitiveness. The strategy and structure of the firm and its rivalry performances determines whether the firms can perform competitive. The opportunity is out of control of the firms and the government policy play a key role in influencing a firm's performance.

2.1.3 Regional Competitive Advantage Model

A country's output per worker determines the country's standard of living, which is simply another way of explaining the relations between country competitiveness and productivity. In the regional competitiveness model, Kitson et al (2004) argues that except hard productivity, other softer dimensions of the urban socio-economy also need to be considered.

Figure 5 Regional Competitive Advantage Model
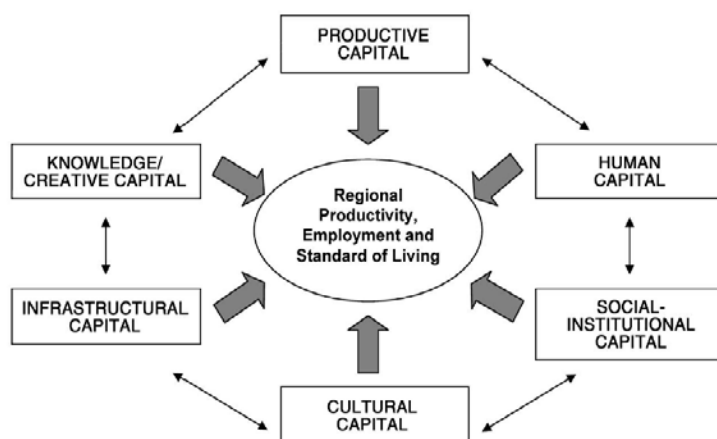
Source: (Kitson, Martin, et al., 2004)

In this regional competitiveness model, the core, regional productivity, employment and standard of living represents for the regional competitiveness, which is determined by six capitals. Human capital means the quality of the labour force. Infrastructural capital indicates the scale and quality of the regional infrastructure. Productive capital reflects the efficiency of the economy. Knowledge and creative capital presents innovative and creative talent class. The range and quality of cultural facilities and assets decide the Cultural capital. At last, social and institutional capital indicates conditions of social networks and institutional forms (Kitson, Martin, et al., 2004). The last three capitals (knowledge/creative, cultural and social/institutional capitals) are categorised as soft factors for regional competitive advantage.

2.1.4 Input and Output Framework: Global Urban Competitiveness Report 2010

With regard to all cities over the world, Pengfi Ni and Peter Karl Kresl compiled the Global Urban Competitiveness Report 2010 to measure the top 500 competitive cities around the world through a specific urban competitiveness measurement model. In the report, global urban competitiveness is defined as "a city's ability to attract and transform resources, to control and dominate the market, thus creating more wealth in a faster and better manner as well as providing welfare for its citizens"(Ni and Kresl, 2010. pp. 1). According to the definition, the urban competitiveness model is divided into two separate models, one input framework which explains the ability of a city to utilize its resource and market, and the other output framework represents the performance of its wealth creation.

Input framework and location factors explanations

As interpreted above, a city itself cannot utilize the resource and market, but enterprises and industrial systems within the city. The input model is consisted by seven first-class factors. They are enterprise quality, industry structure, human resources, hard environment, soft environment, living environment and global connectivity.

Output framework and location factors explanations

As mentioned above, the output framework mainly focuses on the "wealth" a city created. Thus, it contains cost, economy growth, development level, production efficiency, employment, economic aggregation, technology innovation and decision-making ability.

2.1.5 Input and Output Framework: Chinese Annual Report on Urban Competitiveness 2011

In this report, it mentions that a city functions as the same as an enterprise. Cities create wealth by utilizing its resources through its industrial structure. Thus, urban competitiveness is similarly as the previous report divided into input and output framework. Theoretically, the input framework is equal as the output framework (Ni, 2011).

From the input perspective, urban competitiveness contains hard competitiveness and soft competitive. The input framework is formulized as *UC (input) = F (H, S) = F (HC, FC, ST, CL, ES, I, EE, BC, ES, GM, BM, OW)*. Hard competitiveness includes talent competitiveness, capital competitiveness, science and technology competitiveness, comprehensive location competitiveness, economic structure competitiveness, infrastructure competitiveness and environment competitiveness. Soft competitiveness contains culture competitiveness, institutional competitiveness, government management competitiveness, enterprise management competitiveness and openness competitiveness.

The output framework is illustrated as *UC (output) = F (ES, EG, EE, IP, DC, LI, GNH)*. Economic Scale, Economic Growth, Economic Efficiency, Industry Aggregation, Development Cost, Level of Income and Index of Happiness are presented as components for output indicators for urban competitiveness.

2.1.6 12 pillars of competitiveness-The Global Competitiveness Report (2010-2011)

In this report, competitiveness is defined as "the set of institutions, policies, and factors that determine the level of productivity of a country" (Schwab, 2010. pp. 4). 12 factors determining competitiveness of countries are identified as institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market environment, technological readiness, market size, business sophistication and the last one, innovation. Similarly, achieving the increase of productivity and improvement of quality of life are ultimate aims for cities, thus these 12 factors can also be applied to measure urban competitiveness.

One economy entity, cities or countries, will experience three stages along its development, grown from factor-driven economy into efficiency driven-economy and at last becomes innovation-driven economy.

In the first factor-driven stage, companies within the cities or countries compete based on their factor endowments. Thus, through acquiring well-functioning institutions, well-constructed infrastructure, a stable macroeconomic environment and healthy and primary educated labour force, companies can enhance productivity, which leads an increase in urban or country competitiveness. As countries or cities moving into the efficiency-driven stage of development, more efficient product processes and production quality need to be improved.

Thus, competitiveness is influenced by higher education and training, goods market efficiency, labour market efficiency, financial market environment, technological readiness and market size. In the last development stage, the extent of business sophistication and the ability of innovation significantly determine competition among companies aiming at producing new and unique products (Schwab, 2010).

Figure 6 12 pillars of competitiveness
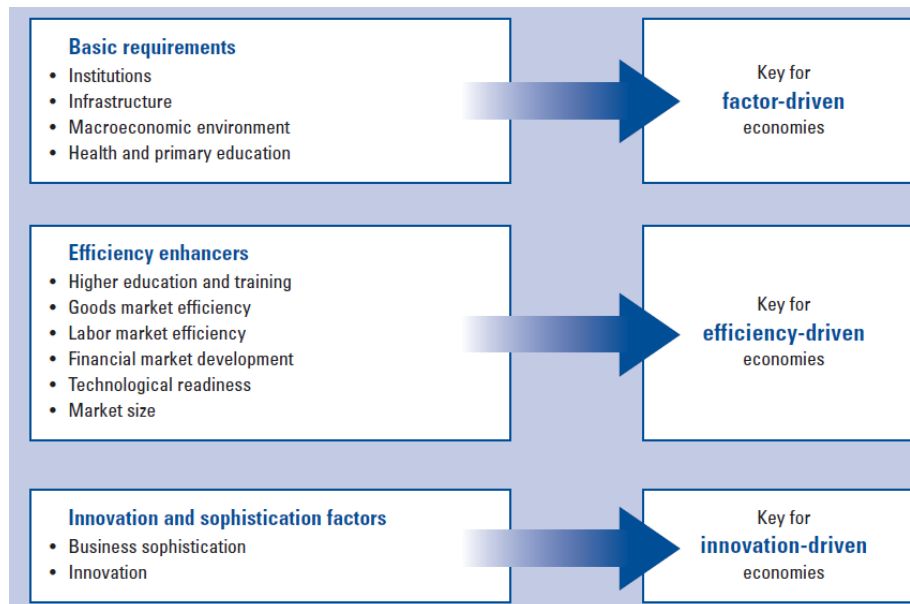
Source: The Global Competitiveness Report 2010-2011, pp. 9

2.1.7 Others' Location Factors

In addition, Dr. Jean-Paul Rodrigue argued basic location factors as "Site, Accessibility and Socioeconomic Environment". [2] The site means micro-geographical characteristics of a certain region, such as land, basic utilities, and other visible activities (head offices, amenities, quality of life, nature and local transportation). The accessibility mainly includes labor, materials, energy, markets and accessibility to suppliers and customers. Socioeconomic environment is a specific macro-geographical characteristic of certain regions, which contains the availability of capital, varied subsidies, regulations, taxation and technology (Rodrigue, J. P.,).

UNCTAD (United Nations Conference on Trade and Development) conducted the Worldwide Survey of Foreign Affiliates in 2007. This survey concluded important location factors for foreign affiliates across regions and industries. Macroeconomic and political stability were given the highest average score by foreign affiliates. Others crucial location factors include the quality of telecommunications, the supply and costs of skilled labor, corporate taxes, banking and other financial services. From the result from resource-based industries, rail and sea transportation and accessibility to natural resources were considered important by these foreign affiliates (UNCTAD, 2009).

Additionally, in his article *Urban Geopolitics*, Ronald Wall (2012) argued that several indicators can be included as location factors, such as market size, GDP per capita, wages,

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[2] http://people.hofstra.edu/geotrans/eng/ch2en/conc2en/locationfactors.html

corporate taxes, accessibility by air road and rail, language similarity, patents, education levels, export, imports, housing quality, environmental indicators, cultural indicators, amenities and entertainment levels, quality of built environment, architectural highlights etc(Wall, R. S., 2011).

2.2 Network Theory

2.2.1 Foreign Direct Investment and FDI Network

Foreign Direct Investment is defined as "the acquisition of at least ten percent of the ordinary shares or voting power in a public or private enterprise by non-resident investors. Direct investment involves a lasting interest in the management of an enterprise and includes reinvestment of profits (OECD, pp. 7)." FDI is also defined as asset transfer by the establishment of subsidiaries or affiliates outside the home country but without loss of control (Hymer, 1960).

Friedmann (1995) argued that cities can acquire more command and control powers through attracting foreign investments and then improve their competitiveness in order to change the ranking structure of the city system. Saskia Sassen (2001) considered that cities locate dispersedly but integrate with other cities through economic activities, which accelerate urbanizations. Global cities should also possess some expert industries. Despite traditional roles as trade and banking centers, four new functions of world cities have been set as "highly concentrated command points in the organization of the world economy, key locations for finance and specialized service firms that replaced manufacturing as the leading economic sectors, sites of production including the production of innovations in these leading industries and lastly, markets for the products and innovations produced." (Sassen 2001, pp.3-4) It is globalization that cuts across the old divides in the world system and generates the new urban hierarchy. Old core cities are being peripheralized as well as once peripheral cities have begun to emerge as new cores in the global urban hierarchy. When Alderson and Beckfield (2004) assess the world city hypothesis, they found the relations linking cities into a world system is multinational enterprises and their subsidiaries as well as FDI.

The power of world cities is measured by three point centralities, out-degree centrality, closeness centrality and betweenness centrality (Alderson, A. S. and Beckfield, J., 2004). A city can be competitive and powerful among world cities when it has direct involvement with other cities and have more alternative cities to exchange (out-degree centrality) or it is closer to more cities, which makes the city more independent and avoid being controlled by others (closeness centrality) or the city stands between all the other pairs of cities which means it has greater power and ability to coordinate action and to withhold or distort information or block exchange to its own advantage (betweenness centrality). Alderson and Beckfield also argued that the in-degree also refers to the number of investments it received, is a simple and straightforward measure of a city's prestige. Cities are prestigious when they have high in-degree.

2.2.2 Multinationals and Location Choice

Multinational enterprises (MNE) settle in foreign territory and serve foreign markets, but possess ownership-advantages also refers to as intangible asset, such as knowledge, technology, or advanced management techniques. In this form of international business, the firm should consider exporting or licensing, only if the benefits are inferior to the

disadvantages and costs of operating in foreign countries (Batra and Ramachandran, 1980, Dunning, 1980).

The primary aim of multinational enterprise (MNE) is to capture the highest return on investment and maximize the control power of the firm through optimum allocation the firm's resources on a worldwide basis (Robinson, 1972).

Firms can witness significant reductions in cost by locating labour-intensive stages of production in countries with cheaper labour. MNEs seek optimal-specialized-segment locations with regard to their ability in strategically separating activities, which leads the manufacturing and service boom in China and India (Buckley and Ghauri, 2004). The firms prefer to engaging in foreign direct investments rather than exporting or licensing, which explains why FDI happens. Exportation is often served as a measurement of foreign location by firms that will switch to foreign investment if the test satisfied with their expectation (Hirsch, 1976, Hisey and Caves, 1985).

John Dunning's eclectic paradigm (1993), proposes that MNEs' investment decisions are determined by the OLI triad: ownership, location and internalization. The "O" stands for the ownership advantages which represent the market power gained through possession of products or production processes which the host country do not possess. The "L" explains the location advantages in locating their plant in a foreign country rather than in their home country. Internalization advantages, represented by "I", are gained from internationalising their foreign activities in fully owned subsidiaries which lead to cost cutting and profit maximization and an oligopolistic control of their multiple assets in foreign locations (Dunning, 1980, Wall and Burger, 2012, Dunning, 1998, Dunning, 1993).

With regard to the internal organisation of the MNE, foreign investments are distinguished into horizontal and vertical investments (Navaretti and Venables, 2004). Horizontal foreign investments are served for MNEs as duplicating abroad a number of activities conducted the same in the home country. For instance, Coca Cola plants in different countries have the same function. Vertical foreign investments are investments of MNEs utilizing for geographically segmenting their activities based on functions (Wall and Burger, 2012). Take Apple company as an example, their production base is mainly in China, but the R&D department and headquarter locates in America.

After relate the two concepts above, the OLI paradigm and the distinction between horizontal and vertical foreign investments, Dunning (1993; 1998) classifies investments as resource-seeking, market-seeking, efficiency-seeking and strategic asset-seeking investments. From this classification, four main motivations for firm's production process segment and location choice can be defined as (1) access to natural resources; (2) access to new markets; (3) reduce the costs of production and increase efficiency and (4) access to strategic assets augment. These motives can be divided into two types, of which the first three motives are asset-exploring activities and the last motive is an asset-augmenting activity (Narula and Bellak, 2009). The main objective of the asset-exploring activities for the MNE is utilizing specific firm's possessed capabilities to create economic rent. While, the asset-augmenting activity is

required for firms by acquiring or augmenting specific assets aiming at enhancing technological capabilities, improving management skills or obtaining marketing expertise.

Wall and Burger (2012) also argue that MNEs will tend to focus on different location characteristics based on different motives to invest abroad. For instance, a manufacturing plant needs low-wage but skilled labour and cheap land; sales and marketing offices need a large domestic market for its development; and R&D and headquarters require high-level local resources such as very specialised labour force, agglomeration economies and clusters of related activities (Narula and Bellak, 2009).

Not all regions are suitable for all types of investments because of lack of the appropriate specialised location advantages that MNEs require (Wall and Burger, 2012). Cities are not considered as good locations, if they cannot provide the local resources for the above-mentioned types of investments of MNEs (Raines, 2003, Mataloni Jr., 2011).

A clear hierarchy of foreign activities existing in Europe have been indicated by Narula and Bellak (2009) and McCann (2011). The highest value-added activities such as headquarters and R&R departments are hosted by the most advanced economies. However, lower value-added activities such as manufacturing plants and sales and marketing offices are generally located in Central and Eastern Europe (MaCann, 2011). It is demonstrated that more spatially concentrated investments are flown into knowledge-intensive manufacturing and services and dispersed investments can be investigated flowing into their less knowledge-intensive counterparts (Castellani and Pieri, 2010). A higher degree of territorial competition of investment projects can be suggested by a wider distribution of the less knowledge-intensive investments (Raines, 2003).

2.2.3 Territorial Competition and Territorial Complementarities for Foreign Investments

It has important implications for territorial competition that how the MNEs select the potential locations to set up subsidiaries. Territorial competition is defined as "the actions of economics agents that are taken to enhance the standard of living in their own territories, such as regions, cities, or countries (Poot, 2000. pp. 210)." It is not cities or regions are actually in competition, but firms or other groups with territorially based economic interest(Cheshire and Gordon, 1998). In some countries, due to electoral pressures, local and regional government officials wish to be perceived as active in stimulating local and regional economic development through engaging in territorial competition activities to create jobs and safeguard business interests (Markusen and Nesse, 2007, Turok, 2004). Recently, the emphasis on attracting foreign investments has been set as the focus on territorial competition. "Foreign investments are seen as both an instrument and an indication of territorial competitiveness (Wall and Burger, 2012. pp. 6)." Territories with competitive advantages are able to attract more foreign investments. On the other hand, the foreign investments create employment and bring advanced knowledge and technologies to certain regions which increase the competitive advantage of the territories (Wall and Burger, 2012).

However, between subsidiaries of the same MNE, there can also be competitions (Phelps and Fuller, 2000, Phelps and Raines, 2003). Under strategy of MNEs, changing divisions of

labour within the MNE is the initiation of the intra-MNE competition which means subsidiaries can gain or lose responsibilities (Phelps and Fuller, 2000). Fierce competition can be manifested as some subsidiaries must be discontinued whereas other subsidiaries receive reinvestments and can expand (Wall and Burger, 2012). Hence, territories competition is caused by competitions of subsidiaries within the same MNE.

Territories are not necessarily in competition but can cooperate on the basis of mutuality, as firms can utilize distinct competitive advantages of different regions for different reasons (Taylor, 2010, Gordon, 1999). From this point of view, complementarities can be identified through input-output relations linked between dissimilarly specialised regions (Scott and Storper, 2007).

According to the tension between competition and complementary relations between territories, three conditions for the existence of territorial competition are defined as sectorial market overlap, functional market overlap and geographical market overlap (Burger, Van Oort, et al., 2011). As a conclusion, "territorial competition would be high when territories receive investments for the same functions and sectors from similar parts of the world (Wall and Burger, 2012. pp. 10)." Territorial complementarities would exist when different locations do not have the above overlaps, but complementary sectors for foreign investments.

2.2.4 Factors Driving FDI

Raines (2003) and Turok (2004) indicate that through attracting foreign investments, local and regional governments are able to augment and exploit regional assets related to specialised labour pools, university research, and even lifestyle and culture. Thus, augmenting and exploiting their local assets are initiations for most of the authorities. As indicated in the previous literature review, it identifies four motivations of MNEs that accelerating the delivery of investments into better chosen locations. When combine the authorities initiations and MNEs motivations, it obviously reflect that FDI is bridge relating the MNEs and the local governments. A certain region must possess some assets that interested by MNEs, otherwise, although greater initiations an authority has, the MNEs will not come. Former scholars have concluded some factors driving foreign investments.

Governance Infrastructure

Government infrastructure is greatly determined by the form of government of the host country. Jensen (2003) found democratic governments attract as much as seventy percent more FDI as a percentage of GDP than authoritarian governments, when economic and political factors are controlled. In developing countries with increasing democracy, property rights protection (patent, trademark, and copyright laws) is stronger which is vitally important to MNEs, especially in the technology industries (Li and Resnick, 2003). It shows that strategic asset-seeking firms will invest in a certain location with solid regulation of property rights law (Dunning, 1998).

Except forms of government, government policies such as accelerated depreciation, grants or subsidized land also affect MNEs decisions (Li and Resnick, 2003). Investment incentives are

primary concerns of resource-seeking and efficiency-seeking FDI (Dunning, 1998). An increase in the tax rate reduces the level of inward FDI (Wei, 2000).

The conditions of legal system, government corruption and political stability are also defined as main factors driving FDI (Globerman and Shapiro, 2003, Habib and Zurawicki, 2002, Jensen, 2009, Jensen, 2003).

Lower Production Costs

In the profit maximization business, priority for firms is to reduce production costs which drives firms begin investing in less developed countries to obtain advantages from cheaper labour. Dunning (1973, 1998) indicates that production costs are significantly influential for efficiency-seeking firms. As the imperfect market wage in certain countries is lower than the value of marginal product, MNEs are able to obtain competitive advantage (Park, 2000). Regions with lower market attractiveness are attracting more FDI because of the local lower wages.(Sethi, Guisinger, et al., 2003)

Human Infrastructure

Human infrastructure is an important factor determining whether MNEs invest in a certain location especially for market-seeking MNEs (Wells, 1998)(Alderson, A. S. and Beckfield, J., 2004). Since 1980s, union density is positively correlated with direct investment outflow which suggests firms become more sensitive to union density in the home country (Alderson, 2004). Positive correlations between FDI and average years of education are found in a study on industrial and labour relations conducted by Cooke (1997).Globerman and Shapiro (2003) found that more FDI is likely attracted through investments in human capital and the general quality of life, which might also to relate with better governance.

Market Size and Economic Growth

A large market and a growing economy provide an efficiency production base for firms that aiming at delivering market seeking FDI (Dunning, 1998, Li and Resnick, 2003, Habib and Zurawicki, 2002, Caves, 1971, Dunning, 1973). Market size is also found statistically to be the most determinant predictor of the level of inward FDI (Globerman and Shapiro, 2003). In addition, a large market size is crucial for firms maintaining lower marginal cost of production (Caves, 1971). The larger the market size, the greater reduction in the marginal costs of production will occur, which drives firms direct investing in that location rather than exportation (Dunning, 1973, Dunning and Buckley, 1976).

Exchange Rate Fluctuations

Wells (1998) argues that currency instability, exchange controls and the development of local capital markets are also important driving forces of FDI. A study conducted by Goldberg and Kolstad (1995) shows the exchange rate variability has a positive effect on FDI shares. MNEs will have advantage over host country firms if the domestic currency devalued (Goldberg and Kolstad, 1995).

Technological and Entrepreneurial Atmosphere

Alderson (2004) and Dunning (1980, 1998) both mentioned that the intensity of research and development and the intensity of skills are all positively related to FDI inflow. Firms prefer to locate in knowledge-intensive regions, when they involved in market-seeking, efficiency-seeking and strategic asset-seeking FDI. Knowledge and ideas as well as opportunities for new projects can be exchanged in an ideal location which also refers to as an entrepreneurial environment (Dunning, 1973).

Geographical and Cultural Proximity

In terms of transportation costs, the geographical proximity is such significant factor for MNEs. Habib and Zurawicki (2002) argue that market-seeking firms can switch to exportation rather than FDI because of high transportation costs. Many studies have shown that cultural distance between countries negatively affects FDI flows[3].An example explains the geographical and cultural proximity is that U.K. and Canada are treated as traditional U.S. targets according to language, legal structure and geographic proximity similarities (Green and Meyer, 1997).

Presence of Natural Resources

Natural resources are vitally important for MNEs especially the ones engage in resource-seeking investments. Dunning (1998) considers that, ideally in a host country, local partners will promote their knowledge by capital-intensive exploiting partnership with MNEs. A country can attract higher level of FDI through natural resource exploration, which is independent from political institutions and government policies (Jensen, 2003).

Presence of Rival Firms

According to "bandwagon effect" or "oligopolistic reaction", firms tend to follow each other's movements and invest in similar countries as their rivals when they exist in the same oligopolistic industry but from different countries (Ito and Rose, 2002). Dunning (1998) argues that a major investment motivation for market-seeking firms is the presence and competitiveness of rival firms. More often, a firm will invest into the same country in which its rivals have already moved.

From the previous scholars' studies, it can be concluded that factors driving FDI are listed as governance infrastructure, lower production costs, human infrastructure, market size and economic growth, exchange rate fluctuations, technological and entrepreneurial atmosphere, geographical and cultural proximity, presence of natural resources and presence of rival firms.

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[3] http://www.hninfo.gov.cn/govpublic/rkxgl/jcyj/200911/t20091127_143513.htm

2.3 Conclusions

The previous chapter highlighted two major elements- location factors and FDI networks. Considering that the main objective of this research is to identify the different location factors that attract foreign investments in the coastal and inland area of China, these factors need to be defined as independent variables and FDI as the dependent variable, so as to reveal the correlation between them.

According to the literature review on urban competitiveness and its various models, it is clear that location factors can reflect a city's differences when it is compared and contrasted to others; thus, a city's story can be told through detailed descriptions of its location factors. The main aim of urban competitiveness analysis is to establish a city's comparative advantage over others. With regard to urban competitiveness theories and models, it is deduced that government structure, natural resources, infrastructure, knowledge-based human capital, and so forth comprise the core factors when assessing a city's competitiveness. It is noted, as in both the latest *Global Urban Competitiveness Report* (2010) and the annual Chinese *Annual Report on Urban Competitiveness* (2011), that the *input and output framework* is preferred as the tool for measuring urban competitiveness. Firstly, the output framework is mainly dealing with the output performance of cities, the indicators of which may vary. For instance, in the *Global Urban Competitiveness Report* (2010), the output indicators are cost, economic scale, employment, economic aggregation, development level, economic efficiency, innovation, economic growth and decision-making ability; and in the Chinese *Annual Report on Urban Competitiveness* (2011), the output indicators are economic scale, economic growth, economic efficiency, industry aggregation, development cost, level of income and index of happiness. Nevertheless, the indicators used in both reports illustrate, through an economic paradigm, how competitive a city is. Output indicators alone, however, are insufficient when analysing the inherent properties of a city, which is why both reports also contain an input framework to assess urban competitiveness. Quality of firms, human resources, industry structure, living environment, soft business environment, hard business environment and global connectivity are listed as input indicators for measuring urban competitiveness in the *Global Urban Competitiveness Report* (2010). The Chinese *Annual Report on Urban Competitiveness* categorizes the input indicators under hard and soft competitiveness, in which talent competitiveness, capital competitiveness, science technology competitiveness, comprehensive location competitiveness, economic structure competitiveness, infrastructure competitiveness and environment competitiveness are attributed to hard competitiveness, and soft competitiveness includes culture competitiveness, institutional competitiveness, government management competitiveness, enterprise management competitiveness and openness competitiveness. There are plenty of indicators under input location factors that are closer to reflecting the innate nature that cities possess. Input location factors in the Chinese *Annual Report on Urban Competitiveness* (2011) encompass all of the location factors of Chinese cities, which are suitable for the location factors required in this research.

Furthermore, the *input and output framework* breaks down competitiveness into *revealed indexes* (output indicators) and *explanatory indexes* (input indicators). Different from the

conventional three dimensions of location factors (economic, social-economic and environmental), the explanatory indexes are grouped into hard and soft aspects according to their nature.

In sum, network theories suggest that there are two major factors driving MNEs to invest into certain areas, of which one is MNEs four motivations and the other one is attractiveness of the location. Corresponding to FDI flows from the MNEs, territorial competition and territorial complementarity will occur. Cities compete for foreign investment in order to strengthen their comparative advantage, while MNEs also prefer to invest in sectors with comparative advantage, promising higher rates of return. Thus, as Wall and Burger argued, "competitive territories attract more foreign investments, while foreign investments are thought to increase the competitive advantage of territories by creating new employment and bringing new knowledge and technologies to a region" (2012: 6). As the attraction of better location factors evokes a *bandwagon effect*, or *oligopolistic reaction*, of firms, various MNEs invest into the same area, which helps develop an in-degree centrality of cities in certain regions. Those in-degree centrality cities develop fast with the influence of FDI through spill over effects. Authorities would also like to expand their labour pools, university research and even lifestyle or culture to attract foreign investments.

To conclude, for this research input variables measuring urban competitiveness are identified as location factors, as they reflect the intrinsic nature of cities more comprehensively. Hard and soft competitiveness are two dimensions of the input variables. Some of these location factors attract foreign investments, improving a city's position within the network of in-degree centrality. Thus, in terms of foreign investments, cities will be more competitive according to their competitive advantage that is enhanced through foreign investments. Ultimately, improving input location factors will influence the level of a city's competitiveness.

2.4   Conceptual Framework
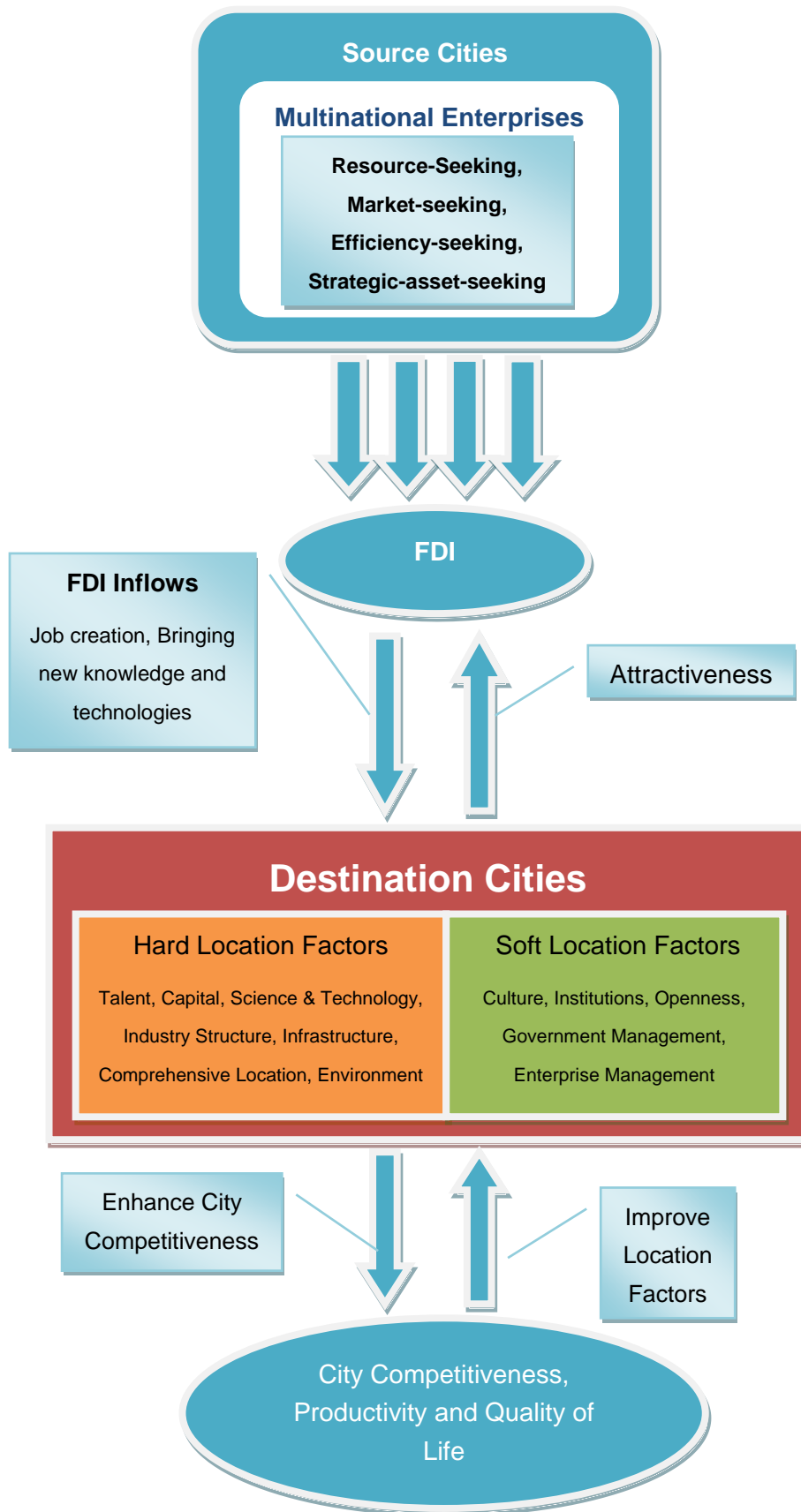
Figure 7 Conceptual Framework

Chapter 3: Research Design and Methodology

This chapter presents a detailed research design and methodology outline, along with revised research questions that reflect the information offered in the literature review. Research approach and techniques, followed by operationalization, sample size, validity and reliability issues, data collection methods and finally data analysis methods will all be illustrated in this chapter.

3.1   Revised Research Questions

Overall research question:

Which different location factors are attracting investments to major cities in eastern coastal area and the rest of the inland area of China?

Specific research questions

1. What is the network between Chinese cities in attracting FDI? Which cities are more powerful in the whole of China and in different regions?
2. What are the location factors of Chinese major cities, and which location factors are dominant in attracting investment to major cities in eastern coastal area and inland area?
 (What are the multiple regression models for coastal and inland areas of China?)

3.2   Research Type, Approach, Techniques

The research objective is to identify the location factors that attract FDI flows in coastal and inland areas of China; hence, the research is exploratory in nature. A quantitative approach is introduced in the thesis, and the methods involve the analysis of existing databases by two analytical software programs, *Ucinet* and *SPSS*. The data used in this study is obtained from *FDI markets.com* (developed by the Financial Times), the Chinese *Annual Report on Urban Competitiveness* (2011), and the *China City Statistical Year Book* (2003 – 2011). Multiple regression models designed with SPSS will be utilized for analysing relations between FDI and location factors.

3.3   Variables Explanations

In the operationalization, one Y and 12 X variables will be identified.

The dependent variable Y represents FDI inflows into a certain city.

As indicated in the conceptual framework, twelve independent variables X are classified into two groups, hard and soft competitiveness (location factors).

Hard competitiveness includes X1: Talent Competitiveness, X2: Capital Competitiveness, X3: Science & Technology Competitiveness, X4: Industry Structure Competitiveness, X5: Infrastructure Competitiveness, X6: Comprehensive Location Competitiveness, and X7: Environmental Competitiveness

Soft competitiveness contains X8: Cultural Competitiveness, X9: Institutional Competitiveness, X10: Government Management Competitiveness, X11: Enterprise Management Competitiveness, and X12: Openness Competitiveness.

Talent Competitiveness (X1)

Talent Competitiveness is encompasses human resource scale, literacy quality, and status of the labour market, labour cost and education levels. The scope of, and changes in the human resource scale influence the wealth creation for a city. Wealth is generated through continuous production and consumption enjoyed by citizens and firms. Population scale, labour scale and its growth rate, literacy rate, accessibility for skilled labour, salaries, bank savings and government education input, etc. are also reflected in talent competitiveness.

Capital Competitiveness (X2)

Capital Competitiveness is expressed as the capital scale, capital quality, financial control power, and capital gain accessibility of a city. Capital is one of the basic factors of production. The larger the capital scale, the larger the industry scale. Capital quality is represented by the deposit and loan rate of financial institutions, plus the risk of bank debt. The number of foreign and domestic financial institutions and their diversity can determine financial control power. The accessibility of capital, security markets, and varying private sector agendas explain the difficulties of gaining capital.

Science & Technology Competitiveness (X3)

Science & Technology Competitiveness refers to the strength of science and technology, the scientific innovation ability and the scientific transfer ability. It is defined by the number of universities and scientific research institutions, the number of science and technology activities personnel (scientists and engineers), the government and enterprise input for R&D, the number of granted patents and published papers, research collaborations between firms and universities, and the ability to import foreign technology.

Industry Structure Competitiveness (X4)

The status of existing industrial infrastructure, transformation of the economic structure, the conditions of the service system, the reaction of all economic entities to economic change and industrial agglomeration, are all part of the *industry structure competitiveness*. The percentage of primary, secondary and service industries, plus the number of high-tech personnel indicate the status of an industrial structure. An increase in the rate of the service industry and non-agricultural output account for the GDP, and a decrease in percentage of the Engel coefficient and non-agricultural populations explain the status of structural transformation of economy. The number of food and beverage services, and intermediaries could reflect the conditions of the service system.

Infrastructure Competitiveness (X5)

Urban infrastructure consists of basic internal city infrastructure (roads, streets, public buses, drinking water, electricity, gas, amenities, and hotels etc.), external basic infrastructure (highways, ports and airports), and IT infrastructure (mobile phones and internet). The cost of

infrastructure is another determinant for *infrastructure competitiveness* such as tariff for bridges and highways, local telephone charges and pricing of housing.

Comprehensive Location Competitiveness (X6)

Natural location convenient degrees, economic location advantage, resource advantage, and political and cultural location advantage make up *comprehensive location competitiveness*. The natural location convenient degrees factor is determined by the distance between cities and lakes, rivers and seas, together with the position of vantage points within urban agglomerations. The economic location advantage investigates the development level, market scale and logistics capability of a city's economic hinterland. The resources advantage pays more attention to conditions of fresh water resources and plantation. The political and cultural location advantage represents the administrative level of a city.

Environmental Competitiveness (X7)

Four major aspects are included in *environmental competitiveness*: city environmental quality, environmental comfort degree, overall urban natural environment, and urban artificial environment. In general, all dimensions related to the environment will be reflected in this variable, such as wastewater treatment rate, level of CO_2 emissions, recycling of industrial solid waste, cleanness of the city, climate conditions, natural disasters, and number of historical relics, and so forth.

Cultural Competitiveness (X8)

A city's spiritual culture is a major determinant of urban competitiveness. Value orientation, enterprising spirit, innovative atmosphere and communication ethics are important indicators of *cultural competitiveness*. These also contribute to the overall business culture of a city.

Institutional Competitiveness (X9)

Institutional competitiveness is defined by property protection systems, individual economic decision-making of degrees of freedom, market development degree, government approval and control, and integrity of the city law system. A fair institutional system supports trust and confidence for investors and citizens.

Government Management Competitiveness (X10)

The government plays a dominant role in China, and so a good level of public management can improve urban competitiveness. *Government management competitiveness* is evaluated through an analysis of government planning abilities, government promoting abilities, government social cohesion, government financing abilities, government enforcement capabilities, government service abilities, and government innovation ability. These elements assess the capacity of the government system that directly influences a city's competitiveness.

Enterprise Management Competitiveness (X11)

As the major value producers in economic development, enterprises are considered the engines for regional development. The level of *enterprise management competitiveness* determines the optimal utilization of resources and effective profit generation. More specifically, it consists of five factors: management application level, management standards, incentive and restraint performance, product and service quality, and economic benefits.

Openness Competitiveness (X12)

Openness is one of the basic features of a city. Urban openness is embodied in economic, social and cultural openness. In light of the tremendous amount if pressure introduced by foreign competitors, openness forces urban economic entities to enhance investment, improve efficiency and creativity. International openness, regional openness, humanities openness, and social communication level are the indicators for measuring the *openness competitiveness*.

3.4   Operationalization: Variables, Indicators

Research Questions	Variable	Indicators
1. What is the network between Chinese cities in attracting FDI? Which cities are more powerful in the whole China and different regions?	Source Cities	Foreign Cities that investing into China
	Destination Cities	The names of Chinese cities that receiving FDI
	In-degree	The total FDI value a city received
2. What are location factors for Chinese major cities and which location factors are attracting investment to the cities in different regions of China? (What are the multiple regression models for coastal area and inland area of China?) 3. How to improve location factors so as to attract more investment to less-developed and undeveloped cities in different regions?	Y:FDI Value	The average logged amount of FDI inflows in values from 2007 to 2011.
	X1:Talent Competitiveness (Hard Competitiveness)	1. Human Resource Scale 2. Literacy Quality 3. Status of the Labor Market 4. Cost of Labor Force 5. Education Status
	X2:Capital Competitiveness (Hard Competitiveness)	1. Capital Scale 2. Capital Quality 3. Financial Control Power 4. Capital Gain Accessibility
	X3: Science & Technology Competitiveness (Hard Competitiveness)	1. S & T Strength 2. Scientific Innovation Ability 3. Transfer Ability of S&T

	X4: Industry Structure Competitiveness (Hard Competitiveness)	1. Status of Industrial Structure 2. Status of Structural Transformation of the Economy 3. Integrity of Service System 4. Economic System Adaptability (Reaction of All Economic Entities to Economic Change) 5. Industrial Agglomeration Degree
	X5:Infrastructure Competitiveness (Hard Competitiveness)	1. Internal City Basic Infrastructures 2. External Basic Infrastructures 3. IT Infrastructures 4. Cost of Infrastructures
	X6:Comprehensive Location Competitiveness (Hard Competitiveness)	1. Natural Location Convenient Degrees 2. Economic Location Advantages 3. Resources Advantages 4. Political and Cultural Location Advantages
	X7:Environmental Competitiveness (Hard Competitiveness)	1. City Environmental Quality 2. Environmental Comfortable Degree 3. Overall Urban Natural Environment 4. Urban Artificial Environment
	X8:Cultural Competitiveness	1. Value Orientation

	(Soft Competitiveness)	2. Enterprising Spirit
		3. Innovative Atmosphere
		4. Communication Ethics
	X9:Institutional Competitiveness (Soft Competitiveness)	1. Property Protection System
		2. Individual Economic Decision-making of Degrees of Freedom
		3. Market Development Degree
		4. Government Approval and Control
		5. Integrity of City Law System.
	X10:Government Management Competitiveness (Soft Competitiveness)	1. Government Planning Ability
		2. Government Promoting Ability
		3. Government Social Cohesion
		4. Government Financing Ability
		5. Government Enforcement Capabilities
		6. Government Service Ability
		7. Government Innovation Ability
	X11:Enterprise Management Competitiveness (Soft Competitiveness)	1. Management Application Level
		2. Management Standards
		4 Incentive and Restraint Performance
		5 Product and Service

		Quality	
		6	Economic Benefits
	X12:Openness Competitiveness (Soft Competitiveness)	1	International Openness
		2	Regional Openness
		3	Humanities Openness
		4	Social Communication Level.

Table 1 Operationalization: variables, indicator

3.5   Sample Size and Selection

The sample size consists of 54 major cities from four different economic regions in China.

Selection Procedures:

There are a total of 2,028 foreign and Chinese cities related to China's FDI investments in the *FDImarkets.com* database. In the FDI network analyses for six regions of China, 62 out of the 2,028 Chinese cities were identified as the FDI top, or star cities. However, data was available for only 54 of cities; thus, the sample size was fixed at 54 cities. Each of them has 12 first-class indicators and 54 second-class indicators, which are treated as location factors in this study.

3.6   Validity and Reliability

All of the data was collected from the *FDIMarkets.com* database (Financial Times), the Chinese *Annual Report on Urban Competitiveness* (Chinese Academy of Social Sciences 2011), and *China City Statistical Year Book* (The National Bureau of Statistics of the P.R. China 2003-2011), which warrant the validity and reliability of the data.

3.7   Data Collection Methods

All of the collected data is categorized under secondary data, and was extracted from the sources mentioned in the previous section. Following extraction, the data was re-organized, and missing values of the FDIMarkets.com data sets were found to ensure that it was as complete as possible prior to analysis.

3.8   Data analysis methods

To identify the regional star cities, a sophisticated method was utilized.

FDI Network Establishment

Social network data analysis software, UCINET, was introduced in developing FDI networks in order to answer the first research question. All data related to investments going to China was filtered from the *FDImarkets.com* database. Source and destination cities needed to be numbered, since the software can only recognise numbers and not names; similarly, the

investments amounts needed to be logged to prevent distortions. Ultimately, every single investment can be translated into two numbers (the source city and the destination city) plus one logged number (inward investments value). After importing this new data into UCINET, city numbers were replaced by real city names. Investments from the same source city into the same destination cities were aggregated; and thus, FDI network maps were generated, corresponding to powerful in-degree Chinese cities and out-degree foreign cities. Finally, six FDI network maps were generated, identifying the regional star cities in terms of incoming FDI.

Location Quotient

After regional star cities were identified in the six regions of China, the *location quotient* is introduced to analyse sectors that have comparative advantage in attracting and receiving FDI in each province.

Formula: LQ= (Investment Sector X in province Y/Total Investment in province Y) * Weight Sector X.

For each province there are 39 sectors established by the FDImarkets.com database (see annex). Considering total foreign investments into sectors, the whole country receives a certain amount of FDI in each sector. Thus, each sector accounts for a percentage of the total foreign investments going into China at a national level. With regard to total investments going into each province, each sector has its own percentage accounting for the total investments within the province. Thus, location quotient will be calculated as a sector's provincial ratio divided by its national-level ratio. There are 31 provinces/MduCGs within six regions existing in the database, not all of which receive foreign investments in all 39 sectors. Therefore, some provinces or regions have higher comparative advantage over their neighbours.

Multiple Regressions

In the very beginning, all dependent and independent variables needed to be inspected for heteroskedasticity. In statistical models, if the graph shows a dependent or independent variable with skewed properties, the variable needs to be logged prior to its analysis in the regression model. After the screening, a VIF-test was conducted for collinearity diagnostics among the two groups of first-class indicators- hard and soft. Any indicator with a result above 10 should be excluded, because it entails a high correlation with others. After the VIF-test, multiple regressions were introduced to analyse regression models between the dependent variable, FDI, and the independent variables that have been selected after the VIF-test. It must be noted that FDI inflows to Chinese cities were collected for the years 2007 to 2011, since location factors were deduced from data for the year 2011. Moreover, FDI records show higher impact in recent years; the reason is that for small cities, the FDI inflows have been higher in recent years in comparison to records for the period of 2003 to 2006, which has also been examined in this study. All FDI results are logged. The *Stepwise Method* was utilized in regression modelling. After regression model analyses, key first-class indicators were be identified out of 12 categories. Subsequently, the second-class indicators under the key ones were tested again to ensure their relevance in this study. The collinearity

diagnostics were applied again, followed by multiple regressions. Finally, key location factors that influence FDI had emerged through first-class and second-class indicator analysis.

After FDI analysis, another two multiple regression analyses were also conducted. One was for the *Domestic Enterprise Industry Production Output* and location factors, and the other one was for *Foreign Enterprise Industry Production Output* and location factors. *Domestic/Foreign Enterprise Industry Production Output* was derived from the data extracted from the Chinese City Statistics Yearbook (2011). This data presents industrial production in values of domestic and foreign enterprises respectively. However, because of the constraints on the length of this thesis, and the overall complexity of the process, together with elaborations, only the results are presented.

Chapter 4: Research results and analysis

In this chapter, the procedure of the data analyses is presented. Through network analyses of six regions of China, 54 regional star cities are concluded as the sample size. FDI profiles of provinces in six regions are also delivered. The result indicates in the coastal area, the amount of FDI is much more than that in the land areas. In the western part, FDI is more related to resource-seeking motives. Manufacturing and services industries are mainly clustered in coastal areas. As multiple regressions analyses, it indicates that for the coastal cities, the talent and openness competitiveness are significantly driving FDI. However, with regard to the inland cities, determinant factors are the talent, openness and comprehensive location competitiveness. From the second-class indicators analyses, it reflects the crucial factors for the coastal cities are human resource scale, status of the labour market and humanities openness. For cities in the inland area, only the natural location convenient degree is the greatest driver for FDI.

4.1 Regional Stars Identification

Regional star cities were identified through UCINET- social network analysis software. In the network maps, cities are connected through company investments. For instance, city A invests 10 units of FDI in Beijing from 2003 to 2011, and city B invests a total of 20 units of FDI in Beijing; there will be one line from city A and one line from city B going to Beijing. This illustrates that by the end of 2011, Beijing has received 30 units of FDI, which means the in-degree of Beijing is 30 units. Different cities have been investing into different Chinese cities in 2003 to 2011. Different firms from different cities will invest in one Chinese powerful city, which reflects the in-degree centrality of this particular Chinese city. In different regions, dissimilar Chinese cities are functioning as in-degree centres and they keep receiving investments from foreign firms from a variety of foreign cities, which leads to having more lines connecting many foreign cities to only one Chinese city. The more investments a city attracts, the bigger the circle representing one Chinese city will show in the network map. It is important to stress that due to the large number of Chinese cities and their connections, and plenty of foreign cities, only significant lines and major cities are presented. In regional network maps, detailed connections are given for every city.

The six regions translated into FDI network maps are northeast China, the Bohai coastal region, northwest China, southwest China, central China and southeast China. Through FDI network analysis, regional star cities are identified for these six regions. A city can attract more investments only if it possesses location factors that are appealing to foreign firms. Thus, analyses for those powerful cities are conducted to reflect specific location factors that attract FDI.

Figure 8 exhibits the overall network of Chinese cities.
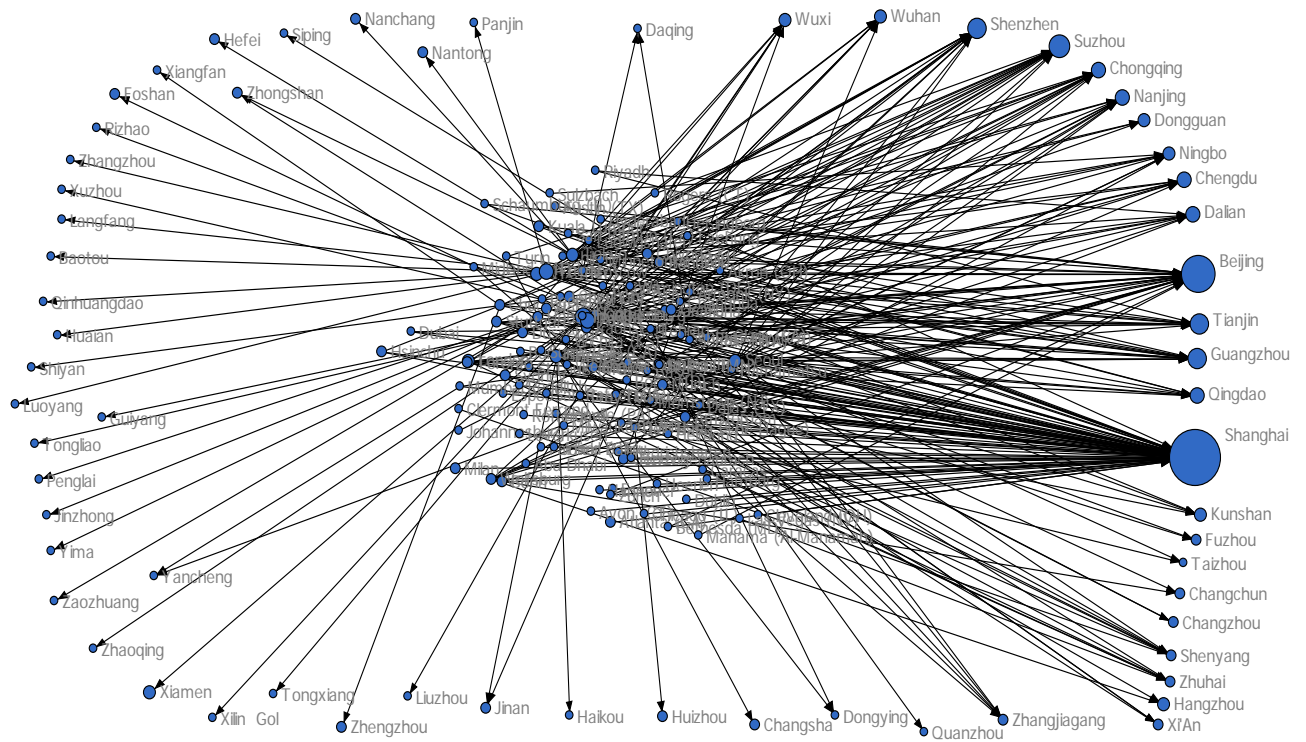
Figure 8 China Network Source: FDImarkets.com, investments in values

The map above shows that more lines are going to and from cities on the right. Chinese cities, or the in-degree cities, are located in periphery while the foreign cities or the out-degree cities are located in the centre of the map. The two largest circles from the above map are Shanghai and Beijing, which means that those two cities receive the highest amount of FDI from foreign countries in the years 2003 to 2011. The network map also illustrates that both Shanghai and Beijing are national star cities, but according to the size of the circles and the number of lines going to those two cities, it is apparent that Shanghai has more power than Beijing in attracting FDI. Other cities such as Shenzhen, Suzhou, Tianjin, Guangzhou, etc. perform well in attracting FDI as well. The following table shows the top 20 cities that have been investing the most in China in the recent years.

HK	Taipei	Paris	Tokyo	Singapore	Seoul	London	NYC	Osaka	Munich
574	421	399	387	367	318	269	261	191	168
Toronto	Chuo-ku	Bentonville	Amsterdam	Atlanta	Chiyoda-Ku	Memphis	Denver	Berlin	Hsinchu
165	161	142	133	128	124	117	116	112	111

Table 2 Total China Source Cites. (Source: FDImarkets.com, investments in LN-values)

It is clear that Asian cities are the most dominant investors in China. Cities from the U.S. and Europe invest in China, but with less capital.

Between the year 2003 and 2011, the top two FDI receipt sectors- chemicals and transportation- both received more than 100,000 ME FDI, of which the chemicals sector obtained an even higher amount (around 120,000 ME). Automotive OEM and real estate

industries received a little more than 80,000 ME FDI. Other sectors are also dominant in receiving FDI, such as coal, oil and natural gas, electronic components, financial services, hotel and tourism, and semiconductors.
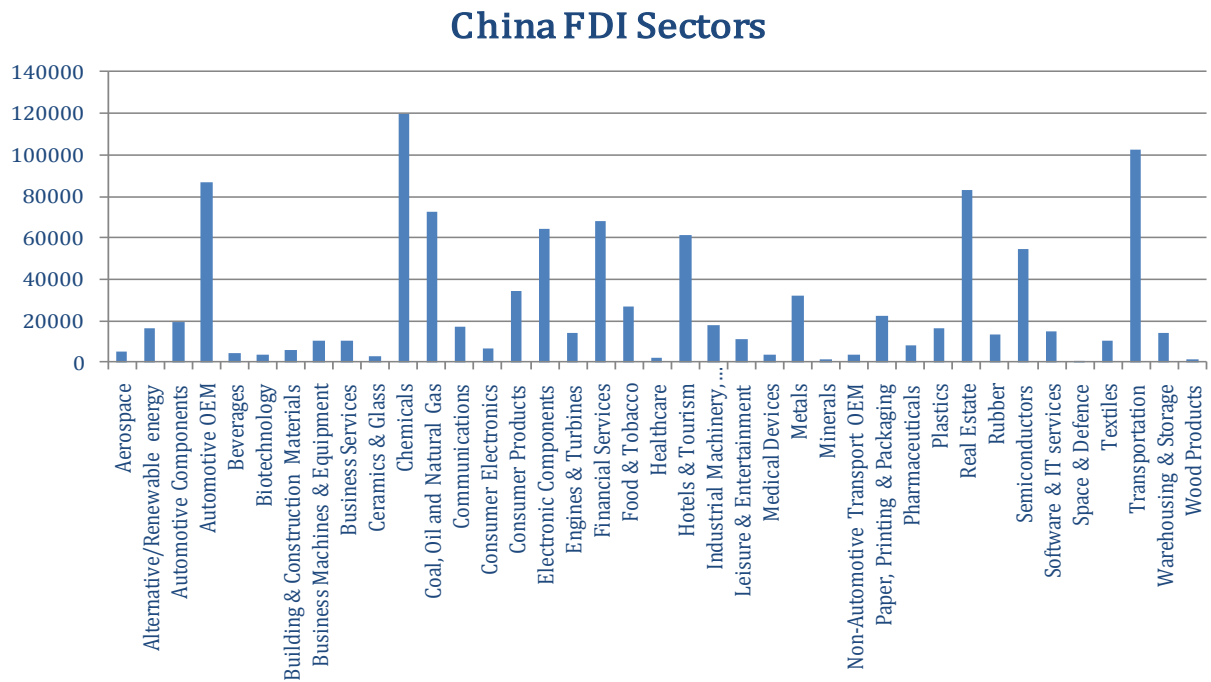
Figure 9 China FDI Sectors (Source: FDImarkets.com, investments in values. Units: Million Euros

4.1.1 Northeast China Regional Star Cities Identification and FDI Sector Profile

4.1.1.1 Northeast China Regional Star Cities Identification
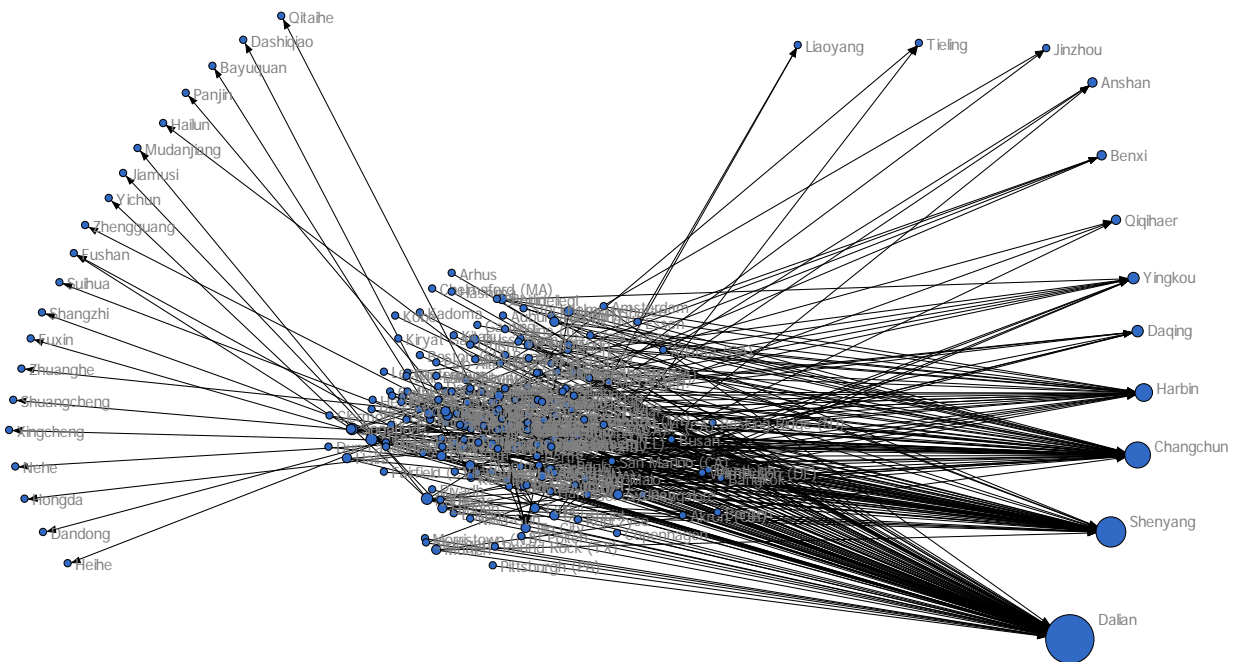
Figure 10 Northeast China Network. Source: FDImarkets.com, investments in values

Northeast China consists of three major provinces: Heilongjiang, Jilin and Liaoning. The network map for this region shows that the cities Dalian, Shenyang, Changchun and Harbin are the top four largest circles (FDI inflows in LN-values are 399, 218, 181 and 98 respectively), and also share the most connections with other foreign cities. Shenyang, Changchun and Harbin are all provincial capital cities for Liaoning. Dalian is the most important port city in north-eastern China. Table 3 presents the top 10 cities investing most in northeast China, six of which are from Asia.

HK	Seoul	NYC	Paris	Singapore	Tokyo	London	Taipei	Sydney	Detroit
54	43	40	38	37	36	31	29	25	24

Table 3 Northeast China Source Cities. (Source: FDImarkets.com, investments in LN-values)

4.1.1.2 Northeast China FDI Sector Profile

From 2003 to 2011, Liaoning province received the highest amount of FDI (50,717.6 ME) compared to Heilongjiang (19,790.96 ME) and Jilin (9,206.7 ME) provinces (FDImarkets.com). Figure 11 illustrates that Heilongjiang province receives a vast amount of FDI amounting to an estimated 15,000 million Euros in its transportation sector; other sectors such as coal, oil and nature gas and aerospace are also appealing to foreign investors. Province Jilin received a significant amount of FDI in its automotive OEM sector. For province Liaoning foreign investors favour more diverse sectors. Real estate, chemicals, automotive OEM, transportation and metals are the top five receiving sectors. The Location Quotients for each sector are as follows: Heilongjiang province is more specialized in attracting FDI in its transportation sector (8.2)[4], as well as its aerospace sector (5.2); Jilin has comparative advantage in automotive OEM (6.6), food & tobacco (5.2), automotive components (3.8) and rubber (3.6) judging by the flow of FDI in these four sectors; Liaoning province has the highest LQ (7.4) for the non-automotive transport OEM sector, with high investment also going into rubber (3.7), real estate (2.3) and metals (2.3).

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[4] Numbers in the bracket are results for location quotients.
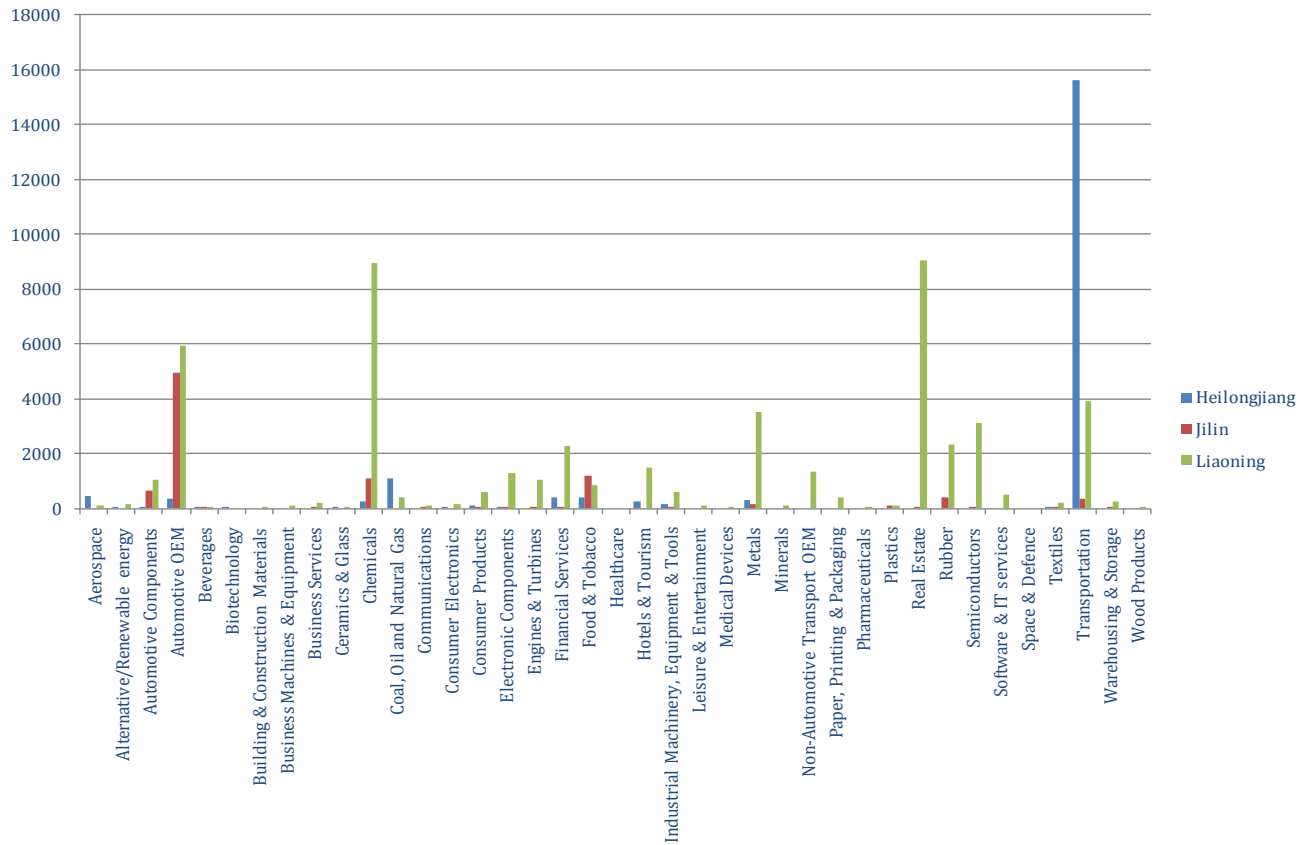
Figure 11 Northeast China FDI-Sectors. (Source: FDImarkets.com, investments in values. Units: Million Euros)

4.1.1.3 Northeast China Conclusion

The major cities in northeast China are identified as Dalian, Shenyang, Changchun and Harbin. The important FDI source cities are Hong Kong, Seoul, New York, Paris and Singapore. Jilin and Heilongjiang provinces have much fewer amounts of FDI received than Liaoning province, which means that both Jilin and Heilongjiang could have huge development potential. Transportation, chemicals, real estate and automotive OEM are the major sectors attracting FDI in north-eastern China. Heilongjiang, Jilin and Liaoning have comparative advantage in transport related industries, considering the flows of FDI in the transportation, automotive OEM, and non-automotive transport OEM sectors.

4.1.2 Bohai Coastal Area Regional Star Cities Identification and FDI Sector Profile

4.1.2.1 Bohai Coastal Area Regional Star Cities Identification
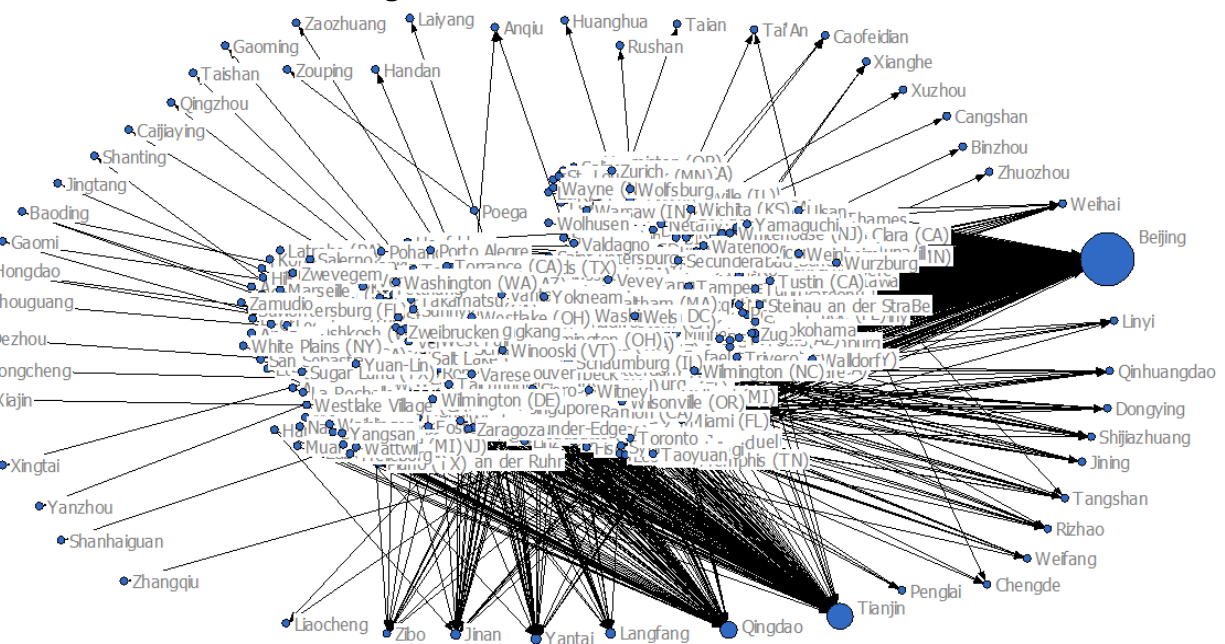
Figure 12 Bohai Coastal Area Network. (Source: FDImarkets.com, investments in values)

This area hosts two out of the total four MduCGs- Beijing and Tianjin- both with larger land area, higher population and provincial administrative level. That is why these two cities can attract more investment than others in this area. Most cities are located along the Bohai coast, which facilitates foreign investment. The following table shows FDI inflows to these cities received in the period of 2003 to 2011.

Beijing	Tianjin	Qingdao	Yantai	Jinan	Shijiazhuang	Weihai	Zibo	Tangshan	Weifang
1849	744	406	96	95	46	46	43	41	28

Table 4 Bohai Coastal Area Destination Cites. (Source: FDImarkets.com, investments in LN-values)

Beijing, Tianjin and Qingdao have absolute advantages in attracting FDI in comparison to the other cities in this area, as indicated by both the numbers in the table and the intensities of the connections in the network map. Dongying, Langfang and the rest of the cities listed in table 4 are also effective in attracting FDI.

Seoul	HK	Tokyo	Taipei	Singapore	Paris	London	NYC	Toronto	Dusseldorf
75	69	68	54	48	47	41	34	28	26

Table 5 Bohai Coastal Area Source Cites. (Source: FDImarkets.com. investments in LN-values)

Table 5 indicates the top 10 out-degree foreign cities, of which the first five are all from Asia and the other five are all from western countries.

4.1.2.2 Bohai Coastal Area FDI Sector Profile

From the total amount of FDI recorded from 2003 to 2011, Beijing receives the most (106,129 ME), with Tianjin and Shandong receiving about the same (44696.1 ME and 43775

ME), and with Hebei province on the lower end of the line, receiving the least amount of FDI (8726.68 ME).

In figure 13, it is apparent that most of the foreign investment packages flow into the real estate, transportation, financial services and automotive OEM sectors. The real estate sector dominates over other sectors in both Beijing and Tianjin, and the financial services sector in Beijing is the second largest FDI destination sector. For Tianjin, chemicals and transportation sectors are the second and the third largest FDI sectors. Hebei province receives the most amount of FDI in communications and alternative/renewable energy sectors. For the last province in this area Shandong, transportation sector, coal, oil and natural gas sector and paper, printing and packaging sector are the top three receiving sectors for FDI.
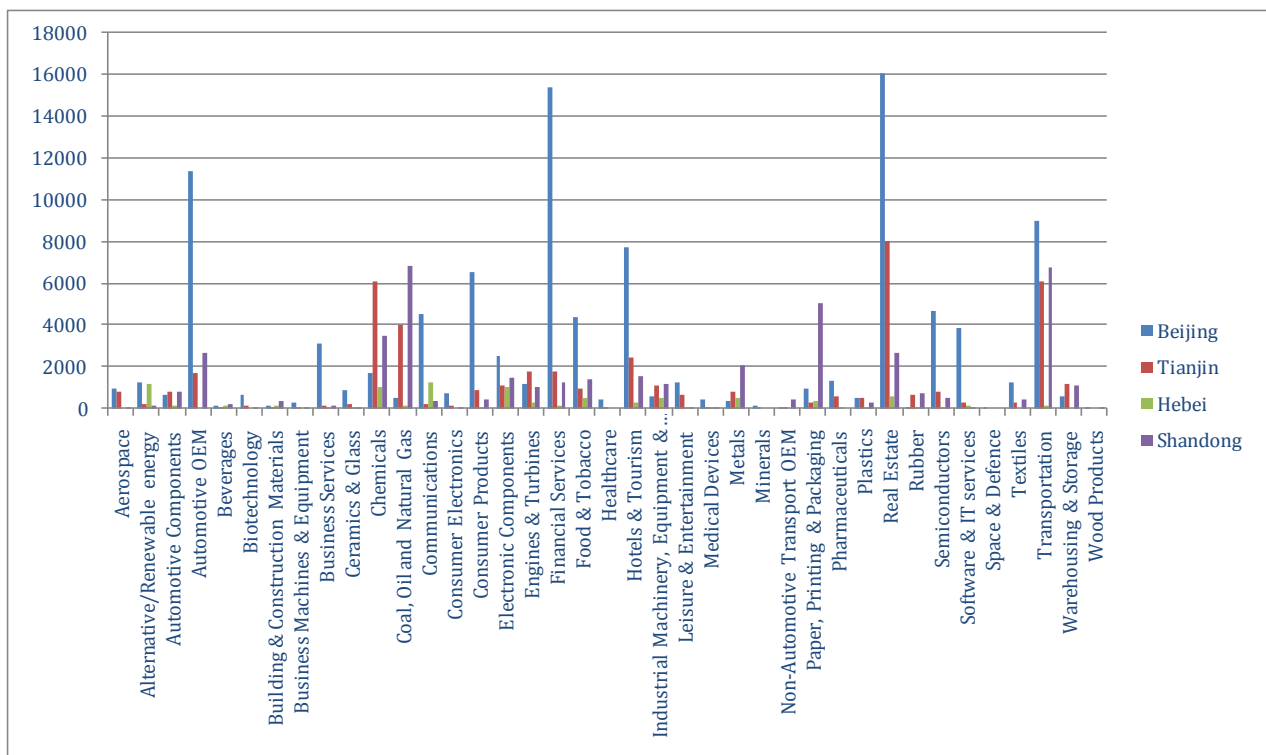
Figure 13 Bohai Coastal Area FDI-Sectors (Source: FDImarkets.com, investments in values. Units: Million Euros).

The location quotient is also identified for these provinces and the MduCGs within the Bohai coastal region. Beijing specialized in many sectors, attracting FDI in sectors such as space and defence (5.3), business services (3.0), ceramics & glass (2.9), communications (2.7), software and IT services (2.6), financial services (2.3), and health care (2.2). Other sectors such as aerospace, biotechnology, consumer products, and real estate all have a LQ of 1.9. Tianjin municipality has comparative advantage in sectors like aerospace (3.8), engines & turbines (3.0), real estate (2.3), and warehousing and storage (2.0). Hebei province has huge advantage in communications and alternative/renewable energy sectors with a LQs of 8.9 and 8.8 respectively. The LQs for building and construction metals, beverages, and industrial machinery sectors are between 3.0 and 4.0. Last but not least, paper, printing & packaging

(5.5), non-automotive OEM (2.9) and coal, oil and natural gas (2.3) sectors have comparative advantage for FDI in the Shandong province.

4.1.2.3 Bohai Coastal Area Conclusions

As discussed above, the major cities of the Bohai coastal area are Beijing, Tianjin, Qingdao, Yantai, Jinan, Shijiazhuang, Zibo, Langfang, Dongying,Tangshan, Weihai and Weifang. Hebei province is the weakest in terms of the total amount of FDI attracted. Beijing municipality is the most attractive for FDI. The majority of the FDI goes into the real estate, transportation, financial services and automotive OEM sectors. It must be noted that Tianjin and Shandong both receive a larger amount of FDI in the energy sector, because of oil extraction projects in the Bohai Sea. In terms of the location quotients for FDI attractiveness, Beijing is more specialized in service industries, such as business services, financial services, software & IT services and health care. Tianjin municipality has the highest comparative advantage in aerospace, and engines and turbines sectors. Hebei province is strong in communications and alternative/renewable energy sectors, both of which receive the most FDI. Shandong province specializes in the paper, printing and packaging industry, mainly due to its seaboard location. Furthermore, the coal, oil and natural gas sector is another comparative advantage possessed by the Shandong province.

4.1.3 Northwest China Regional Star Cities Identification and FDI Sector Profile

4.1.3.1 Northwest China Regional Star Cities Identification
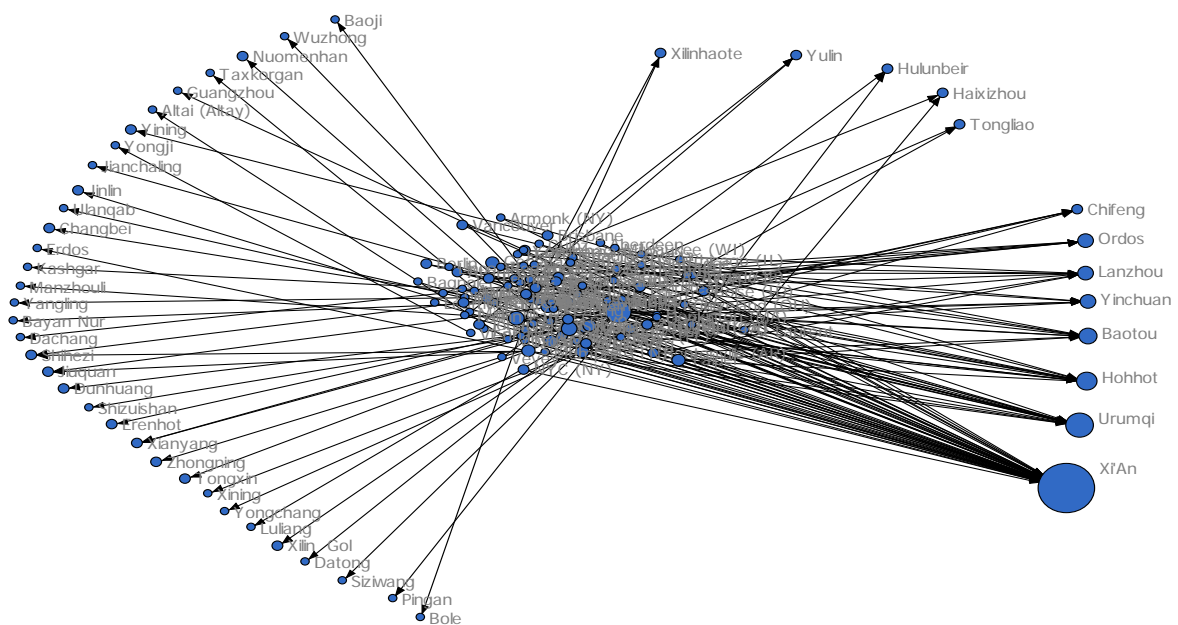
Figure 14 Northwest China Network (Source: FDImarkets.com, investments in values)

There are six provinces in northwest China: Inner Mongolia, Gansu, Xinjiang, Shaanxi, Qinghai and Ningxia. This FDI network (figure 14) is relatively concise. As mentioned in the background section of the first chapter, most cities in the northwest are on the left side of the

Hu-line, which suggests an area with fewer inhabitants and larger land areas, but notable development potential, also due to the abundance of natural resources. As indicated on the map, Xi'an is the biggest circle with the most lines connecting it to the central area, followed by Urumqi, Hohhot and Baotou. The amount of FDI in LN-values for each city is 174, 69, 46 and 38 respectively (FDImarkets.com). Yinchuan, Lanzhou and Ordos are also strong cities in terms of FDI flows. Apart from the former four cities, most of the others have singular investment relations. The top ten out-degree cities from foreign countries are displayed in the table below. It is clear that Hong Kong is the biggest investor, with an investment package twice the size of the one from Paris. The rest of the cities in the table are weak in comparison to Hong Kong in terms of FDI.

HK	Paris	Singapore	Seoul	Geneva	Markham	Denver	London	Taipei	Sydney
64	30	24	22	18	16	16	15	15	12

Table 6 Northwest China Source Cites (Source: FDImarkets.com, investments in LN-values)

4.1.3.2 Northwest China FDI Sector Profile

All six provinces have relatively fewer sectors receiving FDI. In terms of the total amount of FDI received, Inner Mongolia autonomous region and Shaanxi province are the strongest (18,034.1 ME and 13,303.2 ME respectively). Ningxia and Xinjiang autonomous regions receive much fewer FDI than the first two with a number of 4,763.22 and 4,117.55 ME. Much fewer investments (1195.54 ME) flow into Gansu province. Qinghai province obtains the lowest FDI inflows at 268.9 ME (FDImarkets.com).
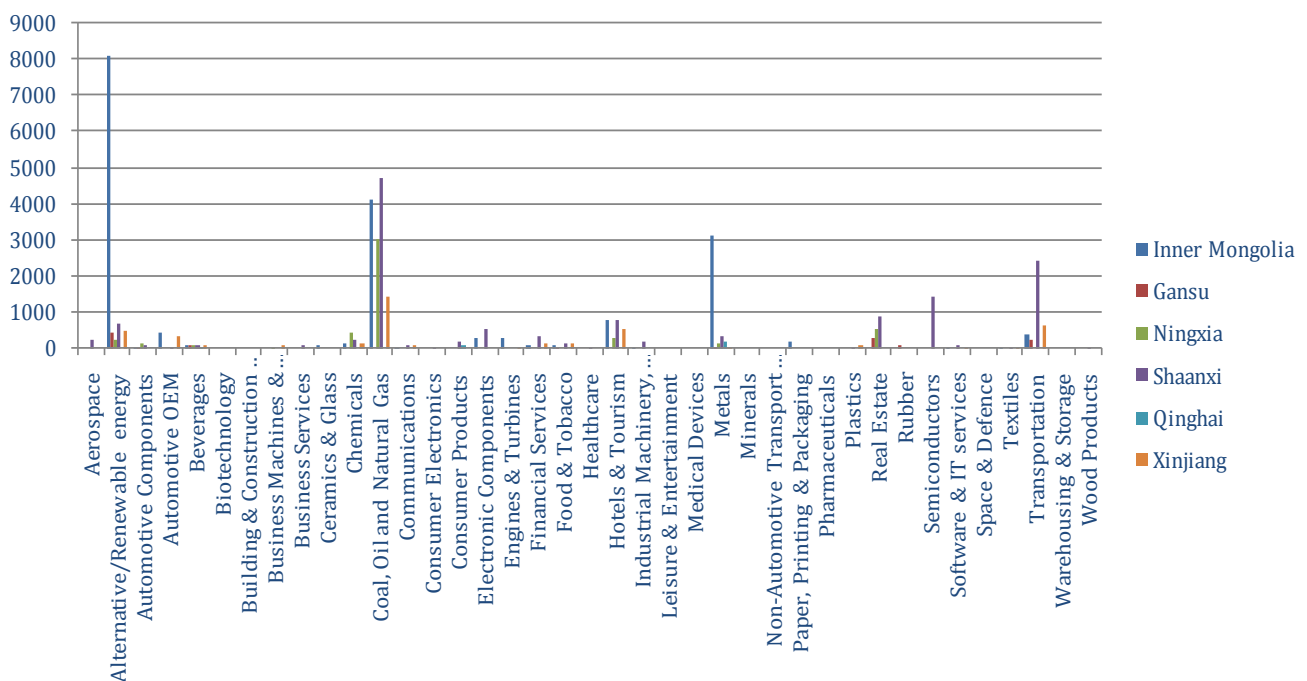
Figure 15 Northwest China FDI-Sectors (Source: FDImarkets.com, investments in values. Units: Million Euros).

Most of the investments flow into energy related sectors, such as the alternative/renewable energy sector, the coal, oil and natural gas sector, the metals sector, and transportation sector (figure 15). From the total amount of FDI in the alternative/renewable energy sector, Inner Mongolia receives the majority- an estimated 8,000 million Euros. For the coal, oil and natural gas sector, four provinces receive a considerable amount of FDI. Foreign enterprises also invest around 3,000 million Euros in metals in Inner Mongolia. In the transportation and semiconductors sectors, Shaanxi province performs better in attracting FDI. The real estate and hotels and tourism sectors are developed through FDI, but at a lower level when compared to the energy sectors.

As for the location quotients for sectors attracting FDI, five provinces- Inner Mongolia, Gansu, Ningxia, Shaanxi and Xinjiang- have comparative advantage in the alternative/renewable energy sector, especially Inner Mongolia and Gansu provinces (LQ equals 29.3 and 24.4 respectively). With the exception of Gansu and Qinghai, the other four provinces are effective in attracting FDI in the coal, oil and natural gas sector. Both Inner Mongolia and Qinghai provinces have higher location quotients for the metals sector (5.7 and 20.1 each). Except for Inner Mongolia (LQ of 1), the rest of the provinces all have comparative advantage in the beverage sector, Gansu and Qinghai in particular (LQ is 17.1 and 14.1 respectively). Gansu province is also good at attracting FDI in the automotive OEM, real estate, rubber and transportation sectors. It must be noted that Shaanxi has comparative advantage in four additional sectors: the aerospace, semiconductors, transportation and wood products sectors. The business machines and equipment, hotels and tourism, and transportation sectors are advantageous for Xinjiang; and, the consumer products sector for Qinghai.

4.1.3.3 Northwest China Conclusions

Xi'an, Urumqi, Hohhot, Baotou, Yinchuan, Lanzhou and Ordos are better performing cities in this region. Even though insufficient FDI flows into a handful of sectors within this area, and limited capital is invested into energy related sectors, such as the alternative/renewable energy, the coal, oil and natural gas, the minerals, the chemicals and the transpiration sectors when compared to other regions in China, these sectors do have a comparative advantage in this area. The hotel and tourism, and real estate sectors also receive higher amount of FDI.

Shaanxi, as the province of Xi'an city, is the only region that obtains FDI in the semiconductors, electronic components and aerospace industries, which could lead to the establishment of a high-tech industry centre in the northwest in the future. According to the FDI flows, Inner Mongolia has the potential to become a hub for alternative and renewable energy industries..

4.1.4 Southwest China Regional Star Cities Identification and FDI Sector Profile

#### 4.1.4.1 Southwest China Regional Star Cities Identification
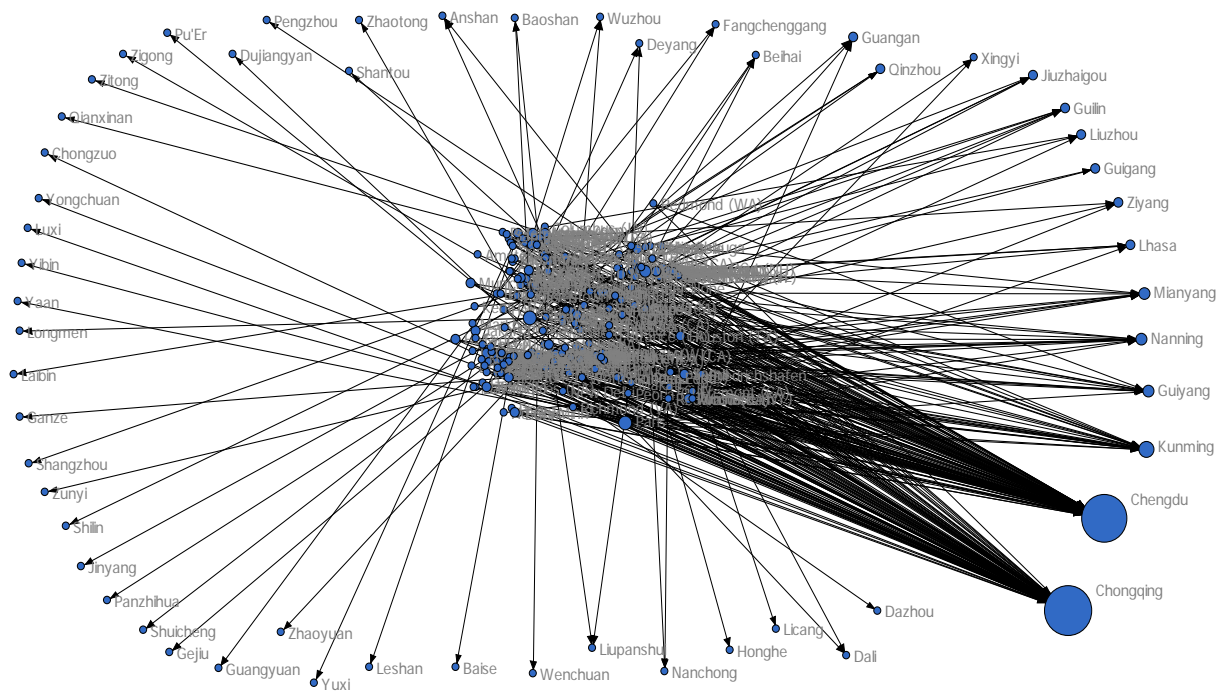
Figure 16 Southwest China Network (**Source: FDImarkets.com, investments in values**)

Southwest China is also located along the Hu-line, mainly on the left side, and consists of Sichuan, Guizhou, Yunnan, Guangxi, Tibet provinces, and one MduCG- Chongqing. The vast majority of the cities in the southwest have singular relations with foreign countries in terms of investments. However, as illustrated in the Southwest China Network (figure 16), two of the considerably bigger circles are identified as Chongqing and Chengdu, which receive the LN-values of FDI inflows of 431 and 412 respectively. Other cities also function as regional in-degree centres such as Kunming, Nanning, Guiyang, Mianyang and Liuzhou (FDI inflows in LN-values are 82, 42, 39, 37 and 14 respectively). Table 7 lists the strongest source cities, with Asian cities Singapore, Hong Kong, Taipei and Seoul exercising investor dominance in the area.

Paris	Singapore	HK	Taipei	NYC	London	Seoul	Toronto	Bentonville	Vancouver
68	64	57	48	32	29	23	22	21	20

Table 7 Southwest China Source Cites (Source: FDImarkets.com, investments in LN-values)

4.1.4.2 Southwest China FDI Sector Profile

In terms of total investments going to provinces, Sichuan and Chongqing both receive FDI at a higher level (33,657.6 ME and 31,065 ME each). The other four provinces do not perform as well as the former two in attracting FDI. Guangxi, Yunnan, Guizhou and Tibet respectively attract 5,021.9 ME, 3,532.61 ME, 2912.8 ME and 360.9 ME in FDI (FDImarkets.com).

According to figure 17, it is apparent that the majority of FDI flows into both Sichuan and Chongqing, and into similar sectors, such as the automotive OEM, business machines and equipment, electronic components, financial services, real estate and transportation sectors. It is also shown that Sichuan received 7,139.84 million Euros in FDI in the coal, oil and natural gas sector, which is by far the biggest investment out of all sectors in this area. Although Sichuan and Chengdu have many similar sectors receiving FDI, Chongqing has a more diverse palette of sectors for investors to choose from. Many sectors in Chongqing receive a relatively balanced amount of FDI, such as the automotive OEM, business machine and equipment, chemicals, electronic components, real estate, rubber, semiconductors and transportations sectors. For the rest of the provinces, less FDI attraction is demonstrated in figure 20. It must be noted that in Guizhou province the real estate sector receives 1,249 Million Euros in FDI, which is the highest recorded FDI in these sectors. FDI is injected in many sectors in Yunnan, but with a relatively lower intensity (all below 600 million Euros per sector). Guangxi province peaks in the paper, printing and packaging sector, which attracts 1050.8 million Euros in FDI. In Tibet, FDI flows into only five sectors, with the strongest sector being hotels and tourism (252.7 ME).
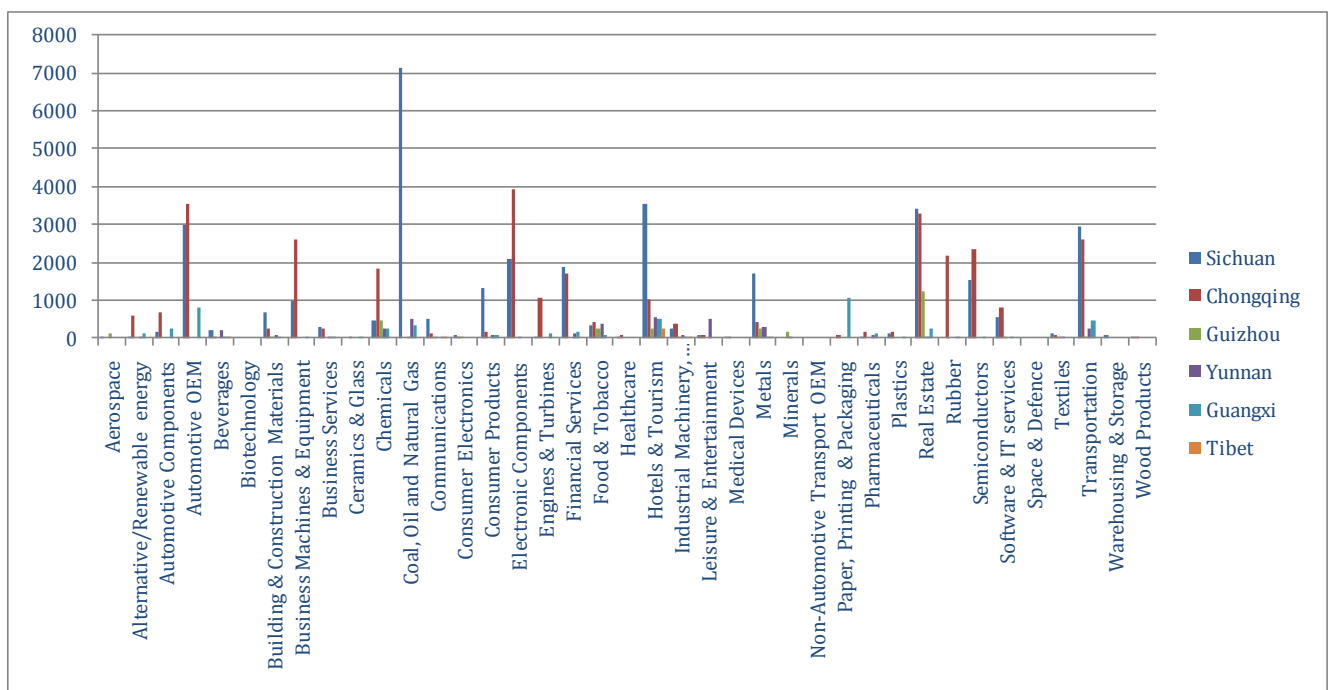
Figure 17 Southwest China FDI-Sectors (Source: FDImarkets.com, investments in values. Units: Million Euros).

In terms of location quotient, almost all of the provinces have comparative advantage in the hotel and tourism, and the building and construction materials sectors.

Sichuan province also specializes in the coal, oil and natural gas, business machines and equipment, beverages and metals sectors (LQ equals 3.1, 2.9, 1.7 and 1.7 respectively). For the MduCG Chongqing, the business machines and equipment sector is the one with highest comparative advantage, according to its 8.3 location quotient. Strong comparative advantage is also exhibited in the rubber sector (5.7). Chongqing also has advantage in sectors such as

engines and turbines, electronic components and software and IT services (2.6, 2.1 and 1.9 LQ respectively). Although Guizhou province receives a large amount of FDI in its real estate sector, it is only the third (5.5) strongest sector in terms of the location quotient. The highest two sectors are minerals (34.3) and aerospace (9.7). Yunnan performs best in the beverages (14.0) and leisure and entertainment (13.0) sectors. Guangxi province receives the highest value of FDI in the paper, printing and packaging sector (9.9). Tibet only has five sectors receiving FDI, thus all of the five are crucial for Tibet's development.

4.1.4.3 Southwest China Conclusions

As explained in the above section, the in-degree centres are Sichuan, Chongqing, Kunming, Nanning, Guiyang, Mianyang and Liuzhou. Singapore, Hong Kong and Taipei are the important source cities. Most of the FDI is shared by the same sectors both in Sichuan and Chongqing, which also forces those two provinces to compete. Outstanding amount of FDI flows into the metals and coal, oil and natural gas sectors in the Sichuan province. According to the FDI flowing into many manufacturing sectors in Chongqing municipality, a manufacturing base in the southwest of China can be forecast for the near future. Furthermore, the whole of the southwest area exhibits comparative advantage in the hotel and tourism sector.

4.1.5 Central China Regional Star Cities Identification and FDI Sector Profile

4.1.5.1 Central China Regional Star Cities Identification
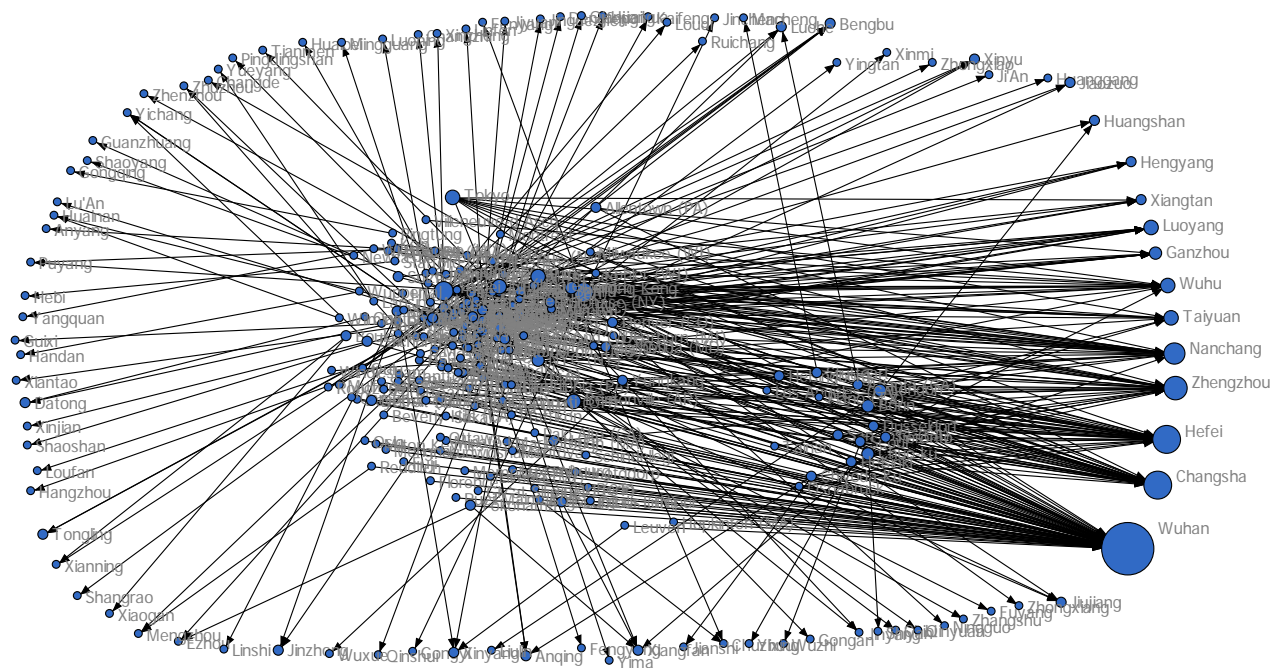
Figure 18 Central China Network (Source: FDImarkets.com, investments in values)

Central China is an important area in China's history, and consists of the Henan, Shanxi, Anhui, Hubei, Hunan and Jiangxi provinces. In the old days, the Chinese mainly settled in these parts of the country. Two famous rivers, the Yellow River and the Yangtze River are

flowing through central China. The regional star cities are Wuhan, Changsha, Hefei, Zhengzhou, Nanchang, Taiyuan and Wuhu, exhibiting stronger FDI flows than other cities. Table 8 lists the amount of inward investments flowing into cities in central China.

Wuhan	Changsha	Hefei	Zhengzhou	Nanchang	Wuhu	Taiyuan
316	141	141	111	103	53	44

Table 8 Central China Destination Cites (Source: FDImarkets.com, investments in LN-values)

Taipei, Hong Kong and Tokyo are the top three source cities that invest the most into this area. From table 9, it is apparent that, among the top 10 FDI senders, Asian cities play dominant roles both quantitatively and qualitatively.

Taipei	HK	Tokyo	Paris	Singapore	Bentonville	Chuo-ku	London	Munich	Bonn
77	73	47	45	43	42	35	34	27	26

Table 9 Central China Source Cites (Source: FDImarkets.com, investments in LN-values)

4.1.5.2 Central China FDI Sector Profile

Within central China, Hubei province receives the largest amount of FDI (26,414.3 ME). Both Henan and Anhui provinces attract around 10,000 million Euros in investments (12,865.6 ME and 9747.08 ME respectively). Jiangxi and Hunan perform at the same level (7,022.04 ME and 6,558.27 ME each) in terms of total FDI inflows obtained. The least FDI is delivered into Shanxi province (4,224.46 ME) (FDImarket.com).
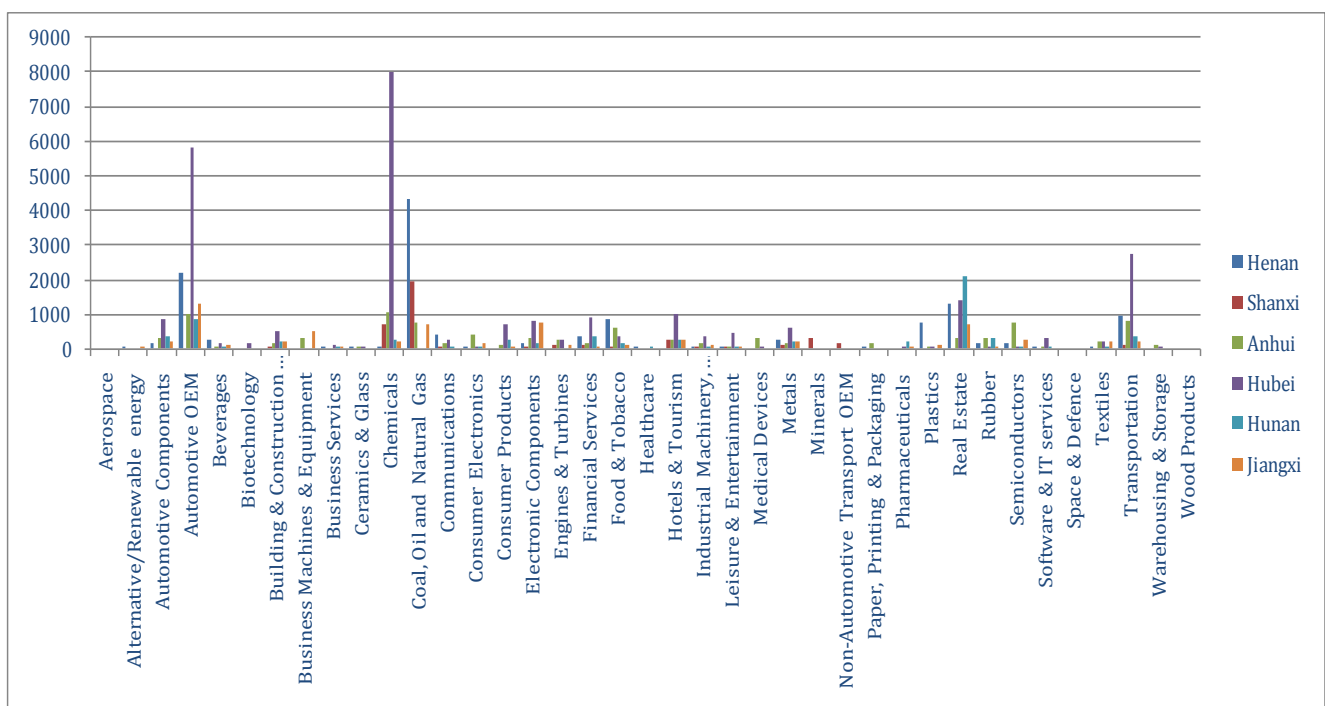
Figure 19 Central China FDI-Sectors (Source: FDImarkets.com, investments in values. Units: Million Euros).

According to figure 19, FDI flows into specific sectors in each province. For all six provinces, the automotive OEM, chemicals, food and tobacco, real estate and transportation sectors

receive the most FDI. Henan, Shanxi, Anhui and Jiangxi receive plenty of investment in the coal, oil and natural gas sector. However, it is apparent that the Hubei province is most dominant in attracting FDI in the automotive OEM (5,790.9 ME), chemicals (7,977.99 ME) and transportation (2,744.8 ME) sectors. Apart from the automotive OEM sector, Henan province also receives the majority of FDI in the coal, oil and natural gas (4,329.8 ME) sector. As in the Henan province, Shanxi's coal, oil and natural gas sector is the most important FDI receiver, with 1,978.35 million Euros in capital inflows. The other two larger FDI attracting sectors- chemicals and minerals- are both resource related. Excluding common industries attractive for FDI, the semiconductor sector also obtains around 1,000 million Euros in investments for the Anhui province. Except for the automotive OEM sector, the other sectors in Jiangxi all receive FDI injections of less than 1,000 million Euros, out of which coal, oil and natural gas (739.47 ME), electronic components (746.5 ME), and the real estate (694.54 ME) sectors are most dominant.

As far as location quotients are concerned, the Henan, Anhui, Hubei, Hunan and Jiangxi provinces all have comparative advantage in the automotive OEM and beverages sectors. Shanxi and Henan provinces specialize in natural resource related sectors, such as the minerals sector (48.3) in Shanxi, and the coal, oil and natural gas sector (6.9 and 4.9 respectively) in both provinces. Provinces in this area are similarly own the comparative advantage in the Building & Construction Materials and the Automotive Components sectors.

4.1.5.3 Central China Conclusions

First of all, major in-degree cities in this area are as follows, Wuhan, Changsha, Hefei, Zhengzhou, Nanchang, Taiyuan and Wuhu. Moreover, major source cities are mainly from Asia, such as Taipei, Hong Kong, Tokyo and Singapore.

From the total value of FDI flowing into this region, central China provinces perform better than other inland regions, with the exception of southwest China that attracts the total of 76,550.81 million Euros, as opposed to central China's 66,831.75 million Euros. In this area, most investments are delivered into the Automotive OEM, Chemicals, Coal Oil and Natural Gas, Real Estate and Transportation sectors. Hubei province functions as the economic engine of this area, according to the FDI received in the manufacturing sectors. This region has comparative advantage in several sectors; for example, the Automotive OEM, Automotive Components, Beverages and Building & Construction Materials.

4.1.6 Southeast China Regional Star Cities Identification and FDI Sector Profile

4.1.6.1 Southeast China Regional Star Cities Identification

Like the Bohai coastal area, southeast China is located on the coast. Ever since the first areas opened to the world, cities in the southeast are still playing key roles in the national economy. Five provinces, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan, plus one MduCG-Shanghai-, comprise the sound economic engine and the most vivid economic entity in China. Figure 20 illustrates the FDI network between foreign cities and cities in south eastern China. From the numbers of Chinese cities receiving FDI, and the sophistication of the network, it can be deduced that southeast China is preferred by foreign enterprises, and

generates huge economic value in comparison to the other five regions, especially the inland ones.
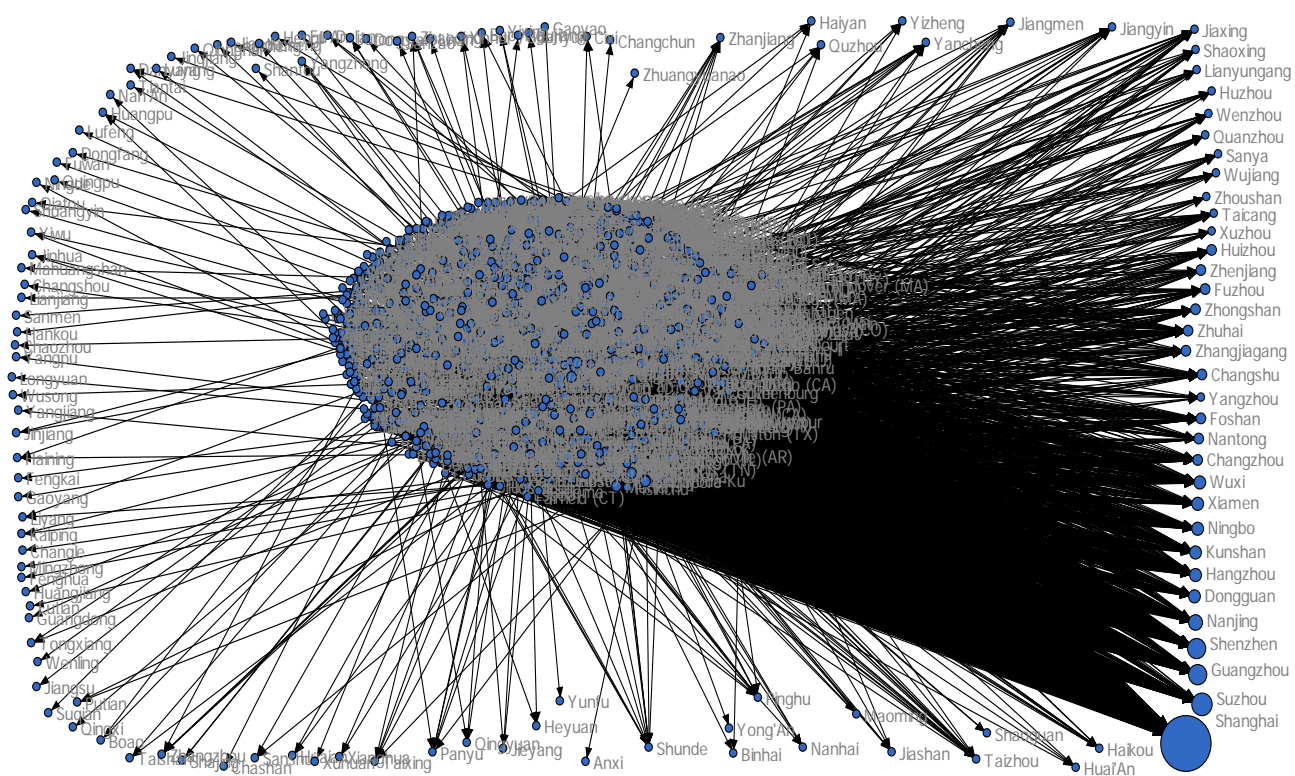
Figure 20 Southeast China Network (Source: FDImarkets.com, investments in values)

It is apparent that many cities have complicated ties with foreign cities, and that the number of single-connection-cities is higher than the other areas of China. The MduCG Shanghai is the most attractive city in the area judging by the size of the circle and the strength of its ties in the network map. Other cities like Suzhou, Guangzhou, Shenzhen, and Nanjing etc. also perform well in receiving FDI.

Shanghai	Suzhou[5]	Guangzhou	Shenzhen	Nanjing	Hangzhou	Wuxi	Ningbo	
3140	1139	829	734	453	381	363	293	
Xiamen	Dongguan	Changzhou	Foshan	Zhuhai	Nantong	Zhongshan	Huizhou	Fuzhou
262	261	227	192	183	135	123	117	95

Table 10 Southeast China Destination Cites (Source: FDImarket.com, investments in LN-values)

In the table above, some of the powerful cities are listed; however, apart from the cities in the table, there are other cities that are just as vital, such as Yangzhou, Wenzhou, Xuzhou, Quanzhou, Shaoxing, Taizhou, Jiaxing, and Haikou as discovered through dataset analysis. In the following table, the top 10 FDI source cities are presented. Asian cities are again the most

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[5] Kunshan is a county level city under Suzhou city, thus, the number 1139 includes investments into Kunshan and Suzhou

dominant in this list, with Hong Kong as the spearhead investor, and Tokyo and Taipei as the subsequent advancing investors.

HK	Tokyo	Taipei	Paris	Singapore	Seoul	NYC	London	Osaka	Chuo-ku
264	222	202	178	162	143	133	126	125	89

Table 11 Southeast China Source Cites (Source: FDImarket.com, investments in LN-values)

4.1.6.2 Southeast China FDI Sector Profile

Southeast China receives the highest value of FDI, amounting to about 2,616,647.68 million Euros within China. The MduCG Shanghai is the biggest FDI destination city in this area, obtaining 206,227 million Euros. Guangdong and Jiangsu provinces are in the second echelon, with their FDI amounting to 153,431 ME and 151,024 ME respectively. Zhejiang province receives a total of 43,881 million Euros in FDI, which is much higher than the numbers flowing into Fujian province (FDI: 28,212.9 ME). Lastly, Hainan is the smallest, attracting only 7,644.78 million Euros FDI. (FDImarket.com Dataset).

The vivid economic activities for all regions in this area have been exhibited in the FDI-Sector graph (Figure 21). Shanghai, Jiangsu and Guangdong all receive plenty of FDI in the Chemicals Sectors (26,109 ME, 26,783.3 ME and 21868.9 ME respectively). Shanghai is also powerful in attracting FDI into sectors like the Financial Services (25,652.4 ME), Hotels & Tourism (20,327.3 ME), Transportation (15,630.5 ME), Automotive OEM (11,711.6 ME), Real Estate (11,499.6 ME) and Semiconductors (11,357.3 ME) sectors. Jiangsu province also receives an outstanding amount of FDI in two sectors: the Electronic Components (23,062.8 ME) and the Semiconductors (17,623.3 ME) sectors. Guangdong province obtains strongest FDI in the Automotive OEM (13,165 ME), the Transportation (14,119.5 ME) and the Coal oil and Natural Gas (14,124.4 ME) sectors. For Zhejiang province, outstanding sectors for FDI can be identified as the Automotive OEM, Chemicals and Transportations (all receiving around 5,000 million Euros lower than the other provinces). Fujian province only has one key attractive sector that is Coal, Oil and Natural Gas receiving 8,178 million Euros. For the rest of the sectors in Fujian, except for the Transportation sector that receives FDI of 3,573.1 million Euros, the rest are all invested in with an amount less than 3,000 million Euros. As the southernmost province in China, the Hotel & Tourism (2,858.8 ME), Paper Printing & Packaging (2,045 ME) and Real Estate (888.78 ME) are three leading sectors in attracting FDI.
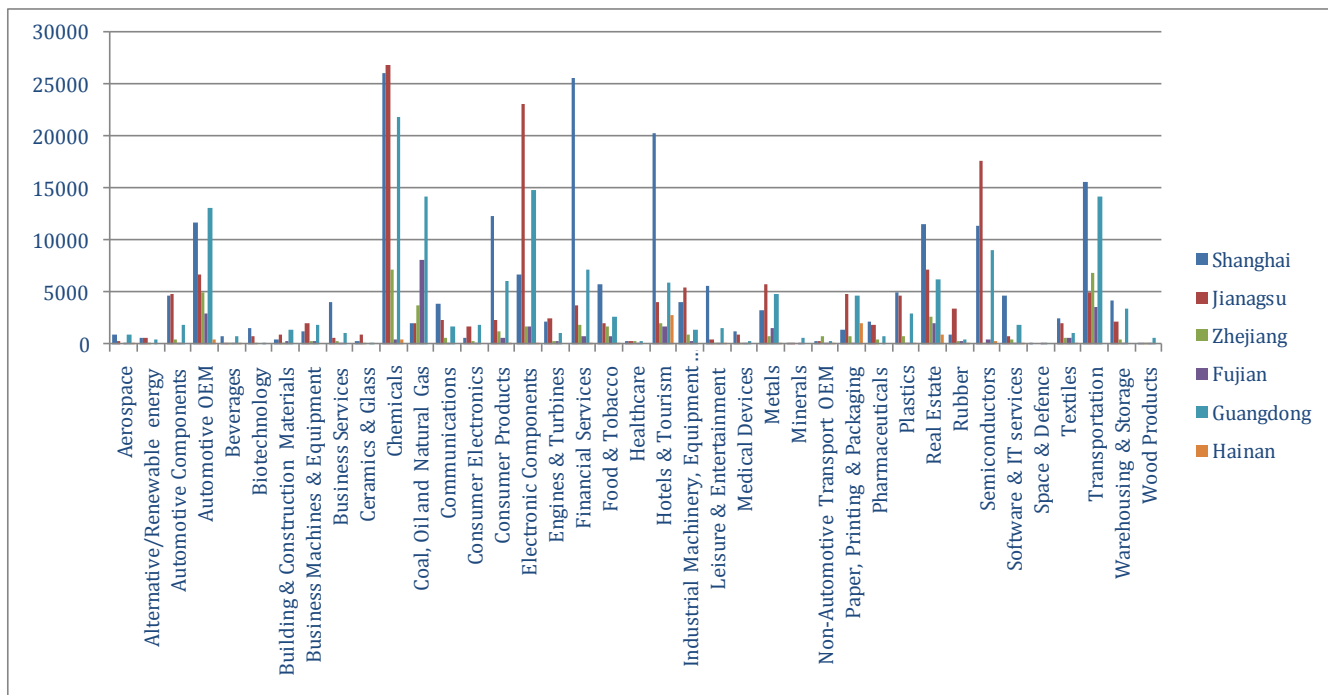
Figure 21 Northeast China FDI-Sectors (Source: FDImarkets.com, investments in values. Units: Million Euros).

In terms of location quotient, all regions are powerful in the Chemicals sector. As for the other sectors, six provinces complement each other at an almost perfect level.

4.1.6.3 Southeast China Conclusions

There are many attractive cities in this region of China: Shanghai, Shenzhen, Guangzhou, Hangzhou, Foshan, Dongguan, Suzhou, Wuxi, Nanjing, Ningbo, Xiamen, Changzhou, Zhongshan, Fuzhou, Zhuhai, Yangzhou, Nantong, Wenzhou, Xuzhou, Quanzhou, Huizhou, Shaoxing, Taizhou, Jiaxing, and Haikou.

As the first region to open to the world, southeast China is still experiencing significant FDI inflows, larger than the regions previously mentioned in this chapter. Many sectors are heavily invested in. The Automotive OEM, Chemicals, Financial Services, and Hotels and Tourism sectors, attract the highest level of investments. Unlike other regions that are only powerful in manufacturing sectors, southeast China is also strong in service type sectors, especially Shanghai and Guangdong. A complementary FDI absorbing into sectors can be identified through location quotient calculations.

4.1.7 Conclusion: FDI Distributions into Provinces and Regional Star Cities List

In conclusion, the east coastal area receives vast amount of FDI, including the two regions- the Bohai coastal area and southeast of China. Figure 22 lists the cities located in this area. The remaining regions are relatively weak in receiving and attracting FDI; those areas are inland regions consisting of northeast China, central China and western China.
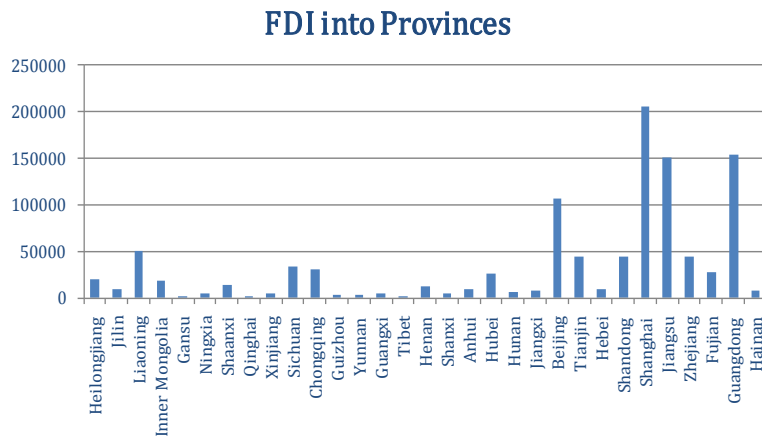
Figure 22 China Total FDI-Provinces. (Source: FDImarkets.com, investments in values. Units: Million Euros)

Regional star cities are listed in below.

Northeast China: Dalian, Shenyang, Changchun, Harbin.

Northwest China: Xi'an, Urumqi, Hohhot, Baotou, Yinchuan, Lanzhou, Ordos.

Southwest China: Chongqing, Chengdu, Kunming, Nanning, Guiyang, Mianyang, Liuzhou

Central China: Wuhan, Changsha, Hefei, Zhengzhou, Nanchang, Wuhu, Taiyuan.

Bohai Coastal Area: Beijing, Tianjin, Qingdao, Yantai, Jinan, Shijiazhuang, Zibo, Langfang, Dongying, Tangshan, Weihai, Weifang.

Southeast China: Shanghai, Shenzhen, Guangzhou, Hangzhou, Foshan, Dongguan, Suzhou, Wuxi, Nanjing, Ningbo, Xiamen, Changzhou, Zhongshan, Fuzhou, Zhuhai, Yangzhou, Nantong, Wenzhou, Xuzhou, Quanzhou, Huizhou, Shaoxing, Taizhou, Jiaxing, Haikou

The identification of the regional star cities is very important for the coming section of the analysis. A city that can attract huge amount of investments and also establish numbers of connections with foreign cities, is a city that possesses specific factors that leading enterprises have an affinity for and, thus, invest in. Once major cities have been identified, a detailed examination of the relationship between investments and location factors can be carried out. The cities marked in red are those for which no detailed location factors were found during the field work.

4.2 Relations between Investments and Location Factors

There are 12 first-class indicators as demonstrated in Chapter 3, which are Talent Competiveness (X1), Capital Competitiveness (X2), Science & Technology Competitiveness (X3), Industry Structure Competitiveness (X4), Infrastructure Competitiveness (X5), Comprehensive Location Competitiveness (X6), Environment Competitiveness (X7), Culture Competitiveness (X8), Institutional Competitiveness (X9), Government Management Competitiveness (X10), Enterprise Management Competitiveness (X11) and Openness Competitiveness (X12). They are divided into two groups: first seven factors comprise hard competitiveness, and the rest comprise soft competitiveness. After the VIF-test within the two different groups, none of the first-class indicators got a result above 10, which means they are

all qualified for the collinearity diagnostics test and ready for multiple regression models analysis.

4.2.1 Key First-Class and Second-Class Indicators Identification-All Cities

4.2.1.1 Key First-Class Indicators Identification-All Cities

All of the first-class indicators for the 54 cities in different regions of China undergo SPSS for multiple regressions analysis. The *stepwise method* is utilized as the main calculation approach, instead of Enter method. Results are shown for first the Talent Competitiveness and the Openness Competitiveness, since they are the two key first-class location factors influencing FDI inflows in the whole of China.

The Model Summary exhibits that for Model 1 and Model 2 around 71% and 77% dependent variables are explained in the analysis models. Both Models have Sig. under 0.05, which ascertains the models as valid. Table 12 shows the result obtained through the stepwise method.

Variables Entered/Removed^a

Mode l	Variables Entered	Variables Removed	Method
1	Talent Competitiven ess	.	Stepwise (Criteria: Probabili ty-of-F-to-enter <= .050, Probabili ty-of-F-to-remove >= .100).
2	Openness Competitiven ess	.	Stepwise (Criteria: Probabili ty-of-F-to-enter <= .050, Probabili ty-of-F-to-remove >= .100).

a. Dependent Variable: FDI 07-11

Table 12 Key First-Class Indicators for Total China

The Coefficients for Talent and Openness Competitiveness are illustrated in the following table 13, which shows Talent has a bigger coefficient (7.919) than that for Openness (2.610). Both significances are 0.000 which means the coefficients are significant. Thus the Talent Competitiveness is more influential to FDI inflows than the Openness Competitiveness.

Coefficients^a

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.173	.475		2.470	.017
	Talent Competitiveness	9.719	.864	.842	11.254	.000
2	(Constant)	.924	.430		2.149	.036
	Talent Competitiveness	7.919	.910	.686	8.706	.000
	Openness Competitiveness	2.610	.697	.295	3.747	.000

a. Dependent Variable: FDI 07-11

Table 13 Coefficients for Key First-Class Indicators for Total China

For both Talent Competitiveness and Openness Competitiveness, there exist five and four second-class indicators, which are Human Resource Scale, Literacy Quality, Status of the Labour Market, Cost of Labour Force and Education Status under Talent Competitiveness, together with International Openness, Regional Openness, Humanities Openness and Social Communication Level under Openness Competitiveness. The nine second-class indicators are crucial for attracting FDI, and the next step aims to identify which of them are more influential than others.

4.2.1.2 Key Second-Class Indicators Identification-All Cities

After the first step analysis, nine sub-indicators from the two groups- talent and openness- are set. The collinearity diagnostics test is applied for these indicators and the results show that for none of them the VIF is above 10, which suggests all nine second-class indicators are qualified for the multiple regressions analysis.

Variables Entered/Removed[a]

Mode l	Variables Entered	Variables Removed	Method
1	Human Resource Scale	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Status of the Labor Market	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	Humanities Openness	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: FDI 07-11

Table 14 Key Second-Class Indicators for Total China

In the above table 13, three indicators out of nine are given out as key second-class indicators for total sample size, which are Human Resource Scale, Status of the Labour Market and Humanities Openness. Around 61% of the total dependent variables are explained by the independent variables for Model 1. For the Model 2 and Model 3, around 72% and 78%, respectively, of the total data are represented through the model analysis. All of the three models are significant (significance=0.000).

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.210	.371		8.649	.000
	Human Resource Scale	7.077	.782	.782	9.051	.000
2	(Constant)	-.922	.962		-.959	.342
	Human Resource Scale	6.172	.695	.682	8.879	.000
	Status of the Labor Market	5.297	1.165	.349	4.548	.000
3	(Constant)	-.784	.864		-.907	.369
	Human Resource Scale	4.557	.764	.504	5.966	.000
	Status of the Labor Market	4.062	1.098	.268	3.700	.001
	Humanities Openness	2.766	.756	.324	3.658	.001

a. Dependent Variable: FDI 07-11

Table 15 Coefficients for Key Second-Class Indicators for Total China

The coefficients for the above three second-class indicators are available in the table 15. In the last block 3, all three indicators have Sig. under 0.05 with the suggestions that all coefficients are valid. Human Resource Scale has the highest coefficients 4.557 followed by Status of the Labour Market 4.062 and Humanities Openness 2.766. Take Human Resource Scale as an example: if one unit Human Resource Scale shifted, a number of 4.557 FDI inflows would change positively. Thus Human Resource Scale is the most dominant second-class indicator of all.

4.2.1.3 Conclusions

Since the 54 major cities selected for this study almost include all of the *large cities* across China, it may be deduced that the key factors for cities attracting FDI in China are Talent Competitiveness and Openness Competitiveness, which, in other words, means human resources and extent of connections; more specifically, the Human Resource Scale, Status of the Labour Market and Humanities Openness. Human resource scale is defined by population size, employees' size, and employees' growth rate. Status of the Labour Market contains the unemployment rate, the accessibility for skilled worker and advanced talents. At last, Humanities Openness is mainly reflected in the percentage of the temporary resident population and immigration, foreign language popularity rate and foreign culture affection.

The sample size consists of 35 cities on the eastern coastal area and 19 from the rest of China. They are all more developed cities than the unselected ones. However, the 35 cities in the eastern coastal area are even more prosperous than 19 inland cities. This may influence the results.

4.2.2 Key First-class and Second-Class Indicators Identification-Eastern Coastal China

4.2.2.1 Key First-class Indicators Identification-Eastern Coastal China

Again, after collinearity diagnostics test, all 12 first-class location factors for the 35 cities in eastern coastal China are valid for input into the SPSS for further multiple regression models analysis. The stepwise method is utilized in multiple regressions, and the result shows that Talent Competitiveness, Openness Competitiveness and Comprehensive Location are all determinants for attracting FDI (Table 16).

Variables Entered/Removed[a]

Mode l	Variables Entered	Variables Removed	Method
1	Talent Competitiven ess	.	Stepwis e (Criteria: Probabili ty-of-F- to-enter <= .050, Probabili ty-of-F- to- remove >= .100).
2	Openness Competitiven ess	.	Stepwis e (Criteria: Probabili ty-of-F- to-enter <= .050, Probabili ty-of-F- to- remove >= .100).
3	Comprehensi ve Location	.	Stepwis e (Criteria: Probabili ty-of-F- to-enter <= .050, Probabili ty-of-F- to- remove >= .100).

a. Dependent Variable: FDI 07-11

Table 16 Key First-Class Indicators for Coastal Cities

The Model Summary Table revealed on the SPSS output, illustrates that around 79% and 86% of the data is explained through model 1 and model 2 respectively, and about 88% of the dependent factors are explained by the independent variables At the same time, the significances for all models is under 0.05 which ensures that the three models are all valid.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.453	.462		3.144	.004
	Talent Competitiveness	9.319	.835	.889	11.157	.000
2	(Constant)	1.056	.396		2.671	.012
	Talent Competitiveness	7.075	.890	.675	7.952	.000
	Openness Competitiveness	3.061	.763	.340	4.011	.000
3	(Constant)	1.755	.488		3.594	.001
	Talent Competitiveness	8.662	1.103	.826	7.853	.000
	Openness Competitiveness	2.966	.722	.330	4.110	.000
	Comprehensive Location	-2.432	1.096	-.200	-2.219	.034

a. Dependent Variable: FDI 07-11

Table 17 Coefficients for the Key First-Class Indicators for Coastal Cities

In table 17, coefficients and significances for the three key location factors are clearly addressed. None of them has significance above 0.05, which means that all coefficients are significant. Although all three factors play a dominant role in the regression model, negative coefficient appears for the Comprehensive Location indicator. The other two, Talent Competitiveness and Openness Competitiveness, both have positive impact on FDI (coefficients 8.662 and 2.966 respectively). Therefore, Talent Competitiveness and Openness Competitiveness are the two first-class indicators that influence FDI positively.

An explanation is required for the negative coefficient factor- Comprehensive Location. Under this first-class indicator, there are 4 second-class indicators including Natural Location Convenient Degrees, Economic Location Advantages, Resources Advantages and the last one, Political and Cultural Location Advantages. The Natural Location Convenient Degrees is

represented by firstly, the distance from the lake, river or sea, and secondly, whether the city is located on a vantage point within the regional urban agglomeration. The Economic Location Advantages includes development level and market size of a city's economic hinterland, together with economic regional logistics capability, such as volume of passenger traffic, goods transported and post and telecommunication business. The Resources Advantages includes water supply conditions and arable area per capita. The last sub-factor Political and Cultural Location Advantages shows a city's administrative level, and its Science Education Culture center's level.

Since most of the coastal cities are economically well-developed, thus each of them positions in a comparatively disadvantageous situation when comparing with other cities among the cities agglomerations. In the coastal area, because of the high density of population and industry, water and land resource have become scarce, which explains the third sub-factor Resources Advantages' lower score. As mentioned in the background, the vast majority of *large cities* in the coastal area are not necessarily provincial capital cities, which means that the administrative level and Science, Education and Culture are lower, because in China only the provincial capital cities have higher administrative and other organizational levels. As a conclusion, most of the sub-factors under the Comprehensive Regional Competitiveness have lower scores, but the cities in this area have relatively higher FDI inflows. This is why there is a significant negative coefficient in the regression model.

4.2.2.2 Key Second-class Indicators Identification-Eastern Coastal China

After having identified the major first-class indicators, detailed second-class indicators need to be tested through collinearity diagnostics. The test results show that none of the second-class indicators are above 10. They are all valid for multiple regression analysis.

In the multiple regression model analysis, the stepwise method is conducted first. Results are revealed in table 18. Humanities Openness, Human Resource Scale and Status of the Labor Market are analyzed from three models as the determinant second-class indicators for the dependent variable, FDI inflows, from 2007 to 2011.

Variables Entered/Removed^a

Mode l	Variables Entered	Variables Removed	Method
1	Humanities Openness	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Human Resource Scale	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	Status of the Labor Market	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: FDI 07-11

Table 18 Key Second-Class Indicators for Coastal Cities

The Model Summary table shows that model 1, 2 and 3 explain around 65%, 77% and 85% of the total dependent variables respectively, through independent variables. All three models are significant with the Sig. at 0.000.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.185	.555		3.935	.000
	Humanities Openness	6.704	.842	.811	7.960	.000
2	(Constant)	1.959	.463		4.228	.000
	Humanities Openness	4.128	.948	.499	4.355	.000
	Human Resource Scale	4.087	1.019	.460	4.012	.000
3	(Constant)	-.968	.829		-1.167	.252
	Humanities Openness	3.243	.815	.392	3.981	.000
	Human Resource Scale	3.911	.843	.440	4.638	.000
	Status of the Labor Market	4.134	1.039	.303	3.979	.000

a. Dependent Variable: FDI 07-11

Table 19 Coefficients for the Key Second-Class Indicators for Coastal Cities

In table 19, coefficients and significances for the three sub-factors are revealed. Status of the Labor Market has the highest coefficient at 4.134, which suggests it is the most influential second-class indicator. Human Resource Scale and Humanities Openness are both crucial for FDI inflows. The other six out of nine second-class indicators are also determinants for the dependent variable, yet just the former three are the most suggestive ones.

4.2.2.3 Conclusions

From the coastal cities multiple regression analysis, determinant first-class indicators are identified as two positive ones, Talent Competitiveness and Openness Competitiveness, and one negative- Comprehensive Locations. As in the previous analysis, negative Comprehensive Locations does not actually means that to this factor could lead a bad result in FDI. On the contrary- the high level of FDI and development causes this negative. For instance, high density of population results in water and land scarcity, plenty of developed cities aggregated together establishes the vantage points for each at a relatively lower position, plus most of the *large cities* in coastal area are not provincial capital cities and are with lower administrative and other organizational levels. Those factors lead to a lower score when measuring city competitiveness, yet are inconsistent with huge amount of FDI, thus creating such a negative coefficient. Furthermore, as in the total China sample size analysis, nine second-class indicators under Talent and Openness Competitiveness are processed through SPSS. The result shows that Status of the Labor Market, Human Resource Scale and Humanities Openness are three determinant factors for FDI in the eastern coastal China.

4.2.3 Key First-class and Second-Class Indicators Identification-Inland China

4.2.3.1 Key First-class Indicators Identification-Inland China
As mentioned at beginning, all 12 factors are qualified, as determined by the VIF-test. Thus, those factors for inland cities of China are imported into SPSS for further multiple regression analysis. Three crucial first-class indicators emerge from the analysis: Talent Competitiveness, Openness Competitiveness and Comprehensive Location (Table 20).

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	Talent Competitiveness	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Openness Competitiveness	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	Comprehensive Location	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: FDI 07-11

Table 20 Key First-Class Indicators for Inland Cities

The Model Summary suggests that for the Model 1, around 53% of the dependent variables are explained by the independent variables, and for Model 2, about 70% of the total FDI are represented, and, finally, for the last Model 3, around 82% of the data are revealed through the model. All three models have significances under 0.05 which means that all of the models are tenable.

Coefficients^a

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1.052	1.688		-.623	.541
	Talent Competitiveness	13.614	3.104	.729	4.386	.000
2	(Constant)	-2.485	1.449		-1.715	.106
	Talent Competitiveness	9.161	2.904	.490	3.154	.006
	Openness Competitiveness	10.580	3.404	.483	3.108	.007
3	(Constant)	-4.737	1.393		-3.400	.004
	Talent Competitiveness	7.187	2.450	.385	2.934	.010
	Openness Competitiveness	10.114	2.772	.462	3.648	.002
	Comprehensive Location	5.472	1.805	.354	3.032	.008

a. Dependent Variable: FDI 07-11

Table 21 Coefficients for the Key First-Class Indicators for Inland Cities

Unlike the coastal cities, here all three first-class indicators have negative coefficients with significance values of 0.010, 0.002 and 0.008 respectively. From the table 21 above, it is ensured that Openness Competitiveness has the biggest coefficient at 10.114, Talent Competitiveness has the second biggest one at 7.187 and Comprehensive Location has the smallest of 5.472. Thus, in terms of attracting FDI, there are three driving factors for the inland cities, and two for the coastal cities. The final first-class indicators that determine FDI are Openness Competitiveness, Talent Competitiveness and Comprehensive Locations.

4.2.3.2 Key Second-class Indicators Identification-Inland China

There are four more second-class indicators that need to be analyzed for inland cities. The remaining nine sub-indicators are the same as the ones for coastal cities. New second-class indicators under the Comprehensive Locations include Natural Location Convenient Degrees, Economic Location Advantages, Resources Advantages and Political and Cultural Location Advantages. Collinearity diagnostics show the four new comers are not related. Thus a total of 13 sub-indicators need to be tested in the multiple regression models with the dependent variable FDI.

Variables Entered/Removed^a

Mode l	Variables Entered	Variables Removed	Method
1	Natural Location Convenient Degrees	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: FDI 07-11

Table 22 Key Second-Class Indicators for Inland Cities

Table 22 shows that only one second-class indicator out of the thirteen is selected through the stepwise method as the determinant factor for the dependent variable. From the Model Summary Table revealed in the output, it shows that around 71% of the total data are represented in this model, which also has a 0.000 significance value. Thus this model is valid to reflect the relations between FDI and second-class indicators.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.944	1.279		-1.521	.147
	Natural Location Convenient Degrees	12.519	1.927	.844	6.495	.000

a. Dependent Variable: FDI 07-11

Table 23 Coefficients for the Key Second-Class Indicators for Inland Cities

In the coefficients table 23, significance value is at a valid level and the coefficient for the indicator natural location convenient degrees is 12.519, which is higher than the other coefficients that appear on the above analysis. Thus, it may be deduced that, as the other sub-indicators under talent, openness and comprehensive location competitiveness, natural location convenient degree is as important for inland cities attracting FDI inflows.

4.2.3.3 Conclusions

Only 19 inland cities are selected for the sample size, which is much fewer than the 35 selected from coastal area. However, through multiple regression analysis under the Stepwise method, talent competitiveness, openness competitiveness and comprehensive locations competitiveness are addressed as the positive determinant factors for FDI inflows. Furthermore, 13 second-class indicators under the above three factors are analyzed again through multiple regression. And it appears that only one indicator- natural location convenient degrees- is crucial among the indicators. As illustrated above, natural location convenient degree is measured by the distance away from lakes, rivers or seas, and by the

location of vantage points within urban agglomerations. The inland cities are not as well connected to the world as the coastal city, which suggests that investment in form of capital, skilled labor and knowledge is not conveniently transferred into the area. The extent of vantage points is crucial for inland cities. The situation for inland cities is far different from that for coastal ones. As mentioned in the background, *large cities* in inland China usually represent provincial capital cities or economic central cities. The "high density of developed cities aggregations" situation in the coastal area cannot occur in the inland regions. Thus, the vantage point of a city among urban agglomerations is embodied evidently. Once a city achieved this vantage point in the inland area, more FDI inflows would occur.

4.2.4 Other Relations with Location Factors

During field work, additional two set of data were found. One is domestic enterprise industry output, the other one is foreign enterprise industry output, and both of them are related to investments. The first one is related to domestic investments and the second one is related to FDI. Thus, analysis for the two is necessary. The analysis method and orders are as the same as in the former ones.

4.2.4.1 Relations between Location Factors and Domestic Enterprise Industry Output

For the total sample size first-class indicators analysis, science & technology competitiveness and institutional competitiveness are identified as the determinants, with the coefficients at 2.350 and 1.497 respectively. And the second-class indicators analysis shows that scientific innovation ability and government approval and control are the two dominant sub-indicators for generating domestic enterprise industry output, both with coefficients at around 1.850.

For the coastal cities analysis, one first-class indicator is selected as the crucial factor for the dependent variable through the model, which is science and technology competitiveness with a coefficient by 1.997. After second-class indicators analysis, it is revealed that scientific innovation ability is chosen as the key factor.

For the inland cities, capital competitiveness and talent competitiveness are calculated as the influential factors that affect the dependent variable. The coefficients for both are 5.827 and 4.030, which shows that more capital competitiveness can be delivered to the cities in inland area. In second-class indicators analysis, financial control power turns as the most dominant factor.

Thus, as a conclusion, the relation between location factors and domestic enterprise industry output are quite different. For the major cities in China, science and technology competitiveness and institutional competitiveness play dominant roles in positively affecting the amount of domestic enterprise industry output. Specifically, scientific innovation ability and government approval and control are the keys of the keys for influencing industry output. For the coastal cities, only science and technology competitiveness play a key role for industry output. Similarly, the ability of scientific innovation is more crucial. Capital competitiveness and talent competitiveness are more important for inland cities to generate higher amount of industry output. With regard to all sub-factors under the capital and talent competitiveness, the financial control power is the most determinant.

4.2.4.2 Relations between Location Factors and Foreign Enterprise Industry Output

Firstly, all cities' data was analyzed through multiple regression models. Among the first-class indicators, openness, institutional and talent competitiveness are calculated as the determinant indicators for foreign enterprise industry output. Openness competitiveness has higher influence than institutional competitiveness, and talent competitiveness is the weakest. In the following second-class indicators analysis, five results are processed from the SPSS. They are international openness, integrity of service system, human resource scale, individual economic decision-making freedom degree and economic system adaptability. Among those five, integrity of service system has the highest coefficient.

For the cities in the eastern coastal area, different results show openness competitiveness and industry structure competitiveness as first-class indicators with positive coefficients around 4. International openness and integrity of service system are the two determinant second-class indicators for the amount of the foreign enterprise industry output. The coefficient for integrity of service system is 8.795, which is much higher than 2.984 for international openness.

For inland cities, results are common for first-class indicators which are openness competitiveness and Comprehensive Locations. Both of them have relatively high coefficients (11.416 and 5.478 respectively). Natural location convenient degree is again resulted as the only positively affect second-class indicator with a high 8.754 coefficient value.

As a conclusion, the relations between location factors and the foreign enterprise industry output is more or less similar with that between location factors and FDI inflows. The 54 major cities, in general, have talent, institutional and openness competitiveness as key factors for generating more foreign enterprise industry output. Furthermore, once a city performed well in integrity of service system, international openness, human resource scale, economic system adaptability and individual decision-making freedom degrees within talent, institutional and openness competitiveness, it would shows better performance in foreign enterprise industry output. For the coastal area, determinant for cities are openness and industry structure competitiveness. International openness and integrity of the service system are the keys of the keys. Lastly, for the inland area, comprehensive locations competitiveness and openness competitiveness are crucial. Natural location convenient degree is the most influential factor for foreign enterprise industry output.

4.3   Data Analysis Conclusions

In the first part of the data analysis, FDI networks for six geographic regions have been generated. Major FDI source cities and destination cities are revealed from the network maps. The recent flows of FDI into sectors are also illustrated. Provinces in the coastal area receive much higher FDI than inland provinces, which means that cities located along the coast have elevated attractiveness capacity.

As elaborated throughout the chapter, multiple regression models are established between one major and two minor dependent variables and the independent variables- location factors. The analysis aims to identify the most dominant location factors within cities in different

regions influencing investments, mainly FDI (and industry output). In the data, there are 12 first-class indicators that reflect a city's competitiveness through 12 different aspects. Under the 12 first-class indicators, 54 second-class indicators illustrate urban competitiveness in more detail. Analysis is first conducted for the 12 first-class indicators. After identifying the key factors within those 12, the detailed second-class indicators are analyzed to reveal the specific location factors influencing the FDI inflows (and industry output).

From the total sample size FDI regression models, talent competitiveness and openness competitiveness emerge as the two key factors for attracting FDI, of which talent competitiveness performs much better than openness competitiveness, as shown by their coefficient values. Human resource scale, status of the labor market and humanities openness are the three crucial second-class location factors for FDI inflows.

As for the major cities analysis, talent competitiveness and openness competitiveness are concluded by SPSS as the most determinant first-class location factors for FDI inflows to eastern coastal cities. Status of the labour market, human resource scale and humanities openness are also three key second-class indicators for FDI inflows. In this analysis, Status of the Labor Market plays a key role.

For the last major analysis for the 19 inland cities, openness competitiveness, talent competitiveness and comprehensive location competitiveness emerge as the significant general factors for attracting FDI inflows. Furthermore, natural location convenient degree is the most important location factor for inland cities in attracting FDI.

In the relationships between location factors and the domestic enterprise industry output and foreign enterprise industry output (which, to some extent, are related to domestic inward investments and FDI) some common points are discovered. Take multiple regression analysis for foreign enterprise industry output as an example: both talent and openness competitiveness again are proven to be, together with Institutional Competitiveness, key first-class location factors for all of the 54 cities. Openness competitiveness for the coastal cities and comprehensive location competitiveness for the inland cities again become significant influencers. For the second-class indicator analysis, international openness instead of humanities openness becomes the crucial key for the coastal area[6] and natural location convenient degree is remaining the same as the most significant one for inland cities.

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[6] International Openness is represented by ratio of dependence on foreign trade, proportion of foreign trade accounted for total fixed assets investments, and the last one the percentage of foreign companies accounted for the number of urban total enterprises

Chapter 5: Conclusions and Recommendations

Location factors are key points when measuring cities competitiveness. Cities competitiveness in every aspect can be revealed as dissimilar location factors in the form of characters or scores. The objective of this research is to address the relations between location factors and FDI in different regions of China. After 1978, China activated its *Open and Reform* policy which accelerates its rapid economic growth. Foreign enterprises settled their plants in the open-policy area aiming at achieving their minimizations of production cost and maximizations of profit, which bring advanced knowledge and management skills and foreign culture diversity at the same time. After over 30 year's development, China now has become the second largest economic entity in the world. However, within China, there exists a huge development gap between eastern and western area. The FDI inflows mainly occur in the right side of the Hu-line, especially the coastal area. Many cities along the coast receive a huge amount of FDI and perform competitive. On the opposite, for the inland area, only can provincial capital cities compete against coastal cities. Thus, the research objective is to figure out which location factors are dominant in attracting FDI for the cities in the eastern coastal area and inland area. The first step of this research is to find out the major cities from different regions that powerful in receiving FDI inflows. After identified those major cities, multiple regression models are utilized for testing the coefficients for every detailed indicators. At last, dominant location factors for FDI will be figured out.

5.1 Regional Star Cities and FDI Profile

For the major regional star cities identifications, China has been divided into six regions, Northeast, Northwest, Bohai coastal area, Central area, Southwest and Southeast. Based on the data in "FDI.Markets Database", six FDI network maps are generated by the "Ucinet" analytical software. The result is showing as follows.

Northeast China: Dalian, Shenyang, Changchun, Harbin.

Northwest China: Xi'an, Urumqi, Hohhot, Baotou, Yinchuan, Lanzhou, Ordos.

Southwest China: Chongqing, Chengdu, Kunming, Nanning, Guiyang, Mianyang, Liuzhou

Central China: Wuhan, Changsha, Hefei, Zhengzhou, Nanchang, Wuhu, Taiyuan.

Bohai Coastal Area: Beijing, Tianjin, Qingdao, Yantai, Jinan, Shijiazhuang, Zibo, Langfang, Dongying, Tangshan, Weihai, Weifang.

Southeast China: Shanghai, Shenzhen, Guangzhou, Hangzhou, Foshan, Dongguan, Suzhou, Wuxi, Nanjing, Ningbo, Xiamen, Changzhou, Zhongshan, Fuzhou, Zhuhai, Yangzhou, Nantong, Wenzhou, Xuzhou, Quanzhou, Huizhou, Shaoxing, Taizhou, Jiaxing, Haiko.

Totally 62 cities are indicated as the in-degree centre cities in terms of FDI inflows received. It is noticed that the cities coloured in red represents for no-specific location factors were found during the field work.

The result also shows the Southeast and Bohai coastal areas of China receive much more FDI inflows than the inland areas (Northeast, Northwest, Central and Southwest). For the north-

western regions, natural resource and energy related sectors are more preferred by foreign enterprises. As for provinces in the central, southwest and northeast of China, the manufacturing industries receive relatively higher investments. In addition, based on its traditional old China cultural heritage, southwest regions attract a vast number of foreign investments into the Hotel & Tourisms sectors. Central China provinces receive foreign investments into more sectors than Northeast China. At last for the regions along the coast, both the manufacturing and the service industries are supported for attracting the FDI inflows. From the detailed FDI-purpose of MNEs, it reveals back to the theory that Shanghai and Beijing are hosting the highest value-added activities such as headquarters and R&D functions, while, lower value-added activities such as manufacturing plants are located mainly in the Central, Northeast, and Southwest areas. As illustrated in terms of the Hu-line, on the right side of the Hu-line, more value-added sectors receive the FDI inflows, while for the other side of the Hu-line only resource-related sectors are preferred by MNEs.

5.2   Location Factors Attracting FDI

After identified the major cities, detailed multiple regressions are conducted through the SPSS. 35 cities in the coastal area and 19 cities from inland cities are tested respectively. The input location factors are grouped into first-class and second-class indicators. The collinearity diagnostics and hetroscadacity are applied for all first-class indicators to test the collinearity and skewness. After the test, data are processed into the SPSS. The result reveals that for the cities in the coastal area, the Talent Competitiveness and the Openness Competitiveness determines most to the FDI inflows. According to the coefficients values, the Talent Competitiveness has more influential power than the Openness Competitiveness onto the dependent variable. With regard to the second-class indicators, Human Resource Scale, Status of the Labour Market and Humanities Openness, are resulted as three key factors for coastal cities. Similar test is conducted again for the inland cities, which indicates that the Comprehensive Locations is another key first-class indicator except the Talent and Openness Competitiveness. Through the multiple regressions for the second-class indicators, the Natural Location Convenient Degrees becomes the most significant factor for FDI inflows in the inland area. All the models during the analysis process are valid and represent a vast majority of the independent variables which explain the dependent variables.

For both coastal and inland cities, openness and talent competitiveness are important. Openness competitiveness includes international openness, regional openness, humanities openness and social communication degrees, which entails the extent of connections within the regions or the whole world, and also the extent to which the city itself is influenced by foreign culture from either external provinces, or countries. Foreign enterprises would like to invest in a relatively westernized city rather than a rural, conventional area. Talent competitiveness includes everything about labour, quality and quantity, such as human resource scale, literacy quality, status of the labour market, coast of labour force and education status. As long as the objects are firms, they do need labourers. Thus, it is an important consideration for firms whether there are cheaper, more skilled and relevant industry-related labourers in a city. Talent competitiveness will further influence the science

and technology competitiveness of a city, and also the creative spirit. The more talent a city has, the more creative and vivid a city will be. In every city's development phases, talent is always a determinant, not only for city's development itself, but also for foreign enterprises. For the inland cities, except for talent and openness competitiveness, the comprehensive location competitiveness also determines the amount of FDI a city received. The vast majority of inland cities are located within the vicinity of a water source and an overall land resource affluent environment, which makes a physical background for potential large-scaled industry productions. At the same time, almost all the cities are provincial capitals, which corresponds to the high level of administration and science technology. Most provincial capitals are also the economic centre within their provinces; thus, they occupy the most beneficial vantage points within cities agglomerations, whereas other cities in the provinces are relatively less developed or even undeveloped. Ultimately, inland cities rely more on their comprehensive locations to attract FDI inflows.

For the second-class indicators, the determinants of FDI inflows in coastal cities are human resource scales, status of the labour market and humanities openness, and are even more important than the other six sub-indicators. It has been revealed that foreign enterprises focus more on the total scale of labour, the number of skilled and talent labours, plus a city's westernized level. For the inland cities, a natural location convenient degree which is illustrated as whether a better vantage point a city locates among the cities agglomerations

and the distance a city away from lakes, rivers or seas , is the key for the Comprehensive

Location Competitiveness,

5.3 Reflection to the Literature

As indicated in the literature review, the four motivations of MNEs can be reflected from the results. In northwest of China, coal, oil and natural gas sector receive huge amount of foreign investments which prove MNEs' natural resource-seeking motivation. According to the results from multiple regressions, determinant factors human resource scale and status of the labour market can support the market-seeking and efficiency-seeking motivations of MNEs. Because of large scale of human resource ensures the size of the market and the lower labour cost. High-quality labour force helps firms enhance the production efficiency. From the FDI profiles, manufacturing industries receive huge number of foreign investments, which can be explained by the greater attractiveness of the determinant location factor human resource scale. The comparative advantages obtained from the cheap labour (lower cost) keep attracting manufacturing industries set their plants in China.

As mentioned in the literature review, factors driving FDI contains governance infrastructure, lower production cost, human infrastructure, market size, technological & entrepreneurial atmosphere, geographical & cultural proximity, presence of natural resources and rival firms. From the data analyses, it proves that the talent competitiveness, the openness competitiveness (for both coastal and inland cities) and the comprehensive location competitiveness (for the inland cities) are the strongest factors in terms of driving FDI into Chinese cities. The human resource scale, status of the labour market, humanities openness

and natural location convenient degrees, these four second-class indicators are even more important for driving foreign investments. The human resource scale determines the cost of the labour force, which decides the production cost of MNEs. The status of the labour market mainly reflects the human infrastructure of a certain area. As illustrated above, humanities openness is comprised by immigrations, foreign language penetrations and western cultural diversity. Thus, in some extent, the humanities openness represents cultural proximity. The natural location convenient degree reflects cities physical locations. This factor is vitally important for the inland cities, because the distance an inland city away from lakes, rivers or seas determine the amount of transportation cost for MNEs. This finding is similar as geographical proximity reviewed in the literature. The vantage point an inland city positioned among urban agglomerations is the other determinant factor driving foreign investments. It is not as same as the geographical proximity mentioned in the literature review, but as same as the centralities theories in the "World City System". A city positions in a vantage point among others suggests betweenness centrality and out-degree centrality. Through investing into such beneficial positioned cities, MNEs could acquire alternative consumption markets and enlarge the potential market (out-degree centrality). Additionally, MNEs could conveniently and quickly obtain business information to their own advantages.

This research mainly addresses the factors dominant in attracting foreign investment in coastal and inland areas of China. However, due to the limited sample size, the result may have some differentiations compared with the reality. In addition, the specific approaches for cities improving location factors are not studies in this thesis, which might be the objectives for the future work.

5.4　Recommendations

In order to attract more foreign investment, cities need to enhance both talent and openness competitiveness.

As illustrated above, human resource scale, labour quality, education status and standards of consumption, are the four main sub-factors for improving talent competitiveness; thus, in order to enhance the performance of these four sub-factors, the government needs to focus on increasing education input and introducing policies that attract more senior technical workers and top talents. Improving overall local education facilities and setting favourable prices in the housing and automobile markets are some of the attributes migrants find attractive. At the same time, the government should also consider increasing the income level of the citizens, with the objective of increasing domestic consumption demand. Since China's aging population dominates the labour market, abolishing the *one-child policy* at a proper time could increase the country's position on the human resource scale. Consistent with an increased government education input, a new labour force might be quantitatively and qualitatively stronger. Those instruments can help cities enhance their talent competitiveness.

Cities need to improve their performance in international openness, regional openness, humanities openness, and social communication levels in order to enhance their openness competitiveness. Incentive-based policies can encourage investment appetites of the MNEs,

and also inter-governmental and inter-nongovernmental communications can raise a city's reputation and improve its image, both of which influence the openness of a city. In addition, strengthening road transportation infrastructure can improve connectivity of a city, creating more opportunities by simplifying the transfer of factors of production. Humanities openness can be improved by increasing foreign language competence, and by bringing in highly dexterous workers. Such actions can support a city in increasing its openness competiveness.

Apart from talent and openness competitiveness, comprehensive location competitiveness is also as significant determinant for the inland cities. Although, some physical factors of cities cannot be improved, such as the distance to the rivers or seas, cities can improve access to their existing vantage points, and also expand their market capacity. Market capacity can be improved by raising income levels of inhabitants.

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Annex 1 Map of China (English Version)

Map of China

Locations of provinces, autonomous regions and municipalities.

Annex 2 Location Quotient (1)

Industry Sector	Heilongjiang	Jilin	Liaoning	Inner Mongolia	Gansu	Ningxia	Shaanxi	Qinghai	Xinjiang	Sichuan	Chongqing
Aerospace	5.2	0.0	0.6	0.0	0.0	0.0	3.8	0.0	0.0	0.2	0.0
Alternative/Renewable energy	0.1	0.0	0.2	29.3	24.4	3.1	3.3	0.0	7.6	0.1	1.2
Automotive Components	0.0	3.8	1.2	0.1	1.4	1.4	0.4	0.0	0.0	0.3	1.2
Automotive OEM	0.2	6.6	1.4	0.3	0.0	0.0	0.0	0.0	1.0	1.1	1.4
Beverages	1.1	0.5	0.2	1.0	17.1	3.7	1.1	14.1	4.7	1.7	0.5
Biotechnology	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Building & Construction Materials	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.3
Business Machines & Equipment	0.0	0.0	0.3	0.0	0.0	0.6	0.0	0.0	2.4	2.9	8.3
Business Services	0.0	0.4	0.4	0.0	0.0	0.0	0.5	0.0	0.0	0.8	0.8
Ceramics & Glass	0.5	0.0	0.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Chemicals	0.1	1.1	1.6	0.1	0.0	0.8	0.2	0.0	0.3	0.1	0.5
Coal, Oil and Natural Gas	0.8	0.0	0.1	3.3	0.0	9.2	5.2	0.0	5.0	3.1	0.0
Communications	0.0	0.1	0.2	0.0	0.0	0.0	0.3	0.0	0.8	0.9	0.3
Consumer Electronics	0.1	0.0	0.5	0.0	0.0	0.0	0.3	0.0	0.0	0.4	0.3
Consumer Products	0.2	0.0	0.4	0.0	0.0	0.0	0.4	10.4	0.0	1.2	0.2
Electronic Components	0.0	0.0	0.4	0.3	0.0	0.0	0.6	0.0	0.0	1.0	2.1
Engines & Turbines	0.0	0.3	1.6	1.1	0.0	0.0	0.0	0.0	0.5	0.0	2.6
Financial Services	0.3	0.1	0.7	0.1	0.0	0.0	0.4	0.0	0.5	0.9	0.9
Food & Tobacco	0.9	5.2	0.7	0.2	0.4	0.0	0.4	0.0	1.1	0.4	0.5
Healthcare	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	1.1
Hotels & Tourism	0.2	0.0	0.5	0.7	0.0	0.9	1.0	0.0	2.1	1.8	0.6
Industrial Machinery, Equipment & Tools	0.5	0.4	0.7	0.1	0.0	0.0	0.7	0.0	0.0	0.5	0.7
Leisure & Entertainment	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Medical Devices	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Metals	0.5	0.5	2.3	5.7	0.6	0.8	0.8	20.1	0.3	1.7	0.5
Minerals	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Automotive Transport OEM	0.0	0.0	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paper, Printing & Packaging	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Pharmaceuticals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7
Plastics	0.0	0.9	0.2	0.0	0.0	0.0	0.2	0.0	1.0	0.2	0.4
Real Estate	0.0	0.0	2.3	0.0	2.9	1.5	0.8	0.0	0.0	1.3	1.4
Rubber	0.0	3.6	3.7	0.0	6.0	0.0	0.0	0.0	0.0	0.0	5.7
Semiconductors	0.0	0.0	1.2	0.0	0.0	0.0	2.1	0.0	0.0	0.9	1.5
Software & IT services	0.0	0.0	0.7	0.0	0.0	0.0	0.3	0.0	0.1	1.2	1.9
Space & Defence	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Textiles	0.1	0.1	0.5	0.2	0.0	0.0	0.1	0.0	1.2	0.3	0.3
Transportation	8.2	0.4	0.8	0.2	2.1	0.0	1.9	0.0	1.6	0.9	0.9
Warehousing & Storage	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Wood Products	0.0	0.0	0.2	0.0	0.0	0.0	2.2	0.0	0.0	0.4	0.5

Annex 3 Location Quotient (2)

Industry Sector	Guizhou	Yunnan	Guangxi	Tibet	Henan	Shanxi	Anhui	Hubei	Hunan	Jiangxi
Aerospace	9.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alternative/Renewable energy	0.0	0.2	1.5	0.0	0.3	0.0	0.0	0.0	0.0	0.1
Automotive Components	0.0	0.0	3.0	0.0	0.7	0.0	1.9	1.8	3.2	1.9
Automotive OEM	0.0	0.0	2.0	0.0	2.1	0.0	1.2	2.7	1.6	2.3
Beverages	0.0	14.0	0.7	24.1	5.1	0.0	2.0	1.6	2.7	4.4
Biotechnology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0
Building & Construction Materials	3.1	4.1	1.8	0.0	0.0	3.4	3.3	3.4	5.3	5.7
Business Machines & Equipment	0.0	0.0	0.1	0.0	0.0	0.0	3.1	0.0	0.0	7.5
Business Services	0.0	1.7	0.2	0.0	0.1	0.0	0.0	0.4	0.2	0.0
Ceramics & Glass	0.0	0.0	2.4	0.0	0.2	0.0	2.2	0.6	0.0	0.0
Chemicals	1.4	0.6	0.5	0.0	0.0	1.5	1.0	2.7	0.4	0.3
Coal, Oil and Natural Gas	0.0	2.1	1.0	0.0	4.9	6.9	1.1	0.0	0.0	1.5
Communications	0.2	0.0	0.7	1.4	2.0	0.3	1.2	0.6	0.7	0.0
Consumer Electronics	0.5	0.0	0.0	0.0	0.2	0.0	7.0	0.4	2.0	3.5
Consumer Products	0.0	0.8	0.5	0.0	0.0	0.0	0.3	0.8	1.3	0.4
Electronic Components	0.0	0.0	0.0	0.0	0.2	0.3	0.6	0.5	0.4	1.7
Engines & Turbines	0.0	0.0	1.9	0.0	0.0	2.2	2.3	0.8	0.0	1.3
Financial Services	0.0	0.5	0.6	0.0	0.4	0.4	0.3	0.6	0.8	0.1
Food & Tobacco	3.7	4.3	0.5	0.0	2.6	0.9	2.5	0.6	0.9	0.7
Healthcare	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	5.0	0.0
Hotels & Tourism	1.5	2.7	1.7	12.1	0.0	1.0	0.4	0.7	0.7	0.6
Industrial Machinery, Equipment & Tools	0.0	1.5	0.6	4.1	0.1	0.1	1.1	0.8	0.2	1.0
Leisure & Entertainment	0.0	13.0	0.0	0.0	0.5	1.5	0.6	1.6	1.0	0.9
Medical Devices	0.0	0.0	0.0	0.0	0.0	0.0	9.3	0.0	0.0	0.0
Metals	3.1	2.8	0.4	3.8	0.7	1.0	0.6	0.8	1.1	1.0
Minerals	34.3	7.5	0.0	0.0	0.0	48.3	0.0	0.0	0.0	0.0
Non-Automotive Transport OEM	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0
Paper, Printing & Packaging	0.0	0.0	9.9	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Pharmaceuticals	0.0	2.8	3.0	0.0	0.0	0.0	0.0	0.0	4.0	1.3
Plastics	0.0	0.0	0.4	0.0	3.7	0.0	0.6	0.2	0.0	1.2
Real Estate	5.5	0.1	0.7	0.0	1.3	0.0	0.4	0.7	4.1	1.3
Rubber	0.0	0.0	0.0	0.0	1.2	0.0	2.6	0.2	3.7	0.3
Semiconductors	0.0	0.0	0.0	0.0	0.2	0.0	1.5	0.0	0.0	0.8
Software & IT services	0.6	0.0	0.6	0.0	0.3	0.0	0.4	0.8	0.3	0.0
Space & Defence	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Textiles	0.3	0.9	0.0	0.0	0.3	0.0	2.4	0.9	0.5	3.1
Transportation	0.1	0.7	0.9	0.0	0.8	0.3	0.9	1.1	0.6	0.4
Warehousing & Storage	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.2	0.0	0.0
Wood Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Annex 4 Location Quotient (3)

Industry Sector	Beijing	Tianjin	Hebei	Shandong	Shanghai	Jiangsu	Zhejiang	Fujian	Guangdong	Hainan
Aerospace	1.9	3.8	0.0	0.0	1.0	0.5	0.0	0.4	1.2	0.0
Alternative/Renewable energy	0.7	0.3	8.8	0.2	0.2	0.3	0.3	0.0	0.2	0.0
Automotive Components	0.3	1.0	0.7	1.0	1.2	1.7	0.5	0.3	0.7	0.0
Automotive OEM	1.3	0.5	0.0	0.7	0.7	0.5	1.4	1.3	1.1	0.7
Beverages	0.3	0.2	4.1	1.1	0.9	0.1	1.2	1.3	1.3	1.1
Biotechnology	1.9	0.7	0.0	0.5	2.3	1.5	0.1	0.0	0.2	0.0
Building & Construction Materials	0.2	0.0	3.1	1.5	0.4	1.0	0.2	1.9	1.5	0.0
Business Machines & Equipment	0.3	0.0	0.0	0.1	0.6	1.4	0.7	0.9	1.2	0.0
Business Services	3.0	0.3	0.6	0.3	2.0	0.4	0.6	0.1	0.7	0.0
Ceramics & Glass	2.9	1.6	2.0	0.6	0.5	2.0	1.2	0.0	0.4	0.0
Chemicals	0.1	1.2	1.0	0.7	1.1	1.6	1.4	0.1	1.3	0.5
Coal, Oil and Natural Gas	0.1	1.3	0.2	2.3	0.1	0.2	1.3	4.3	1.3	0.0
Communications	2.7	0.3	8.9	0.5	1.2	1.0	0.8	0.1	0.7	0.0
Consumer Electronics	1.1	0.4	0.0	0.1	0.5	1.9	0.9	1.3	1.9	0.0
Consumer Products	1.9	0.6	0.3	0.3	1.8	0.5	0.9	0.6	1.2	0.4
Electronic Components	0.4	0.4	1.9	0.6	0.5	2.5	0.6	1.0	1.6	0.2
Engines & Turbines	0.8	3.0	2.1	1.8	0.8	1.2	0.4	0.9	0.5	0.0
Financial Services	2.3	0.6	0.2	0.5	2.0	0.4	0.7	0.5	0.7	0.1
Food & Tobacco	1.6	0.8	2.2	1.3	1.1	0.5	1.5	1.1	0.7	0.8
Healthcare	2.2	0.2	0.0	0.0	0.8	1.3	2.8	1.4	1.3	0.0
Hotels & Tourism	1.3	1.0	0.5	0.6	1.7	0.5	0.8	1.1	0.7	6.5
Industrial Machinery, Equipment & Tools	0.3	1.5	3.4	1.6	1.2	2.1	1.2	0.5	0.5	0.0
Leisure & Entertainment	1.1	1.3	0.7	0.1	2.5	0.3	0.4	0.4	0.9	0.1
Medical Devices	1.2	0.3	1.2	0.4	1.8	2.0	0.4	0.4	0.7	0.0
Metals	0.1	0.6	2.0	1.6	0.5	1.2	0.6	1.7	1.0	0.4
Minerals	1.1	0.9	0.0	0.0	0.4	0.1	0.0	0.7	2.5	0.0
Non-Automotive Transport OEM	0.2	0.1	0.0	2.9	0.4	0.6	5.0	1.7	0.6	0.1
Paper, Printing & Packaging	0.4	0.3	2.1	5.5	0.3	1.5	0.9	0.0	1.5	12.7
Pharmaceuticals	1.7	1.7	0.3	0.0	1.4	1.6	1.5	0.0	0.7	0.0
Plastics	0.3	0.8	0.5	0.4	1.5	2.0	1.1	0.1	1.3	0.3
Real Estate	1.9	2.3	0.9	0.8	0.7	0.6	0.8	0.9	0.5	1.5
Rubber	0.1	1.2	0.5	1.3	0.4	1.8	0.7	0.8	0.3	0.9
Semiconductors	0.8	0.4	0.0	0.2	1.1	2.3	0.1	0.3	1.1	0.7
Software & IT services	2.6	0.5	1.1	0.1	1.6	0.4	0.8	0.3	0.9	0.0
Space & Defence	5.3	0.0	0.0	0.0	0.2	0.0	0.0	4.2	2.2	0.0
Textiles	1.2	0.7	0.0	1.0	1.2	1.4	1.4	2.4	0.8	0.3
Transportation	0.9	1.4	0.1	1.6	0.8	0.3	1.6	1.3	1.0	0.0
Warehousing & Storage	0.4	2.0	0.0	1.9	1.6	1.1	0.8	0.5	1.7	0.0
Wood Products	0.8	0.0	0.0	0.7	0.9	0.4	0.9	0.0	3.9	0.0