

The Impact of Geographical Location on Urban Development

Yi Zhu^{1,a,*}

¹*Suzhou Foreign Language School, Suzhou Jiangsu 215101, China*

a. ha@swl42.wecom.work

**corresponding author*

Abstract: City is the focus of logistics, passenger flow and information flow, and the unity of a large number of material and spiritual entities in a narrow geographical range. Cities can gather a large number of people, buildings and social and economic activities in a small area, all depend on a good location. When a region needs a city and where it is born, the decisive factor is location. A city, as long as it has a good location, can be quickly rebuilt after natural and man-made disasters. Based on the geographical location of the city, this paper discusses the natural resources, time difference and traffic respectively, and with examples of different cities are given in detail. This paper discusses the impacts of geographical location on urban development on different aspects, from natural resources, time difference and traffic. Those are factors can be determined by the geographical location of cities. Iceland benefits from superior geographical location with abundant natural resources, while Saudi Arabia suffers from poor geographical location with limited clean water supply. Bangalore enjoys the perfect time difference with United States. Zhengzhou and Guangzhou are in superb geographical locations in terms of convenient transportation. This paper concluded that geographical location plays a great role in promoting economic growth and potential urban development.

Keywords: geographical location, climate, resource, urban economy, regional development

1. Introduction

1.1. Research Background

In the context of global economies, development is the primary mission of human society apart from living. From large countries to small companies and individuals, all are pursuing development. International disputes and wars are all caused by the pursuit of development and imbalance in regional development. All social conflicts are inextricably linked to development. There is a old Chinese saying which is “Favourable timing, geographical and human conditions”. In the international community, geographical factors are crucial to the development in the long term. Geographical location shows the characteristics of a city's formation and development. Urban geographical location refers to the spatial combination of a city and its external natural, economic, political and other objective things. The geographical location of a city has its uniqueness and particularity, which often determines the particularity of the nature of the city and the potential of scale development. Geography has a huge natural influence on the economic development of any country or region. The economic development level of most countries or regions, whether developed or backward, is correspondingly

benefited from the superior geographical conditions or subject to the poor geographical conditions, and the economic development process is more or less marked with "geographical imprint". Geography seems to have become an inescapable threshold, quite a bit of fatalism. However, there are exceptions. A few countries or regions with poor geographical conditions have, through their own efforts, been able to break out of the fetters of geographical conditions and let their economic development soar against the trend, creating a miracle of man's triumph over nature.

1.2. Literature Review

There are both domestic and foreign researchers have carried out detailed analysis and research on the field of geographic economy through geographical location, natural environment and keywords related to geography. He et al. stated that the recent advances and innovative development regarding to the aspect of environmental economic geography [1]. Neil Reid and Jay D. Gatrell highlighted the diversity as well as major challenges faced by resource-based economies and industries [2]. The book about geographical economics written by Hideaku Miyagi uses geographical language to explain the relationship between geography and economic development from the five aspects of geographical location, resources, trade and population, so as to clearly understand the present and grasp the future trend. Hideaku Miyagi states that "What drives the global economy is geography". In this book, most of the examples are about geographical advantages that lead to the economic prosperity of a region or even a country.

Economists have long recognized the importance of natural resources, and some studies have explored the importance of natural resources in terms of trade, division of labor, resource endowment, and scale. Adam Smith once pointed out in the *Wealth of Nations* that the differences based on geographical and natural conditions will lead to the absolute differences in commodity costs, which will lead to the division of labor among regions. The basis of division of labor is mainly favorable natural endowments. Thomas Robert Malthus stated that natural resources are an extremely important determinant of growth and that having an abundance of them should be a necessary condition for continued growth. David Ricardo emphasized the important role of natural resources and put forward the theory of comparative advantage on this basis. Since the 1950s, the important role of natural resources has once again appeared in the research field of modern economics. In the resource-oriented growth model, the state of natural endowment determines the level of economic development of a country to a large extent. Habakkuk deemed that the abundance of natural resources led to higher productivity in the United States, which ultimately led to the prosperity of the 19th century [3]. De Ferranti et al. reached a similar conclusion. He believed that the success of American industrialization was largely attributed to the country giving full play to the role of extensive mineral resources [4]. Gylfason showed that Norway achieved the economic boom was due to the successful management of abundant natural resources [5]. Kashbrasiev showed that the rapid growth of BRIC economies is partly due to the abundance of natural resources in her recent research [6].

1.3. Research Content and Significance

This paper will analyze different factors caused by geographical location, such as climate, time difference and traffic, and analyze their impact on long-term urban development with specific examples. This topic reflects the influence of geographical location on urban development. This research direction is still a little blank, therefore would like to make a contribution to this field through this research.

2. Natural Resources

2.1. Iceland

Iceland is located in the North Atlantic near the Arctic Circle. It is the second largest island country in Europe, with an area of 103,000 sq. km and a population of about 34000 in 2022 [7].

Iceland belongs to volcanic island, it is mainly due to the formation of asia-europe plate and America plate extrusion, and then in the process of extrusion will overflow above the earth's crust lava flows, the lava flows, after sun drying after slowly upward, formed the undersea volcano, and then in the submarine volcanic eruption on this lava flows to constantly grow. Iceland is an accumulation of upper mantle material from a rift in the mid-Atlantic ridge. Some of these rocks are basalt, andesite, and rhyolite. The whole of Iceland is like a bowl of highlands, it is surrounded by coast mountains, it is a plateau in the middle. Most of the plateau is mesa, the height of which ranges from 400 to 800 meters, with some individual peaks reaching 1,300 to 1700 meters. The highest mountain in Iceland is Huanadarskhenuk, which has an altitude of about 2,119 meters. Although Iceland is located in high latitude, but due to the North Atlantic current and westerlies these control and influence, so Iceland island's climate belongs to the temperate maritime climate, so it has become a special climate in the same latitude area. Iceland is heavily affected by the North Atlantic Current, which flows mainly in the south, with a bypass in the west and north. So although it is located near the Arctic Circle, winter temperatures are not low, and summer temperatures range from 7 to 12°C across the island. The weather near the center of Iceland's low pressure is changeable. The cyclone brings abundant rainfall to Iceland, with annual rainfall ranging from 1000 to 2000 mm in the southwest and west, and less from 400 to 600 mm in the north and northeast. No matter what season it is, it may rain and snow. Iceland is rich in geothermal resources and hot springs. It is rich in fishing, water and geothermal resources, but poor in other natural resources, and products such as oil need to be imported. The annual hydropower capacity that can be developed is 64 billion kilowatt-hours, and the annual geothermal capacity is 7.2 billion kilowatt-hours. Iceland's hydropower and geothermal resources are in the right place at the right time, so Iceland's energy industry will be relatively strong, power will be abundant, and prices will be low. Iceland's geothermal technology is unique on the planet.

As a kind of clean energy, geothermal energy development and utilization are drawing more and more attention in the world. Geothermal resources play an important role in the new energy structure. As a clean energy and one of the most realistic and competitive new energy in the new energy family, geothermal resources have the advantages of low cost, wide use, recyclable, etc., which has been widely paid attention to by countries around the world and has broad application prospects. Due to the special geographical location in the Arctic Circle, Iceland has a cold climate and needs heating for most of the year. Geothermal heating is the main heating method. Therefore, Iceland has a high degree of direct utilization of geothermal energy and more experience. The development and utilization of geothermal energy includes two aspects: direct utilization and indirect utilization. Iceland is rich in geothermal resources, and the direct utilization of geothermal energy per capita ranks first in the world, which is mainly used in heating, processing and drying, agriculture, forestry, animal husbandry, fishery, tourism and entertainment. Indirect utilization is mainly used for power generation, mainly refers to high temperature geothermal resources (temperature above 150 °C), and the hot water produced after power generation can be used for multi-purpose cascade utilization.

Iceland was one of the early adopters of geothermal power. In recent years, due to the rapid development of energy-intensive industries, the demand for electricity continues to increase, prompting geothermal power generation has made great progress. Currently, the installed capacity of geothermal power stations totals 200Mwe, ranking eighth in the world. In 2005, geothermal power accounted for 19.1 percent of the country's total power generation (compared with 20 percent in the Philippines) at 1,658 GWH. But with hydropower, Iceland's renewable power accounted for 71 percent of the

country's total power generation, ranking first in the world. Starting in 2006, the expansion of some existing geothermal power stations and the construction of two new power stations will increase the installed capacity by 210Mwe. Electricity production has led to the development of an energy-intensive industry led by aluminum. As of 2004, Iceland's aluminum exports accounted for 25% of the country's total exports, making it one of the world's largest aluminum producers. The seaweed factory, Thorverk, located in the western Iceland produced directly from geothermal resources and has produced an estimated 2,000-4,000 tons of keratonia and algae powder annually since it began production in 1976. Geothermal energy has been used to dry fish products in Iceland for about 25 years. 15,000 tons of dried cod are exported every year. In recent years, the drying industry of pet food has burgeoned, with annual production of about 500 litres. The Haedarendi geothermal field in the Grismnes region of southern Iceland produces about 2,000 tons of commercially used liquefied carbon dioxide annually in geothermal fluids. Since 1924, Iceland has tried to build geothermal green greenhouse and develop ecological agriculture, and achieved success. At present, the total area of green greenhouse in China is 195,000 square meters, and the production of tomatoes and cucumbers can meet the demand of 70% of the domestic market [8].

Taking Iceland as an example of the advantages brought by natural resources, is a suitable choice. Iceland had a sufficient amount of geothermal energy and its government had make full use of it when allocating the resources efficiently. Rich in geothermal energy is the reason which leads to an development in other industries of the Iceland's economy. Through this example, geographical location brought Iceland a brilliant advantage in natural resources, which stimulate the economy of it and develop other subsidiary industries, such as tourism and fishery. Eventually, there is an overall positive effect on the economy of Iceland.

2.2. Saudi Arabia

On the other hand, there are also some country suffer from the severe geographical location. There are also cases in which economic and social development is affected by poor geographical conditions.

The extreme water scarcity in Saudi Arabia is a stark contrast to the country's oil wealth. Saudi Arabia is the largest of 18 countries that do not have perennial rivers, and most of the others are small islands. In Saudi Arabia, there is desert as far as the eye can see. The average annual precipitation in northern Saudi Arabia is only 100-200 millimeters, and the highest temperature can reach 54 degrees. Because of the lack of rainfall, people need to excavate underground aquifers to obtain the main domestic water. It is from this groundwater that the people of the country use to grow crops and achieve self-sufficiency. However, two decades after achieving self-sufficiency, the aquifer is gradually depleted, causing Saudi Arabia's grain production to decline year by year. Its grain imports have been expanding year by year since its grain production failed to meet domestic demand. Water scarcity is dynamic and complex, emerging from the combined influences of climate change, basin-level water resources, and managed systems' adaptive capacities [9]. If Saudi Arabia, which can rely on food imports, raises the price of oil for immediate benefits, it could be subject to sanctions on food exports from other countries. According to the 2018 Arab Regional Report, rapid population and economic growth, shared water supplies across borders, and the effects of climate change including frequent droughts, declining rainfall and high evaporation rates have significantly impacted water supplies in the region [10]. This phenomenon fully emphasized the importance of natural resources and the significance of geographical location.

3. Time Difference

Bangalore, a city known as "India's Silicon Valley", has been dubbed "India's Electronics Capital" and "World's Top 10 high-tech City" as early as in the 1980s because of its concentration of a large

number of high-tech and modern industries. In recent years, with the development of biotechnology, Bangalore has become the "Mecca" of biotechnology development, with 40 percent of India's biotechnology enterprises stationed in the city. More importantly, the rapid growth of manufacturing and production services has led to the maturation of consumer services such as retail, luxury goods, banking, accounting, law, advertising, construction, private education and healthcare. In this sense, Bangalore is setting a model for innovative city construction in the developing world and around the world [11].

Bangalore itself has accumulated favorable development conditions from its history. In the 1950s and 1960s, Bangalore was selected by the central government as the base for the development of aerospace industry. A tech-savvy workforce has also been drawn to Bangalore in large numbers. The ensuing electronics hub has brought many small and medium-sized manufacturers to Bangalore. Around 1988, big industrial players began to move into Bangalore, such as Texas Instrument, which set up its research and development center in Bangalore. Other internationally renowned companies have followed suit. Bangalore's success today is due to its unique natural observation and profound historical accumulation, which is mainly reflected in the strong guidance and support of the government in humanities and scientific research, as well as the unremitting innovation and entrepreneurial spirit from generation to generation.

Since 1947, Bangalore has emerged as India's most important industrial center. Then, with the arrival of many high-tech companies, the industrial atmosphere began to change. Information, high-tech atmosphere began to form in the city. Known as the Silicon Valley of Asia, nearly all of the world's 131 well-known technology companies have designed their offices here. The city is home to more than 35 percent of India's proudest IT talent. The development of high-tech and information industries does not mean the stagnation and relocation of industrial development. In Bangalore, industry is still booming. It is home to many of India's pharmaceutical and even aircraft factories. This is a very important investment location for the entire Indian government. India's richest man, Prejim, has made his mark here and is even vying with Jack Ma for the top spot in Asia. As one of the world's most important IT cities, the city is undoubtedly busy and "young and dynamic". There may be some IT-related activities and conferences going on here every day. So if you go here, you have to book a hotel in advance, otherwise the place you live may not be as satisfactory as you imagined. It's the talent from all over the world that comes together that makes for an amazing evening. In Bengaluru, the nightlife is very good, the wine culture is very popular, maybe people need alcohol to relax themselves after a day's work.

Today, Bangalore has become one of the world's famous IT industry centers, but the environmental problems here still follow the "Indian tradition". It doesn't really want to be like Silicon Valley in terms of the environment, the streets are still full of cows and the lake is still covered with moss. The international fame of the city and the rapid increase in population have made the transportation and water supply of the whole city a huge challenge. Bangalore is now divided into two areas, the old city and the new city, in order to alleviate urban congestion and other problems.

In particular, the almost perfect 12-hour time difference between Indian time and Pacific Time allows MNES to "relay" knowledge production between their home offices and their Indian operations.

4. Traffic

Transportation geographical location has great influence on national and regional economy and foreign trade. This is because traffic carries condition since productivity layout one of the important content and condition, it is the fundamental condition of economic development.

4.1. Zhengzhou

If a city is close to its surroundings in all directions, it is in a central position. The central location of the city is not only convenient for all directions of communication lines to converge to the center, promote economic development and the exchange of ideas, but also conducive to open up new communication lines. This favorable central location contributed to the formation and rapid growth of cities. For example, Zhengzhou is located in the center of Henan province. Although the central location is not necessarily the geometric center of the region in the strict sense, the development of the city will always be biased towards the dominant regional location. For example, Fuzhou is located at the mouth of the Minjiang River, which controls the distribution of commodities throughout the Minjiang River basin in Fujian Province.

Taking Zhengzhou as an example, traffic conditions have a far effect on urban development. Since ancient times, Zhengzhou has been a developed area of traffic in China and plays an important role as the national transportation hub. The appropriate geographical location provides the necessary conditions for the transportation of Zhengzhou. Zhengzhou is a comprehensive transportation hub and an important highway and railway freight hub in China.

Zhengzhou is a national transportation hub of the public railway, air and communication, has formed a transportation network composed of railway, highway and air transportation. As of April 2022, Zhengzhou has two terminals, two runways, 162 air routes, six railway stations, two trunk railway lines, six high-speed railway lines, 22 rail transit, 11 expressways, and 37 BRT lines [12].

4.2. Guangzhou

Guangzhou is located in the middle south of Guangdong Province, north of the Pearl River Delta. It lies close to the South China Sea, Hong Kong, and Macau. Zhujiang (The Pearl River), the third largest river of China, runs through Guangzhou and is navigable to the South China Sea. Situated in such an excellent geographical region, Guangzhou is called China's South Gate [13].

The Pearl River is the second longest river and the third longest river in China, with a navigable length of 15,000 kilometers. In 2020, the freight volume of 1.05 billion tons, accounting for 15% of all inland river freights volume of China, and the economic value is second only to the Yangtze River. Guangzhou has the estuary of the Pearl River, and is the largest port in the Pearl River basin, which naturally benefits greatly. Guangzhou faces the South China Sea, which is the world's busiest golden waterway and the main waterway for maritime trade with East Asia, Southeast Asia, West Asia, Africa and Europe, accounting for 40% of the world's maritime trade volume. It is no surprise that Guangzhou has become the center of China's foreign trade.

5. Conclusion

To sum up, the development of cities is closely related to their geographical location. They are not only the most primitive and basic conditions for the formation of cities, but also an important decisive factor to promote future development and a powerful force in the process of human civilization. Geographical location is an indispensable element in the study of urban formation and development. In addition, urban development should also follow regional theory, economic theory, human ecology theory, transportation and communication theory, economic globalization theory and various basic laws. In addition, there are uncontrollable factors in urban development, such as non-compliance with laws and regulations.

There are no geographically identical cities in the world, only cities that are geographically similar in some way. Because natural, economic, political and geographical elements are rich and vast in content, the spatial relationship between cities and these elements is ever-changing, and various elements themselves have been in constant change in history, especially the cultural elements have

changed more frequently. Therefore, even natural conditions, which are less variable, have different effects on the formation and development of cities in the past, the present and the future. The favorable geographical position will promote the formation and development of the city, while the unfavorable geographical position will inhibit the formation and development of the city.

References

- [1] Canfei H., Shuqi H., Enyi M., Jian P.: *Environmental economic geography: Recent advances and innovative development. Geography and Sustainability*, 3(2), 152-163 (2022). 2.
- [2] Neil R., Jay D.G.: *Resource geographies & economic development: Understanding place-based industries in a global economy. Applied Geography*, 45, 363-364 (2013).
- [3] Habakkuk, H.: *Fluctuations in House-Building in Britain and the United States in the Nineteenth Century. The Journal of Economic History*, 22(2), 198-230 (1962).
- [4] De Ferranti et al.. 2002. *From Natural Resources to the Knowledge Economy : Trade and Job Quality. World Bank Latin American and Caribbean Studies - Viewpoints;. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/14040>.*
- [5] Thorvaldur G.: *Natural resources, education, and economic development. European Economic Review*, 45(4-6), 847-859 (2001). *Competition Development in the BRIC Countries: Toward a Unified International Economic Space.*
- [6] Kashbrasiev, R.V.: *Competition Development in the BRIC Countries: Toward a Unified International Economic Space. In: Schlunze, R.D., Agola, N.O., Baber, W.W. (eds) Spaces of International Economy and Management. Palgrave Macmillan, London (2012).*
- [7] Worldometer, <https://www.worldometers.info/world-population/iceland-population/>, last accessed 2022/09/23.
- [8] National Energy Administration, http://www.nea.gov.cn/2013-01/29/c_132135478.htm, last accessed 2022/09/23.
- [9] Dolan F., Lamontagne J., Link R., Hejazi M., Reed P., Edmonds J.: *Evaluating the economic impact of water scarcity in a changing world. Nat Commun*. 12(1):1915, (2021).
- [10] Erica D.M.S., Omar S.A., Azhar S., Haider K., David O.C.: *Climate Change and Water Scarcity: The Case of Saudi Arabia. Annals of Global Health*, 81(3), 342-353 (2015).
- [11] Chengwei W.: *Reflecting on innovative cities: A case study of Bangalore, Silicon Valley, India. Research in Science of Science*. 2011; (4).
- [12] News China, https://news.china.com/domestic/945/20170302/30296136_all.html, last accessed 2022/10/8.
- [13] Guangzhou Municipal Transportation Bureau, <http://jtj.gz.gov.cn/>, last accessed 2022/10/8.