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Research on the Influencing Factors of Chinese FDI in Africa

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Contents

<u>ABSTRACT.....</u>	<u>- 1 -</u>
<u>1. LITERATURE REVIEW</u>	<u>- 2 -</u>
1.1 REVIEW OF THE FACTORS INFLUENCING CHINESE FDI IN AFRICA	- 2 -
1.2 THEORETICAL EXPLANATION OF FOREIGN DIRECT INVESTMENT	- 4 -
1.2.1 DEFINITION OF FOREIGN DIRECT INVESTMENT	- 4 -
1.2.2 THE DEVELOPMENT PROCESS OF FDI THEORY	- 5 -
<u>2. THE DEVELOPMENT PROCESS OF CHINESE FDI IN AFRICA.....</u>	<u>- 7 -</u>
2.1 THE INITIAL STAGE OF CHINA-AFRICA COOPERATION	- 7 -
2.2 THE CONTINUOUS PROMOTION STAGE OF CHINA-AFRICA COOPERATION.....	- 8 -
2.3 THE MATURE STAGE OF CHINA-AFRICA COOPERATION	- 9 -
<u>3. THE CONDITION OF CHINESE FOREIGN DIRECT INVESTMENT IN AFRICA.....</u>	<u>- 10 -</u>
3.1 THE SCALE OF CHINESE FDI IN AFRICA	- 10 -
3.2 INDUSTRY DISTRIBUTION OF CHINESE FDI IN AFRICA	- 14 -
3.3 REGIONAL DISTRIBUTION OF CHINESE FDI IN AFRICA	- 16 -
3.4 SUMMARY OF THE CONDITION OF CHINESE FDI IN AFRICA	- 18 -
<u>4. THEORETICAL ANALYSIS OF THE FACTORS INFLUENCING CHINESE FDI IN AFRICA.....</u>	<u>- 20 -</u>
4.1 MARKET SIZE.....	- 20 -
4.2 IMPORT AND EXPORT TRADE.....	- 21 -
4.3 NATURAL RESOURCES	- 22 -
4.4 HUMAN RESOURCES	- 24 -
4.5 INFRASTRUCTURE RESOURCES	- 25 -
4.6 MANUFACTURING RESOURCES.....	- 26 -
<u>5. EMPIRICAL ANALYSIS OF THE FACTORS INFLUENCING CHINESE FDI IN AFRICA.....</u>	<u>- 28 -</u>
5.1 HYPOTHESIS FORMULATION.....	- 28 -
5.2 DATA SOURCES AND DESCRIPTIVE STATISTICS	- 30 -
5.3 MODEL SELECTION AND SETTING	- 35 -

5.4	CORRELATION ANALYSIS.....	- 36 -
5.5	HAUSMANN TEST	- 38 -
5.6	RESULTS OF THE EMPIRICAL ANALYSIS	- 39 -
5.7	ROBUSTNESS CHECK	- 44 -
6.	<u>CONCLUSIONS AND RECOMMENDATIONS.....</u>	<u>- 46 -</u>
6.1	MAIN CONCLUSIONS	- 46 -
6.2	SUGGESTIONS FOR THE AFRICAN COUNTRIES	- 48 -
6.3	SUGGESTIONS FOR THE CHINESE GOVERNMENT	- 49 -
6.4	SUGGESTIONS FOR CHINESE COMPANIES.....	- 49 -
	<u>REFERENCES.....</u>	<u>- 51 -</u>

Abstract

In recent years, with the increasing trend of economic globalization and integration, the rising economic status of African countries has led to the rapid development of trade between Africa and various countries. Also, some countries are looking at the rich resources and huge market size of Africa. Therefore, FDI has become a very popular investment method in African countries and major economies of the world. Compared to traditional Western countries, FDI in China has started relatively late. But the greatest advantage of FDI in China is that it is developing very fast due to the rapid growth of China. According to the Chinese Outward Foreign Direct Investment bulletin, the amount of Chinese Outward Foreign Direct Investment in 2020 is US\$258.06 billion, of which FDI for Africa is US\$43.4 billion. The Chinese FDI brings many opportunities for Africa, for example: providing a good investment environment for Africa, expanding the African market, providing a large number of jobs, promoting the economic development of Africa, and promoting external trade.

The research process of this paper will follow the procedure. Firstly, this article composes the theories related to Chinese FDI in Africa from the literature. Secondly, it analyzes the conditions of Chinese FDI in Africa from three perspectives: the scale of Chinese FDI, industry distribution, and regional distribution. Third, based on the literature, the impact factors of Chinese FDI in Africa will be summarized into seven aspects. Fourth, this paper will take a panel data model by using the stock data of Chinese FDI in Africa from 2004 to 2020 and analyze the results in detail. Finally, depending on the results of the combined theoretical and empirical analysis, this paper will propose some reasonable suggestions.

1.Literature Review

1.1 Review of the Factors Influencing Chinese FDI in Africa

(1) Review of international studies

The study of foreign direct investment (FDI) has been very popular in both Chinese and international research fields, and the specific research directions are extremely diversified with numerous research results. In general, it is mainly focused on two directions, the first one is the study of the correlation between FDI and economic growth of host countries and the existence of the influence mechanism, and the second one is the analysis of the relevant influencing factors that determine foreign investment.

First, the main differences in the correlation between FDI and economic growth in Africa depend on the adjustment of the sample countries, the research methodology, and the variables selected. From the massive literature, it is possible to analyze those African countries are able to gain some benefits from other countries' FDI in Africa, especially in the area of human capital increase. For example, Lema Yoseph Argaw (2019) analyzed the correlation between labor cost factors in Africa and foreign direct investment from China by selecting panel data for 50 countries in Africa from 2003-to 2016 and that there is a significant positive correlation between Chinese FDI in Africa and labor cost factors in Africa. Meanwhile, according to the World Bank Zafar (2007), China has made huge investments in sub-Saharan Africa, which will eventually be transformed into the infrastructure and helped to improve the living standards and human capital of the African people who need it.

Then, much of the literature focuses on analyzing the influencing factors of FDI in Africa, which has been studied earlier by international scholars and has been matured by both theoretical and empirical studies. Most scholars believe that the influencing factors of FDI include economic development, trade liberalization, foreign exchange

reserves, inflation, resource situation, etc.

P-J Buckley (2007) empirically analyzes data from 1984-to 2001, noting as a particular point that Chinese direct investment in Africa is attracted by high political risk factors and cultural proximity with China. However, Sanfilippo's (2010) results show that Chinese FDI is significantly and positively related to African natural resource endowment, the potential for economic development, and Chinese economic aid to Africa, while it is barely related to the political and economic risk of the host country. He also points out that there is a mutually reinforcing relationship between China-Africa economic cooperation and Chinese investment in Africa with a standard investment model. Ramasamy et al. (2012) find that the equity structure of Chinese companies also has an impact on Chinese FDI. SOEs tend to invest in host countries with rich natural resources, unstable political environments, and higher risks, whereas private-sector firms are more interested in the market size and potential expansion of host countries.

The majority of international scholarship centers on the statement that "China is seeking African natural resources and is driven by its energy pursuits". According to Mary et al. (2011), although Chinese investment in Africa is increasing rapidly and continues to grow in scale, the choice of African countries for Chinese investment is highly concentrated, with 60% of investment over the years concentrated in Nigeria, Algeria, South Africa, and Sudan. Foster et al. (2009) point out that Chinese investments in Africa are influenced by Chinese policies, citing Chinese infrastructure projects in Africa and suggesting that the precondition for China to implement such projects is to obtain the benefits of the project's natural resources. However, Ivar et al. (2010), through an empirical analysis of panel data from 2003 to 2006 based on 29 African countries, conclude that the poor institutional environment and the abundance of resources in the host country are only two of the reasons for the high attractiveness of Chinese investments. Chinese firms, which are different from multinational companies, will direct their investments to Africa from these two aspects.

(2) Review of China Studies

Chinese academic research on FDI in China and Africa has mainly focused on the relationship between trade and investment, while research on their influencing factors has only started in recent years. But comparing the literature of foreign authors, they have a deeper and more specific understanding and knowledge of China. Based on a trade gravity model, Zhang Na (2016) investigated data on Chinese investments in 131 countries from 2003 to 2013, and she found that there was a significant positive correlation between investment agreements on both sides and Chinese outward FDI. From the point of view of the host country's investment environment, Beiwen Zhao (2015) argues that one of the biggest drivers of Chinese direct investment in Africa is the search for resources. However, Shen Jun and Bao (2013) believe that the main emphasis of Chinese investment in Africa is currently not on energy, but on developing new markets. In addition, China prefers to invest in countries that are more developed and larger but with higher economic risks. Using a sample selection model and incorporating actual cases, Lai (2017) shows that since 2009, Chinese companies' direct investments in Africa have tended to be in places with high market demand rather than high resource supply. Compared to other developed countries' investment companies, Chinese companies are late in the foreign direct investment field, especially Chinese private companies that prefer to invest in African countries with the unstable political environment and market demand in order to avoid aggressive competition with developed countries.

1.2 Theoretical explanation of Foreign Direct Investment

1.2.1 Definition of Foreign Direct Investment

Since the 21st century, foreign direct investment has developed drastically, and international scholars have put forward various opinions. FDI is a very important component of international trade and has been the focus and direction of research by

different international research institutions, so in 1997 the International Monetary Fund (IMF) proposed a definition of FDI as an investment with a continuing interest in an enterprise and in an investor operating in a country (economic region) other than the one in which it is located, intending to have the right to operate and manage the enterprise.

The OECD defines foreign direct investment as the establishment of a long-term relationship between residents of a country or region and multinational enterprises, whose main aim is to obtain long-term benefits and to conduct control of investment activities. Long-term benefits refer to the cooperation between the company and the company in the long run, so FDI has a great influence on the operation and management of the enterprise. The understanding of the concept of FDI is also completely different due to the different economic and political situations of countries. However, there are three characteristics of FDI in general: first, it is a cross-border investment activity, and second, it is an investment to gain effective control over the management of the foreign enterprise. Third, the investor must hold 10% or more of the equity of the enterprise.

In the process of FDI, the country with capital outflow is called the home country, and the invested country with capital inflow is called the host country, while OFDI and FDI are expressions of the same investment behavior standing from different perspectives. For example, Chinese direct investment in Africa is OFDI from the Chinese point of view and FDI from African point of view.

1.2.2 The development process of FDI theory

The traditional theory of FDI was first proposed by the American scholar Hymer (1960) as the Monopolistic Advantage Theory. He argues that under the assumptions of specific advantages given to firms and incomplete markets, MNCs are more likely to exhibit a particular advantage than host country companies, which can be size, capital, technology, management, and quality. At the same time, this advantage can reduce the investment costs for multinationals, so that they can achieve higher profits. His mentor,

Kindleberger, complemented and enhanced this theory. However, from the current investment approach, the theory has some shortcomings, which means U.S. companies are considered representatives of multinational corporations and cannot be fully applied to investment activities in developing countries.

Internalization theory is another classic theory in the field of FDI and is proposed by Buckley among other international researchers. It focuses on the reasons why MNCs resort to FDI rather than direct exports when they have a monopoly advantage. The research results show that the incomplete market in the host country may lead to a massive increase in transaction costs, while the supply-demand relationship in the host country is not particularly stable. Therefore, choosing the FDI approach to establish a multinational company can replace the external market mechanism with the internal management mechanism of the enterprise, which can achieve cost reduction and overcome the impact of an unstable supply-demand relationship. Internalization theory reveals that the essence of FDI is the transfer of management and control, rather than the transfer of capital.

Since Japan is one of several important FDI countries, a new theory of FDI expansion was proposed by Japanese professor Kiyoshi Kojim (1978) based on the actual investment condition in Japan. It argues that the process of FDI should have clear objectives, and FDI needs to move the marginal industries overseas from the home country first, and make those industries still have advantages in the host country. Thus, it can achieve the purpose of optimizing the industrial structure of the home country and promoting the development of labor-intensive industries in the host country.

The Eclectic Theory of International Production, first proposed by the British economist Dunning, combines a number of classical theories and suggests that if firms want to consider using FDI as a means of entry into a host country rather than other forms of trade, they must satisfy both ownership advantages, internalization advantages, and location advantages.

2.The Development Process of Chinese FDI in Africa

At the macro stage, the Chinese decision to invest in Africa will bring great benefits. First, Chinese and African conditions are complementary. African rapid economic expansion has created a vast overseas market for China, which has a strong production capacity and financial strength, and there is a supply-demand inequality for many capacities and technologies in China, so China urgently needs to find a suitable market and opportunity. Secondly, China has frequent political engagement with Africa, and the political relations between the two regions are developing rapidly while both are developing countries. Chinese foreign direct investment in Africa also contributes to a certain extent to the political ties between China and Africa. Finally, Chinese investment in Africa can provide some economic support. The African people have established many nationally independent states after various independence movements, which have led to a dramatic increase in population and a decline in people's disposable income. Therefore, they urgently need economic assistance and financial support. For this reason, the economic and trade cooperation between China and Africa has shown distinctive features at various historical stages. This paper divides the whole development process into three stages.

2.1The initial stage of China-Africa cooperation

After World War II, China was in a newly established reform period, while many African countries were on the road to independence. China did not have much international influence in this social environment, so in order to escape from this political isolation and to improve its international status, China chose to establish diplomatic relations by foreign direct investment in Africa, which mainly met its diplomatic demands. According to Luo Jianbo and Liu Hongwu (2007), China was found to have provided about \$2.4 billion in economic aid to 36 African countries from

1956-to 1977, but there were only \$817 million, which accounted for 1/3 of the total was economically effective. Among the many aid projects, the "Tanzanian Railway" is the most central project, for which China provided an interest-free loan of \$988 million to ensure its success, which not only improved the infrastructure construction in Africa but also achieved a certain political purpose. In general, Chinese foreign direct investment in Africa was on a small scale at the beginning. It was mainly for political purposes and only financed some interest-free loan projects in some countries.

2.2 The continuous promotion stage of China-Africa cooperation

Since 1979, Chinese society has been developing rapidly, and in response to the practical problems that have arisen in the process of aid to Africa, China has begun to change its investment model, and its investment in Africa has begun to take on the characteristics of international investment which have diversified from the political to the economic field. It marked a new stage in Chinese FDI to Africa. The economic and trade cooperation between China and Africa is gradually changing from a single loan to African countries to an increase in joint ventures and cooperation for large projects, and Chinese investment will focus on economic benefits to African projects and improvement of local infrastructure, etc. During this period, Brautigam (2012) showed that Chinese investments in Africa totaled over \$50 million, distributed in industrial, agricultural, resource projects, and construction in transportation projects. But he argued that even though China has seen the importance of the African market, it still has not launched massive investment activities. And Bates (2009) et al. argue that China has entered a new stage of cooperation with Africa. Through Chinese political and economic support to Africa, they can both reap better economic returns as well as raise their international status.

2.3 The mature stage of China-Africa cooperation

Due to the close political and cultural ties between the two regions in recent years, the Chinese "One Belt, One Road" policy has significantly increased the scale of Chinese foreign direct investment and other economic assistance to Africa. The stock of Chinese foreign direct investment in Africa will reach \$43.4 billion in 2020, an increase of more than 50% compared to 2011 figures. Chinese FDI in Africa is expanding and broadening. on the one hand, it has created more jobs in the host countries, and on the other hand, it has contributed to the upgrading of the Chinese industrial structure. The renewal of ports and other infrastructures in African countries following the implementation of the Belt and Road strategy in 2015 has not only increased import and export trade in port-building countries but has also affected the foreign trade activities of other landlocked countries. China has not only increased its investment in the African region but has also expanded its aid to African countries. According to Rotberg (2012), Chinese aid to Africa accounted for 44 % of all Chinese aid as of 2003. And China has established eight standards of conduct on China-Africa cooperation at the 2018 FOCAC, which is a guarantee for the development of the China-Africa social community. At the same time, China provided \$60 billion in interest-free loans to African countries at the conference. By analyzing data on trade between China and African countries, Sautman (2007) found that after the creation of the Forum on China-Africa Cooperation (FOCAC), the number of countries that trade with China in excess of \$100 million quickly surpassed 16. This shows that FOCAC has made the partnership between China and Africa more stable and comprehensive.

3.The Condition of Chinese Foreign Direct Investment in Africa

3.1 The scale of Chinese FDI in Africa

Since the Forum on China-Africa Cooperation in 2000, Chinese foreign direct investment in the African region has gradually increased. in 2004, Chinese investment in Africa totaled only \$899 million, while Chinese foreign direct investment in Africa totaled \$43.4 billion in 2019, a 40-fold increase from 16 years ago. According to the stocks shown in the chart 3-1, the stock of Chinese foreign direct investment in Africa has maintained a very stable upward trend.

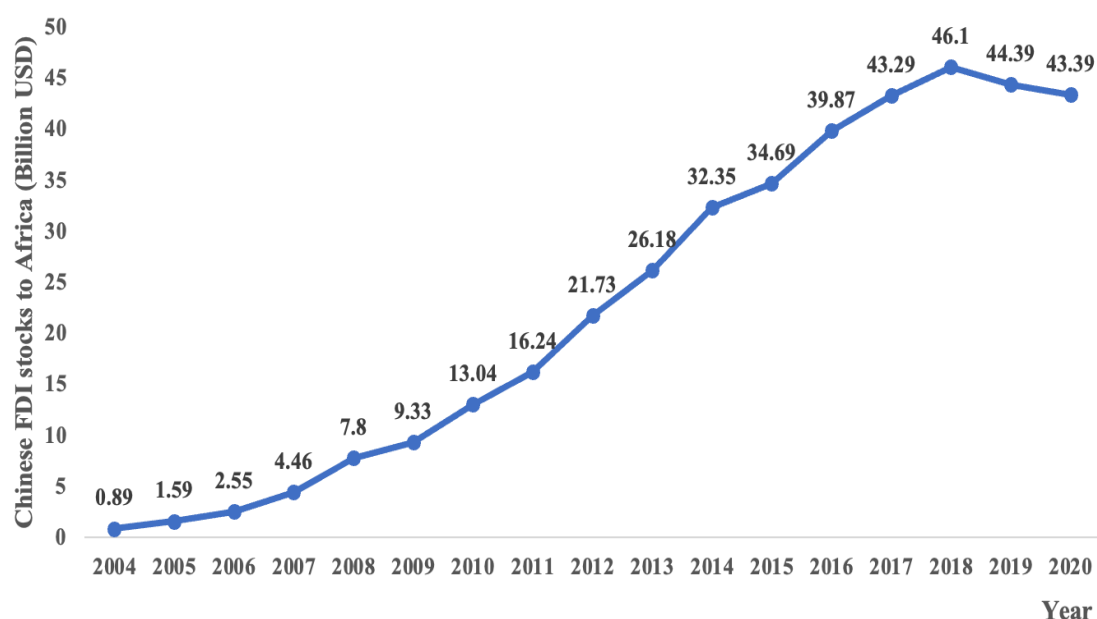


Chart 3-1 Chinese FDI stocks to Africa during 2004-2020

Source: China OFDI Statistical Bulletin, MOFCOM

From a flow perspective, the scale of Chinese FDI to the African region grew rapidly before the global financial crisis in 2008. However, due to the financial crisis in 2008, many countries faced various problems and China had to take measures to reduce its

overseas investments, which led to a decrease in the FDI flow to \$1.439 billion in FY2009. In recent years, affected by the epidemic and unexpected situations, the world economy, in general, showed a downward trend, and the scale of Chinese FDI flows to Africa gradually decreased from 2014 but showed a stable growth trend after 2017. 2020 Chinese FDI flows to Africa increased by 50% compared with 2018. the scale of Chinese FDI flows to Africa between 2009 and 2020 still increased from \$1.439 billion to \$4.22 billion.

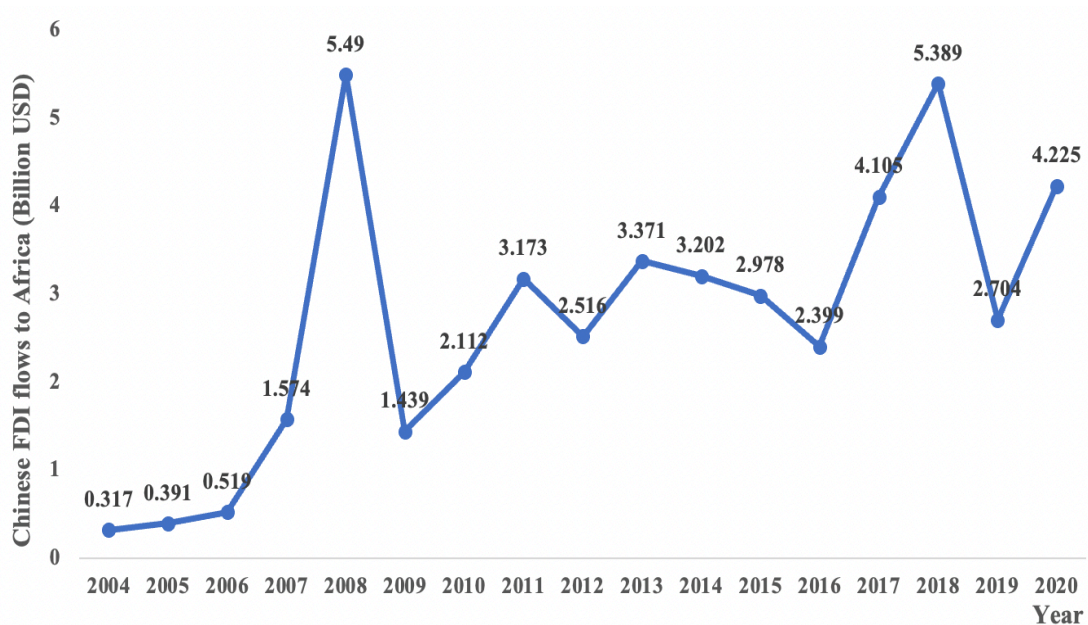


Chart 3-2 Chinese FDI flows to Africa during 2004-2020
Source: China OFDI Statistical Bulletin, MOFCOM

As you can see from the chart 3-3, although Chinese investment in Africa continues to grow, compared to some developed countries, the total amount of Chinese investment is still small. However, the scale of Chinese FDI as a developing country is quite huge.

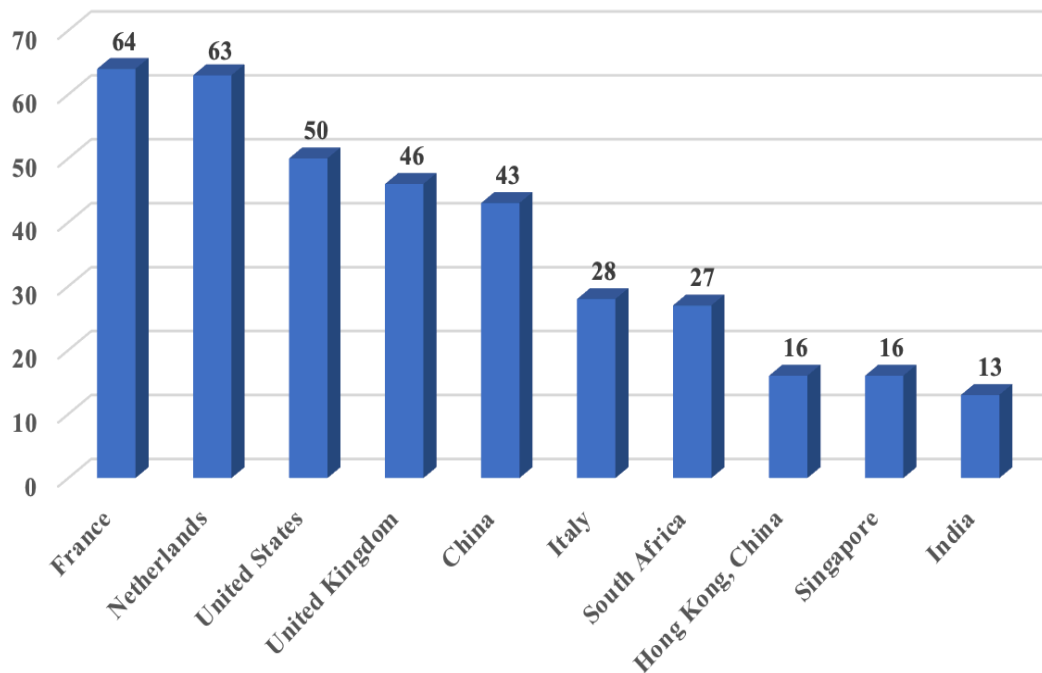


Chart 3-3 Comparison of FDI stock to Africa between China and major countries(regions)in 2017 (billions USD)

Source: China OFDI Statistical Bulletin, UNCTAD

As the table 3-1 shows, Chinese FDI to Africa still accounts for a very low proportion of Chinese investment. 2004 Chinese FDI was US\$5.5 billion inflows and US\$44.8 billion in stocks, of which African stocks accounted for 2% of Chinese FDI, while African flows accounted for 5.8% of Chinese FDI. In 2020, Chinese FDI was \$153.7 billion in inflows and \$2580.6 billion in stocks, of which African stocks accounted for 1.68% of Chinese FDI, while African flows accounted for 2.6% of Chinese FDI. Thus, both total stocks and total flows of Chinese FDI to the African region have shown significant growth, but their ratios have been decreasing.

Table 3-1 The scale of Chinese FDI to Africa from 2004 to 2020 (Billion USD)

Year	Chinese FDI stock	Chinese FDI stock to Africa	FDI stock ratio to Africa	Chinese FDI flow	Chinese FDI flow to Africa	FDI flow ratio to Africa
2004	44.77	0.89	1.98%	5.49	0.31	5.64%
2005	57.20	1.59	2.78%	12.2	0.39	3.19%
2006	75.02	2.55	3.40%	17.6	0.51	2.89%
2007	117.91	4.46	3.78%	26.5	1.57	5.92%
2008	183.97	7.8	4.24%	55.9	5.49	9.82%
2009	245.75	9.33	3.79%	56.5	1.43	2.53%
2010	317.21	13.04	4.11%	68.8	2.11	3.06%
2011	424.78	16.24	3.82%	74.6	3.17	4.24%
2012	531.94	21.73	4.08%	87.8	2.51	2.85%
2013	660.47	26.18	3.96%	107.8	3.37	3.12%
2014	882.64	32.35	3.66%	123.1	3.20	2.59%
2015	1097.86	34.69	3.17%	145.6	2.97	2.04%
2016	1357.39	39.87	2.93%	196.1	2.39	1.21%
2017	1809.03	43.29	2.39%	158.2	4.10	2.59%
2018	1982.26	46.1	2.32%	143.0	5.38	3.76%
2019	2198.88	44.39	2.01%	136.9	2.70	1.97%
2020	2580.65	43.39	1.68%	153.7	4.22	2.74%

Source: China OFDI Statistical Bulletin, UNCTAD

3.2 Industry Distribution of Chinese FDI in Africa

As Chinese FDI in Africa continues to increase and the African market develops rapidly, Chinese investment in Africa has also diversified. A study by Lili Song and Mengxiao Li (2013) shows that Chinese foreign direct investment in the African region is gradually expanding from the traditional mining, agriculture, and construction industries to industrial production, real estate, and finance. According to the China-Africa Business and Economics Research Center, Chinese foreign direct investment in Africa increased by \$2.4 billion in 2016 across many industries. But it was dominated by mining, construction, finance, manufacturing, scientific research, and scientific services. And the remaining industries accounted for only about 15% of the total foreign direct investment stock in Africa. The main industry sectors of Chinese enterprises' FDI in Africa are mining and construction, as can be seen from the chart 3-4, at the end of 2016, the proportion of investment in the construction industry has exceeded that of the mining industry, where construction accounted for 28.3%. And the proportion of mining has decreased, from 27.5% at the end of 2015 to 26.1% at the end of 2016. Financial services, scientific research, and technical services have all increased as a percentage of investment in all industries. 2016 Chinese foreign direct investment in African science and technology services totaled \$1.91 billion, compared to \$448 million in 2013, which more than tripled in three years. This indicates that financial, leasing, and business services have also become a new investment hotspot. In recent years, due to Chinese economic reform, industrial restructuring, industrial transfer, and technology export, some high value-added industries are gradually shifting to Africa, and China has been increasing its investment in African manufacturing industries. All in all, the views of some international academics may be controversial, as the data suggest.

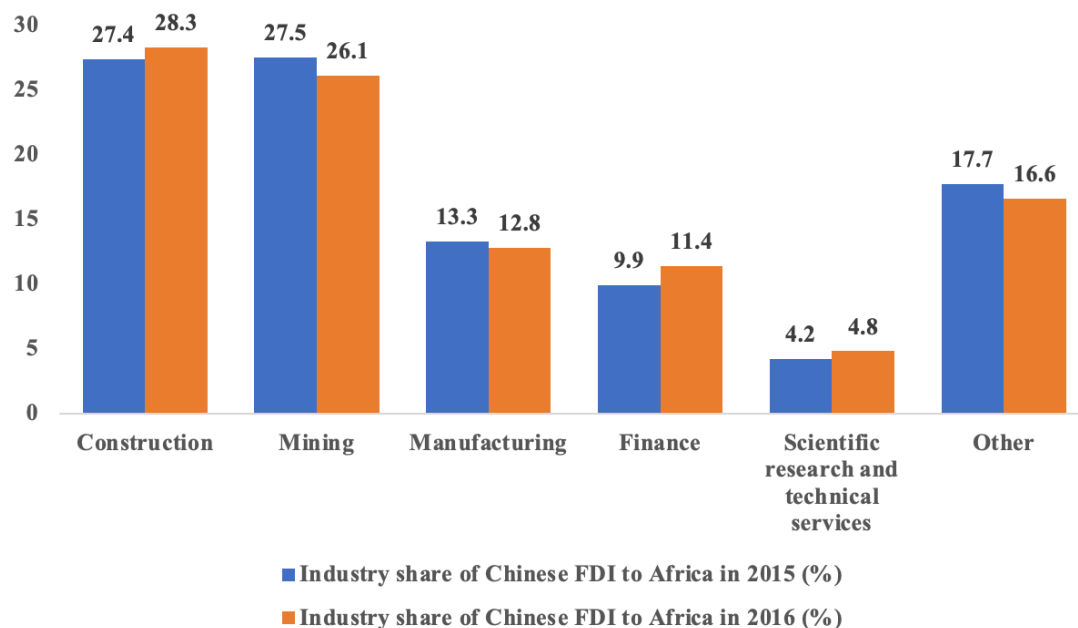


Chart 3-4 Industry Distribution of Chinese FDI to Africa in 2015-2016
Source: China OFDI Statistical Bulletin, MOFCOM

The growth of investment in construction projects is mainly due to economic, political, and historical constraints. The scarcity of infrastructure projects in Africa, combined with the rapid industrialization and urbanization in Africa, has created a huge demand for infrastructure investment in Africa. Jean-Paul (2021) collates Chinese BRI policy towards Africa showing that China completed the first modern electrified railway in Africa, the Addis Ababa–Djibouti Railway, and the total investment by Chinese companies for this project is about \$4 billion in October 2016. Such infrastructure projects not only solve the problem of scarcity of expertise and jobs for the unemployed in Africa, but also improve local transportation, increase foreign trade sources for residents, and greatly improve the local economy. Mesafint (2020) points out the benefits of China building this infrastructure. This railway has reduced local shipping times from 3 days to 10 hours. Overall, Chinese construction projects for BRI will significantly reduce local transportation costs in Africa.

Mineral resources have always been the main object of Chinese FDI in Africa. According to Irene s (1966), it was shown that Africa is abundant in natural resources,

which feature large reserves, high quality, and easy exploitation. For example, unexploited oil reserves on the African continent account for 90% of global reserves, while mineral resources such as chromium, platinum, and manganese account for more than 80% of global reserves, and diamonds, gold, and cobalt account for more than 50% of global reserves. According to the BP Energy Statistics Yearbook, Africa produced 104,300 tons of cobalt in 2017, which is 75.9% of the world. However, the study of Rahal Farah (2014) for resource trade between China and Africa suggests that these resources have been underutilized, and when Western countries invested in African mining industry, they did not bring in a large amount of advanced technology. This has led to a low technical level of mining in Africa, which has affected the upgrading of the mining industry. Therefore, if China assists Africa in upgrading and enhancing the technology of the mining industry, it can improve mining efficiency in Africa, which is also significant for Chinese high economic growth, industrial growth, and energy security issues.

3.3 Regional Distribution of Chinese FDI in Africa

According to the statistical bulletin of Chinese FDI, China has invested in 52 countries in Africa in 2020, but only 8 countries have yet to do so due to the geographic location and investment environment. With the implementation of the Chinese "One Belt, One Road" policy, Chinese companies have set up multinationals in African countries. However, based on the number of Chinese companies, in 2009, about 1,600 Chinese companies were investing in Africa, or 12.5% of all Chinese companies abroad, while in 2020, the number of Chinese companies investing in Africa has increased to 3,500, or 7.9% of all Chinese companies abroad. This indicates a decrease in the proportion of Chinese companies investing in Africa.

At the same time, although investment in Africa has become a new investment trend for Chinese companies, Chinese FDI in Africa is still far below the overall level in China. As the table 3-2 shows, at the end of 2020, nearly 80% of Chinese FDI in Africa

was concentrated in 10 countries out of the total number of countries covered by the investment.

Table 3-2 Top 10 African countries ranked by Chinese FDI flows to Africa in 2020

Country (region)	FDI flows (million)	Shares (%)	Top 10 countries combined (%)
Kenya	629	14.88%	78.16%
Congo (DRC)	611	14.46%	
South Africa	400	9.46%	
Ethiopia	310	7.33%	
Nigeria	309	7.31%	
Congo (Brazzaville)	247	5.84%	
Niger	235	5.56%	
Zambia	214	5.06%	
Senegal	213	5.04%	
Madagascar	136	3.22%	
52 invested countries in Africa	4225	100.00%	

Source: China OFDI Statistical Bulletin, MOFCOM

Kenya, Congo (DRC), South Africa, Ethiopia, Nigeria, Congo (Brazzaville), Niger, Zambia, Senegal, and Madagascar are the top 10 countries that received Chinese FDI flows in 2020, all of which are above \$130 million, but the number of countries is less than 1/5 of the total countries covered by Chinese FDI in Africa. This is due to historical factors, as all these countries have established diplomatic relations with China earlier.

Thus, the geographical distribution of Chinese FDI in Africa is wide but overly concentrated. On the one hand, the reason for the distribution of investment is that

investors tend to favor countries and regions with a better economic base, more stable political situation, or outstanding resources. And on the other hand, China will tend to invest in countries that have established diplomatic relations for a long time, since China is more familiar with the local environment and conditions.

3.4 summary of the condition of Chinese FDI in Africa

From the development process of Chinese investment in Africa and the current investment situation, Chinese foreign direct investment in Africa has a long historical background, and Africa also provides a good platform for Chinese overseas investors. In recent years, the growth rate of Chinese investment in Africa has been accelerating. China has successfully formulated various foreign investment policies, and the scale of its FDI in the African region has been expanding, as well as the industrial layout. However, there are still several issues that need to be focused on as follows.

1. The growth rate of investment continues to slow down. From the data and analysis above, the growth rate of Chinese FDI flows to Africa remains at a steady pace, despite the sustained growth of its FDI stock to Africa. In addition, the growth rate of Chinese FDI stock to Africa is decreasing every year, which indicates that China should adjust its FDI activities in Africa as soon as possible.
2. The proportion of Chinese FDI stock to Africa to the total FDI in China is still low. Up to 2020, the size of Chinese FDI stock is US\$2,580.6 billion, of which the amount of its stock in Africa is US\$43.39 billion. It is only 1.68% of the total FDI, and it ranks at the bottom among the 6 continents, so it is evident that Chinese FDI in Africa may still represent a relatively small part of total Chinese FDI, but they are rapidly growing and their peculiar intertwining with political issues makes them quite interesting in perspective.
3. Chinese FDI to Africa is mainly centered on key regions and some industries. From the 2019 Chinese FDI bulletin, it is clear that Chinese FDI in Africa has involved 80%

of the key national economic industries in Africa. However, according to the analysis of the investment stock in each industry, the main industries are still mining, construction, transportation, etc.

4. With the dynamic changes in the international scenario and the global economy slowing down under the impact of covid and war, Chinese companies tend to reduce the risk of their companies by decreasing their overseas investments. So Chinese companies are likely to be cautious about FDI in Africa in the coming years.

4.Theoretical Analysis of the Factors Influencing Chinese FDI in Africa

Through the analysis of the size, industry, regional distribution, and investment mode of Chinese FDI in Africa, it is found that there are various influences on Chinese FDI in Africa. Therefore, this paper will conduct theoretical and empirical analysis from various aspects such as market size, resource factors, human resources, and infrastructure.

4.1 Market Size

In recent years, the Chinese domestic market is highly competitive and generally, the Chinese market is in a situation where supply exceeds demand, so many companies want to get out of such a predicament to look for overseas markets. Also establishing overseas multinational companies is one of the strategies to enhance international competitiveness and product influence. Dunning (1981) in *The Eclectic Theory of International Production*, highlights the role of market size on the FDI of companies. The increasing market size can help to overcome the trade barriers in the host country and expand the economic efficiency of the investing firm. Although the income per capita of African countries is very low, GDP is large. And some African markets are growing rapidly, so there is at least some potential for market size growth. According to Wells' (1983) small-scale technology theory, developing country firms have a greater competitive advantage in smaller markets for products manufactured abroad. Taylor (2002) argues that the size of the market investment space is positively correlated with the size of the market, and the larger the market size is, the more favorable it is for MNCs' FDI to achieve scale economies. Through the study of the impact of FDI theory on Chinese economic development, Jiang (2002) believes that using the existing overseas market to invest can reduce the risk of FDI, so if the host country has a larger scale of investment activities, it must be accompanied by a larger scale of commodity

export behavior.

Compared with the Chinese market, most countries in Africa are relatively backward in economic development and need massive infrastructure construction, so Africa has a huge market and demand for investment. Africa became the second most populous continent in the world besides Asia, with the resident population remaining at around 1.2 billion in 2016, while the average annual population growth rate in Africa is 1.3% higher than in Asia, and African urbanization process is also accelerating. Therefore, Africa is a diversified and potential market with huge consumption. And according to the African Economic Outlook 2018 report, African economies are expected to achieve continuous growth from 2017-to 2025, with real economic growth increasing from 2.2% in 2017 to 4.1% in 2025. Therefore, market size may play an important role in influencing FDI.

4.2 Import and export trade

China and Africa are both developing countries, so they have many similarities in terms of consumer demand and standards, and many popular Chinese goods are loved by African people. As some African countries have lower industrial capacity, most light industrial products needed by African people have to rely on imports, while China currently has excess capacity and is in urgent need of industrial structure optimization. It is evident that the continued expansion of the size and demand of the African market has boosted Chinese exports to Africa and promoted Chinese foreign direct investment in Africa.

And with the progressive increase in the purchasing power of African people, Chinese exports to Africa have been diversified. Data from National Bureau of Statistics of China shows that Chinese mechanical and electronic exports to Africa have exceeded 50% over the total exports in 2015. According to a study by schott (2012), Chinese trade models are rapidly changing. China will mainly import some basic products, and then process these basic products into highly precise products. Finally, these products

will be exported to overseas countries. As a result, a large number of Chinese companies have broken into the African market with highly sophisticated products. This is the main reason why this paper argues that import and export trade can influence Chinese FDI in Africa.

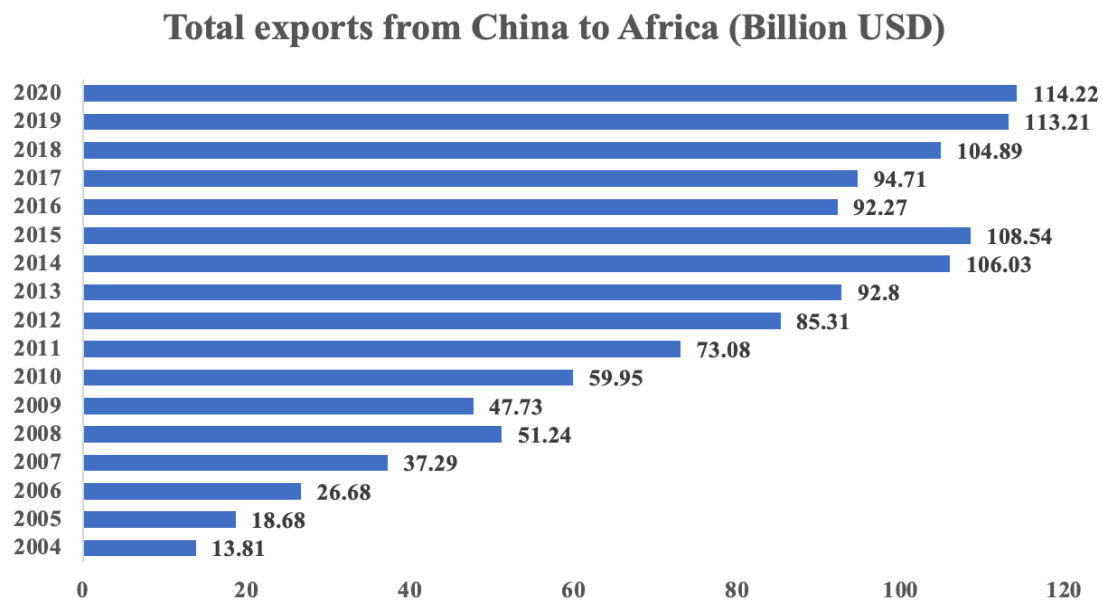


Chart 4-1 Chinese merchandise exports to Africa from 2004-2020 (Billion USD)

Source: GENERAL ADMINISTRATION OF CUSTOMS.P.R.CHI, NBSPRC

4.3 Natural Resources

According to Robinson et al. (2006), the higher the natural resource abundance, the easier it is to attract high-quality FDI. And there is a significant positive relationship between the natural resource abundance of the host country and FDI. Economic development can stimulate market demand and also drive the oil demand. Therefore, the average annual growth rate of world GDP is positively correlated with the quantity of crude oil consumption. According to the data published by the Chinese Energy Bureau in 2010, the dependence of China on imported oil has exceeded the international alert level of 50%, which indicates that China is no longer able to meet its domestic energy consumption through domestic oil production alone, and the shortage of domestic natural resources will inevitably hinder the development of some enterprises.

So, China urgently needs to find new ways to solve its energy problems. Based on the World Energy Outlook 2017, it is estimated that by 2040 Chinese dependence on oil imports will rise to 80%, with net oil imports likely to reach 13 million barrels. Africa, as a high-quality energy source, is rich in all types of energy, with more than 100 billion barrels of discovered oil reserves, while African oil production can reach 11% of the world's total daily oil demand. At the same time, because some countries and regions in Africa are still backward in extraction technology, so the cost of oil extraction in Africa is well below the international average extraction cost, and this is one of the reasons why many companies invest in Africa.

In addition, other non-energy minerals (including metallic minerals and non-metallic minerals) are also very abundant. China is also in great demand for these non-energy minerals. African reserves of chromium, manganese, copper, and other metals occupy more than 80% of the world's total reserves, and another mineral (diamond, gold, platinum, etc.) reserves rank first in the world. As Gu Xueming (2011) said, due to historical or capital factors, most African countries have been independent only for a short time, and they do not have enough technical experts and capital to carry out normal resource development on a large scale. Therefore, China can sign a mutual aid agreement with African countries to help African countries in resource extraction and make full use of their rich natural resources. This mutual aid approach can not only accelerate the development of local industrialization and train suitable technical experts but also solve the problem of Chinese energy demand.

Therefore, the reason why China chooses Africa for its FDI is not just a matter of resources. Foreign direct investment by Chinese enterprises in the mining industry is generally on a declining trend, and Chinese oil consumption only represents 1/10 of African total oil production. But some developed countries like the U.S. have 83% of their FDI concentrated in major energy countries. Except for South Africa, the U.S. FDI in the remaining countries is inclined toward the oil field.

Finally, Africa still needs to pay attention to the environmental problems caused by the

massive exploitation of natural resources, given that the massive exploitation of resources such as oil, metals, and minerals can lead to serious environmental problems. According to a study published by Professor McKenzie Frances Johnson (2019), since extraction technology and labor quality in Africa are different from those in developed countries, Africa should not implement the corresponding international environmental standards. It should establish treatment standards appropriate to the national situation instead. It should also explicitly require environmental preservation plans when accepting foreign investments.

4.4 Human Resources

Based on the theory proposed by Kiyoshi Kojim (1978), FDI needs to move the domestic marginal industries abroad first and keep these industries still having an advantage in the host country. And as the labor cost in China has been increasing extremely fast in recent years, which impacts labor-intensive industries tremendously, so the profits of these firms need to be used to pay for the labor costs. These firms want to move to places where the labor prices are relatively low in order to reduce the costs of their firms. That's why these companies want to move to places where labor costs are lower than they are.

Many African countries have been independent for a short time, and the development of these labor-intensive industries is low. Analysis of World Bank data shows that extreme poverty is slowly decreasing, with the number of people living in extreme poverty in the world decreasing by 1.3 billion from 1990-to 2015. However, in 2015, the extreme poverty population in the southern Sahara Desert region has been rising and has exceeded half of the world's extreme poverty population. Local preferential policies want to attract labor-intensive enterprises to solve this thorny problem. This condition is found all over Africa, so the overall labor cost in Africa is low. However, if Chinese companies want to use the labor resources in Africa, they still need to overcome the problems of low education level, poor labor quality, and low labor

productivity in African countries.

Table 4-1 Comparison of monthly wages between Chinese and African (USD)

	China	Ethiopia	Tanzania
Manufacture of shirts	237-269	26-48	93-173
Manufacture of wood products	206-251	37-52	75-125
Leather Industry	237-448	16-33	80-140

Source: HT.Dinh “Light manufacturing in Africa.” (2012)

4.5 Infrastructure Resources

Another important factor that affects the FDI of multinational enterprises is the infrastructure of the host country. The higher the degree of infrastructure improvement in the host country, the more attractive it is for MNCs to make FDI. The better infrastructure can also bring more jobs and expand the size of the local market.

As most of Africa is suffering from years of war, the country's financial shortage and unstable political situation seriously hinder infrastructure projects. And in turn, the dilapidated infrastructure affects the country's economic growth and political stability. In order to solve the series of problems caused by infrastructure, and to be able to use more funds and more advanced technology to improve the infrastructure construction. Most African countries have established policies to attract foreign direct investment.

China, as one of the world's most infrastructure-oriented countries, has very mature experience in managing infrastructure construction. And due to its high technical level and well-managed processes, its construction teams offer low prices and are able to complete construction tasks efficiently. To maintain friendly relations between China and African countries, China has signed mutual assistance agreements with African countries, in which it offers to provide large loans to help build the high-quality, low-priced, and locally necessary infrastructure, such as railroads, roads, bridges, hospitals,

and schools. By the end of 2011, China had assisted 140 transportation projects, 70 communication projects, and 60 power supply projects to African countries, covering a quarter of all Chinese assistance to Africa.

Chinese infrastructure investment in Africa can not only meet its own economic development needs and solve its market saturation problem but also help African people solve urgent infrastructure construction problems and enhance Chinese international influence.

4.6 Manufacturing Resources

Table 4-2 Manufacturing value added (MFI) as a percentage of GDP

	1999	2004	2008
Africa	12.1	12.3	12.1
China	34.7	36.7	39.0
India	16.3	15.7	15.0
The rest of the developing countries	19.2	20.0	20.4
Global	19.8	20.1	19.9

**Source: United Nations Industrial Development Organization (UNIDO)
International Yearbook 2010**

According to Table 4-2, African manufacturing value added as a share of total GDP remained essentially constant during the period 1999-2008. This indicates that manufacturing in African countries is developing slowly. And Fukunishi (2012) summarizes the data of the top 20 countries in Africa in 2010, which shows that the average manufacturing production value of these 20 countries is only 10% of GDP. He also points out that manufacturing productivity in sub-Saharan Africa is low but labor costs are higher than the African average due to the low level of FDI investment as well as the small size of FDI firms. The complexity of most African countries has resulted in a weak local business environment and high overhead costs, which has limited the increase in manufacturing productivity. The characteristics of Chinese products are low price and high availability. Therefore, manufacturers from China may strongly reduce the demand for African products from African people. And this is harmful to the growth

of African manufacturing industry. As confirmed by Bannister (2009), the market share of the Southern African Customs Union (SACU) members decreases with the rise of Chinese exports to Africa.

However, African manufacturing resources have an attractive effect on FDI. It's still in the primary stage of manufacturing, so most of the African enterprises produce basic products. And for China, the United States, and other countries with advanced technology. They can use the products made by African enterprises for secondary processing. And it can effectively reduce the transportation cost. African countries can also make full use of the resources and technologies of these FDI enterprises to expand the manufacturing industry chain and improve the added value of local goods. To sum up, Chinese FDI in Africa may be influenced by African manufacturing resources.

5. Empirical Analysis of the Factors Influencing Chinese FDI in Africa

Based on the current condition of Chinese FDI in Africa and the qualitative analysis of the influencing factors, this part selects 27 countries as the research sample, and selects the total stock of Chinese FDI in 27 African countries as the explanatory variables. From the panel data of Chinese FDI in Africa from 2004 to 2020, this part conducts a scientific multiple linear regression analysis on the influencing factors of Chinese FDI in Africa, aiming to obtain the specific degree of influence on FDI by each influencing factor.

5.1 Hypothesis formulation

(1) Economic factors

A large literature shows that FDI is strongly influenced by economic factors. As the country's economic development increases, the larger the local market size, the more foreign direct investment can be attracted, so this paper puts forward the following hypotheses by selecting three elements of economic factors.

H1: Host country market size is positively correlated with Chinese FDI in Africa.

H2: The import and export trade of the host country is positively correlated with Chinese direct investment in Africa.

H3: The level of economic development of the host country is positively correlated with Chinese FDI in Africa.

(2) Natural Resource Factors

African countries and regions are endowed with abundant natural resources, especially

oil and mineral resources. International academics commonly believe that the main purpose of Chinese FDI is to plunder African natural resources. However, due to restructuring and changes in Chinese energy strategy, China has diminished the share of resource industries in its FDI in Africa. Therefore, Therefore, this thesis makes a hypothesis about the relationship between natural resources and FDI.

H4: Natural resources in the host country are positively correlated with Chinese FDI in Africa.

(3) Human Resources Factors

The labor cost in China is rising with the rapid economic development, as a developing country, China has many labor-intensive industries. So in order to reduce the cost of operation, Chinese companies want to transfer these industries to African, which can take advantage of the lower labor cost in Africa. The African region has a large population base and high population growth rate. According to the population pyramid, Africa has an excellent demographic structure. 40% of the African population is younger than 15 years old. Therefore, the following assumptions are made in this thesis.

H5: Human resources in the host country are positively correlated with Chinese FDI in Africa.

(4) Infrastructure resources factors

Numerous studies have shown that the country's infrastructure affects the benefits and costs of FDI in the host country. Most African countries have chaotic economic systems and serious government corruption, which can heavily affect the investment and construction of infrastructure in African countries. Investors prefer countries with good infrastructure and convenient transportation. Therefore, the following assumptions are made in this thesis.

H6: Infrastructure resources in host countries are positively correlated with Chinese

FDI in Africa.

(5) Manufacturing resources factors

As African economies improve, the market demand in Africa continues to expand. But they have a serious shortage of professional skills and engineers. At the same time, Chinese companies are able to make full use of the basic products made by local African companies to go for lean processing. Therefore, manufacturing resources may have a great impact on Chinese FDI in Africa. This thesis makes the following hypothesis.

H7: Manufacturing resources in the host country are positively correlated with Chinese FDI in Africa.

5.2 Data sources and descriptive statistics

To research the factors influencing the stock of Chinese FDI in Africa, considering the representativeness of the sample and the availability of data, this paper selects 27 African countries' bilateral trade data with China as the research sample.

The influencing factors of Chinese FDI in Africa are divided into the market size, the economic development level, the import and export trade, the natural resources, the manufacturing resources, the infrastructure, and human resources. Through the previous theoretical analysis, this thesis argues that all these factors can have some influence on FDI. So, this thesis selects seven relevant variables to analyze the factors influencing Chinese FDI in Africa.

Table 5-1 27 African sample countries

	1. Algeria	2. Benin	3. Botswana	4. Cameroon
	5. Cabo Verde	6. Chad	7. Congo (DRC)	8. Congo (Brazzaville)
Country	9. Egypt	10. Ethiopia	11. Gabon	12. Ghana
(Region)	13. Guinea	14. Kenya	15. Lesotho	16. Madagascar
	17. Mauritius	18. Morocco	19. Mozambique	20. Namibia
	21. Nigeria	22. Senegal	23. Seychelles	24. Sierra Leone
	25. South Africa	26. Togo	27. Zambia	

(1) Real GDP per capita (PGDP): the PGDP is derived by dividing the GDP with the number of permanent residents of the country. GDP generally measures the income level of the country's residents, which is correlated with the size and potential of the market. Meanwhile, Wu Shuaifeng (2014) selected PGDP as a variable in the correlation analysis of market size and FDI and concluded that market size is positively correlated with FDI. Therefore, PGDP is selected as a variable to describe the market size of the country in this thesis.

(2) GDP: this indicator measures the level of economic development of the host country. According to the analysis of FDI data for 30 countries from 1996-2016 by Wang Yan (2016), it is known that the economic growth of the country can have a positive correlation effect on the FDI. And Africa has experienced rapid economic development in recent years, so GDP is selected as a variable to describe the level of economic development of the country in this thesis.

(3) Total merchandise exports (EX) and total merchandise imports (IM): This indicator measures the extent of export and import trade in the host country. In the FDI theory published by Kiyoshi Kojima (1978), it is clearly stated that the trade growth of the country affects the inflow of FDI. And a large number of studies have selected total

merchandise exports and total merchandise imports as variables to measure the country's export trade.

- (4) Natural Resources (EN): Maliling (2012) argues that natural resources in African countries have a significant impact relationship with Chinese FDI. And Africa exports up to 90% of its fuel exports to developed countries. Therefore, in this thesis, the percentage of energy export commodities to total merchandise exports is chosen as the measurement variable of natural resources.
- (5) Infrastructure (ECP): Xinyi Liu (2016) points out that the level of infrastructure in Africa has become a decisive factor in attracting FDI to Africa. Meanwhile there are some studies suggest that the rapid improvement of infrastructure has led to the increased inflow of FDI. In this thesis, the amount of electricity infrastructure is selected as a variable to measure infrastructure resources.
- (6) Manufacturing resources (MFI): ji milan-zhou (2007) published a study on the relationship between the level of manufacturing and the market of the investee country. Therefore, considering that there is a close link between market and FDI, this thesis uses the indicator of manufacturing value added in percent of GDP (MFI) to measure the level of influence from manufacturing resources.
- (7) Human Resources (HR): According to the World Bank, the unemployment rate of youth in sub-Saharan Africa is on average 20%. Jan misun et al. (2002) found that the level of human resources in the host country can have both positive and negative effects on FDI. In this thesis, the employment numbers from African countries are chosen as the variable to measure the human resources of the host country.

The specific data are obtained from the World Bank WDI database, China Statistical Yearbook, and China Foreign Direct Investment Statistical Bulletin. Due to the poor degree of political and economic in Africa, many data are missing too much. For the problem that some of these indicators have a small amount of data still missing, it is reasonable to use linear trend interpolation or linear interpolation method to realize data filling and ensure data availability. Linear interpolation is a common method of supplementing missing data in the data processing operation. According to E. Meijering

(2002), linear interpolation is widely used in astronomical data processing and is applied in modern image processing techniques. It is mainly used to solve the problem of missing one-dimensional data, which is based on the distance between two adjacent data points and the current missing data position. Then, the missing data is predicted according to the weight of the data position. This method can be implemented not only in the case of missing data in the middle of the data series, but also in the case of missing data at the top of the data series. It is now possible to use the "ipolate" command in STATA software to quickly add small portions of data. However, this method uses only two sets of data, which may be affected by various contingencies. Therefore, this method can only help to supplement a small part of the data, and the data error is not very accurate. At the same time, in order to reduce the impact of large data variance on the estimation results, this paper takes the logarithm treatment of the variables.

Table 5-2 Indicator selection and data sources

	Variables	Description	Symbols	Data source
Explained variables	Chinese FDI stock to Africa	The total stock of Chinese FDI in 27 African countries	FDI	China OFDI Statistical Bulletin
	Marker size	Host country GDP per capita	PGDP	WDI database
	economic development	Host country GDP	GDP	WDI database
	merchandise imports	Total annual merchandise imports of the host country	IM	WDI database
	merchandise exports	Total annual merchandise exports of the host country	EX	WDI database
	Natural Resources	Host country national energy exports as a percentage of export commodities	EN	WDI database
	Human Resources	National employment in the host country	HR	WDI database
	Manufacturing Resources	Host country annual manufacturing production value added	MFI	WDI database
	Infrastructure Resources	Electricity consumption per people in the host country	ECP	WDI database

The specific statistical results of the variables derived using the STATA software are shown in the following table.

Table 5-3 Descriptive statistics table

Variable	Obs	Mean	Std. Dev.	Min	Max
lnfdi	391	9.814	1.897	3.85	13.524
lnen	391	1.036	3.431	-22.236	8.966
lnmfi	391	2.363	.472	1.224	3.91
lnecp	391	6.001	1.232	3.427	8.487
lnpgdp	391	7.455	.918	4.916	9.324
lngdp	391	24.056	1.161	21.539	26.755
lnim	391	22.862	1.096	20.436	25.569
lnex	391	22.51	1.234	19.895	25.413
lnhr	391	20.791	1.156	18.162	22.957

From the results of the descriptive statistics, it can be seen that the p-values corresponding to Chinese investment stock, market size in Africa, economic development in Africa, import and export trade in Africa, natural resources, manufacturing resources, infrastructure, and human resources in Africa are less than 0.05, indicating that the above samples do not obey normal distribution, and the standard deviation of each variable except energy is less than 2, indicating that the above variables do not have large fluctuations of the above variables.

5.3 Model selection and setting

Referring to the existing research results, combining the hypotheses proposed in this paper and the selected variables, the main regression model is set as follows.

$$\ln fdi_{it} = \alpha_0 + \alpha_1 \ln en_{it} + \alpha_2 \ln mfi_{it} + \alpha_3 \ln ec p_{it} + \alpha_4 \ln pgdp_{it} \\ + \alpha_5 \ln gdp_{it} + \alpha_6 \ln im_{it} + \alpha_7 \ln ex_{it} + \alpha_8 \ln hr_{it} + u_t + \varepsilon_{it}$$

In the model, α is the regression coefficient of each influencing factor and FDI, and its magnitude measures the effect of each factor such as economy and resources on FDI. If it is significantly less than 0, it indicates that the factor has a negative effect on FDI. If it is significantly greater than 0, it indicates that the policy has a positive contribution to FDI. u_t and ε_{it} is the fixed utility and random disturbance terms.

5.4 Correlation Analysis

Table 5-4 Correlation Analysis table

	lnfdi	lnen	lnmfi	lnecp	lnpgdp	lngdp	lnim	lnex	lnhr
lnfdi	1								
lnen	-0.012	1							
lnmfi	-0.107**	0.272***	1						
lnecp	0.184***	0.138***	0.464***	1					
lnpgdp	0.214***	0.118**	0.269***	0.770***	1				
lngdp	0.459***	0.263***	0.283***	0.407***	0.425***	1			
lnim	0.416***	0.239***	0.313***	0.561***	0.523***	0.943***	1		
lnex	0.353***	0.436***	0.253***	0.576***	0.625***	0.864***	0.892***	1	
lnhr	0.320***	0.128**	-0.037	-0.290***	-0.450***	0.607***	0.454***	0.298***	1

Note: ***, **, and * represent 1%, 5%, and 10% significance levels.

Table 5-4 presents the Pearson correlation coefficients between the main variables. The results show that FDI is significantly and positively correlated with market size, economic development level, import and export size, and human resources in Africa at the 1% level, which initially indicates that market size, economic development level,

import and export size, and human resources in African countries can positively promote Chinese investment in African countries. The correlations between variables can be seen that the correlation coefficients between different variables are also significantly correlated at the 1% level, in which the correlation coefficients of the import and export size of African countries, the market size, and the economic development level of their own countries are higher than 0.5. And other variables have correlation coefficients below 0.5.

Considering that the direct correlation of variables is overly large can easily cause the multi-collinearity problem and make the estimation results biased. Meanwhile, this paper performs the variance inflation factor (VIF) diagnosis for all explanatory variables in the model. Variance Inflation Factor (VIF) is the ratio of the variance when there is multi-collinearity between explanatory variables to the variance when there is no multi-collinearity ratio. The larger the VIF, the more severe the multi-collinearity problem. The empirical judgment method shows that when $0 < \text{VIF} < 10$, there is no multicollinearity; when $10 \leq \text{VIF} < 100$, there is strong multicollinearity; when $\text{VIF} \geq 100$, there is severe multicollinearity. The table 5-5 shows the results of the multicollinearity test of the model. It can be seen that the VIF values of many variables are chosen to be greater than 10. In general, the indicators selected in this paper have severe multicollinearity problems, and it is considered to exclude some variables for analysis.

Table 5-5 Variance inflation factor (VIF) diagnosis

	VIF	1/VIF
lngdp	120.327	.008
lnhr	83.584	.012
lnpgdp	64.053	.016
lnim	18.106	.055
lnex	10.258	.097
lnecp	4.016	.249
lnmfi	2.311	.433
lnen	1.794	.557
Mean VIF	38.056	.

5.5 Hausmann test

The design of the empirical model in this paper mainly focuses on the main factors affecting Chinese FDI in African countries. Referring to the research results, the important influencing factors are divided into 7 parts which are market size, economic development level, import and export trade, natural resources, manufacturing resources, infrastructure, and human resources. Since the data required for the empirical analysis in this paper are panel data from Chinese trade with African countries, so the first step is to use the Hausman test to determine whether a fixed-effects model or a random-effects model should be used. The Hausman test is performed for the baseline regression model for the key influencing factors in FDI, and the Chi-square test value is 147.92 and the p-value is 0.0000, which is less than 0.10. The original hypothesis is rejected, and the results show that the baseline regression model should be used for the fixed-effects regression model. At the same time, to determine whether to choose the mixed-effects model or the fixed-effects model, this paper also conducted an F-test, and the F-test statistic was 76.22, $p=0.00<0.05$ so the original hypothesis was rejected, and the

fixed-effects model was chosen.

Table 5-6 Hausmann test

	Coef.
Chi-square test value	147.92
P-value	0

5.6 Results of the empirical analysis

The results of the empirical analysis are presented separately for each factor using mixed regression, random-effects regression, and fixed effects regression for FDI, and the results of the Hausman test indicate that fixed effects regression should be used. Considering the previous data VIF diagnosis, it was found that two groups of variables in the indicators selected have a serious co-linearity problem (PGDP vs. GDP and EX vs. IM), so it was decided to exclude the GDP variable and IM variable in this empirical analysis.

Table 5-7 Results of the empirical analysis

	Hybrid OLS	Random effects	Fixed effects
VARIABLES	lnfdi	lnfdi	lnfdi
lnen	0.026 (0.03)	0.010 (0.02)	-0.009 (0.02)
lnmfi	-1.140*** (0.16)	-1.060*** (0.24)	-0.578*** (0.16)
lnecp	0.332*** (0.10)	1.023*** (0.17)	0.759*** (0.16)
lnpgdp	1.756*** (0.26)	2.099*** (0.22)	1.008*** (0.18)
lnex	-0.799*** (0.09)	0.128 (0.18)	0.633*** (0.12)
lnhr	1.481*** (0.14)	2.884*** (0.25)	6.763*** (0.58)
Constant	-15.411*** (3.32)	-72.303*** (4.79)	-155.728*** (10.69)
Observations	391	391	391
R-squared	0.357	0.751	0.805
Fixed effect	NO	NO	YES
F	126.7	-	159.3
Number of id	23	23	23

Note: ***, **, and * represent 1%, 5%, and 10% significance levels.

The results of the empirical analysis are presented separately for each factor using mixed regression, random-effects regression, and fixed effects regression for FDI, and the results of the Hausman test indicate that fixed effects regression should be used.

Ian (2012) points out that mixed-effects models are generally used in cases where

individuals have identical regression equations. If the cross-sectional data have the same intercept and slope of the regression equation for each cross-sectional data, it allows OLS regression of all the panel data. Thus, using mixed effects to study the impact of various factors on Chinese FDI in African countries, the regression equations would be identical for each country, including the slope and intercept. Mixed effects are also characterized by the fact that individual differences in the sample data are not taken into account.

According to Cheng, Lili (2017) showed that the fixed effects model has been widely used since 1976 and there are still many studies using this model until today. The essence of the fixed effects model is to test whether the intercept differences in the data individuals are significant or not. In other words, for different cross-sectional data or time series data, the regression equations of the fixed effects model have different intercepts but the same slope. Also, the fixed effects model inherently takes into account the issue of individual effects and is able to control for factors that are unchanging for the data sample (e.g.: time, interaction). Through a detailed case study of the Xavier(2018) thesis, this thesis exemplifies that the strength of this model lies in the ability to reduce the effect of some variables, which reduces the endogeneity of the model. But the drawback of the model is that it highlights the differences of individuals in the same sample at different times. Most scholars in finance and management academic research eventually choose fixed effects models to analyze the data.

The random effects model and the fixed effects model have some similarities. The regression equations for the random effects model have different intercepts, and the slopes are the same. In contrast to fixed effects, the intercept of random effects is uncorrelated with the independent variable. Another characteristic of random effects is the ability to relate fixed effects to groups. If several Southern African countries are selected as a sample of data, taking random effects can infer some conclusions embodied by the entire composition of all Southern African countries. Also, a large number of studies in order to fit data that are not independent observations, they bring

in it to see the correlation between the individuals from the sample.

Considering the previous data VIF diagnosis, it was found that two groups of variables in the indicators selected have a serious co-linearity problem (PGDP vs. GDP and EX vs. IM), so it was decided to exclude the GDP variable and IM variable in this empirical analysis.

Therefore, this paper analyzes the major influencing factors affecting Chinese FDI in African countries from the fixed effects regression results. The regression results show that the regression coefficient of the market size of African countries is significantly positive at the 1% level with a coefficient of 1.008, which indicates that the market size of African countries has a positive promoting effect on Chinese FDI to African countries. The regression coefficient of the export size is also significant positive at the 1% level with a coefficient of 0.633, indicating that the degree of openness to the outside world for African countries also has a positive promoting effect on Chinese FDI, which is consistent with the results of our previous theoretical analysis. This empirical result shows the previous hypothesis that both the market size and the openness of African countries as two important factors in economic growth will significantly increase the number of Chinese investments in African countries. Meanwhile, in terms of economic implications, every 1% expansion of market size in African countries will pull up its FDI to Africa by 1.008%, and every 1% expansion of export size in African countries will drive Chinese investment to Africa by 0.63%. The reason is mainly related to the profitability of capital. The purpose of capital is to obtain profit. The improvement of the African economic development level and the expansion of the market size will increase the demand for foreign investment.

From the perspective of resource factors, the African infrastructure regression coefficient is significantly positive at the 1% level with 0.759, indicating that the African infrastructure has a significant positive contribution to Chinese FDI in Africa. And every 1% increase in infrastructure conditions will be a 0.75% increase in Chinese

FDI to Africa. Infrastructure is the foundation for the realization and continuation of various human activities. A complete infrastructure can attract foreign capital, promote the development of related industries and create more jobs.

The regression coefficient of human resources in African countries is also significantly positive at the 1% level, with a 6.763 coefficient value, indicating that human resources in African countries have a significant positive contribution to Chinese FDI in Africa. And for every 1% increase in human resources level, Chinese FDI in Africa will increase by 6%. When African countries have a more stable political situation, more suitable institutional arrangements for economic, more complete infrastructure conditions and human capital advantage, the advantage of attracting foreign capital will be stronger. As an important trade partner and foreign direct investment source for African countries, Chinese investment will continue to increase, especially with the promotion of the Belt and Road project.

However, the African manufacturing resources show significant but negative, which is not matching with the expected hypothesis. One possible explanation is that at present, manufacturing enterprises in Africa are invested by foreign investors, so the improvement of manufacturing resources will be regarded as the stabilization of foreign investment in Africa by various countries and the completion of industrial structure conversion. So African countries will tighten the policies related to foreign investment because of the improvement of manufacturing enterprises. Another possible explanation is that the continuous improvement of manufacturing resources will bring certain negative factors. Due to the insufficient capital and expertise, African manufacturing enterprises tend to adopt more backward production methods, which will certainly produce pollution emission problems and environmental problems. At the same time, the manufacturing industry needs to recruit a lot of labor, and the labor training structure in Africa is not complete. So, it may lead to the problem of low-quality labor. But because of data availability, the variables taken in this paper are not comprehensive, and the classification of manufacturing resources is more complicated,

which may appear mostly labor-intensive and resource-intensive industries in the data. So, it may lead to the manufacturing factor is significant but negative in the full model.

According to the results of the empirical analysis, it is clear that the natural resources are not significant, which is not matching the previous theoretical analysis. From the overall data performance, on the one hand, since the growth rate of Chinese FDI to Africa has been decreasing in recent years, and Chinese companies consider that the international condition is unstable in the covid period. So they tend to reduce the risk by cutting back their investment. At the same time, Chinese FDI in Africa is more oriented to the construction industry, so the capital invested in the resource industry is getting lower. On the other hand, China is not the largest importer of resources from African countries. And China consumes only 1/10 of the total oil production in Africa, while some developed countries like the US have 83% of FDI concentrated in the energy countries. In general, those may lead to the insignificant regression results of the natural resources factor in the model.

5.7 Robustness check

This part does a robustness check on the previous empirical results. Firstly, it replaces the existing explanatory variables with FDI in the previous period. And secondly, it takes into consideration the exogenous impact of the epidemic on the economy. So, the 2020 data is excluded from the sample to reduce the interference of the epidemic in the study. The regression results show that the regression coefficients of the economic factors (African countries' market size and openness to the outside world) remain positive at the 1% level, while the human capital and infrastructure conditions as resource factors are also significantly positive at the 1% level, which is consistent with the baseline regression results. It indicates the previous empirical conclusions are robust.

Table 5-8 Robustness check

	(1)	(2)
VARIABLES	f_lndi	lnfdi
lnen	0.002	-0.002
	-0.02	-0.02
lnmfi	-0.636***	-0.653***
	-0.12	-0.16
lnecp	0.694**	0.723***
	-0.26	-0.19
lnpgdp	1.149***	1.110***
	-0.22	-0.19
lnex	0.493***	0.565***
	-0.16	-0.15
lnhr	5.429***	7.044***
	-0.88	-0.75
Observations	368	368
Number of groups	23	23
Fixed effect	YES	YES
F	2270	283.2
R-squared	0.794	0.814

Note: ***, **, and * represent 1%, 5%, and 10% significance levels.

6. Conclusions and Recommendations

6.1 Main conclusions

This paper, through the definition of some classical FDI theories, FDI-related concepts, and the status and characteristics of Chinese FDI in Africa, combined with the panel data of 2004-2020, has conducted an empirical analysis to study the Chinese FDI influence factors on Africa, and finally obtained the conclusions.

The most significant impact of Chinese FDI in Africa is caused by the host country's economic factors. First, the overall market size in Africa has been expanding in recent years, and the demand for consumer goods and textiles in Africa has been rising. Local African enterprises lack capital and technology, which provides opportunities for Chinese SMEs to expand overseas markets. The increasing foreign trade of African countries also indicates that African countries actively accept foreign direct investment to drive the host country's economic growth. Second, the empirical analysis shows that FDI is positively correlated with market size and export size in Africa, which indicates that the higher the income of African people, the greater the positive impact on Chinese investment. Higher export value of countries indicates higher acceptance of FDI. In other words, Chinese enterprises tend to enter African countries with high economic development levels, such as South Africa and Angola.

Chinese FDI in Africa is still affected by the resource abundance of the host country. Since the composition of resource factors is complex, this paper focuses on natural resources, infrastructure, manufacturing, and human resources. Regarding natural resources, the empirical analysis shows that the natural resources factor is not significant, probably because Western countries such as the US, UK, France, and Japan have invested in African resource industries earlier, while the scale of Chinese investment in African markets is small. So, China faces a strong competitive environment for natural resources. China has not yet entered some important mineral

resource fields. In addition, due to factors such as war and epidemic, Angola, as the largest Chinese oil invested country in Africa, has a terrible security environment, and there are often vicious incidents such as robbery and kidnapping against Chinese people. So many Chinese companies choose to quit. At the same time, piracy harassment in the Caribbean has led to a reduction in Chinese FDI in oil and gas fields. This has led to a decline in the ranking of Chinese investment in mining in Africa and its share decreases year by year. But the importance of natural resources for both China and Africa are still elaborated on in the theoretical analysis section. Which can also show that natural resources are not the only important influencing factor for Chinese investment in Africa anymore. However, combined theoretical and empirical analyses illustrate that natural resources are not the only important influencing factor for Chinese FDI in Africa.

At the same time, Chinese FDI is significantly correlated with infrastructure and human resources, which proves the conclusion obtained from the theoretical analysis that Chinese investment in African countries is based on the rich human resources, huge market space, greater infrastructure needs, and longer-term benefits. However, human resources cannot be determined by the number of employable labors alone. Local health care and education problems will keep appearing as the population grows, so African governments should make appropriate policies to improve the education level of their citizens so that they can attract better foreign direct investment.

At this moment, Chinese FDI in Africa is affected by various factors. But in general, China and Africa have excellent political relations, and African countries are also actively introducing policies to attract Chinese investment. However, because of a large number of African countries and their different conditions, Chinese companies and African countries should fully consider the various conditions that may arise in the process of FDI, which will help reduce the investment risks of both sides and maximize the benefits of both sides.

6.2 Suggestions for the African countries

First, African governments should continue to promote economic growth and expand local markets. Due to the closed information, this will lead to a very different market environment between Africa and China, and these differences will directly affect the production and sales of Chinese products. Therefore, if the African government wants to continue to attract more Chinese enterprises for FDI, it should pursue and improve the local market, which will transform the potential demand of the people into the actual market demand.

Second, African governments should take a positive attitude toward FDI from China. According to the results of the empirical analysis, Chinese FDI and African economic factors have a mutual influence on each other. Moreover, the impact of African infrastructure on Chinese FDI is obvious, and some Chinese aid to Africa such as infrastructure and expertise will contribute to the economic growth of African countries. However, since the infrastructure construction in many African countries has not yet reached the expected status, it has some influence on Chinese FDI in Africa. But the influence is not significant. And as China-Africa cooperation continues, the infrastructure construction of African countries will become more and more complete. Therefore, African countries should reasonably expand their FDI from China, but they should avoid unlimited expectations of aid from Chinese investors.

Third, African governments should strengthen their political establishment and ensure the investment environment. Although Africa is at a relatively stable stage, the overall political and security environment is still unsafe. Many multinational companies have chosen to invest in other countries or even withdraw their previously invested capital because the safety of their employees cannot be guaranteed, and they need to face higher risks. If a country cannot guarantee investors' lives and properties and everyone needs to worry about their well-being, it will be impossible for companies to develop in the long run. Similarly, the riots in Angola triggered a large number of Western

companies to escape from the country. Therefore, African countries should establish a healthy legal mechanism and create a favorable investment environment, to enhance the local attractiveness to foreign investors.

6.3 Suggestions for the Chinese Government

First, the Chinese government should ensure the successful implementation of Chinese FDI. At present, trade between China and African countries is frequent, but Chinese investors are constantly threatened by terrorist groups, and they cannot live and work normally in Africa. This has led many investors to withdraw from the African market and give up the opportunity to make FDI in Africa. In the face of these problems, the Chinese government should actively negotiate with local governments to protect the personal and property of overseas citizens.

Secondly, the Chinese government should deal with the relationship between China and Africa on equality. Since the 1990s, the Chinese government has actively helped African governments to develop African societies by providing interest-free loans, infrastructure, professional and technical training, agricultural cooperation, and other comprehensive and multifaceted aid programs. These aid programs have increased the dependence of African countries on the one hand. On the other hand, Chinese aid programs for Africa have a huge impact on international politics. Therefore, the Chinese government needs to reorganize its aid programs and link them closely with FDI to African countries, which can change simple aid into friendly trade relations between countries, and avoid some African countries not being able to take advantage of economic relief programs, resulting in wasted funds.

6.4 Suggestions for Chinese companies

(1) Research on the ground and make a full pre-planning

As an emerging investment land, Africa has great potential to be invested in, but it

should be noted that the political environment in many African countries is not stable enough, and political risk is a potential hidden danger. At the same time, although both China and Africa belong to the developing countries, there are many differences in the economic, political, and cultural aspects of each country, which requires Chinese enterprises to understand the reality of the invested country in all aspects before investing, to clearly understand the market condition and to assess the possible risks. The investing enterprise must make good pre-project planning under the condition. Enterprises need to take a long-term perspective, and they also need to pay more attention to the social value of their investment while ensuring their revenue. This is also an effective way to maintain corporate influence and enhance Chinese international reputation.

(2) Enhance core competitiveness and achieve long-term development

Due to enterprise own needs, the number of Chinese enterprises making FDI in Africa is increasing, and the competition among multinational enterprises and between multinational enterprises as well as local enterprises in Africa is becoming more and more intense. Only by strengthening the core competitiveness of Chinese enterprises can they stand out from their competitors and take a place in the African market. In essence, the core competitiveness of an enterprise is the technology expert and the innovation. Most companies have strict control over labor costs and hope to achieve low costs and high revenue, but in the long run, companies should set up favorable conditions to attract scientific and innovative talents. This is the only way to strengthen the company's research and innovation capabilities. The real core technology should be held in the enterprise and formed into patent protection. The lack of innovation is a common problem among Chinese enterprises, especially those investing in Africa. Most Chinese multinational companies invest very little or no money in R&D. Thus, enterprises investing in Africa should raise the cost of product R&D and encourage innovation, thereby it can optimize the structure of Chinese enterprises and achieve their rapid expansion.

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