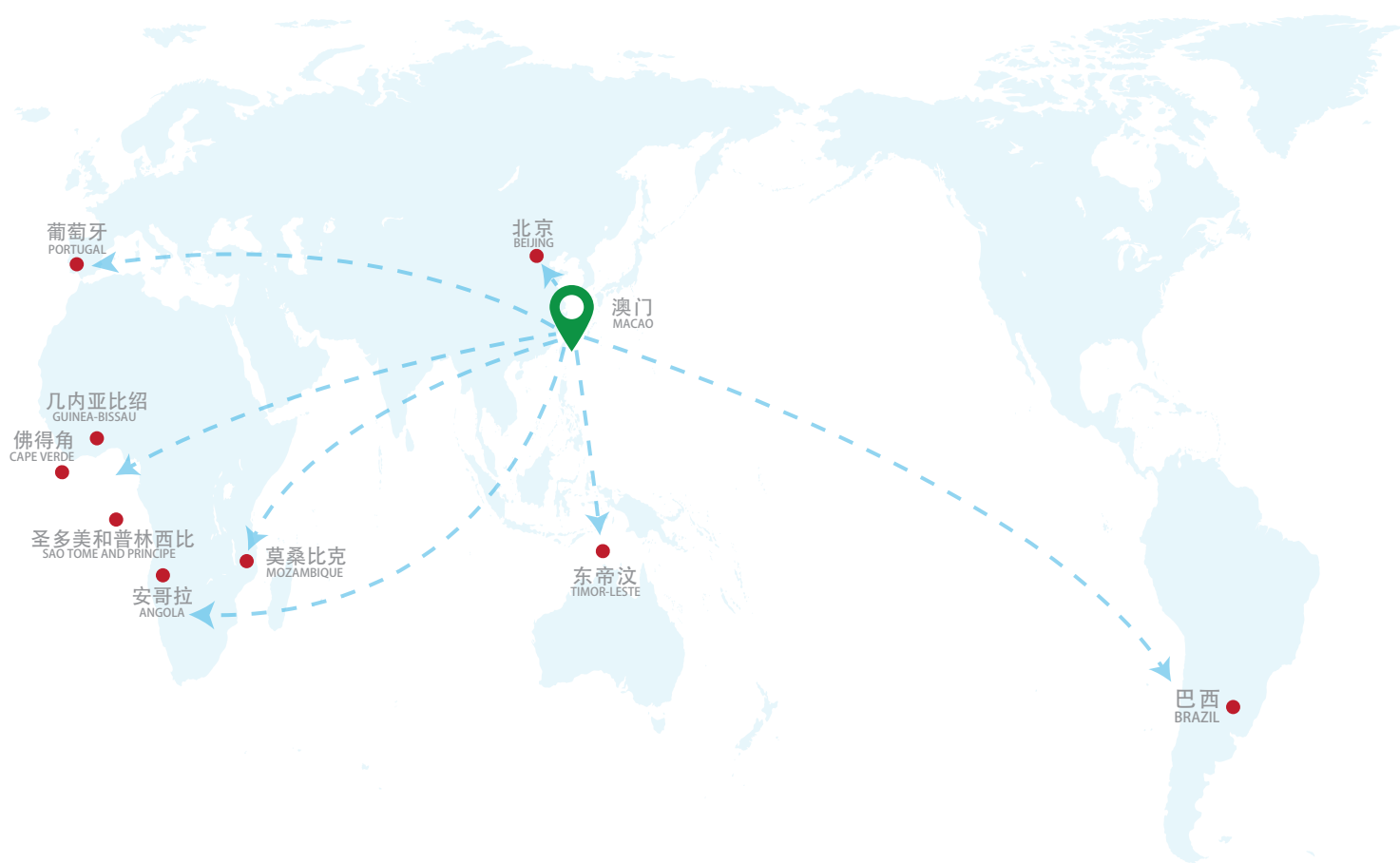


# 中国内地企业参与葡语国家 基建指数报告

Report on Index of Mainland Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development



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## > PREFACE



Macao has maintained close historical and cultural ties with Portuguese-speaking countries. In 2003, the Forum for Economic and Trade Co-operation between China and Portuguese-speaking Countries (Macao) (hereinafter referred to as "Forum Macao") was initiated in Macao. With the support of the central government of China, Portuguese-speaking countries and the Macao SAR government, a permanent secretariat and a training center for the Forum Macao were established, and five ministerial conferences were held. It highlighted the role of Macao as a service platform for business cooperation between China and Portuguese-speaking countries.

Mainland Chinese enterprises (hereinafter referred to as "Chinese enterprises") have actively participated in infrastructure construction in Portuguese-speaking countries for years, and made remarkable achievements. According to statistics from the Ministry of Commerce of P.R.C, China and Portuguese-speaking countries signed a total of 5,620 new projects, and the value of the new contracts is 112.2 billion US dollars and the total turnover is 101.7 billion US dollars, and there are 203,000 dispatched person-times under overseas contracted projects from 2008 to 2018.

In order to further utilize Macao's role as a service platform for China-Portuguese-speaking countries cooperation and promote the cooperation between China and Portuguese-speaking countries in the field of infrastructure, the Macao SAR government has entrusted China International Contractors Association (hereinafter referred to as "CHINCA") to make a research on the "Index of Mainland Chinese Enterprises' Involvement in Portuguese-speaking Countries'

Infrastructure Development" to assess the current situation, problems and trends of Chinese enterprises involved in infrastructure construction in Portuguese-speaking countries, thus providing reference for the Chinese central government and Macao SAR government to formulate policies on the promotion of investment cooperation in Portuguese-speaking countries and providing guidance for Chinese enterprises involved in investment, construction and operation of infrastructure projects in these countries. CHINCA and Beijing SunRisk Information Technology Co., Ltd. set up a joint research group (referred to as "joint research group") to compile the index and the report.

The joint research group has completed the compilation of the index based on the statistical data of overseas contracted projects provided by CHINCA, the enterprise questionnaire survey data and other data sources, using Double Mean Percentage Method. The index consists of four sub-indexes, namely the Index of Portuguese-speaking Countries' Infrastructure, the Index of China-Portuguese-speaking Countries' Relationship Heat, the Index of Local Development Capability of Chinese Enterprises and the Index of Chinese Enterprises' Local Influence. Among them, the Index of Portuguese-speaking Countries' Infrastructure shows the current status of infrastructure in Portuguese-speaking countries, including four dimensions: development need, development heat, development environment and development cost. The Index of China-Portuguese-speaking Countries' Relationship Heat comprehensively measures the development of China-Portuguese-speaking countries relations, including political relations, bilateral trade, bilateral investment, bilateral financing and personnel exchanges. The Index of Local Development Capability of Chinese Enterprises reflects the overall situation of local project contracting and industry development of Chinese enterprises, including the Index of Overall Development Capability of Chinese Enterprises and the Index of Industry Development

Capability of Chinese Enterprises. The index of Chinese enterprises' local influence measures the contribution of Chinese enterprises and their influence on local public opinion, including three dimensions: direct contribution, indirect contribution and social reputation.

When reading the report, the readers should also be aware: first, the index has a full score of 100, the higher score a country gets, the better it performs. Second, the index adopts the results of the Belt and Road Infrastructure Development Index. The joint research group transformed its four sub-indexes into percentage (maximum method) and then re-obtained the infrastructure index by weighting. Third, the Portuguese-speaking countries mentioned in the report include eight countries in the Comunidade dos Países de Língua Portuguesa (CPLP) except Equatorial Guinea, namely Angola, Brazil, Cape Verde, Guinea-Bissau, Mozambique, Portugal, Sao Tome and Principe and East Timor.

The report reflects the independent analysis and prediction of the joint research group on the prospect of Chinese enterprises involved in infrastructure development in Portuguese-speaking countries, and does not represent the attitude and position of government departments on relevant issues. At the same time, political, economic, social situation and related policies of various countries are constantly changing and adjusting, thus the information reflected in the report may differ from actual situation. The basic information on which the judgment is based may also have limitations. There may be disparity between processed and fitted data and the actual situation. In addition, indexes and the report are prepared in a very limited time. It is highly appreciated that readers point out mistakes and make correction.

## ➤ GLOSSARY



No.	Term	Description
1	The Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development	The Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development is an index to evaluate the infrastructure construction environment of Portuguese-speaking countries, China-Portuguese-speaking countries' relationship heat, and the capacity and influence of Chinese enterprises involved in local infrastructure. It consists of four sub-indexes, namely, the index of Portuguese-speaking countries' infrastructure, the index of China-Portuguese-speaking countries' relationship heat, the index of local development capability of Chinese enterprises and the index of Chinese enterprises' local influence.
2	The Index of Portuguese-speaking Countries' Infrastructure	The Index of Portuguese-speaking Countries' Infrastructure is an index to describe the objective situation of Portuguese-speaking countries' infrastructure and to evaluate the development environment, development need, development costs and development heat, as well as an index that shows the judgment of the infrastructure development prospect of the Portuguese-speaking countries in the next 2-3 years based on the analysis of several major influencing factors of infrastructure development in these countries. It consists of development environment index, development need index, development cost index and development heat index.
3	Development Environment Index	Development Environment Index is an index that examines political environment, social environment, financial environment, business environment, impact factors and industrial environment. The political environment examines the political factors that affect infrastructure construction, including political stability, strategic clarity of infrastructure development, policy continuity, friendliness of international relations, and openness of infrastructure industry. The social environment examines whether social factors such as public security and culture can ensure the smooth progress of infrastructure projects. The financial environment examines the sustainability of capital operation and the ease of capital recovery for transnational infrastructure projects, including indicators such as exchange rate, price of commodities, investment openness, and national debt security. The business environment examines the factors that affect the operating efficiency of multinational infrastructure investment enterprises, including economic and legal perfection, administrative efficiency, business convenience, tax burden.



No.	Term	Description
4	Development Need Index	Development Need Index is a measure of the development need gap of Portuguese-speaking countries and an index that evaluates the development need gap, development potential gap and other variables.
5	Development Cost Index	Development Cost Index is an index that measures the cost for enterprises to carry out investment cooperation in Portuguese-speaking countries and one that evaluates the operating cost and financing cost.
6	Development Heat Index	Development Heat Index measures the heat of infrastructure development in Portuguese-speaking countries and is an index that evaluates the heat of enterprises in Portuguese-speaking countries, the heat of global infrastructure development and the heat of private investment.
7	The Index of China–Portuguese–speaking Countries' Relationship Heat	It is an index that evaluates the heat of political relations, bilateral trade, bilateral investment, financial relations and personnel relations between China and Portuguese-speaking Countries, including political heat index, trade heat index, investment heat index, financial heat index and personnel heat index.
8	Political Heat Index	Political Heat Index is a measure of the political relations between China and Portuguese-speaking countries and an index that examines whether China and Portuguese-speaking countries have established diplomatic relations, the frequency of leaders' visits and their participation in the Belt and Road Initiative.
9	Trade Heat Index	Trade Heat Index is a measure of the bilateral trade between China and Portuguese-speaking countries and an index that examines China's total import from and export to Portuguese-speaking countries.
10	Investment Heat Index	Investment Heat Index is an index that examines China's investment stock and flow in Portuguese-speaking countries.
11	Financial Heat Index	Financial Heat Index is an index that examines factors such as the establishment of financial institutions, the signing of bilateral financial agreements, and the proportion of domestic funding sources.
12	Personnel Heat Index	Personnel Heat Index is an index that examines the attitudes of Portuguese-speaking countries towards Chinese enterprises and people, the cumulative number of personnel dispatched by Chinese enterprises and the number of Chinese personnel in Portuguese-speaking countries at the end of the period.

No.	Term	Description
13	The Index of Local Development Capability of Chinese Enterprises	The Index of Local Development Capability of Chinese Enterprises is a measure of the overall situation of Chinese enterprises' local project contracting and industry development, an index that evaluates the overall development capability and the industry development capability of Chinese enterprises..
14	The Index of Overall Development Capability of Chinese Enterprises	The Index of Overall Development Capability of Chinese Enterprises is to measure overall capability of Chinese enterprises in Portuguese-speaking countries and an index that examines the number of new projects, the amount of newly signed contracts, the turnover of projects completed and the personnel dispatched by Chinese enterprises in Portuguese-speaking countries.
15	The Index of Industry Development Capability of Chinese Enterprises	The Index of Industry Development Capability of Chinese Enterprises is a measure of the development capability of Chinese enterprises in different industries in Portuguese-speaking countries and an index that examines the number and amount of newly signed projects, the turnover of completed projects and the dispatched staff by enterprises in Portuguese-speaking countries in the following four industries: energy (electricity), transportation (railways, highways, airports and ports, etc.), communications (mobile phones and networks, etc.) and water-related affairs (water supply and sewage treatment).
16	The Index of Chinese Enterprises' Local Influence	The Index of Chinese Enterprises' Local Influence is a measure of the contribution of Chinese enterprises to the local area and the influence of public opinion and an index that evaluates the direct and indirect contribution of Chinese enterprises' projects in Portuguese-speaking countries and the comments of Chinese enterprises by local governments and media. It is composed of three dimensions: direct contribution, indirect contribution and social reputation.
17	Direct Contribution Index	Direct Contribution Index is a measure of the direct contribution of Chinese enterprises in the infrastructure field in Portuguese-speaking countries and an index that examines the proportion of the turnover of Chinese enterprises in the country's total infrastructure construction value, the employment of local people in Portuguese-speaking countries in projects and local tax payment by Chinese enterprises.

No.	Term	Description
18	Indirect Contribution Index	Indirect Contribution Index is a measure of the indirect contribution of Chinese enterprises to the Portuguese-speaking countries through their involvement in infrastructure projects and an index to examine the performance of Chinese enterprises' social responsibilities in Portuguese-speaking countries and the benefits of projects to the local people.
19	Social Reputation Index	Social Reputation Index is a measure of the recognition of the performance of Chinese enterprises in Portuguese-speaking countries by local owners, government, residents and media.
20	Double Mean Percentage Method	In order to measure the difference between a certain index and the mean, the mean value of all years is obtained on the basis of the annual average value, and then it is expressed in percentage, so as to ensure the historical continuity and horizontal comparability of the index.

Note: 1. In this report, "Chinese enterprises" refers to "Mainland Chinese enterprises".

2. "Sino-Portuguese" mentioned in this report refers to "China and Portuguese-speaking countries" rather than "China and Portugal".

## **Chapter I**

# **General Characteristics of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development**



Based on the calculation results of relevant indexes from 2008 to 2018, the development of Chinese enterprises in infrastructure construction in the eight Portuguese-speaking countries shows the following general characteristics:

### 1 Three-stage development of increased infrastructure investment cooperation

During the 11 years from 2008 to 2018, the index of Chinese enterprises involved in Portuguese-speaking countries' infrastructure (hereinafter referred to as "the overall index") basically fluctuated at a relatively high level above 58. Judging from the trend over the past 11 years, the overall index can be divided into three stages: the first stage from 2008 to 2010 witnesses a rapid rise of the index. Under the impact of the global financial turmoil, Chinese enterprises are still expanding their infrastructure business in Portuguese-speaking countries with remarkable results achieved. The second stage shows a shock period from 2010 to 2016. Under the impact of the global financial crisis, the European debt crisis, and the fiscal and debt pressures of Portuguese-speaking countries, the overall index declined slightly after experiencing fluctuations, but still showed full resilience. The third stage is an upward fluctuation phase from 2016 to 2018. Although the total index dropped slightly to 70.31 in 2018, the overall index was still at a high level (see Fig. 1-1).

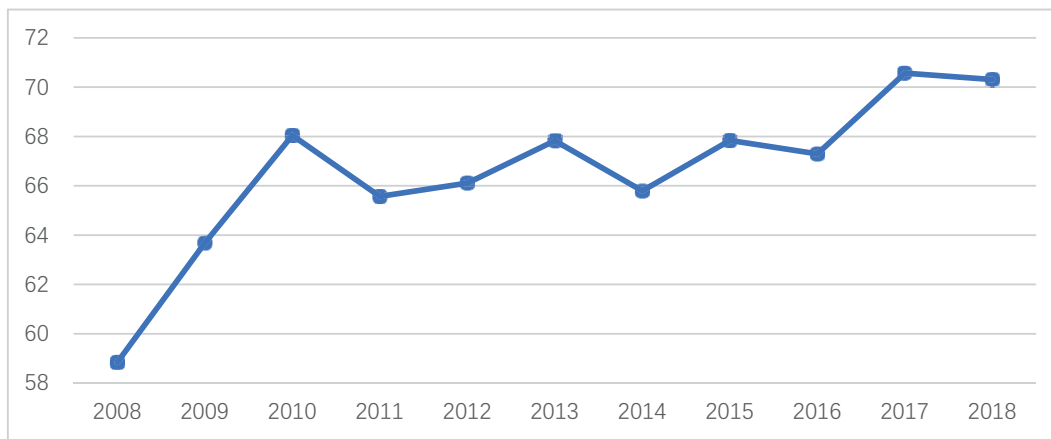


Fig. 1-1: Trend of index of Chinese enterprises involved in Portuguese-speaking countries' infrastructure

Source: Joint Research Group



### Great potential for local development of Chinese enterprises and their increased social influence

Judging from the trend of the four sub-indexes from 2008 to 2018, the Index of Portuguese-speaking Countries' Infrastructure, the Index of China-Portuguese-speaking Countries' Relationship Heat and the Index of Local Development Capability of Chinese Enterprises were all at high levels. Among them, the Index of Portuguese-speaking Countries' Infrastructure went down from 91.2 to 90.29, indicating that the demand for infrastructure in Portuguese-speaking countries decreased and the infrastructure environment also changed accordingly. The Index of China-Portuguese-speaking Countries' Relationship Heat rose from 63.96 to 81.36, which shows that with the continuous warming of Sino-Portuguese relations, Chinese enterprises had a good political foundation for participating in infrastructure construction in Portuguese-speaking countries. The Index of Local Development Capability of Chinese Enterprises rose from 56.36 to 65.59. There was a moderate increase, and it also shows that Chinese enterprises have potential for growth in the infrastructure market of Portuguese-speaking countries. The index of Chinese enterprises' local influence is significantly lower than the other three indexes, but it still rises from 41.76 in 2008 to 60.44 in 2018, which was an obvious increase. It shows that the influence of Chinese enterprises in Portuguese-speaking countries had improved significantly, but it also shows that there is a lot for Chinese enterprises to do in fulfilling their corporate social responsibility and winning recognition from the local society(see Fig. 1-2).

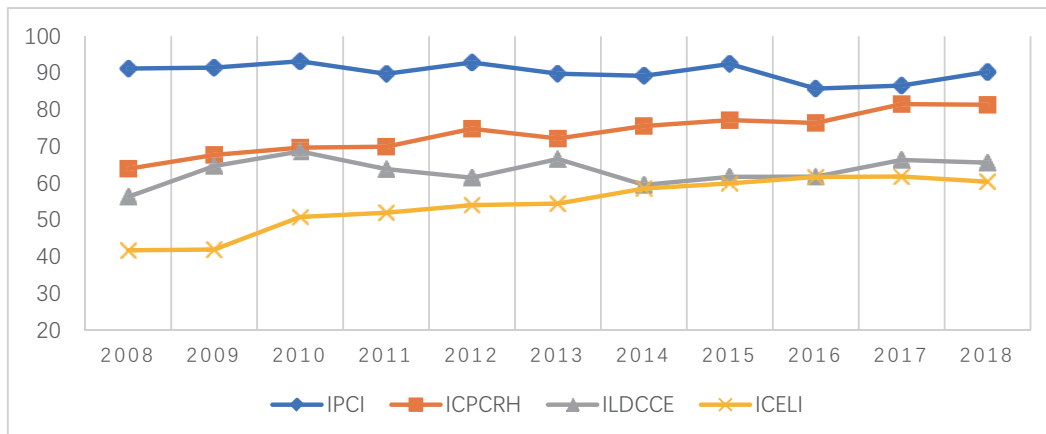


Fig. 1-2: Trend of four sub-indexes of Chinese enterprises involved in Portuguese-speaking countries' infrastructure

Source: Joint Research Group

According to the comparison of the four sub-indexes between 2008 and 2018, the Index of Portuguese-speaking Countries' Infrastructure had slightly declined (down 0.91), the Index of China-Portuguese-speaking Countries' Relationship Heat had increased significantly (increased by 17.4), the Index of Local Development Capability of Chinese Enterprises had increased significantly (increased by 9.23), and the Index of Chinese Enterprises' Local Influence had improved significantly (increased by 18.68) (see Fig. 1-3).

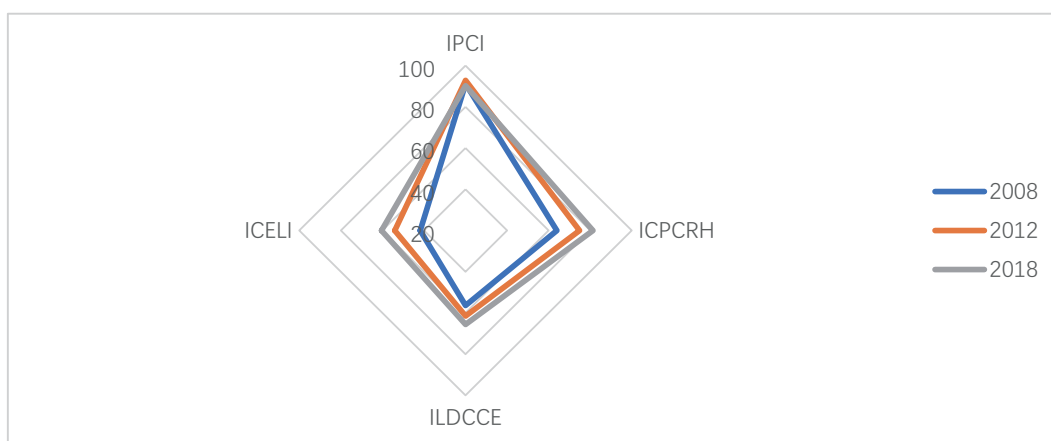


Fig. 1-3: Trend of index of Chinese enterprises involved in Portuguese-speaking countries' infrastructure

Source: Joint Research Group

III

Significant differences among Portuguese-speaking countries in terms of foundation of infrastructure development , with different focus in the sectors of infrastructure investment and cooperation

Among eight Portuguese-speaking countries, from 2008 to 2018, Angola had always got highest index , Brazil ranked second, Mozambique ranked third, indexes of East Timor and Portugal gradually moved closer to each other, indexes of Cape Verde and Sao Tome and Principe were not high but were on an upward trend, and that of Guinea-Bissau basically ranges from 17 to22 (see Fig. 1-4).

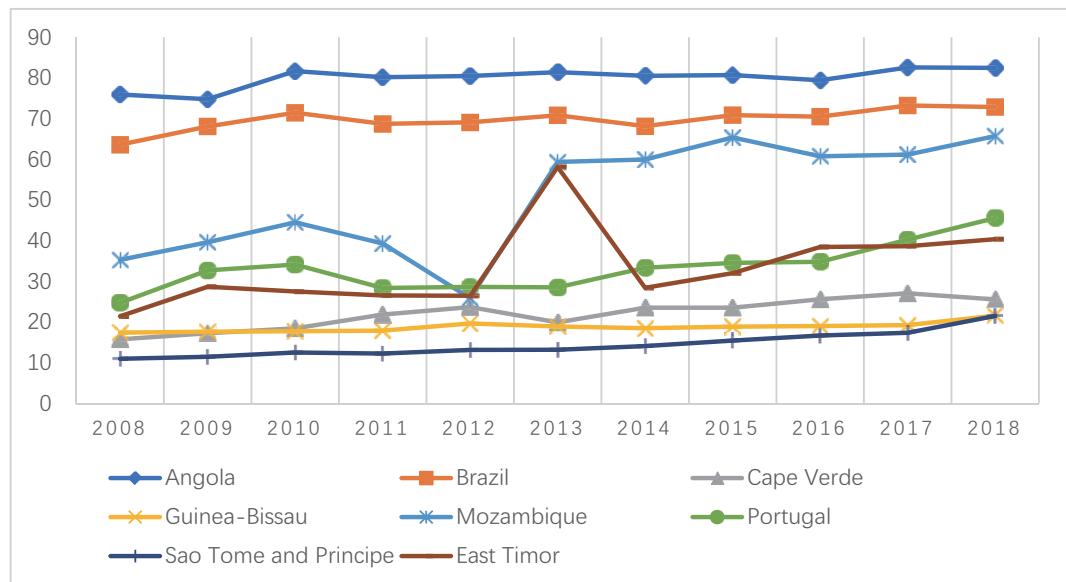


Fig. 1-4: Index of Chinese enterprises involved in Portuguese-speaking countries' infrastructure

Source: Joint Research Group

Fig. 1-1: Ranking of the index of Chinese enterprises involved in Portuguese-speaking countries' infrastructure (by country)

Country	Index of 2018	Ranking in 2018	Change from 2017
Angola	82.45	1	Flat
Brazil	72.85	2	Flat
Cape Verde	25.56	6	Flat
Guinea-Bissau	21.57	7	Flat
Mozambique	65.70	3	Flat
Portugal	45.56	4	Flat
Sao Tome and Principe	21.52	8	Flat
East Timor	40.37	5	Flat

Source: Joint Research Group



From the perspective of sectors, in the future, infrastructure construction cooperation between China and Portuguese-speaking countries will mainly focus on transportation and energy (electricity) fields. However, due to the differences between countries in resource endowment, geographical location and development strategies, various countries have different emphases based on their demand for different types of infrastructure construction projects.

## **Chapter II**

# **Analysis on Sub-index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development**



As the overall index, the index of Chinese Enterprises Involved in Portuguese-speaking Countries' Infrastructure consists of four sub-indexes, namely the Index of Portuguese-speaking Countries' Infrastructure, the Index of China-Portuguese-speaking Countries' Relationship Heat, the Index of Local Development Capability of Chinese Enterprises and the Index of Chinese Enterprises' Local Influence. From the analysis of sub-index calculation results, Chinese enterprises' involvement in infrastructure projects in Portuguese-speaking countries has the following specific characteristics:

**Strong demand for infrastructure construction with the development environment to be improved**

From 2008 to 2018, The Index of Portuguese-speaking Countries' Infrastructure remained at a high level. Among them, Angola's index rose from 76.3 to 82.0. Although Brazil's index declined slightly in 2018, it still remained on a high level above 90 for a long time. Portugal rose significantly from 77.1 to 86.1. Cape Verde, Guinea-Bissau, Mozambique, Sao Tome and Principe and East Timor all recorded small increases (see Fig. 2-1).

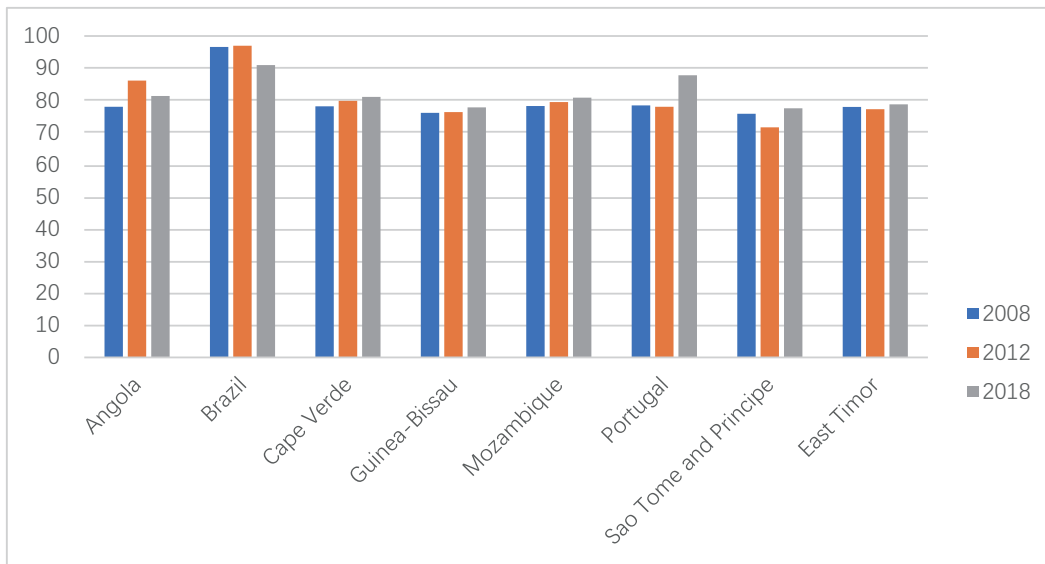


Fig. 2-1: Trend of infrastructure construction index of Portuguese-speaking countries

Source: Joint Research Group

The Index of Portuguese-speaking Countries' Infrastructure includes four dimensions: development environment, development need, development heat and development cost.<sup>1</sup> The growth of development need, development cost and development heat had enabled the infrastructure index to maintain a relatively high level overall, but the continuous deterioration of development environment had caused the infrastructure index to decline in recent years (see Fig. 2-2).

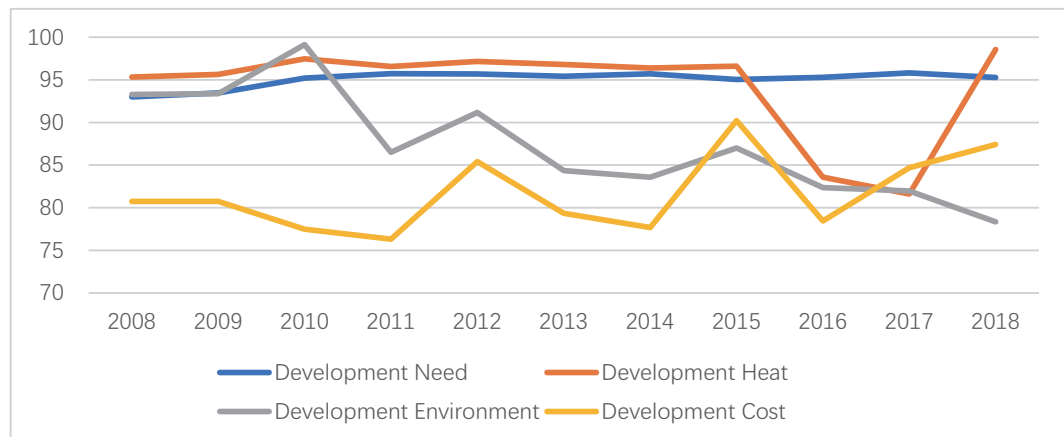


Fig. 2-2: Trend of infrastructure construction sub-indexes of Portuguese-speaking countries

Source: Joint Research Group

From 2008 to 2018, the demand index for infrastructure development rose from 93 to 95.3, maintaining a high level. Since 2008, the Portuguese-speaking countries have maintained rapid economic growth and infrastructure demand increased thanks to the sharp rise in commodity prices. Since 2017, economic growth had resumed in most Portuguese-speaking countries and infrastructure demand had further increased. The development cost index rose from 80.8 to 87.4. Although the operating cost decreased, the financing cost remained high and the overall cost of infrastructure development remained unstable (see Fig. 2-2 and 2-3).

<sup>1</sup> Please refer to Appendix 1 for the specific composition and description of sub-indexes.

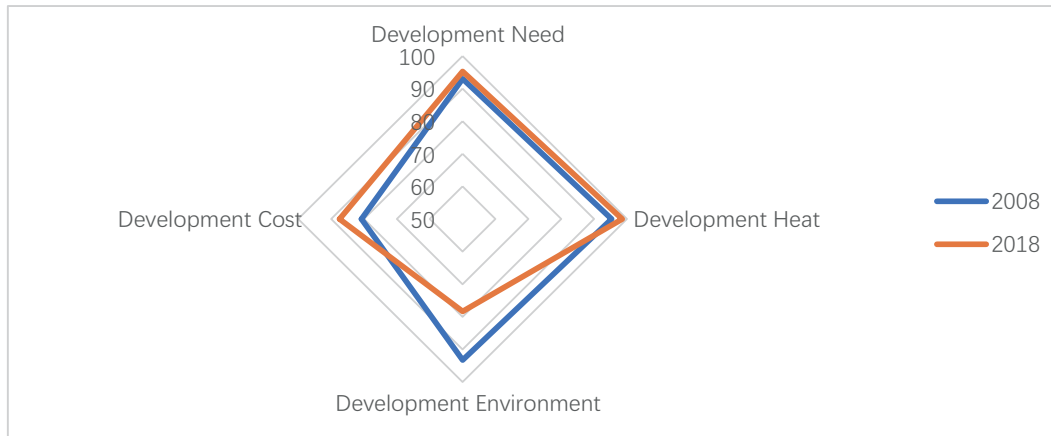


Fig. 2-3: Changes of sub-indexes of Portuguese-speaking countries

Source: Joint Research Group

From 2008 to 2018, the demand index for infrastructure development in Portuguese-speaking countries rose steadily. Among them, Angola rose from 71.0 to 86.7. Brazil had always maintained a high level of 100. Mozambique rose from 63.6 to 77.0. Cape Verde was basically stable above 70. Guinea-Bissau rose from 57.2 to 70.5. Portugal, Sao Tome and Principe and East Timor saw small increases (see Fig. 2-4).

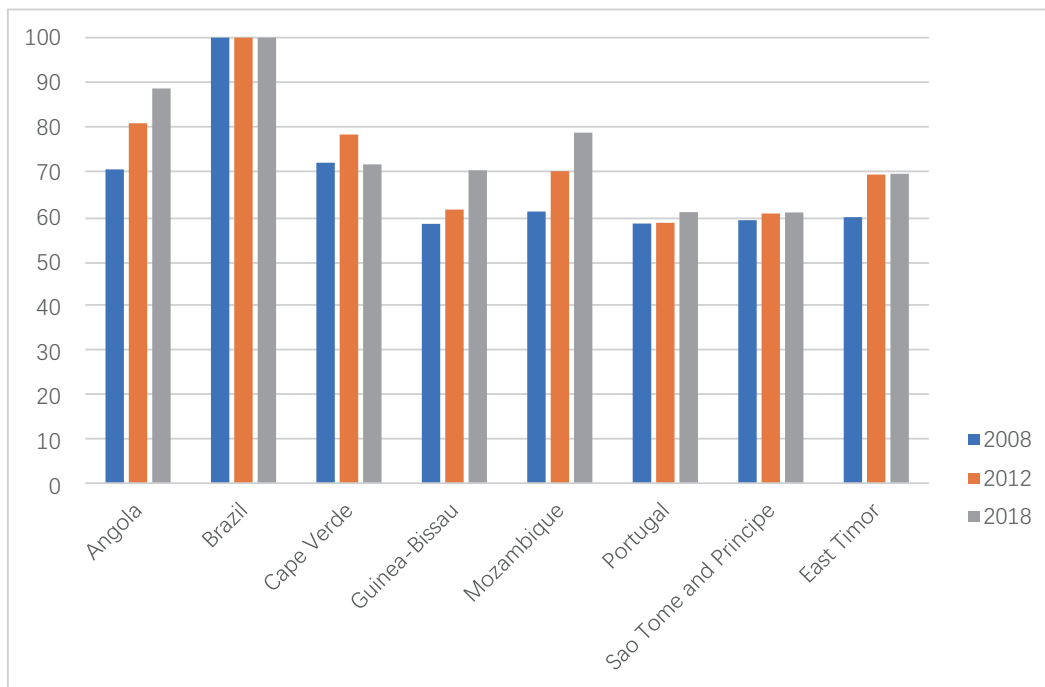


Fig. 2-4: Changes in infrastructure development need of Portuguese-speaking countries

Source: Joint Research Group

From 2008 to 2018, the development environment index dropped significantly from 93.3 to 78.3 due to the political turmoil caused by the elections in major countries, the withdrawal of quantitative easing policy by the Federal Reserve and the impact of interest rate hikes. All other countries except Portugal showed a significant downward trend (see Fig. 2–5). The overall development environment of Portuguese-speaking countries was not optimistic. In addition, with the decline in commodity prices, government debt and fiscal deficits in most Portuguese-speaking countries had risen significantly, current account deficits had increased significantly, and foreign exchange reserves had decreased. For example, Angola was still in recession, economic growth in Brazil had been weak in the past two years, and current account deficit accounts a high proportion of GDP in Cape Verde, Guinea Bissau, Mozambique and Sao Tome and Principe.

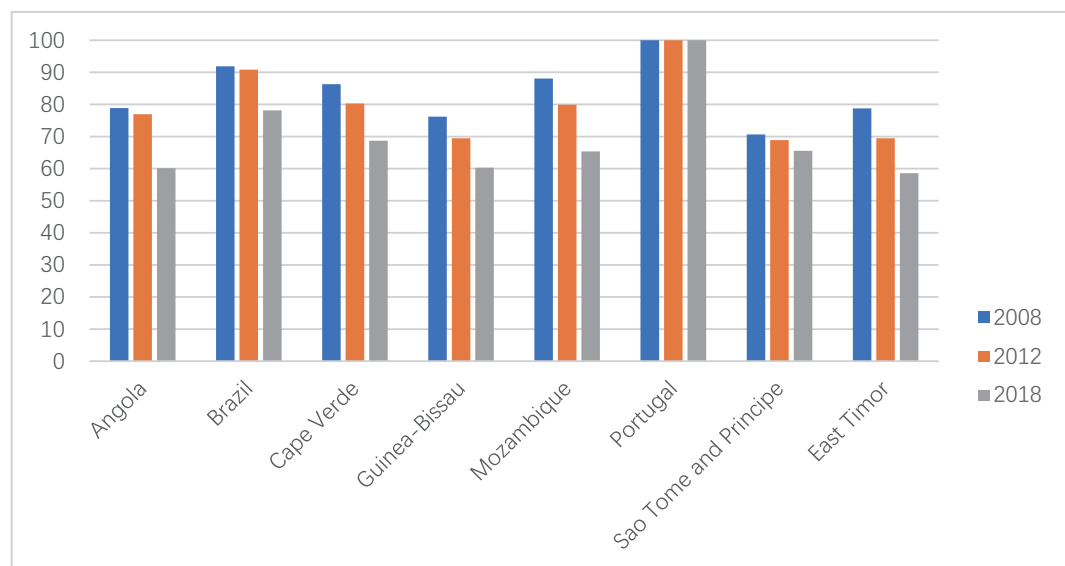


Fig. 2–5: Changes in development environment index of Portuguese-speaking countries

Source: Joint Research Group



## Close political and economic exchanges among China and Portuguese-speaking countries with rapid growth of financial service

The Index of China–Portuguese-speaking Countries' Relationship Heat consists of five dimensions: politics, trade, investment, finance and personnel. The

political, trade, investment and financial indexes of China and Portuguese-speaking countries had all been at relatively high levels in recent years. From 2008 to 2018, the Index of China-Portuguese-speaking Countries' Relationship Heat generally remained at a high level, with Angola rising from 58.4 to 80.7, Brazil rising from 68.4 to 84.5, Mozambique rising from 20.0 to 50.2, Cape Verde, Guinea-Bissau, Portugal and other countries all have a trend in growth(see Fig. 2-6, 2-7 and 2-8).

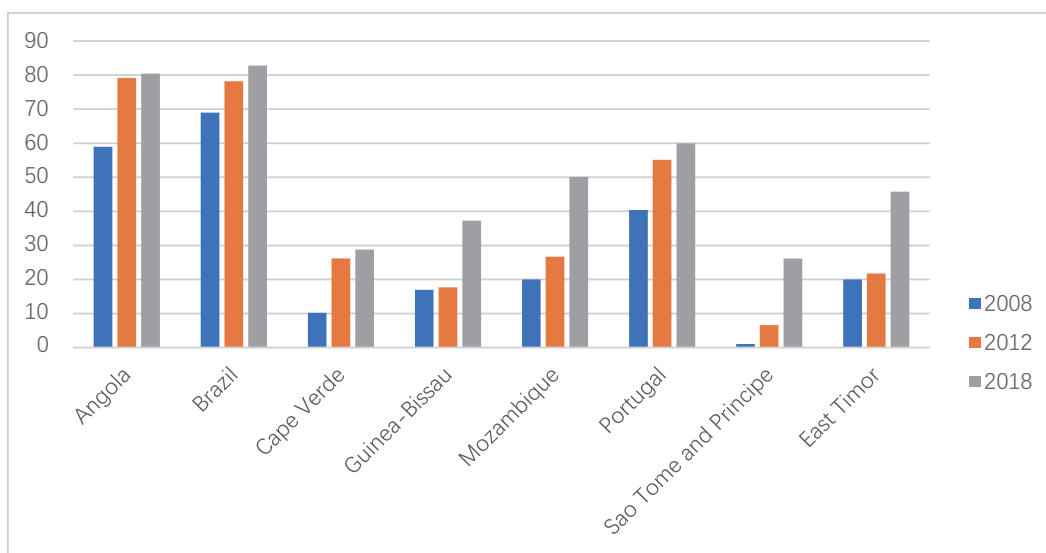


Fig. 2-6: Changes in the Index of China-Portuguese-speaking Countries' Relationship Heat

Source: Joint Research Group

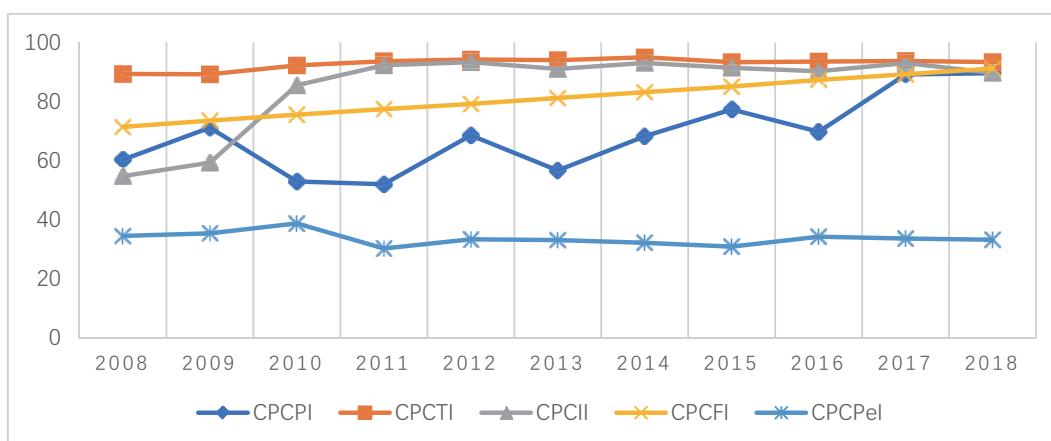


Fig. 2-7: Trends of the sub-indexes of China-Portuguese-speaking Countries' Relationship Heat

Source: Joint Research Group

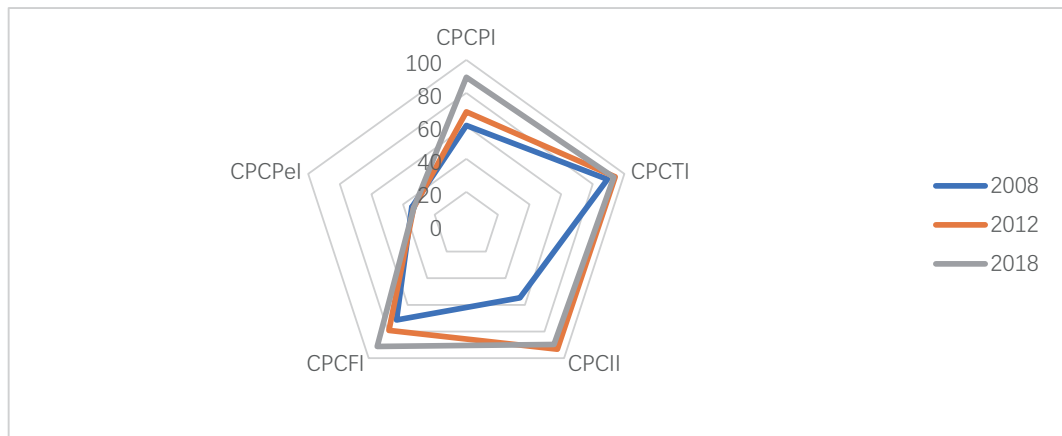


Fig. 2-8: Changes in the sub-indexes of China-Portuguese-speaking Countries' Relationship Heat

Source: Joint Research Group

From 2008 to 2018, China-Portuguese-speaking Countries political heat index rose from 60.3 to 89.5 (see Fig. 2-7), and bilateral political relations improved significantly. China and Sao Tome and Principe resumed diplomatic relations in 2016, further improving diplomatic relations between China and Portuguese-speaking countries. Since the implementation of the Belt and Road Initiatives, Portuguese-speaking countries have responded positively, high-level visits have increased significantly, the bilateral partnership further deepened, and the relationship between China and Portuguese-speaking countries developed to a higher level. For example, Portugal is one of the 57 founding members of the Asian Infrastructure Investment Bank, the first EU country to formally establish a "Blue Partnership" with China, and an important partner for "Belt and Road" to extend to Portuguese-speaking countries and Europe.

From 2008 to 2018, China-Portuguese-speaking Countries trade heat index rose from 89.3 to 93.3, and the investment heat index rose from 54.7 to 89.7 (see Fig. 2-7), both at high levels. In 2018, China's trade with Portuguese-speaking countries totaled 147.3 billion US dollars, up 25.3% year on year. At the same time, China has become Brazil's largest trading partner in the world for eight consecutive years and Portugal and Cape Verde's largest trading partner in Asia. Relevant data from the Forum Macao show that China's investment in Portuguese-speaking countries increased from 56 million US dollars in 2003 to more than 50 billion US



dollars in 2016. At the same time, China is also the most important source of foreign capital for Portuguese-speaking countries such as Brazil, Portugal and Mozambique. Portugal is the fifth largest destination for China's investment in Europe. In 2018, China's investment in Portugal had exceeded 9 billion Euros, involving energy, electricity, finance, insurance and other fields, resulting in significant economic and social benefits.

From 2008 to 2018, the financial heat between China and Portuguese-speaking countries increased significantly, with the index rising from 71.4 to 91.1 (see Fig. 2-7). China and Portuguese-speaking countries had signed and implemented a number of bilateral intergovernmental agreements related to finance. For example, from 2013 to 2016, China and Brazil signed a bilateral currency swap agreement, effectively promoting trade and financial cooperation between the two countries. A number of Chinese-funded financial institutions had successively expanded their business to major Portuguese-speaking countries. For example, Bank of China, Industrial and Commercial Bank of China, Bank of Communications, National Development Bank, Sinosure and China UnionPay had set up branches in Brazil, Angola and Portugal. In addition, the Chinese government had continuously increased its support for infrastructure projects in some Portuguese-speaking countries through foreign aid funds and preferential loans.



### Steady increase in infrastructure scales of Chinese enterprises with different performances among industries.

The Index of Local Development Capability of Chinese Enterprises includes the index of overall development capability and the index of industry development capability. Among them, the overall capability mainly reflects the number of newly-signed projects, the amount of newly-signed contracts, the turnover, the dispatched staff and the use of funds by Chinese enterprises, while the industry capability measures the performance of Chinese enterprises in different industries.

The index of Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure rose steadily in 2008-2018. Among them, Angola has been above 80, Brazil has continued to rise from 63.3 to 69.1, and Mozambique has fallen

to 10.3 in 2012 and then rose to 67.6; Cape Verde has risen slightly, Portugal, Sao Tome and Principe, and East Timor continue to rise (see Figure 2–9).

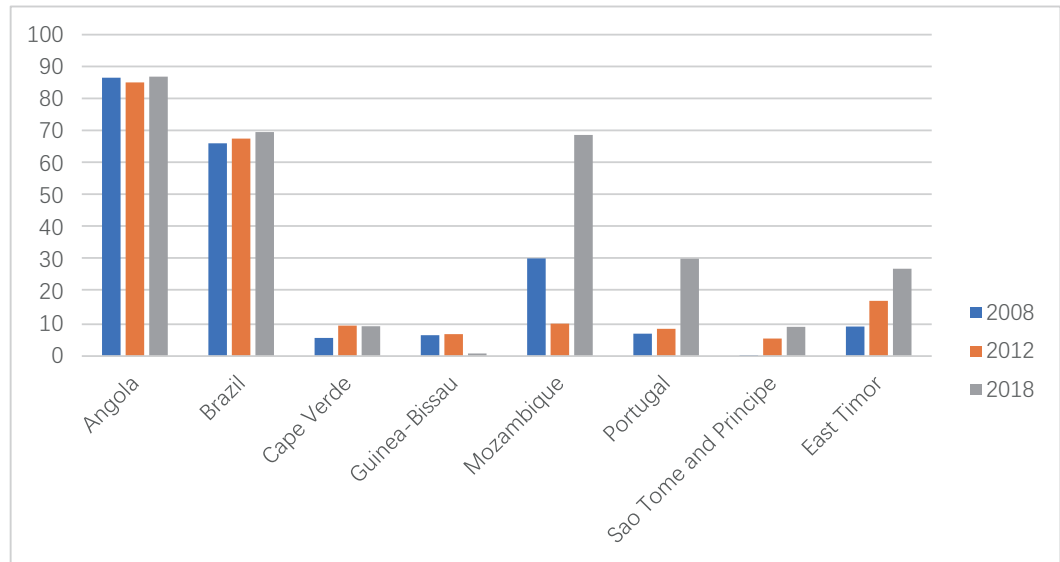


Figure 2–9: Changes in the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure

Source: Joint Research Group

The overall development capacity of Chinese enterprises in Portuguese-speaking countries increased steadily in 2008–2018 with the index rising from 59.4 to 71.7. The industry development capability was basically stable; the index fluctuated greatly, rising from 48.8 to 50.3. (see Figure 2–10).

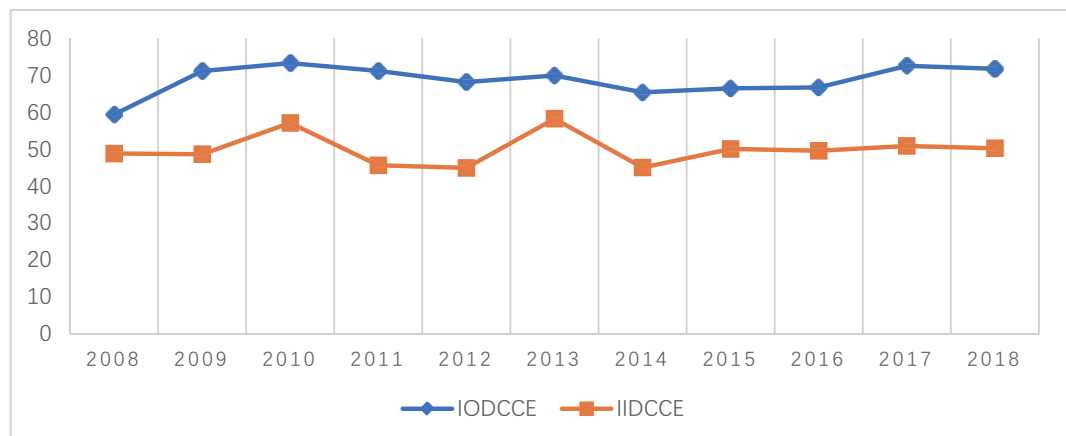


Figure 2–10: Trends of the overall development capability index and the index of industry development capability of Chinese enterprises

Source: Joint Research Group

**(I) Analysis of the overall development capability of Chinese enterprises**

With the continuous improvement of China-Portuguese-speaking Countries Relations, the infrastructure business of Chinese enterprises in Portuguese-speaking countries has developed rapidly. With an increasing number of participating projects, and a growing number of contracted projects, the Chinese enterprises have an outstanding performance in the local infrastructure market. Business statistics show that in 2008-2018, China and the Portuguese-speaking countries have accumulatively signed 5,620 new projects, with a newly-signed contract amount of US\$112.2 billion, and a total turnover of US\$101.7 billion. The number of Personnel dispatched by Chinese international contractors is up to 203,000 and there were 19,000 dispatched workers working in Portuguese-speaking Countries by the end of 2018. When it comes to development trend, the newly-signed contract amount, turnover and number of the people working in the Portuguese-speaking countries at end of term maintained a steady increase before 2013. However, the newly-signed contract amount fluctuated significantly after 2014 and continued to decline after recovery in 2017. (See Figure 2-11), reflecting the impact on Chinese Enterprises' involvement in infrastructure construction caused by the complex external situation of Portuguese-speaking countries.

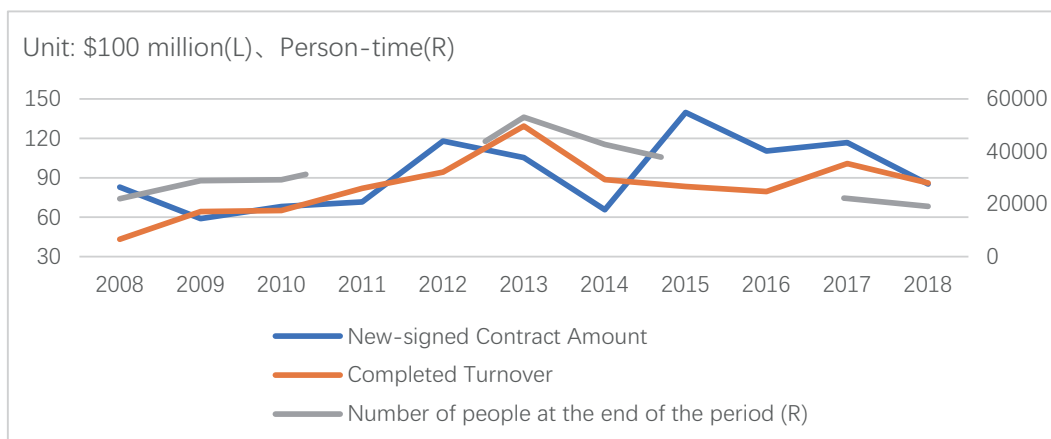


Figure 2-11: The index trends of Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure

Source: Joint Research Group

There are big differences in the performance of Chinese enterprises in the infrastructure sector in different Portuguese-speaking countries. Among them, the newly-signed contract amount has grown steadily in Brazil and Mozambique, with sound development momentum. With the resumption of diplomatic relations between China and Sao Tome and Principe in 2016, the newly-signed contract amount by Chinese enterprises has risen sharply. The overall situation tends to be on the rise in East Timor and Portugal, but it declined in 2018 compared to the previous year. The newly-signed contract amount by Chinese enterprises in Angola remains more than US\$8.5 billion in 2015–2017, but it fell significantly to US\$2.2 billion in 2018 due to factors such as economic downturn and increased fiscal deficit. The newly-signed contract amount by Chinese enterprises in Cape Verde and Guinea-Bissau showed a downward trend (see Figure 2–12–1 and Figure 2–12–2).

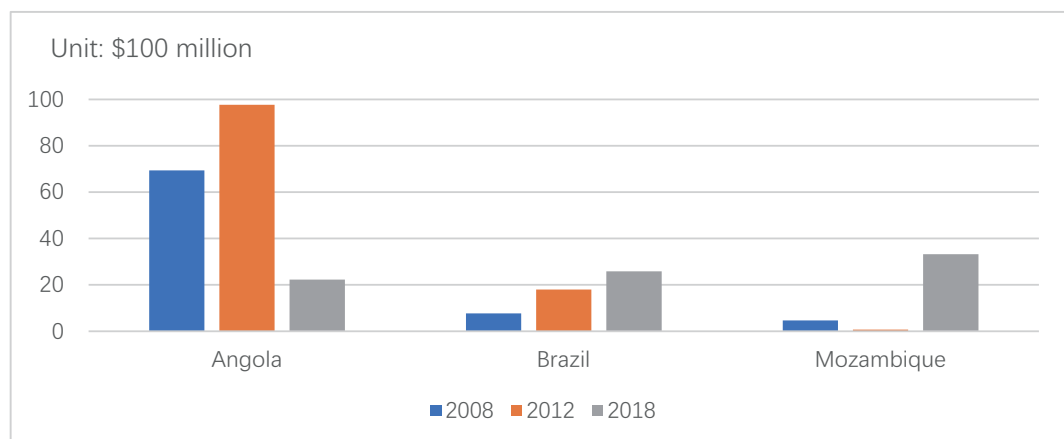


Figure 2–12–1: Changes in newly-signed contract amount by Chinese enterprises in the infrastructure sector of Portuguese-speaking countries

Source: Joint Research Group

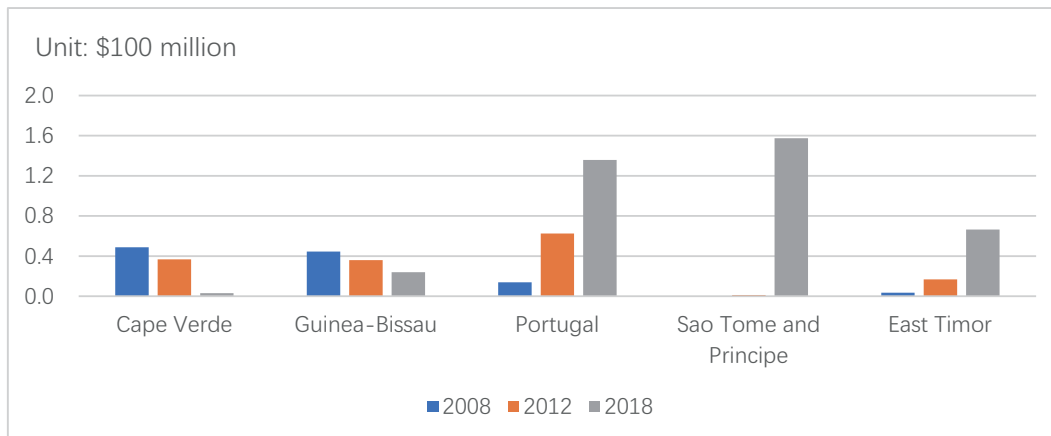


Figure 2-12-2: Changes in newly-signed contract amount by Chinese enterprises in the infrastructure sector of Portuguese-speaking countries

Source: Joint Research Group

In terms of source of fund for Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure, it is mainly funded by host government, followed by commercial loans, with assistance from Chinese government, concessional loans and self-raising by the owners accounting for corresponding proportions. In 2012-2018, the newly-signed contract amount and turnover of infrastructure projects funded by the host government and involved by Chinese enterprises were \$36.2 billion and \$39.3 billion, accounting for 46.7% and 58.4% respectively; the newly-signed contract amount and turnover of Business loans and other projects were US\$25.9 billion and US\$17.8 billion respectively, accounting for 33.5% and 26.4% respectively; the newly-signed contract amount and turnover of projects assisted by Chinese government and preferential export buyer credit were US\$8.6 billion and US\$6.9 billion, with a proportion of 11.1% and 10.2% respectively. The newly-signed contract amount and turnover of projects based on self-raising by owners were US\$ 3.9 billion and US\$ 1.7 billion respectively, accounting for 5.1% and 2.5% respectively (see Figure 2-13). This reflects the diversity of funding sources for Chinese enterprises involved in Portuguese-speaking countries' infrastructure.

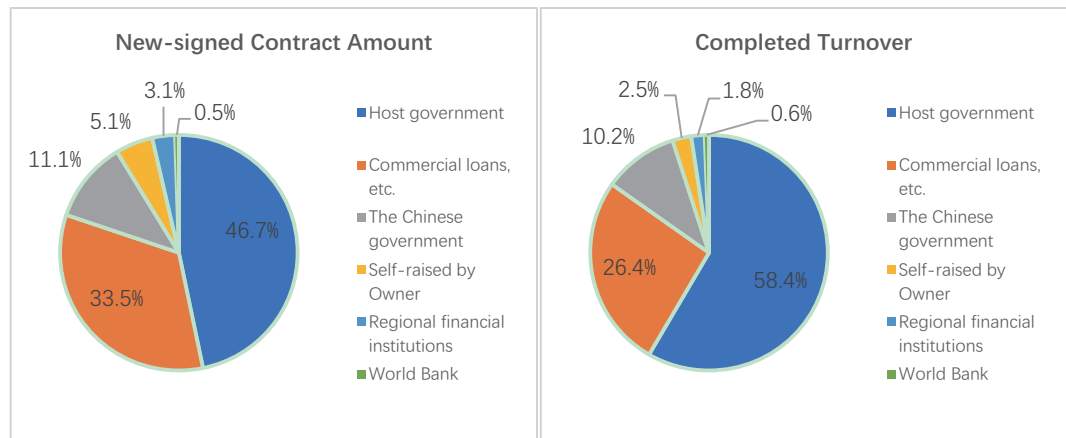


Figure 2-13: Structure of source of fund of Chinese enterprises involved in Portuguese-speaking countries' infrastructure development from 2012 to 2018 (%)

Source: Joint Research Group

## (II) Analysis of industry development capability of Chinese enterprises

Most of the Portuguese-speaking countries are developing countries, so their industry is poorly developed. Their energy and transportation infrastructure also lag far behind. Therefore, from the perspective of industry distribution, the infrastructure projects Chinese enterprises involved in are mainly in the energy and transportation sector, while fewer projects are in water and communication sector. In 2012-2018, the cumulative newly-signed contract amount of the energy industry was US\$16.44 billion, accounting for 37.7%; and the cumulative turnover was US\$11.96 billion, accounting for 34.7%. Among them, key projects include the Angola Luasim Hydro-power Project, Kagulu Kabassa Hydro-power Project, the Beautiful Mountain Phase II Converter Station Project in Brazil, the Chemba 500MW Hydro-power Station in Mozambique, and the 221MW Ground Power Project in Portugal. The cumulative newly-signed contract amount of the transportation industry was US\$12.58 billion, accounting for 28.8%; the accumulated turnover was US\$10.61 billion, accounting for 30.8%. Among them, key projects include the Luanda New International Airport project in Angola, the St. Louis Port project in Brazil, the N6 national road reconstruction and expansion project in Mozambique, the Suai Expressway project

in East Timor, and the expansion project of the Sao Tome and Principe International Airport. The total newly-signed contract amount and turnover in the communications industry was US\$10.61 billion and US\$8.76 billion respectively, accounting for about a quarter of the total, among which there are a series of telecommunications projects awarded to Huawei in Brazil. The water sector takes a minor share, accounting for 9% of cumulative newly-signed contract amount and turnover (see Figure 2-14).

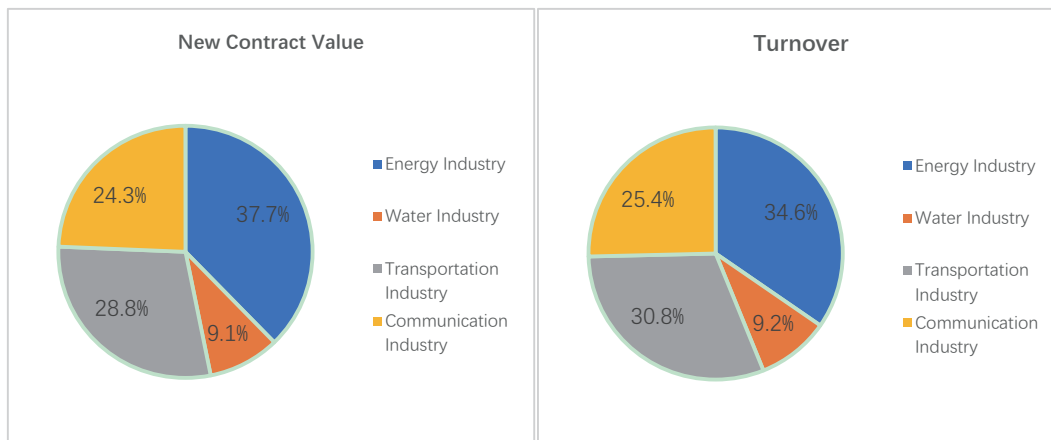


Figure 2-14: The proportion of newly-signed contract amount and turnover in the industry in 2012-2018 (%)

Source: Joint Research Group

Judging from industry development in recent years, the newly-signed contract amount of the energy industry increases by 73% from the US\$ 1.36 billion in 2017 to US\$ 2.35 billion in 2008 (see Figure 2-14). The cooperation between China and Portuguese-speaking countries in energy continues to grow. Take the Angolan Soyo Combined Cycle Power Plant built by China National Machinery Engineering Corporation as an example, it has a total installed capacity of 750,000 kilowatts and a contractual value of US\$ 980 million. In August 2017, the first unit of the power station was commissioned and the supporting power transmission and transformation project was completed. The power station is currently the largest gas turbine combined cycle power plant in Africa. In 2011, the Three Gorges Group successfully became a shareholder of the EDP and jointly developed the Brazilian hydro-power market. It has accumulatively invested in more than 10 local hydro-

power and wind power projects, which has been a role model for third-party market cooperation between China and developed countries.

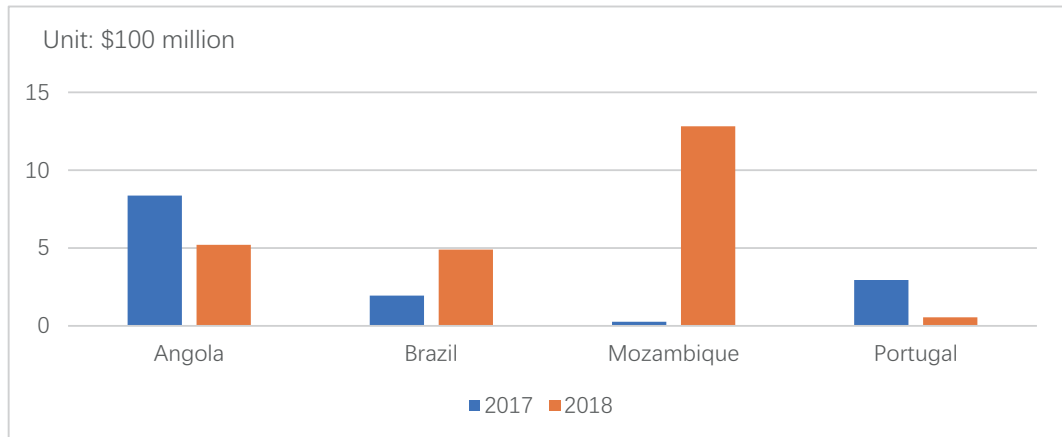


Figure 2–15: Changes in the amount of new contracts signed by Chinese enterprises involved in the major Portuguese-speaking countries' energy sector

Source: Joint Research Group

The Portuguese-speaking countries have attached great importance to the construction of transportation infrastructure for a long time and actively introduced foreign capital to participate in railway, highway and other facilities projects, creating favorable conditions for the development of transportation infrastructure. However, due to the significant reduction in transportation projects in Angola, the newly-signed contract amount of transportation industry in Portuguese-speaking countries decreased sharply by 45% from US\$3.31 billion in 2017 to US\$1.82 billion in 2018 (see Figure 2–16).



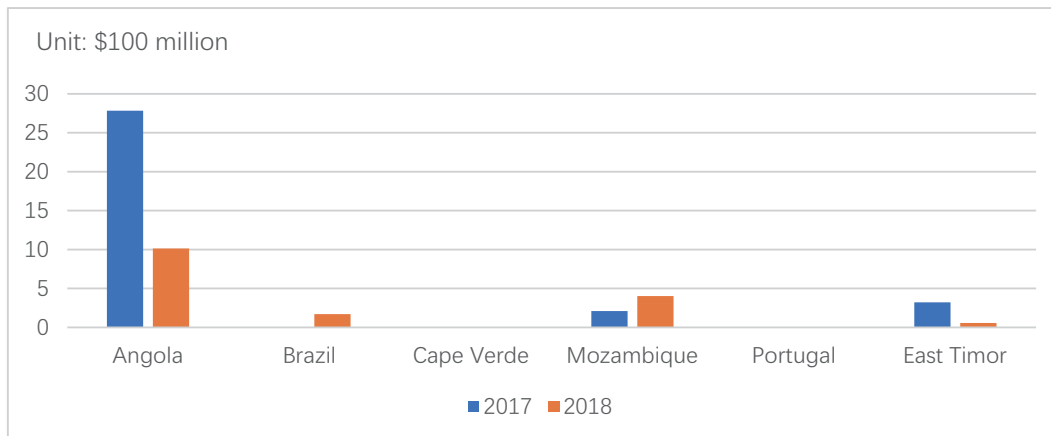


Figure 2-16: Changes of newly-signed contract amount by Chinese enterprises in major Portuguese-speaking countries' transportation sector

Source: Joint Research Group

Chinese enterprises also have good performance in telecommunication sector in some of Portuguese-speaking countries due to their lagging-behind situation in telecommunication industry. In 2018, the newly-signed contract amount and turnover of Chinese enterprises in Portuguese-speaking countries were US\$ 1.67 billion and US\$ 1.34 billion, with a growth of 4.6% and 10.9% respectively. With more than 40% share in Brazilian telecom equipment market, Huawei, a representative of Chinese telecommunications industry, has won various large projects of more than US \$1 billion in recent years. With the population growth and economic development of Portuguese-speaking countries, there is huge potential for Chinese enterprises to participate in the infrastructure of communication industry in Portuguese-speaking countries (see Figure 2-17).

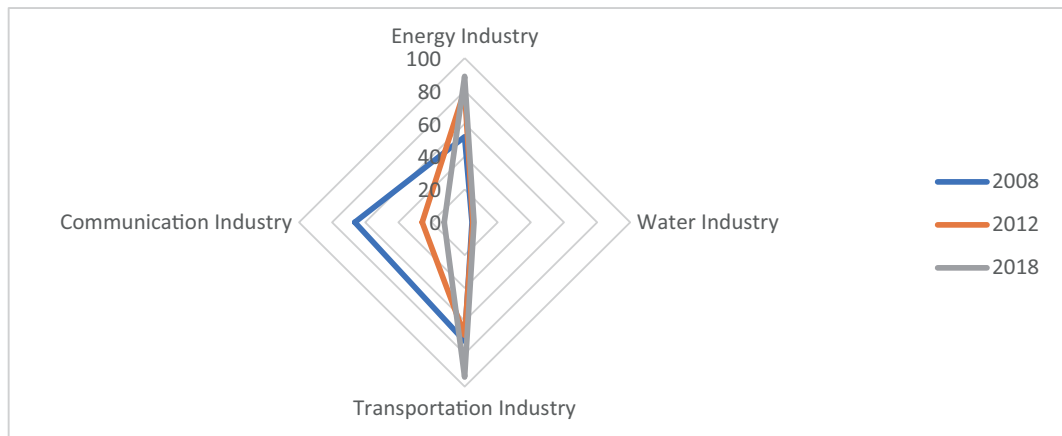


Figure 2-17: Changes in four Industry development capability indexes of Chinese Enterprises

Source: Joint Research Group

## VI

### Actively fulfilling corporate social responsibilities, the Chinese enterprises significantly enhance their local comprehensive influence

The index of Chinese enterprises' local influence includes the direct contribution index, indirect contribution index and reputation index. Among them the direct contribution index refers to the proportion of the turnover of Infrastructure Construction projects involved by Chinese enterprises in the total investment of the country, the tax paying of Chinese enterprises and the scale of its local employees. The indirect contribution index measures the benefits to local residents brought by projects involved by Chinese enterprises and the fulfilling of social responsibilities. The reputation index indicates the degree of recognition of Chinese enterprises from local governments, owners, communities and the media.

In 2008–2018, the direct contribution index of Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development rose from 45.7 to 58.8, the indirect contribution index rose from 40.8 to 58.5, and the reputation index rose from 38.9 to 64.1. The indexes of the three dimensions have risen sharply, showing that with in-depth involvement in Portuguese-speaking countries' infrastructure, the influence of Chinese enterprises in the local area has significantly expanded (see Figure 2-18 and Figure 2-19).

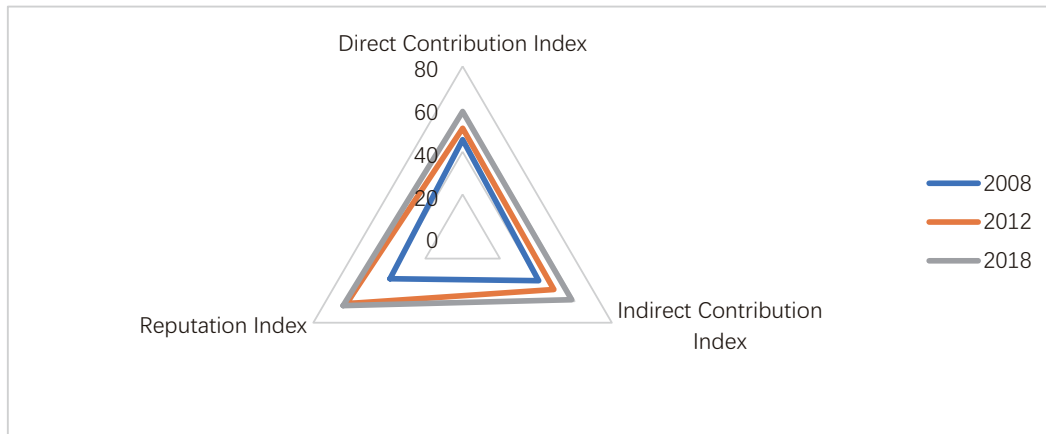


Figure 2-18: Changes in sub-index of the index of Chinese enterprises' local influence

Source: Joint Research Group

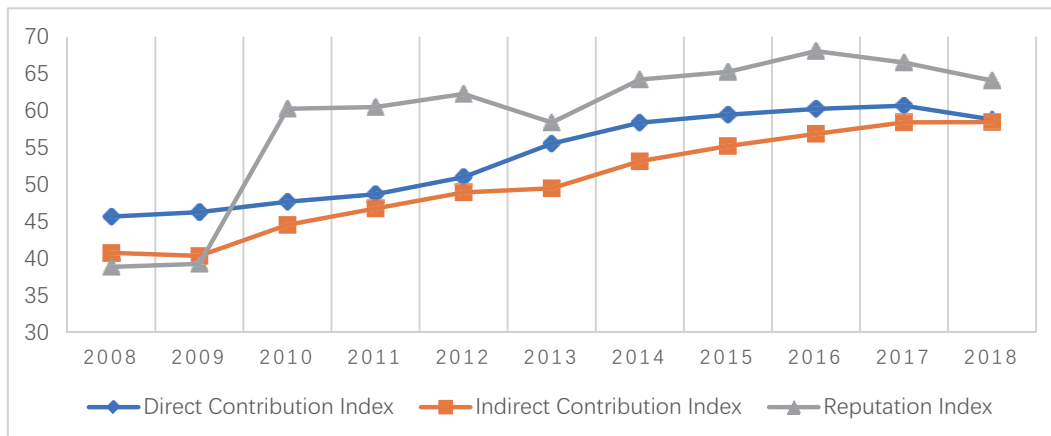


Figure 2-19: Development trend of local influence sub-index of Chinese enterprises

Source: Joint Research Group

As for the average proportion of the turnover of Chinese enterprises in total investment, the direct contribution index of Chinese enterprises in infrastructure projects in East Timor, Guinea-Bissau, Angola and Mozambique is 55.2%, 28.75%, 17.3% and 14.2% respectively, which are at a high level. As for specific projects, the Brazil's St. Louis Port project undertaken by China Communications Construction Enterprise, with a total investment of US \$ 240 million and a construction period of four years, create more than 4,000 jobs and effectively promote the economic development of the region. During the construction of the Benguela Railway in Angola, nearly 100,000 local workers participated in the project, and more than

10,000 workers became technicians specialized in electric welding, mechanical operation, and communication electricity.

Over the years, Chinese enterprises have laid emphasis to fulfillment of social responsibilities quality management, employees' rights and interests, localized operations, environmental protection, and conservation of natural resources, maximizing the positive impact of the project on local economic development, social progress and improvement of people's livelihood. For example, as one of the most representative infrastructure cooperation projects between China and Mozambique, the Maputo–Katenberg Cross–sea Bridge in Mozambique has facilitated cross–strait exchanges, regional connectivity and prosperity. During the construction of the project, the Chinese enterprises and the owners built high–quality immigrant communities, including public facilities such as hospitals, schools and football fields to create a beautiful living environment for relocated residents. In the Maputo Reserve Wildlife Sanctuary where the bridge passes, the Chinese enterprises lowered the road elevation from the route design to the project construction to ensure that wild animals may cross the road freely; There are warning signs on the entrance and exit of the protection zone, and also speed limit signs and speed bumps to ensure the safety of wild animals.

At the same time, the active efforts made by Chinese enterprises in Portuguese–speaking countries have been well received by the local government and the public, and the local media also made reports on it. The reputation of Chinese enterprises in the local society has steadily increased. For example, the Maputo–Katenberg Cross–sea Bridge in Mozambique has received various awards, including the “Fulton” award, the top concrete quality award in the Southern Africa region. The China National Machinery Industry Corporation was honored by the local government as an outstanding Chinese enterprise benefiting the local community for its public service activities during the Cabinda project in Angola..

Of course, it should also be noted that due to the differences in language, culture and religion, Chinese enterprises still need to improve in terms of fulfillment of corporate social responsibility, integration into local society, and sustainable development.



## Chapter III

# Recommendations on Development



Based on index analysis, we found that Chinese enterprises who are involved in Portuguese-speaking countries' infrastructure development have had significant influence on host countries. However, Chinese enterprises also face some challenges since Portuguese-speaking countries are very different in size, resource, and development level, and there are uncertainties in their infrastructure environments. To this end, we make suggestions as follows:

**I The government should play a leading role in building closer China-Portuguese-speaking Countries Relations**

The central government should continue to facilitate political exchanges with Portuguese-speaking countries, make use of the planning and leading advantages regarding the infrastructure connectivity in the Belt and Road Initiative, clarify the objectives and framework of infrastructure cooperation between China and Portuguese-speaking countries, make top-level design for Chinese enterprises involved in the infrastructure of Portuguese-speaking countries, and formulate differentiated infrastructure cooperation development policies according to development of Portuguese-speaking countries so as to create a sound environment for enterprises to participate in project construction.

The Macao SAR Government should give full play to the role of connecting Chinese enterprises and Portuguese-speaking countries, further promote economic and trade cooperation between China and Portuguese-speaking countries, build a cooperation platform for Chinese enterprises involved in Portuguese-speaking countries' infrastructure by making use of the Forum Macao and the China-Portugal Cooperation and Development Fund. At the same time, it is also needed to make full use of special financial business of Macao SAR and the status of the RMB offshore financial center to vigorously support the development of Chinese enterprises in Portuguese-speaking countries.

## II

**Chinese financial institutions should continue to support Chinese enterprises involved in Portuguese-speaking countries' infrastructure development.**

Chinese financial institutions are natural partners for “Go Global” Chinese enterprises. With the continuous deepening of infrastructure cooperation between Chinese enterprises and Portuguese-speaking countries, Chinese enterprises' demands for financing service are increasing, so financial institutions are requested to provide more international financial services. Chinese-funded financial institutions should work closely with international multilateral financial institutions, financial institutions in Portuguese-speaking countries, and regional financial institutions to utilize multiple financial markets and financing channels, seek innovative financing models, optimize financing structures, provide innovative financial services for Chinese enterprises involved in Portuguese-speaking countries' infrastructure development, and solve the financial problems faced by Chinese enterprises. At the same time, Chinese-funded financial institutions should accelerate the overseas deployment according to their own needs, and expand financial services in Portuguese-speaking countries through such methods as IPOs and overseas M&A.

## III

**Chinese enterprises should give full play to their key roles in the infrastructure construction of Portuguese-speaking countries.**

In Portuguese-speaking countries, there are huge development demands in the infrastructure industries such as transportation, power and communications, while Chinese enterprises are experienced in their infrastructure sectors. To further consolidate and expand the business in Portuguese-speaking countries, Chinese enterprises should choose appropriate models flexibly to participate in infrastructure projects based on their financing capabilities, management capabilities and professional advantages. It is necessary to seek innovative business models, strive to extend the project value chain towards upstream investment and design and downstream project operations, strengthen quality management, enhance project profit, and form a development pattern of the entire industry chain. At the same time, since there are higher political, economic and social risks, and complicated market

environment in some Portuguese-speaking countries, Chinese enterprises should enhance their ability to identify and manage risks and effectively promote localized operations. It is necessary to pay close attention to various risk factors affecting infrastructure projects, cooperate with professional institutions, and build a full-process risk management system to provide a strong guarantee for the development of Chinese enterprises in Portuguese-speaking countries. In addition, Chinese enterprises should also adhere to localized operation in Portuguese-speaking countries, respect cultural customs of host countries, strengthen exchanges and cooperation with local governments, social organizations and enterprises, integrate into local communities, actively fulfill social responsibilities, and enhance corporate public relations capabilities to establish a responsible and international brand image.





## Appendix 1

# About the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development, ICEIPCI



In order to further play Macao's role as a service platform for business cooperation between China and Portuguese-speaking countries, promote cooperation between China and Portuguese-speaking countries in infrastructure, and provide decision reference for Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development, and help relevant parties grasp trends, identify opportunities, and avoid risks, China International Contractors Association (hereinafter referred to as the "CHINCA" ), and Beijing SunRisk Information Technology Co., Ltd., entrusted by the Macao SAR Government, established a joint research group to develop the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development, ICEIPCI.

### **The meaning and scope of the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure**

The Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development consists of sub-indexes of four dimensions, namely, the Index of Portuguese-speaking Countries' Infrastructure, the Index of China-Portuguese-speaking Countries' Relationship Heat, the Index of Local Development Capability of Chinese Enterprises and the index of Chinese enterprises' Local Influence. Each sub-index is composed of several layers of indexes, with each one gained by the two-mean value method or the maximum value method of the corresponding index (see Figure 1).

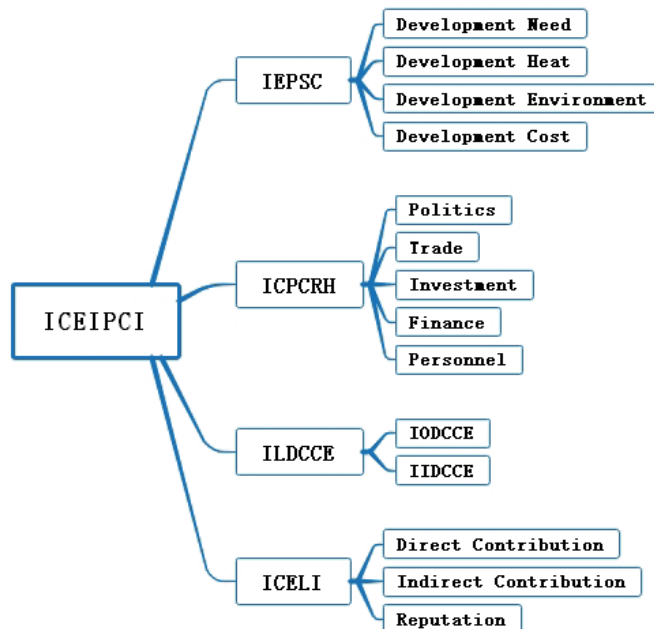


Figure 1: The main dimensions and composition of the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development

Source: Joint Research Group

The Portuguese-speaking countries mentioned in The Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development include such eight countries as Angola, Brazil, Cape Verde, Guinea-Bissau, Mozambique, Portugal, Sao Tome and Principe and East Timor, excluding Equatorial Guinea(it officially became a member of the Community of Portuguese-speaking Countries - CPLP on July 23, 2014)

## II Algorithm of the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development.

The Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development is based on the weighting calculation of GDP after percentage calculation of double mean value of each indicator of the four dimensions. It is released annually since 2018. In order to identify the development trend of and facilitate the Chinese enterprises' involvement in Portuguese-

speaking countries' infrastructure development, the research group collected relevant data and information from 2008 to 2018. For missing data, data fitting is made based on the proportion of indicators and news search, and the annual mean algorithm is adopted according to the comparability and objectivity of the data. On this basis, the maximum or mean value of 2008–2018 is obtained and used as the reference value. Then, with the weight of the national GDP combined with the weight of each index, the Index and various sub-indexes of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development is obtained.

As for Double Mean Percentage Method, that is, in order to measure the difference between a certain indicator and the mean, the mean value of all years is obtained on the basis of the annual mean value, and then percentage calculation is carried out to ensure the historical continuity of the index. The indexes and various sub-indexes of Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development are derived from the Belt and Road Infrastructure Development Index Report 2019. The annual maximum value method is used for the percentage calculation and re-weighting to obtain the Index mentioned in the report.



### Model of the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development

#### (1) Logic and weight of the Index of Portuguese-speaking Countries' Infrastructure

As an assessment of the infrastructure development, the Index of Portuguese-speaking Countries' Infrastructure reflects important factors affecting infrastructure development in Portuguese-speaking countries, including the Development Environment, development need, development costs and development heat. It can analyze the source of risk, measure the long-term driving force, reflect the construction dynamics, and predict the development trend in the short term. The Index of Portuguese-speaking Countries' Infrastructure includes four sub-indexes, namely, the Development Environment, Development Need, Development Costs and Development Heat (see Table 1).

Table 1: Logic and weight of the Index of Portuguese-speaking Countries' Infrastructure

Level 2 index	Weight	Level 3 index	Weight	Level 4 index or indicator
The Index of Portuguese-speaking Countries' Infrastructure	12.0%	Development Environment index	3.0%	Political environment
				Economic environment
				Sovereign solvency
				Business environment
				Duty factor
				Industry environment
		Development Need Index	3.6%	Development need gap
				Development potential gap
				Other variables
		Development Cost Index	2.4%	Operating cost
				Financing cost
		Development Heat Index	3.0%	Local heat of Chinese enterprises
				Global infrastructure construction heat
Private investment heat				

Source: Joint Research Group

## (2) Logic and weight of Index of China-Portuguese-speaking Countries' Relationship Heat

As the primary factor for economic and trade cooperation between China and Portuguese-speaking Countries, China-Portuguese-speaking Countries' Relationship Heat is the long-term driving force for the actual investment or construction of transnational infrastructure, reflecting the trend of trade and investment in China by the country. China-Portuguese-speaking Countries' Relationship Heat composes of five sub-indexes including political relations, trade relations, investment relations, financial relations and personnel relations (see Table 2).

Table 2: Logic and weight of Index of China–Portuguese-speaking Countries' Relationship Heat

Level 2 index	Weight	Level 3 index	Weight	Level 4 index or indicator	Weight	
Index of China–Portuguese-speaking Countries' Relationship Heat	18.0%	Political heat index	4.0%	If diplomatic relations established or not	1.00%	
				Leaders exchange visits	2.00%	
				Participate in the “Belt and Road Initiative”	1.00%	
		Trade heat index	4.0%		Total imports	2.00%
					Total exports	2.00%
		Investment heat index	3.0%		Foreign direct investment stock	1.50%
					Overseas direct investment flows	1.50%
		Financial heat index	4.0%		Branches of financial institutions and various bilateral agreements	2.00%
					Proportion of domestic source of funds	2.00%
		Personnel heat index	3.0%		Attitudes towards Chinese enterprises and Chinese in the host country	1.00%
					Number of dispatched laborers	1.00%
					Number of labors working outside at end of term	1.00%

Source: Joint Research Group

### (3) Logic and weight of the Index of Local Development Capability of Chinese Enterprises

The local development capability of Chinese enterprises reflects the dynamics of Chinese enterprises participating in infrastructure construction in the country. The Index of Local Development Capability of Chinese Enterprises has two sub-indexes, namely, the overall capability of Chinese enterprises and the industry capability of the Chinese enterprises.

The overall capability of the Chinese enterprises is mainly reflected in newly-signed projects' amount, newly-signed contract amount, turnover, dispatched staff of enterprises and sources of funds. The overall capability of the Chinese enterprises reflects the development of the Chinese enterprise in a certain industry in a country, including newly-signed projects' amount, newly-signed contract amount and turnover under various industries (see Table 3).

Table 3: Logic and weight of the Index of Local Development Capability of Chinese Enterprises

Level 2 index	Weight	Level 3 index	Weight	Level 4 index	Weight	Level 5 index or indicator	Weight
The Index of Local Development Capability of Chinese Enterprises	49.0%	The Index of Overall Development Capability of Chinese Enterprises	35.0%	newly-signed projects' amount	7.0%	Number	7.00%
				newly-signed Contract Amount	9.0%	Number	9.00%
				Completed Turnover	9.0%	Number	9.00%
				Dispatched staff of enterprises	4.0%	Number of dispatched staff of the year	2.00%
						Number of dispatched staff working overseas at end of term	2.00%
				Source of Funds	6.0%	Government funds	2.00%
						Self-financing of the owner	2.00%
						Others (except for the first two options and international organizations, regional financial institutions and Chinese government funds)	2.00%

Level 2 index	Weight	Level 3 index	Weight	Level 4 index	Weight	Level 5 index or indicator	Weight
The Index of Local Development Capability of Chinese	49.0%	The Index of Industry Development Capability of Chinese Enterprises	14.0%	Energy (electricity)	3.5%	Number of newly signed contracts	0.50%
						newly - signed contract amount	1.25%
						Turnover	1.25%
						The proportion of turnover to the local infrastructure output value (fixed assets investment can be used for infrastructure production value, the same below)	0.50%
				Transportation (railway, highway, airport, port)	3.5%	Number of newly - signed contracts	0.50%
						newly - signed contract amount	1.25%
						Turnover	1.25%
						The proportion of turnover to the local infrastructure output value	0.50%
				Communication (mobile phone, network)	3.5%	Number of newly - signed contracts	0.50%
						newly - signed contract amount	1.25%
						Turnover	1.25%
						The proportion of turnover to the local infrastructure output value	0.50%
				Water service (water supply and sewage treatment)	3.5%	Number of newly - signed contracts	0.50%
						newly - signed contract amount	1.25%
						Turnover	1.25%
						The proportion of turnover to the local infrastructure output value	0.50%

Source: Joint Research Group



**(4) Logic and weight of the index of Chinese enterprises' local influence**

The Chinese enterprises' local influence reflects the impact brought by Chinese enterprises' involvement in infrastructure construction in the country. The index of Chinese enterprises' local influence has three sub-indexes, namely, the direct contribution, indirect contribution and social reputation (see Table 4).

Table 4: Logic and weight of the index of Chinese enterprises' local influence

Level 2 index	Weight	Level 3 index	Weight	Level 4 index or indicator	Weight	
The index of Chinese enterprises' local influence	21.0%	Direct contribution index	7.0%	The proportion of completed turnover to the local infrastructure output value	3.00%	
				Number of employees from the host country	3.00%	
				Tax paying	1.00%	
		Indirect contribution index	7.0%	7.0%	Benefits to local people	2.50%
					Social responsibility	3.50%
					Construction industry (public welfare projects with the highest proportion)	1.00%
		Social reputation index	7.0%	7.0%	News report of the project	1.00%
					Turnover of the reported project	1.00%
					Awards	2.50%
					Positive news report	2.50%

Source: Joint Research Group

**VI**

**Characteristics of the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development**

Based on the ideas and calculation results of index compilation, this index has the following characteristics:

Vertical comparisons are combined with horizontal comparisons. Comprehensive assessment on Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development is carried out. Through vertical comparison of the development index of the past 11 years, the overall development trend of Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development can be summarized; through horizontal comparison of indexes of various countries, we can understand the ranking of Chinese enterprises in infrastructure construction in each Portuguese-speaking country.

Internal factors are combined with external factors. Multi-layer studies on the factors affecting Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development are carried out. Through analysis of the four dimensions including the development environment of infrastructure construction in Portuguese-speaking countries, China-Portuguese-speaking Countries' Relationship Heat, Local Development Capability of Chinese Enterprises and the local influence of Chinese Enterprises to comprehensively measure the internal and external driving forces and risks affecting the development of infrastructure in Portuguese-speaking countries, and tap into opportunities and constraints for Chinese enterprises involved in Portuguese-speaking countries' infrastructure development.

The status quo analysis is combined with trend analysis. The status quo and trends of Chinese enterprises' involvement in Portuguese-speaking countries' infrastructure development is revealed. The description on the status quo of infrastructure construction in Portuguese-speaking countries, relation between China and Portuguese-speaking countries, Local development capability and influence of the Chinese enterprises' involvement in infrastructure construction reflects the trend in the future, which can help Chinese enterprises and relevant participants to understand the current situation, formulate strategic plans and take appropriate measures.



## Appendix 2

# Ranking of the Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development



Table 1: The Index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
General Index	58.84	63.68	68.04	65.57	66.11	67.83	65.79	67.84	67.29	70.57	70.31

Table 2: Sub-index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
The Index of Portuguese-speaking Countries' Infrastructure	91.20	91.44	93.21	89.75	92.87	89.79	89.23	92.46	85.76	86.58	90.29
The Index of relation between China and Portuguese-speaking countries	63.96	67.72	69.71	69.95	74.84	72.17	75.58	77.17	76.40	81.53	81.36
The Index of Local Development Capability of Chinese Enterprises	56.36	64.71	68.65	63.86	61.51	66.58	59.55	61.76	61.81	66.36	65.59
The Index of Chinese Enterprises' Local Influence	41.76	41.97	50.82	51.98	54.07	54.47	58.57	59.96	61.71	61.86	60.44

Table 3: Ranking of The Sub-index of Chinese Enterprises' Involvement in Portuguese-speaking Countries' Infrastructure Development (Country-based)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Angola	75.92	74.74	81.66	80.17	80.45	81.41	80.51	80.71	79.41	82.56	82.45
Brazil	63.58	68.07	71.44	68.70	69.07	70.81	68.12	70.86	70.49	73.23	72.85
Mozambique	35.28	39.63	44.51	39.31	25.87	59.34	59.93	65.35	60.74	61.17	65.70
Portugal	24.75	32.68	34.14	28.39	28.65	28.52	33.33	34.53	34.81	40.24	45.56
East Timor	21.41	28.68	27.50	26.55	26.44	58.12	28.41	32.02	38.46	38.65	40.37
Cape Verde	15.76	17.25	18.46	21.84	23.69	19.92	23.53	23.54	25.59	27.05	25.56
Guinea-Bissau	17.41	17.63	17.74	17.89	19.66	18.92	18.49	18.88	19.01	19.24	21.57
Sao Tome and Principe	10.98	11.46	12.54	12.25	13.15	13.18	14.10	15.47	16.69	17.36	21.52

Note: All rankings are based on 2018, the same below.

Table 4: Rankings of the Index of Portuguese-speaking Countries' Infrastructure Development

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Brazil	94.33	94.33	95.57	91.80	94.97	91.75	91.06	94.52	86.63	87.36	91.42
Portugal	77.06	77.06	76.58	74.52	76.34	77.90	78.36	78.46	80.69	81.83	86.14
Angola	76.34	76.34	81.11	77.82	83.40	76.42	77.85	87.18	82.51	83.69	82.00
Cape Verde	76.64	76.64	79.58	79.37	79.46	78.39	78.71	76.60	79.44	79.05	81.47
Mozambique	76.74	76.74	79.82	75.64	78.79	76.79	76.84	78.44	73.84	74.81	81.11
East Timor	76.29	76.29	79.97	76.20	75.09	73.05	73.99	76.93	75.60	75.73	77.61
Guinea-Bissau	73.18	73.18	77.05	73.13	73.61	72.74	72.45	74.63	71.39	71.73	76.03
Sao Tome and Principe	72.76	72.76	76.25	71.08	72.24	71.49	73.02	73.48	72.68	71.93	75.56

Table 5: Rankings of the Index of the Relation between China and Portuguese-speaking Countries

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Brazil	68.38	72.43	72.42	72.47	77.14	74.85	77.65	80.40	79.00	84.08	84.48
Angola	58.38	54.61	73.68	73.65	78.71	78.69	76.29	81.20	69.33	77.33	80.71
Portugal	40.64	42.85	46.70	45.62	52.25	42.78	57.02	49.70	59.96	63.33	59.90
Mozambique	20.01	18.48	22.74	25.54	24.70	42.35	42.43	43.94	48.80	47.74	50.18
East Timor	19.99	20.35	24.51	17.96	22.81	35.26	29.81	33.61	41.13	36.81	43.26
Guinea-Bissau	15.18	13.52	17.04	15.46	16.31	18.04	14.36	17.60	20.64	23.69	35.68
Cape Verde	10.31	15.96	19.25	22.52	23.89	21.01	19.74	20.02	22.94	27.92	28.08
Sao Tome and Principe	1.69	2.13	3.13	3.59	4.59	5.04	6.03	6.48	15.35	20.51	23.88

Table 6: Rankings of the Index of Local Development Capability of Chinese Enterprises

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Angola	84.19	84.80	87.72	85.51	81.73	85.41	83.07	79.81	82.66	85.79	84.74
Brazil	63.26	70.80	73.38	68.27	65.71	70.77	62.58	65.55	66.43	70.10	69.10
Mozambique	29.74	35.65	40.94	33.05	10.28	62.61	62.41	68.68	56.40	59.91	67.57
Portugal	5.07	19.94	21.08	10.45	7.60	10.46	13.71	17.99	12.81	21.60	29.60
East Timor	8.83	21.15	16.69	17.72	14.27	68.38	15.72	20.81	24.32	24.15	24.39
Cape Verde	2.85	3.69	2.77	6.66	9.30	3.86	8.30	8.91	10.98	13.25	8.97
Sao Tome and Principe	0.50	1.28	1.72	1.88	2.56	2.64	2.67	5.15	3.54	2.88	8.64
Guinea-Bissau	4.30	4.82	3.34	3.58	4.82	2.79	3.05	2.14	1.55	1.54	1.39

Table 7: Rankings of the Index of Overall Development Capability of Chinese Enterprises

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Angola	99.90	99.70	99.90	99.90	94.20	99.82	96.11	94.20	95.44	99.90	98.39
Mozambique	36.57	38.48	45.01	37.44	6.39	76.99	78.39	83.55	68.96	71.00	77.17
Brazil	66.16	77.35	77.82	76.36	73.02	74.26	68.93	71.26	72.02	77.03	77.03
East Timor	3.79	10.91	8.41	12.65	6.17	81.04	11.73	14.83	18.17	22.02	18.42
Portugal	4.63	23.61	25.05	6.53	4.28	4.43	8.67	7.24	7.66	16.22	17.81
Sao Tome and Principe	0.16	0.80	0.13	0.11	0.09	0.42	1.08	2.64	1.52	0.81	6.91
Cape Verde	2.57	3.72	2.45	7.90	11.59	3.98	5.58	5.33	3.97	5.79	3.61
Guinea-Bissau	6.01	6.74	4.67	5.01	6.75	3.90	4.26	2.72	2.16	2.16	1.72

Table 8: Rankings of the Index of Industry Development Capability of Chinese Enterprises

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Portugal	6.19	10.76	11.13	20.23	15.90	25.54	26.31	44.87	25.69	35.04	59.07
Angola	44.90	47.53	57.27	49.55	50.56	49.37	50.47	43.82	50.69	50.51	50.63
Brazil	56.03	54.44	62.27	48.06	47.42	62.05	46.69	51.28	52.47	52.78	49.27
Mozambique	12.67	28.58	30.74	22.06	20.00	26.66	22.46	31.52	25.00	32.19	43.56
East Timor	21.43	46.76	37.38	30.42	34.54	36.71	25.71	35.76	39.70	29.48	39.32
Cape Verde	3.58	3.62	3.58	3.58	3.58	3.58	15.08	17.85	28.51	31.92	22.37
Sao Tome and Principe	1.35	2.49	5.69	6.30	8.73	8.18	6.65	11.43	8.59	8.05	12.96
Guinea-Bissau	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.71	0.00	0.00	0.56

Table 9: Rankings of the Index of Chinese Enterprises' Local Influence

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Angola	71.44	67.63	74.65	74.65	77.27	77.27	79.69	78.70	78.70	78.86	78.86
Mozambique	37.58	45.83	51.31	44.95	33.01	56.32	59.50	68.44	73.61	67.81	65.85
Brazil	42.61	42.93	52.29	53.28	55.18	55.48	59.79	61.55	63.44	63.14	61.01
East Timor	20.65	26.19	25.31	26.14	30.16	45.24	30.74	31.15	47.94	52.85	53.89
Portugal	27.12	28.33	29.62	29.15	30.28	30.23	33.04	35.01	38.36	40.19	47.34
Cape Verde	15.77	16.07	19.47	23.79	25.22	23.04	30.81	30.39	31.17	28.77	30.17
Guinea-Bissau	18.06	19.31	18.05	21.78	26.30	26.55	27.24	27.19	28.45	26.71	25.44
Sao Tome and Principe	8.11	8.18	9.43	10.27	11.41	11.42	14.04	14.09	16.51	17.25	18.67



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