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A Study On The Contribution Of Medical Device Market And Its Significant Growth On Chinese Economy: A Study Based On The perspective Of Healthcare Industry

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Abstract

Although China is becoming a more desirable place to invest, the nation's medical equipment market has not kept up. Nevertheless, the health technology sector is becoming more and more relevant as more people realise how important it is to invest in it. Like a literature review, a number of publications provide useful details on the investment climate and business environment in China for medical devices. There is a dearth of literature on investments in the medical device industry and related technology. The notion of technology investment is based on concepts related to foreign investment. Companies in the healthcare industry must have clear regulations on the procurement of medical equipment since the Chinese government is now spending more money than it has in the past on healthcare. Investments in medical equipment was be given more attention in future business studies. When it comes to medical device law, the new Chinese limits that were put into place in 2014 get very little attention.

For individuals who are interested in investing in China's medical device business, researchers provide this advice to help investors comprehend the distinctions between the country's past and current medical device laws. The objectives include insights, investment viability, and the major industry drivers. This research introduces a novel strategy to the medical device market by using location quotient. Even though the Chinese healthcare product market is among the most dynamic in the world, this research offers a plethora of important information.

KEYWORDS: *China, Aging population, medical device market, Investment policies.*

1. Introduction

Among the most alluring and lucrative sectors of the world economy are medical supplies and equipment. Since the Chinese government opened its economy to the outside world, foreign investment money has flooded into the country more often. The Chinese medical equipment business, which is one of the most promising and rapidly expanding sectors of the current economy, saw 200 billion yuan in total sales in 2013. In addition, it is the second-biggest market in the globe.

Worldwide, sales of medical devices are concentrated in a few select nations. In 2011, the United States had 42.4% of the global medical device market, followed by Japan (11%), Europe (33%), and other regions. Developed countries had more than 80% of the global market share. Because of growing healthcare demand, rising healthcare expenses, and growing health consciousness, China's medical equipment sector is growing rapidly. International investors doing business in China may find it easier to optimise and improve their investment plans if they conduct research on the distribution and geographic benefits of the Chinese medical device industry (Xin et al., 2021).

2. Background of the Study

Over the last three decades, China's economy has rapidly expanded and prospered due to the implementation of opening-up policies and significant reforms. For China to draw in foreign investment, a complete reform of its institutional framework, value system, policymaking processes, and socioeconomic structure is required. Owing to market saturation and intense competition, current markets may not have the same long-term development potential as China's rising market. Investors from all around the world are drawn to China by its massive consumer market and rapid growth. One of the sectors in the world with the quickest rate of growth is the medical device business, which depends heavily on new technology. One reliable indicator of a nation's manufacturing and technology economy is the medical device sector. The Chinese government is offering incentives to encourage growth in the medical equipment industry. With a 23% annual growth rate and a total production value of more than 688,420 million renminbi (RMB) in 2011, the medical device business in China is flourishing (Wang et al., 2020).

3. Purpose of the Study

Nonetheless, the development of China's medical equipment industry has not kept pace with the nation's overall economic expansion, which has increased interest from investors. Nonetheless, as more and more people realise the advantages of making investments in this area, the health technology industry is expanding. Many of these articles talk about the Chinese investment climate and the medical device industry without really evaluating anything. The healthcare business offers investment potential in medical equipment and related technologies, which academics have largely disregarded. The theories surrounding foreign investment form the basis of this technology investment hypothesis. Given that the Chinese government is investing more money than ever in healthcare, businesses doing business there are required to abide by strict guidelines when it comes to purchasing medical equipment. Future economic studies were giving priority to investments in medical equipment. Medical device restrictions, particularly the more recent ones put in place by China in 2014, have not gotten much attention.

In response, scholars have formulated a proposal that draws comparisons between China's past and present legal frameworks to illuminate the driving forces behind the nation's medical device industry, as well as the potential profits and lessons that foreign investors may learn from the Chinese market. The location quotient was initially used by researchers in the medical device sector. Despite this, one of the most exciting markets for medical equipment worldwide is in China, and this study provides a wealth of useful data (Jipeng & Xiao, 2021).

4. Literature Review

Globalisation has not had a major effect on the medical device business since the 1960s since conventional theories of foreign direct investment (FDI) have concentrated on giving multinational firms monopolistic advantages when they operate abroad. But this theory is coming under more and

more criticism as more companies from the developing world go global. For developing nations, improvements have been made to the fundamental idea of foreign direct investment (FDI). The medical device business has significantly improved people's quality of life and increased GDP growth in industrialised nations. The reason for foreign investment is inadequacies in the product and factor markets. Researchers have shown a connection between these flaws and long-term prospects. The consistent increase in technical skills is a common result of growing nations improving and expanding their technological capacity. China has drawn international investment in a variety of sectors, particularly in the high-tech sector, due to its skilled labour force, easy access to finance, and adept management. China's economy has been expanding at a 10% annual pace, faster than any other major nation, mostly due to investment and exports (Torsekar, 2018).

5. Research Question

- How is the Chinese market for medical devices doing?
- In what ways is the Chinese medical device market affected by changes in the regulatory landscape, healthcare reforms, and the system itself?
- Which medical equipment companies in China are open to foreign direct investment?

6. Methodology

• Methods

An economic sector's geographical or geographic reliance has been represented by a location quotient (LQ). A sector's share of the national economy divided by its share of the region's economic activity is known as its labor-quality ratio, or LQ. An explanation of the basic equation for the location factor in the regional economy sector is provided below:

$$LQ_{ij} = \frac{E_{ij}/E_i}{\sum_j E_{ij}/\sum_i E_i}$$

Where: E_{ij} = Employment in region i in industry j

" E_i = Total employment in region i "

E_{ij} = Employment in Industry in the Nation j

i

E_i = Employment nationwide

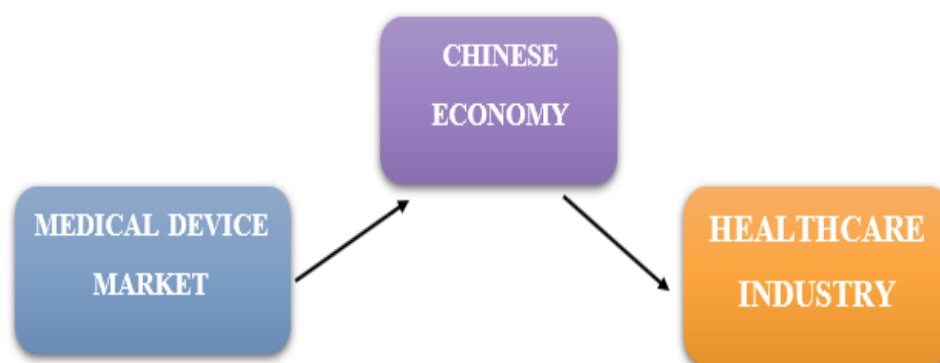
Employment is a common base for calculating the LQ analysis approach, however employment may be characterised in a variety of ways, such as manufacturing or services. An industry's "concentration" in a certain location relative to a broader geographical area, such the state or country, may be measured using industry LQ. As a result, the variables in the equation may be defined as follows: E_{ij} represents industry j 's financial activity in area i ; E_i stands for area i 's overall economic activity; E_{ij} represents industry j 's financial activity across the whole area; and E_i represents the total amount of financial transactions throughout the entire region. In this chapter, the locational analysis technique is used to investigate the following variables: The output value of the medical device sector in China is represented by the symbols E_{ij} , which stands for the province's production value of j in area i , E_i for China's gross domestic product, and E_{ij} for the province's gross domestic product. If LQ is more than 1, which suggests that the industry's output value exceeds the local need and that a significant amount of its products seem to be transferred to non-local industries or

locations, then it is assumed that the medical device company in this region has competitive advantages. In the medical device sector, if LQ corresponds to or less than 1, it means that neither the industry's output value nor its exports from the region meet local demand. There isn't much industry competitiveness in the region, therefore. The LQ index measures the concentration and industry professional level (specialisation) at the regional level. As LQ rises, so does the industrial concentration in the area. LQ is a ratio that illustrates the relative degree of professional level talents in that area, as opposed to the genuine level of specialism in each place. For instance, a region's high LQ in the medical device industry may result from its high industry output value or from its low regional manufacturing output value but high output value in medical devices. Consequently, "market share (MS)²⁵" is included into this study. The industry in the region has a competitive advantage when $LQ > 1$ and MS are above the national average level (average level = $100\% \div 30 = 3.33\%$ in this study).

• Data

The whole value of production in the medical device business in each Chinese province between 2001 and 2011 was calculated using the China Data Yearbook on the advanced technology sector. For further information, see the People's Republic of China's National Bureau of Statistics to learn about China's gross domestic product and gross local product. In most of these provinces, the value of medical device output rose dramatically between 2001 and 2011, indicating a possible quickening of the expansion of the Chinese medical device industry. The falling trend was then ascertained using this figure. Based on the available data, Zhejiang, Jiangsu, Guangdong, Shandong, Shanghai, and Beijing are the most productive Chinese provinces. China's provinces were divided into five groups according to these classification systems. China is divided administratively into twenty-three provinces, four municipalities (Beijing, Tianjin, Shanghai, and Chongqing), five autonomous regions (Guangxi, Xinjiang, Ningxia, Mongolia, Inner, and Tibet), and two special administrative areas (Hong Kong and Macau). In the field of medical devices, Taiwan is acknowledged as a province of China. They can see that this data is strewn all across the map of China. Despite the fact that Tibet, Taiwan, Hong Kong, and Macau are not included in data on the total output value of the medical equipment industry, 30 provinces including 4 autonomous territories and 4 municipalities were chosen for this research. Rather, the remainder of China is the main emphasis.

6.1 Conceptual Framework



7. Result

Each province's LQ outcomes are assessed based on the statistics; Table 1 shows this evaluation.

Table:1 LQ For Every Chinese Province Between 2001 And 2011

Q	Beijing	Tianjin	Hebei	Shanxi	Inner Mongolia	Liaoning	Jilin	Heilong-jiang
2001	3.569	1.730	0.292	0.190	0.024	0.891	0.398	0.397
2002	3.173	1.475	0.246	0.149	0.020	0.930	0.348	0.255
2003	3.136	1.542	0.307	0.217	---	0.914	0.435	0.158
2004	2.586	1.165	0.251	0.179	0.004	0.809	0.498	0.213
2005	2.477	0.894	0.238	0.251	---	0.728	0.295	0.192
2006	2.286	0.858	0.230	0.217	---	0.718	0.255	0.181
2007	1.986	0.659	0.252	0.201	---	0.832	0.257	0.226
2008	1.792	0.751	0.227	0.136	0.004	0.931	0.390	0.173
2009	1.631	0.645	0.283	0.146	0.022	0.954	0.403	0.176
2010	1.412	0.607	0.288	0.142	0.029	0.857	0.452	0.153
2011	1.247	0.417	0.264	0.138	0.016	0.693	0.415	0.114

	Shanghai	Jiangsu	Zhejiang	Anhui	Fujian	Jiangxi	Shandong	Henan
2001	3.015	2.099	2.399	0.333	0.506	0.350	0.640	0.275
2002	2.840	1.848	2.044	0.534	0.604	0.635	0.612	0.257
2003	2.304	1.709	2.198	0.573	0.738	0.511	0.633	0.221
2004	2.435	1.572	1.682	0.486	0.560	0.596	0.653	0.439
2005	2.026	1.577	2.023	0.478	0.480	0.497	0.824	0.349
2006	2.032	1.752	2.041	0.454	0.476	0.553	0.952	0.531
2007	1.925	1.935	2.032	0.504	0.465	0.663	0.967	0.595
2008	1.838	2.683	1.598	0.283	0.390	0.747	0.832	0.619
2009	1.526	2.798	1.683	0.611	0.396	0.763	0.897	0.679
2010	1.542	2.948	1.698	0.640	0.383	0.797	0.821	0.607
2011	1.377	3.389	1.427	0.654	0.389	0.788	0.834	0.710

	Hubei	Hunan	Guang-dong	Guangxi	Hainan	Chong-qing	Sichuan	Guizhou
2001	0.869	0.592	0.796	0.131	0.185	2.194	0.310	0.150
2002	0.830	0.616	0.819	0.171	0.133	2.017	0.362	0.184
2003	0.632	0.347	0.878	0.236	0.039	2.152	0.390	0.258
2004	0.430	0.329	1.479	0.193	0.015	1.691	0.327	0.258
2005	0.647	0.390	1.433	0.195	0.003	1.467	0.343	0.210
2006	0.595	0.363	1.212	0.165	---	1.339	0.411	0.188
2007	0.528	0.381	1.295	0.186	---	1.118	0.446	0.197
2008	0.423	0.865	1.079	0.206	---	1.080	0.632	0.117
2009	0.377	0.780	0.842	0.230	---	0.949	0.693	0.158
2010	0.314	0.911	0.841	0.261	---	1.126	0.336	0.113
2011	0.252	1.026	0.788	0.213	0.229	0.866	0.353	0.089

	Yunnan	Shaanxi	Gansu	Qinghai	Ningxia	Xinjiang
2001	0.390	1.411	0.241	---	1.936	0.014
2002	0.405	1.291	0.247	---	1.980	0.007
2003	0.331	1.087	0.362	0.222	1.472	0.021
2004	0.231	1.278	0.178	0.233	1.256	0.027
2005	0.190	0.855	0.138	0.191	0.938	0.033
2006	0.212	0.978	0.090	0.121	0.214	0.025
2007	0.181	0.796	0.081	0.137	0.572	0.027
2008	0.180	0.427	0.030	0.136	0.487	0.018
2009	0.160	0.749	0.066	0.065	0.496	0.023
2010	0.147	0.595	0.050	0.053	0.406	0.020
2011	0.092	0.631	0.033	0.053	0.327	0.010

Beijing and Shanghai, Jiangsu, Zhejiang, and other four administrative divisions in the area had the greatest professional level and competitive advantages in the medical device business from 2001 to 2011. These areas lack a competitive advantage because their high levels of industrial professional development are below the national average. Nonetheless, there is room for expansion given the competitive advantages the local medical device business has. This region, with low LQ and high MS, has been home to Shandong province, Liaoning, and Henan for the last eleven years. In the medical device business, these locations enjoy a national competitive edge, but this advantage does not translate to the federal level. In spite of this, each province has a number of strong businesses. The medical device industry in these areas expanded slowly in the beginning since there was no professional competitive advantage and its economic value was lower than the national average. Guangdong, the province with the largest economic impact in China, makes a major contribution to the national budget. The professional level of the medical device industry moved from area C to area A, indicating that Guangdong's sector is now ahead of the rest of the country in this respect. The medical device sector is growing, according to statistics, and is now accounting for a larger share of Guangdong's total industrial output.

8. Discussion

Beijing, Shanghai, Jiangsu, and Zhejiang were the four administrative divisions that made up China's medical device sector between 2001 and 2011. Compared to the rest of the nation, these locations provide the greatest professional calibre and substantial competitive advantages. However, these sites don't have a competitive edge due to their low MS levels. The province of Shandong has been in this area for eleven years, with a low LQ and an elevated MS. There also resides Liaoning. Henan had lived in area D before moving to area C. The medical device businesses in these locations have unique local competitive benefits that indicate potential avenues for future growth. Guangdong, the most financially prosperous province in China, seems to be dominating the medical device business nationally as shown by the fact that the industry has moved from area C to area A. The Pearl River Delta (Guangdong) in the south and the Yangtze River Delta (Shanghai, Jiangsu, and Zhejiang) in the east are home to the majority of China's medical device sector. These are the Southeastern zone and

the Bohai Financial Rim (Beijing, Shandong, Liaoning, etc.) in the North (Stephenson et al., 2020). Specialised medical device businesses in these areas have a competitive edge; in 2011, they had around 77% of the market share. China's medical equipment market is dispersed, with concentration limited to certain areas like the three economic zones. The provinces of Jiangsu, Zhejiang, Shandong, Guangdong, Shanghai, and Liaoning were between the top seven in terms of the average total output value of the medical device industry between 2001 and 2011. The three economic zones share a number of characteristics, including the development communication networks that enable trade and technical exchanges, a strong industrial base that supports the growth of medical devices, and prestigious Chinese colleges and universities that provide 74.87% of medical device revenues in 2010 came from sales profits in these categories. The research does, however, have many limitations, such as a sample size that is too small and the use of the LQ method, which could not correctly represent the genuine degree of specialisation. Integrating the LQ and MS methodologies may reduce the error rate linked to the LQ and provide more reliable results (Ye, 2020).

9. Conclusion

Like the Chinese economy, the medical equipment business is growing quickly in China. It should come as no surprise that there are a lot of investment opportunities in China's medical equipment business. Companies are already spending money in this market area because they think it has a promising future, particularly international firms. The Chinese government's reforms to healthcare, growing wages, and insurance accessibility, and expanding medical infrastructure all contribute to a more favourable business climate. Moreover, the improved organisation of the Chinese medical device industry brought about by the 2014 rules is advantageous to investors. These regulations were put into effect by China in 2014. This chapter provides advice to investors interested in purchasing medical devices in China by displaying the geographical distribution of the Chinese medical device market. This chapter also reveals the skilled level and degree of specialisation of the medical device industry in each province by integrating the geographical spread of the Chinese medical device sector with the LQ assessment. The LQ and MS matrices show that the three economic zones in China with the best investment possibilities are the Yangtze River Delta, the Pearl River Delta, and the Bohai Industrial Rim. To encourage additional foreign investment, the Chinese government has granted policy privileges to a few locations (Zhao et al., 2021).

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