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Financial Analysis of Listed Companies of Biological Vaccine Companies

-- Take D Bio for example

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Abstract: Financial analysis is an important tool for enterprises to improve management and optimize economic decisions. The analysis of corporate financial reports can provide directions and clues for improving management and provide decision support for users of financial report information. In this paper, we will take D Bio as an example and analyze its financial indicators to assess its solvency, operating capacity, profitability and growth capacity. The problems of the company's financial situation are pointed out and recommendations are given in a targeted manner to improve the company's competitiveness.

Keywords: Biological Vaccines, Public Companies, Financial Analysis, Biotechnology, New Crown Vaccines.

1. Introduction

As a rapidly developing high-tech industry, the biological vaccine industry has gradually become the focus of attention in the investment industry in recent years. 2023 has seen significant changes in the demand for vaccine markets since then. Within the past three years, many of the listed vaccine companies in China have achieved massive growth in profits through the development and production of new crown vaccines. However, the current historical changes in the biological vaccine market have had a considerable impact on vaccine companies. What is the financial situation and investment value of these companies? The text will take Company D as an example, analyze its financial statements, evaluate its growth prospects, and reflect the current state of development of the biological vaccine industry in which it is located. It is expected to be helpful to the development of current vaccine companies.

2. Literature Review

Financial analysis is a means of improving enterprise management and optimizing economic decisions by evaluating and analyzing the financial situation and operating results of an enterprise based mainly on its financial reports and other relevant information[1]. Financial analysis plays the role of a financial link in an enterprise. Through financial analysis, we can judge the business situation and profitability of an enterprise over a period of time, find out the problems in business management, and guide the enterprise management to make correct decisions. As a rapidly developing industry in recent years, the current financial status and operation level of listed companies in the biological vaccine industry are not only related to the development of the whole industry, but also affect the personal interests of investors. Based on this, this study aims to provide reference for the development of the vaccine industry by conducting a specific analysis of the financial situation of a listed company in China's biological vaccine industry, identifying problems and proposing corresponding improvement measures.

The construction of financial analysis index system is the basis of financial analysis and directly determines the reliability of the analysis results. In China, the early financial analysis was mainly conducted by some foreign banks and Chinese financial capitalists in China. Their financial analysis focused on the analysis of enterprise solvency. After entering the 1990s, some enterprises, government departments, economic scholars and financial workers began to actively explore in a more comprehensive financial analysis, and issues related to financial analysis began to receive the attention of many scholars, and more research results were achieved. These results have laid the theoretical foundation of the basic content of financial analysis in China. In the article "A Trial on the Evaluation Index System of Enterprise Financial Analysis", Monday Hong and Kong Long[2] pointed out the defects of the existing financial evaluation system and proposed five major index systems of financial structure, short-term solvency, operating capacity analysis, profitability and growth status in 1998. The deficiencies of the eight indicators of the new financial analysis index system of Chinese enterprises were improved, but the division of the indicators was not streamlined enough. Zhang Xianzhi[3] in 2001 in "Thinking about building China's financial analysis system" built China's financial analysis system and content into four modules: analysis principle, accounting analysis, financial analysis, and comprehensive analysis, in which financial analysis includes four aspects of profitability analysis, operating capacity analysis, solvency analysis, and growth capacity analysis. The basic contents of our financial analysis system are constructed. In 2008, Shi Guozhu[4] summarized the existing financial analysis indexes of listed companies into four major aspects: solvency, operating capacity, profitability and sustainable development in his "On the Comprehensive Application of Financial Analysis Indexes of Listed Companies". A complete set of financial analysis index system for listed companies is set up, but there are shortcomings in the design of specific indexes. Li Junmei and Li Jimin[1] pointed out the limitations of the current financial index system in China and proposed improvement measures in "Discussion on the financial analysis index system" in 2009. This viewpoint was put forward to enrich the content of the financial index system, but the practical application was not considered. Chen Juan[5] in 2015 in the article "Research on the application of financial analysis - taking Dongguan Yuanmeng Home Textiles Co. as an example" selected the operation status, solvency, operational efficiency and profitability for the financial analysis of Dongguan Yuanmeng Home Textiles Co. The indicators of financial analysis were applied practically, but there were problems of incomprehensiveness in the selection of indicators. Based on the above, this paper proposes the following improvement methods for the selection of the financial analysis index system: Firstly, the four aspects of solvency, operating capacity, profitability and growth capacity are selected for the analysis, which can evaluate the financial situation of the enterprise in a more comprehensive way and do not repeat each other. Secondly, we try to select the most representative indicators that can truly and objectively reflect the actual situation of enterprises.

Scholars at home and abroad have studied the issue of index system of financial analysis and summarized different index systems, but in summary, most scholars on this issue have concluded the four aspects of solvency, operating capacity, profitability and growth capacity. The research in this paper summarizes the conclusions of previous scholars' studies and selects the most representative indicators among these four aspects of the index system to conduct financial analysis of D-listed companies. The existing research shows that these indicators can reflect the financial status of enterprises in a more realistic and comprehensive way.

Based on the above literature analysis, this paper selects the indicators of four dimensions, namely, solvency, operating capacity, profitability and growth capacity, for financial analysis. Solvency refers to the ability of an enterprise to pay off its debts under the existing asset scale and operation mode. In this paper, the indicators of solvency are selected as gearing ratio, current ratio and quick ratio. Operating capacity indicators are usually used to assess the turnover speed of the enterprise's assets. In this paper, the indicators of operating capacity are accounts receivable turnover, current assets turnover, fixed assets turnover and total assets turnover. Profitability directly indicates the ability of an enterprise to earn profits. The indicators of profitability in this paper are selected as return on net assets, net margin on total assets, net sales margin and gross sales margin. Growth capacity refers to the level of the company's effective use of growth opportunities to increase investment to expand production operations, reflecting the sustainability of business expansion over a period of time. In this paper, the indicators of growth capacity are selected as operating revenue growth rate, net asset growth rate and total asset growth rate.

3. Analysis of Financial Indicators of D Bio

3.1. Company Overview

D was incorporated in Antigua and Barbuda on March 1, 1999 as a Beijing-based biotechnology company and was the first vaccine company in China to be listed on the Nasdaq Global Select Market (NasdaqGS: SVA). The company is engaged in the research, development, manufacture and protection of vaccines against infectious diseases, with a product pipeline covering influenza vaccines, hepatitis A vaccines, enterovirus vaccines and many other products. The company has a concentrated shareholding, owning five companies including Beijing KeXing, KeXing (Dalian) and Beijing KeXing Zhongwei through its wholly-owned subsidiary KeXing Holdings (Hong Kong) Limited, and has four industrial bases in Haidian, Changping, Daxing in Beijing and Dalian in Liaoning.

Company D is a leading vaccine manufacturer in China and attaches great importance to R&D innovation. The company has independently developed seven first vaccine products, obtained five national new drug certificates, nearly 60 national invention patents for its core technologies, and published more than 120 SCI papers on its research results. At present, the company has a R&D team of more than 150 people, with the proportion of doctors being about 70%, and a number of overseas high-level talents have been introduced. We have a national postdoctoral research station and have established cooperation with many universities, institutes and research institutions at home and abroad.

When the New Crown epidemic broke out in 2020, D, as one of the first companies to develop the vaccine, was the first to be approved for emergency use in several countries, and its New Crown vaccine became one of the most used vaccines in the world. Based on the sales of New Crown vaccine at home and abroad, Company D's operating income grows significantly in 2020-2021. However, revenue from sales of New Crown vaccine declines in 2022, according to D's published annual report.

3.2. Analysis of D Bio's financial indicators for the period 2018-2022

3.2.1. Solvency Analysis

As shown in Table 1 and Figure 1, Company D's gearing ratio increases and then decreases from 2018 to 2022, and is only 0.09 in 2022, and the five-year average value is 0.22. By analyzing the financial ratios of listed companies in the vaccine industry, we can conclude that the five-year average gearing ratio of the industry is 0.39. Company D's gearing ratio is much lower than the industry average, so Company D's long-term Company D's gearing ratio is much lower than the industry average.

Table 1. D Bio Corporation Solvency Analysis 2018-2022

Solvency Indicators	2018	2019	2020	2021	2022	Average value
Gearing ratio	0.21	0.22	0.41	0.17	0.09	0.22
Current Ratio	4.88	4.01	2.30	6.18	11.11	5.70
Quick Ratio	4.45	3.69	2.14	6.03	10.94	5.45

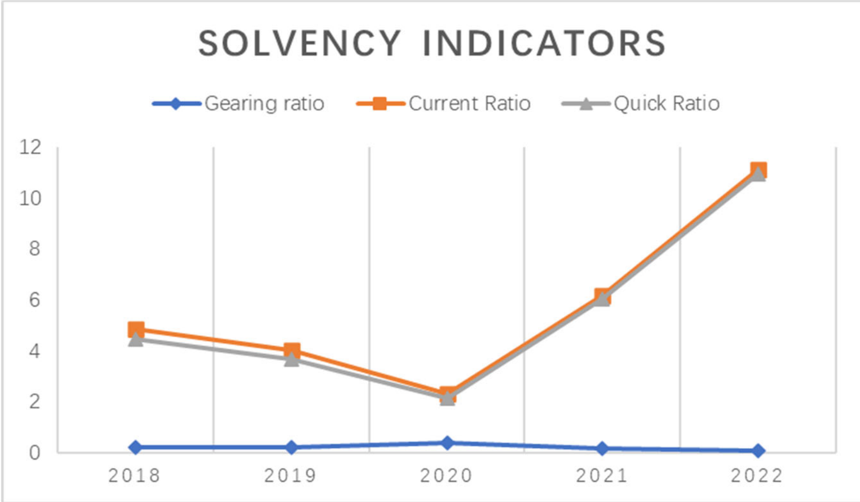

Figure 1. Solvency Analysis of D Bio Corporation 2019-2022

Company D's current and quick ratios show a decrease followed by an increase from 2018-2022, both of which have similar curves. The four-year averages of current ratio and quick ratio are 5.7 and 5.45, respectively, which are higher than the four-year averages of 4.16 and 3.47 for the industry in which they are located. this clearly shows that Company D has a stronger ability to repay short-term debt, and also indicates that Company D is not fully utilizing external liabilities and has a weaker financial leverage effect. In addition, Company D's current ratio and quick ratio have a more significant decrease and increase in 2020 and 2022, respectively. After analyzing Company D's annual report, it is clear that Company D expands its debt in 2022 when it expands its new crown vaccine production line, resulting in both indicators being below the industry average in 2020; the increase in 2022 can be attributed to sufficient capital from earnings, which does not require debt to operate. However, the high current and quick ratios of Company D in 2022 also have a negative impact, as the company's current assets are over-taxed, which affects the efficiency of the company's capital utilization and reduces profitability.

3.2.2. Operating Capacity Analysis

From Figure 2 and Table 2, we can understand that all the operating capacity indicators of Company D have a similar direction in 2018-2022, i.e., they fluctuate slightly in 2018-2020, reach a great value in 2022, and then fall back to the minimum value. And the turnover rate of accounts receivable and fixed assets increases much more than the turnover rate of current assets and total assets. The reason for this is that the expansion of D's asset size mainly originates from the increase of cash-based assets, so the increase of accounts receivable and fixed assets is smaller than that of current assets and total assets.

Table 2. D Bio Corporation Operating Capacity Analysis, 2018-2022

Operating Capacity Indicators	2018	2019	2020	2021	2022	Average value
Accounts Receivable Turnover Ratio (times)	3.27	2.61	2.78	32.13	2.00	8.56
Current Assets Turnover Ratio (Times)	0.94	0.78	0.53	2.35	0.11	0.94
Fixed Assets Turnover Ratio (Times)	3.12	3.39	3.72	35.11	1.57	9.38
Total Assets Turnover Ratio (Times)	0.69	0.60	0.43	2.08	0.10	0.78

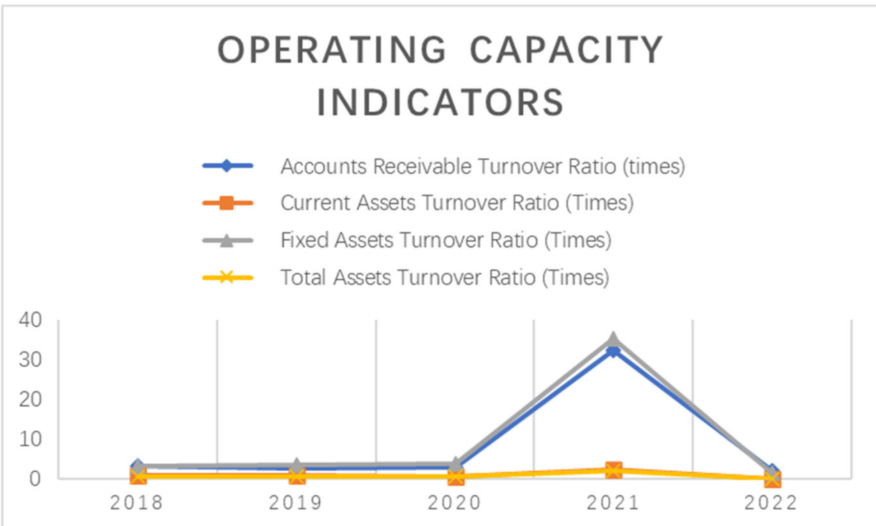

Figure 2. Operating Capacity Analysis of D Bio Corporation 2018-2022

After analyzing the operating capacity indicators of all listed companies in the vaccine industry, it can be concluded that the four-year averages of the four indicators in the vaccine industry are 5.29, 1.23, 4.83 and 0.61. It is easy to find that the averages of Company D are higher than the industry average amount, except for the current asset turnover ratio, which is due to the peak in 2021 pulling up the four-year average. However, comparing the industry averages of 2.22, 0.61, 3.82 and 0.37 for the four metrics in 2022, it is easy to see that Company D is already below the industry average. This indicates that in 2022 the company's operating income is lower, the efficiency of using all assets is decreasing and the operating capacity is lower than the industry average. By comparing various data of Company D with the industry, it can be found that Company D's current asset turnover ratio has the largest gap with the industry average, which is due to the fact that Company D used a large amount of free funds for short-term investment after achieving profitability in 2021, resulting in an excessive amount of current assets and a decrease in current asset turnover ratio.

3.2.3. Profitability Analysis

As shown in Table 3 and Figure 3, D Bio's return on net assets and total net assets margin have similar curves, increasing and then decreasing from 2018-2022. Net sales margin similarly exhibits an increase and then a decrease, peaking in 2021. Gross margin on sales, on the other hand, fluctuates and decreases in this range. The five-year averages for all four metrics are greater than the industry average, indicating that Company D's average profitability over the five-year period is highly competitive in the industry.

Table 3. D Bio Corporation Profitability Analysis, 2018-2022

Profitability Indicators	2018	2019	2020	2021	2022	Average value
Return on Net Assets ROE (%)	10.77	14.54	20.06	167.99	1.18	42.91
Total net asset margin ROA (%)	10.80	15.87	15.74	155.06	0.57	39.61
Net sales margin (%)	15.72	26.50	36.27	74.63	5.90	31.80
Gross sales margin (%)	89.23	86.80	86.84	94.47	54.15	82.30

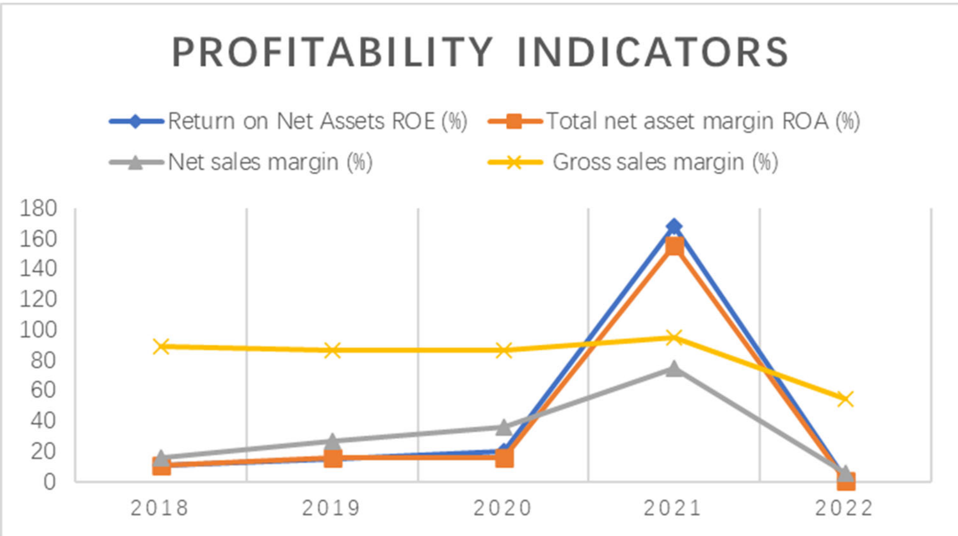

Figure 3. Profitability Analysis of D Bio Corporation 2018-2022

According to Figures 3, Company D's profitability metrics peak in 2021. After analyzing Company D's annual report in combination, it is clear that Company D's new crown vaccine is approved for conditional marketing in China in 2021, and the domestic revenue of new crown vaccine alone reaches \$10.5 billion. And due to the expansion of production scale, the marginal efficiency is improved and the ratio of cost and expense is relatively lower, so all profitability indicators of Company D are significantly higher in 2021. However, in 2022, all profitability indicators of Company D drop to the lowest point and are lower than the average value of the same industry in 2022. This is due to the significant decline in sales revenue of New Crown Vaccine, the main source of profit for Company D. Domestic New Crown Vaccine revenue in 2022 is only \$700 million, resulting in a decline in net profit. At the same time, total assets and total equity remain high due to the growth in the previous two years, so the return on net assets and net margin on total assets drop significantly and the efficiency of asset utilization becomes worse. In other words, Company D was operating projects with large-scale assets that did not generate high revenues. In addition, Company D's net sales margin and gross margin have also declined significantly because Company D's costs and expenses have not decreased in the same proportion after the decrease in revenue and the company has increased its R&D expenses.

For Company D's extremely high profitability in 2021, the main reasons are the hard market demand under specific conditions, the advantage gained by Company D's early approval of New Crown, and the development of foreign markets. However, since 2022, the market demand for New Crown vaccine has changed dramatically and Company D's market is shrinking dramatically. It can be predicted that in 2023, Company D's profitability may experience further decline.

3.2.4. Growth capacity analysis

As shown in Table 4 and Figure 4, the growth rates of operating income, net assets, and total assets for Biological Company D fluctuate upward from 2018-2022, peaking in 2021 and decreasing to negative numbers in 2022. The five-year averages of 749.69, 286.78 and 226.28 for the three indicators are substantially higher than the industry average, indicating that Company D has expanded significantly in size during the last five years.

Table 4. Bio Corporation Growth Capacity Analysis, 2018-2022

Growth Capacity Indicators	2018	2019	2020	2021	2022	Average value
Operating income growth rate (%)	31.72	7.14	107.53	3,694.36	-92.30	749.69
Net Assets Growth Rate (%)	64.8	20.64	218.04	1138.79	-8.38	286.78
Total assets growth rate (%)	23.58	22.32	320.37	780.87	-15.72	226.28

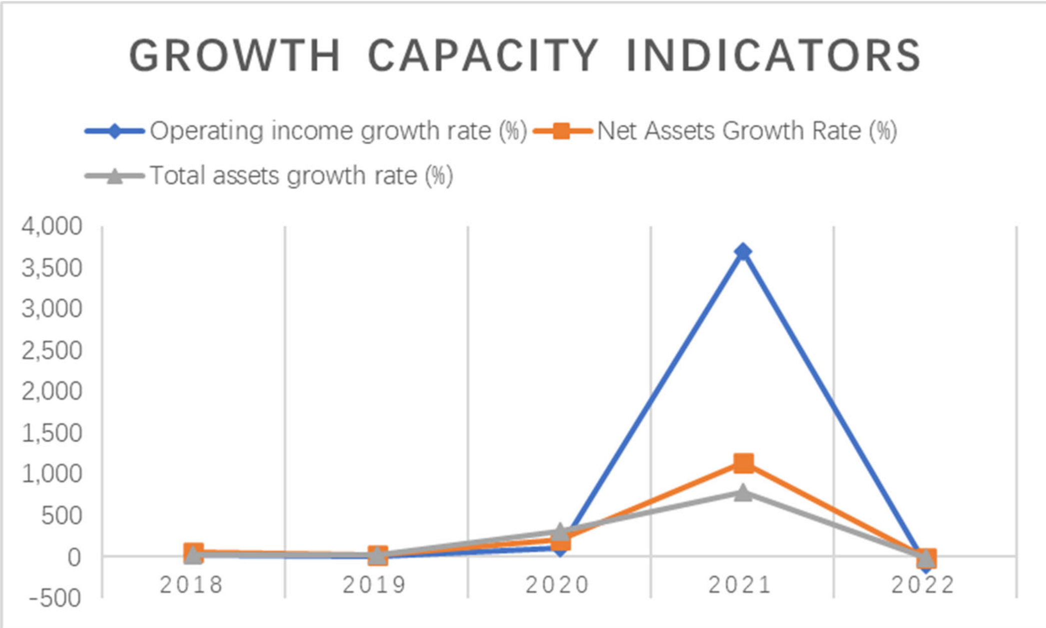

Figure 4. Bio Corporation Growth Capacity Analysis 2018-2022

Company D's significant growth in revenues and assets in 2020-2021 is likewise due to the mass production and sale of New Crown vaccine. The company, however, shrinks its various assets in 2022 following a decline in operating income, while net assets also show negative growth due to a reduction in retained earnings. company D's operations show some reduction in size in 2022.

4. Prospect analysis of D Bio

4.1. Change in the main source of income of Company D

Based on the above analysis of financial indicators, it is easy to see that all financial indicators of Company D increase significantly in 2020-2021, while most of them drop significantly to the lowest values in recent years in 2022. The main reason for this is the decline in revenue from sales of New Crown vaccine, which in 2022 declines by $9.8 billion year-on-year from domestic sales of New Crown vaccine in Company D. The decline in Company D's profitability leads to a decline in overall financial levels. This indicates that the golden period of growth brought by D's New Crown vaccine has passed and the company must rely on other vaccine varieties to achieve growth next.

4.2. Company D's industry still has room for rapid growth

After analyzing the industry in which Company D is located, this paper believes that the biological vaccine industry will still grow rapidly in the future. As for the domestic market, compared with developed countries, all commonly used vaccines in China are old varieties, the adult vaccine market has not been developed, and per capita vaccine expenditure is at a low level. With the trend of aging in China, the demand for expanded EPI coverage and the improved ability to pay for vaccines, there is room for rapid development of the adult vaccine market and second-class self-financed vaccines in China. Meanwhile, the government has formulated vaccine industry development plans and industrial policies to support the development and structural optimization of the vaccine industry and promote enterprises to accelerate technology accumulation, and the innovation and upgrade of the vaccine industry is expected to accelerate. As for the foreign market, the global vaccine market accounts for a small percentage, with a CAGR of 17.3% from 2020 to 2025, and the market scale and growth rate are expected to further increase.

4.3. D has good development prospects for key products

Analysis of Company D's main business reveals that Company D's product pipeline covers a number of key products such as influenza vaccine, hepatitis A vaccine and enterovirus vaccine. At present, the company has more than ten varieties under development, mainly including the combined vaccine series of Pak Pak, hand, foot and mouth vaccine, pneumococcal vaccine series, etc. These varieties are technologically advanced and have high growth potential. With the huge amount of capital brought by the new crown vaccine, D can still stand a firm position in the industry if it can continue to develop other vaccine products with high market demand.

5. Optimization Suggestions to Enhance the Financial Position of D Bio

5.1. Suggestions for solvency optimization

The average amount of gearing of D Bio is lower than the average amount in the industry, reflecting the high long-term solvency of the company. However, on the other hand, the company has more assets and has a large surplus of assets beyond the assumption of debt, which has a weak financial leverage effect. Therefore, the company should optimize the gearing ratio and increase the debt ratio appropriately in order to improve the earnings per share. At the same time, the current ratio and quick ratio of D Bio are also at too high level, indicating that the company has too many current assets. Therefore, Company D should reduce the proportion of current assets and use the surplus funds to either make long-term investments or invest in operating activities.

5.2. Suggestions for optimizing operating capacity

Several of Company D's operating capacity indicators have experienced an upward and then downward trend in recent years, and the values in 2022 are well below the industry average. The reason for this is that the change in revenue has led to a significant rise and fall in operating capacity, and the massive decrease in revenue in 2022 is not followed by a proportional decrease in assets. Therefore, Company D should focus its improvement on improving sales revenue and net profit. At the same time, strengthen the management of each asset and reduce the amount of assets appropriately to make them reasonable in size. company D has the largest difference in current asset turnover ratio compared to the level of its industry. Therefore, Company D should reduce the size of current assets and invest the excess assets in projects with higher profitability.

5.3. Profitability optimization suggestions

Company D's various profitabilities show a significant decrease in 2022, which is mainly due to a significant decrease in net income, while total assets and total equity do not decrease in the same proportion. Therefore, Company D should make efforts to improve its net profit. From the financial point of view, on the one hand, the company can expand sales and increase revenue; on the other hand, it should control costs and expenses and appropriately reduce the size of assets in order to improve the efficiency of capital use. From the business perspective, Company D should focus on the layout of new products that can bring profits, use the surplus capital to increase the investment in research and development, and establish the competitive advantage with the technology level. company D should analyze the domestic and international market demand, locate the adult vaccine market and the secondary vaccine market in China that have more room for development, and develop the products with greater market demand to bring new profit growth points for the company.

5.4. Growth capacity optimization suggestions

Company D's operating income, total assets and net assets show negative growth in 2022 after two years of high growth. It is normal for Company D's total assets and net assets to decrease due to the decrease in its main source of sales revenue. Therefore, Company D should focus its main goal on operating revenue growth, and the company should base on R&D to develop marketable vaccine types to increase market share and increase revenue. The growth of operating revenue will lead to the improvement of overall growth capacity.

On the one hand, Company D should increase the R&D and innovation of key vaccine varieties, such as influenza vaccine, 23-valent pneumococcal polysaccharide vaccine, varicella vaccine, live attenuated mumps vaccine and inactivated polio vaccine. These vaccines are affected by the rising awareness of vaccination among the public, the deepening trend of aging, and the low average vaccination rate of varicella vaccine among Chinese children, and there is a growing trend of market demand. On the other hand, Company D can develop new vaccine varieties with high market demand. The adult vaccine market and Class II self-financed vaccines in China currently have a large development space, and Company D can use sufficient funds to develop adult vaccine varieties, such as HPV vaccine, which will bring new sales revenue growth points.

6. Conclusion

In this paper, the financial ratios of D Bio's financial statements for 2018-2022 were analyzed by selecting indicators in four dimensions: solvency, operating capacity, profitability and growth capacity. It is found that all financial indicators of D Bio Company have a significant increase in 2020-2021, while a significant decrease in 2022, except for solvency. This paper analyzes the financial statements of Company D and concludes that the main reason for the fluctuation of Company D's financial position is the decrease in revenue from the sales of New Crown vaccine. Based on the indicators of the four dimensions and the analysis of the development prospect of Company D, we also give suggestions to improve the corresponding capacity respectively, in order to help the future development of Company D. Many companies in the industry of Company D also experienced similar fluctuations in 2020-2022, and this paper identifies problems and proposes countermeasures through the financial analysis of Biological Company D, hoping to help the development of the biological vaccine industry.

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