

Original Paper

A Study of the Performance of Successive Mergers and Acquisitions of WuXi PharmaTech's Pharmaceutical and Biotechnology Companies

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Abstract

With the development of the international CRO industry, the competition in the international CRO industry has become more and more intense, especially in the past decade, mergers and acquisitions and integration between multinational pharmaceutical companies are common. At the same time, the domestic CRO industry has also taken advantage of the M&A and integration of the international CRO industry to develop and grow rapidly and improve its competitive ability. As the largest domestic CRO company, WuXi AppTec is also continuously acquiring and integrating excellent enterprises in various industries, gradually forming a pattern of vertical integration. By collecting and collating the financial data during the acquisition cases, analysing the motivation of WuXi AppTec's M&A, and analysing the performance of the company by combining with the event study method, it can be seen that these consecutive mergers and acquisitions can indeed bring a positive and active impact on the development of WuXi AppTec. Further, the success of WuXi AppTec's successive M&A events can also provide reference experience for other pharmaceutical companies in China when they carry out successive M&A.

Keywords

Successive mergers and acquisitions, Performance study, WuXi AppTec

1. Introductory

Since the promulgation and implementation of the new Company Law of the People's Republic of China, Securities Law of the People's Republic of China, and Administrative Measures for the Acquisition of Listed Companies after 2000, the M&A and reorganization of listed companies have been further regulated, and on the premise of the relevant laws, M&A has been carried out in full swing in the country, followed by cross-border M&A and continuous M&A and other commercial behaviors. Especially in recent years, the pharmaceutical industry has established new systems at different levels of the “three doctors (medicine, health insurance and medical care)”, including centralized bidding and

purchasing of medicines, fee control of health insurance and hierarchical diagnosis and treatment, etc., and the state's supervision of the pharmaceutical industry has gradually increased, and the pharmaceutical industry has entered the stage of selecting the best and eliminating the worst; at the same time, the development of China's pharmaceutical industry has also shown a good development trend. At the same time, the development of China's pharmaceutical industry also shows a good development trend, mergers and acquisitions is a necessary way for China's pharmaceutical enterprises to internationalization, but also the development direction of its specialization and high concentration. As a leading company in China's medical service outsourcing industry (CXO), WuXi AppTec's business process is divided into three parts, i.e.: R&D outsourcing, production outsourcing and sales outsourcing. After several years of business expansion and mergers and acquisitions, WuXi AppTec now covers a wide range of fields such as CRO, CMO/CDMO and CMO. In the last two years, the company has expanded to 'CRDMO' and 'CTDMO' business models, which are considered to be the driving force for the company's long-term development. Successive mergers and acquisitions are undoubtedly the right choice for WuXi AppTec to achieve business model transformation, which not only reduces unnecessary waste of funds and selects acquired companies with development advantages, but also focuses on the development of other business directions. Therefore, based on the above development goals in 2019-2021, WuXi AppTec conducted three large-scale mergers and acquisitions. What is the motivation for WuXi AppTec's successive acquisitions? Has WuXi AppTec achieved synergies after successive M&As? How to evaluate the performance of WuXi AppTec's successive M&As? What kind of experience can WuXi PharmaTech provide to other pharmaceutical and biotechnology companies after the M&A process? All of these questions deserve in-depth study.

2. Literature Review

As early as 1983, foreign scholars Schipper and Thompson defined successive mergers and acquisitions (M&A) as the successive occurrence of multiple mergers and acquisitions by a single enterprise within a certain period of time, and referred to it as 'M&A programme'. Subsequently, domestic and foreign scholars in the 'merger and acquisition plan' on the basis of continuous mergers and acquisitions to carry out an in-depth discussion, but the precise definition of this concept, different scholars have different understandings, and did not reach a unanimous view. Domestic and foreign scholars have conducted in-depth discussions on successive mergers and acquisitions (M&A) on the basis of 'M&A plan', while different scholars have different understandings of the precise definition of this concept and have not reached a unanimous view. Xiaohui, Yao, and Yitao (2024) define continuous M&A as two or more times in five years; Yi and Shi (2024) define continuous M&A from the perspectives of time, amount, and number of M&As: two or more times in nine years can be regarded as a case of continuous M&A if the size of the transaction exceeds one million yuan; Tan, Zhang, and Song (2024) considers that two or more times in six years is a case of continuous M&A under the same strategic context. Xingcai (2023) on the other hand, shorten the time to one year, and M&A activities greater

than two times in one year meet the criteria of continuous M&A. Xiaoxu and Yu (2023) give a more precise figure, the time is within five years, the number of mergers and acquisitions is 12 times, and two conditions are satisfied at the same time to be defined as the continuous mergers and acquisitions of enterprises. Song, Wu, and Zhang (2023) do not provide a specific time criterion, but only suggest that a number of times within a short period of time can be regarded as consecutive mergers and acquisitions. However, many scholars are of the opinion that the criterion of successive M&As can be loosely defined without defining the number of years and the number of times. Up to now, domestic and foreign academics have not yet formed a unified standard on the timeframe and number of consecutive mergers and acquisitions.

3. Current State of Development of the Pharmaceutical and Biological Industry

3.1 Current State of Business in the Pharmaceutical and Biotechnology Industry

a. Average operating income in the pharmaceutical and biological industries

The industry to which WuXi AppTec belongs is the pharmaceutical and biological industry, with the domestic economy and civilisation developing at a high speed, people's hygiene and health consciousness has been improved, and domestic pharmaceutical and biological enterprises have been highly valued, so the pharmaceutical and biological industry has a huge space for development, and the average operating income of the industry has risen significantly. As can be seen from Table 1, the average operating income of the pharmaceutical and biological industry has increased from 1.597 billion yuan to 3.843 billion yuan in the five-year period from 2018 to 2022, and the average income of the pharmaceutical and biological industry has more than doubled. The quality of most national products has also reached or even exceeded the level of similar foreign products. China's pharmaceutical and biological industry is moving towards localisation, i.e. less imported pharmaceutical and biological products and more use of domestically produced pharmaceutical and biological products.

Table 1. Average Operating Revenues of Pharmaceutical and Biological Industries, 2018-2022

projects	2018	2019	2020	2021	2022
Industry average operating income (\$bn)	15.97	18.22	22.56	28.83	38.43

b. Average net profit of the pharmaceutical and biological industry

As can be seen from Table 2, the average net profit of the Pharmaceuticals & Biologics industry has been on an upward trend over the five-year period 2018-2022 after a slight decline in 2019 and the rest of the years. The average net profit of the industry has increased from 0.65 billion to 0.52 billion, an increase of nearly 10 times. Currently, China's pharmaceutical and biological industry is moving towards domestication, i.e., less imported pharmaceutical and biological products and more use of

domestically produced pharmaceutical and biological products, which has a great prospect for development.

Table 2 Average Net Profit of Pharmaceutical and Biological Industries, 2018-2022

projects	2018	2019	2020	2021	2022
Average industry net profit (\$bn)	0.65	0.36	2.3	3.3	5.2

3.2 Current Market Demand in the Pharmaceutical and Biological Industry

a. Total number of persons aged 65 and their share in the total population

At present, the international community generally considers that the proportion of people aged 65 or over to the total population is greater than 7 per cent, which is considered an ageing society. In 2015, the proportion of people aged 65 and over in our country had exceeded 11 per cent, and we had entered an ageing society. As shown in Table 1, in recent years, the proportion has tended to decline, but it is still above 11 per cent. As the population growth rate continues to slow down, the problem of population ageing in China will not be alleviated in the near future. As age increases, the biggest problem is medical care, because the physical quality of the elderly is getting worse, so they are more likely to get sick than young people, and as the demographic structure changes people's demand for medicines will also increase.

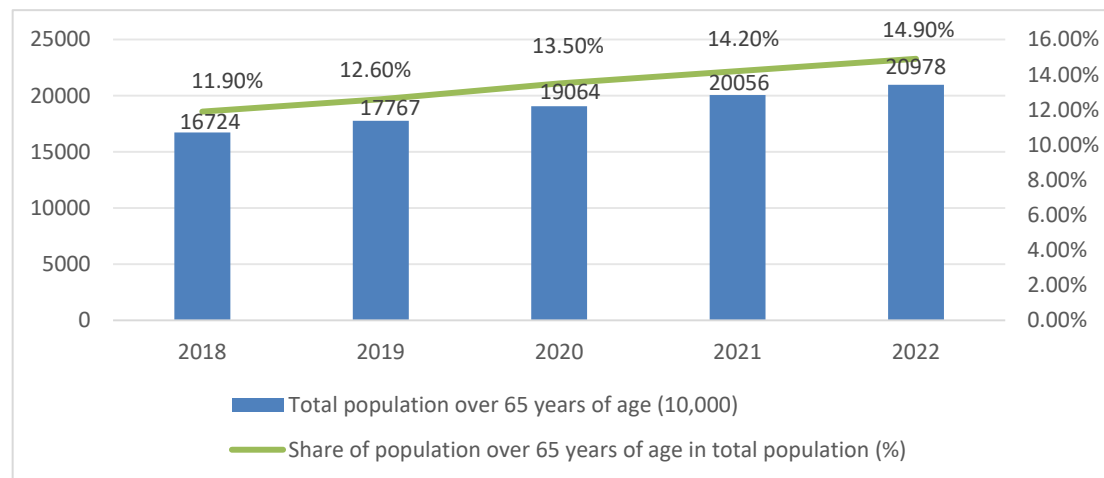


Figure 1. Total Population Aged 65+ and Share of Total Population, 2018-2022

b. GDP per capita

The increase of residents' income, which in turn promotes the upgrading of consumption, can be seen in Table 3, in 2018-2022, GDP has been growing steadily, and the per capita GDP is also increasing, at the same time, people's life is also improving, from the concern for basic life, gradually shifted to the importance of spiritual needs such as quality of life. And the issue of health and medical care becomes

first of all how to enhance people's quality of life and improve their health, so that residents can enjoy life more pleasantly. At present, China's medical insurance system is basically perfect, and the use of medical equipment has gradually reached the level of developed countries.

Table 3. China's GDP Per Capita, 2018-2022

projects	2018	2019	2020	2021	2022
GDP per capita	65650	70077.7	71999.6	81370	85698

c. Per capita health care expenditure and health care expenditure as a share of consumer expenditure

As can be seen from Figure 2, China's per capita health care consumer spending has been in an upward trend in recent years, only to decline in 2020. China's residents' health care expenditure accounts for a relatively low proportion of consumer spending, has been in the 8 per cent up and down, therefore, China's pharmaceutical and biological industry still has a relatively huge growth space.

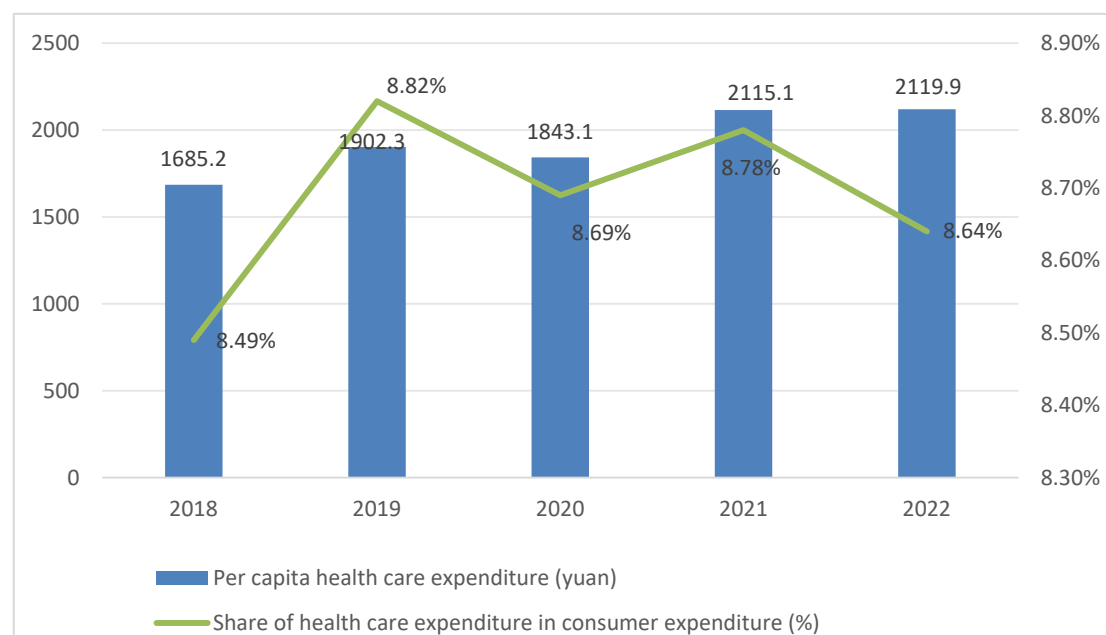


Figure 2. Per Capita Healthcare Expenditure and Healthcare Expenditure as a Share of Consumer Spending, 2018-2022

4. Mergers and Acquisitions Case Studies

4.1 Introduction of Companies on both Sides of the Merger and Acquisition

a. Merging Party

WuXi AppTec was founded in December 2000 and registered in Wuxi, Jiangsu Province. Over the years, WuXi PharmaTech has gradually built up an R&D and manufacturing service platform covering

the entire pharmaceutical outsourcing industry chain, bringing breakthrough therapeutic solutions to patients. WuXi AppTec's main business is divided into four major segments: laboratory services in China, CMO/CDMO services, clinical research and other CRO services, and laboratory services in the United States. China labs provide preclinical CRO, including drug discovery, drug analysis and testing services; CDMO/CMO services mainly provide small molecule drug process development and manufacturing services for pharmaceutical companies; clinical research includes clinical trials from phase I to phase III and registration application services; U.S. labs provide cellular and gene therapy and medical device testing services. Business level, WuXi AppTec was founded in December 2000, registered in Wuxi, Jiangsu Province. Over the years, the company has gradually established a R&D and production service platform covering the entire pharmaceutical outsourcing industry chain, bringing breakthrough treatment solutions to patients. WuXi AppTec's main business is divided into four major segments: laboratory services in China, CMO/CDMO services, clinical research and other CRO services, and laboratory services in the United States. China labs provide preclinical CRO, including drug discovery, drug analysis and testing services; CDMO/CMO services mainly provide small molecule drug process development and manufacturing services for pharmaceutical companies; clinical research includes clinical trials from phase I to phase III and registration application services; U.S. labs provide cellular and gene therapy and medical device testing services. At the business level, WuXi AppTec is one of the few companies that provide comprehensive and integrated new drug R&D and manufacturing services.

WuXi AppTec's revenue mainly from overseas customers, the company's latest annual report shows that in 2022, North America's revenue reached 25.884 billion yuan, China's revenue was 7.526 billion yuan, Europe's revenue of 4.432 billion yuan; of which North America's revenue growth rate reached a staggering 113%. The company adheres to the 'long tail strategy', the service scope from large pharmaceutical companies and biological companies to small and medium-sized, the number of customers more than 4100, accounting for 30% of the total number of global innovative drug companies. 2020 first half, the world's top 20 pharmaceutical companies accounted for the company's overall revenue proportion of 31.9%, long-tail customers accounted for 67.3% of the revenue. To date, WuXi AppTec carries the innovative R&D projects of more than 5,900 active clients in more than 30 countries around the world. 2021, WuXi AppTec is rated AA ESG (Environmental, Social and Governance) by Morgan Stanley Capital (MSCI), and the company is the explorer of the global Top10 in drug discovery and development services.

b. Acquiree

Pharmapace, Inc. was founded in 2013 in San Diego, California by Dr Zaiqian Shen in collaboration with two other experts. Pharmapace is a clinical research service provider offering a full range of services including clinical and statistical planning, data management, biostatistics, clinical data integration, and medical writing to clients in North America, Europe, and Asia.

OXGENE, Oxford Genetics, was founded in 2011 by experts with many years of experience in genetic

engineering from various fields of biology, focusing on providing a wide range of DNA expression vectors for researchers in different fields of biology and biotechnology industry users around the world. The company also provides scientists with a universal cloning platform and DNA insertion matching libraries, which can solve the cloning problems commonly found in current genetic engineering research.

Bristol-Myers Squibb's Couvet site in Switzerland, Bristol-Myers Squibb is committed to meeting China's urgent unmet needs for major diseases, focusing on two major disease areas, viral hepatitis and immuno-oncology, and is committed to introducing groundbreaking innovations in the areas of immuno-oncology, haematology, immunology, etc., to lead the industry's development, and to carry out diversified collaborations, in order to help Chinese patients to overcome their serious illnesses. Couvet Couvet's production site is located in Neuchâtel, Switzerland. The site has state-of-the-art manufacturing capabilities, enabling large-scale commercial production of capsules and tablets. The site meets industry-leading energy efficiency and environmental standards for a sustainable future.

4.2 Successive M&A processes

First M&A: 6 May 2019 - WuXi PharmaTech announced on the same day that it had completed the acquisition of Pharmapace, a clinical research organisation in the United States. After the successful merger, Pharmapace will be a wholly-owned subsidiary of WuXi AppTec's KinderHomage, and will focus its development on statistical data analysis as its core business in the future. In addition, Pharmapace will be merged with the clinical research and development (R&D) business of KinderHomage to increase KinderHomage's strength in clinical R&D. With the acquisition of Pharmapace, KinderHotwing will have more than 850 service personnel in China and the US, and together with strategic partners in Europe and Asia Pacific, we will provide comprehensive clinical R&D and Functional Service Outsourcing (FSP) to patients around the world.

Second acquisition: On 2 August 2021, WuXi AppTec's subsidiary, Hequan Pharmaceuticals, announced the successful acquisition of Bristol-Myers Squibb's (NYSE:BMJ) Couvet, Switzerland, formulation manufacturing site, which will further strengthen Hequan Pharmaceuticals' innovation capability and scale, and help its partners accelerate the process of new drug discovery and development for the benefit of patients around the world.

Third Acquisition: 2 March 2021 - WuXi AppTec announces the completion of its acquisition of OXGENE, a UK-based gene therapy technology company, which will retain its former name and become WuXi AppTec's first R&D and manufacturing site in Europe.

4.3 Analysis of WuXi AppTec's M&A Motivation

a. Realisation of synergies for competitiveness

Increased operational synergies Through continuous mergers and acquisitions, WuXi AppTec is able to integrate the upstream of the industrial chain, thus achieving internalisation of the pharmaceutical market, lowering overheads and R&D costs, thus reducing R&D costs, and improving the efficiency of pharmaceuticals. And by extending the industrial chain to the marketing terminal, it can bring down the

cost of sales, make the distribution chain of products shorter, and make production and sales one and the same, increasing revenues and profits, thus achieving operational synergy.

Increased management synergies WuXi PharmaTech has the world's largest research staff and scientific researchers in China's pharmaceutical CRO industry, accounting for 39% of the total, including 1,407 overseas PhDs and more than 10 years of overseas R&D experience. The companies that WuXi AppTec has acquired one after another are all focused on the CRO field. M&A is an important means for WuXi AppTec to rapidly expand and acquire new technology resources, which can improve management efficiency in the operation process by integrating the existing technology and technical talents of the merging parties, establishing a set of scientific and reasonable internal management system, and realizing the sharing of resources and complementing each other's strengths to promote WuXi AppTec's rapid research and development of new medicines, saving laboratory equipment and buildings and other fixed asset costs, thus achieving management synergy.

Increased financial synergies. The acquisition will not only enhance WuXi PharmaTech's capital, but also enhance WuXi PharmaTech's research and development capabilities in pharmaceutical quality, which will provide the company with more quality agents and efficient manufacturing, which will lead to more customers and orders, thus enhancing the company's cash flow. Moreover, it also reduces the cost of quality research. At the same time, WuXi AppTec's effective use of financial resources in mergers and acquisitions can also make reasonable adjustments to the company's capital structure as a way to reduce the financial risks of the enterprise and improve the efficiency of capital use, thus enhancing the company's solvency and achieving financial synergy effects.

b. Industry environment drives mergers and acquisitions

An enterprise is an important link in the market, and its operation and development are closely related to the industrial environment in which it operates. One of the reasons behind WuXi AppTec's frequent M&A activities over the past decade is the characteristics of the era and industrial structure in which it operates. Compared with developed countries, China's CRO market is still in a start-up stage, and its growth rate is significantly higher than the international average compared with the world average, therefore, international pharmaceutical CRO enterprises are scrambling to join the competition with a view to obtaining more profits. In the face of technological capital wars in developed countries such as Europe, America and Japan, as well as homogeneous competition among domestic enterprises, local enterprises can only accelerate their development, seize the opportunity of development and expand their market share in order to stand out in the market competition and enjoy industrial dividends.

In the era of increasing R&D investment by pharmaceutical enterprises and variety is the king, pharmaceutical enterprises prefer to cooperate with integrated and large-scale CRO companies that have R&D capabilities in specialised fields and are able to rapidly promote the R&D process and enhance the efficiency of R&D. Enterprises that can only provide a single stage of drug R&D services can no longer meet the R&D needs of pharmaceutical enterprises in the whole industry chain. Therefore, the development direction of China's CRO industry is standardisation and integration,

according to customer demand, the upstream and downstream of the industry chain to continue to expand, through their own formation, cooperation, or outward mergers and acquisitions and other forms, to provide customers with a full range of integrated new drug R & D, development, production type of services, and ultimately to become a winner in this market.

In the current competition in the industry, in order to gain competitive advantages and achieve 'import substitution', WuXi AppTec not only needs to achieve endogenous growth, but also to conduct outward mergers and acquisitions, with the expansion of the industry scale as the driving force, and at the same time, according to the company's characteristics and development trend, select a domestic and foreign enterprises that can achieve industrial synergies, so as to achieve the complementarity of advantages and resource sharing. complementary advantages and resource sharing, so as to meet the enterprise's requirements for future industrial layout.

c. Capture market resources

According to the theory of market power, the reduction of competitors after M&A will help the enterprise to control the production and operation environment, and at the same time, its own market share will be enhanced, so as to achieve monopoly or oligopoly in a certain area and obtain long-term excessive profits. Therefore, WuXi AppTec carries out successive M&A activities according to its own development strategy, allowing it to enter a new industry in a short period of time, increasing the enterprise's control over the market, which is conducive to the enterprise's creation of value, and ultimately aiming at achieving market dominance and occupying a dominant position in the market. In 2022, WuXi AppTec will add more than 1,400 new customers and have more than 5,950 active customers, and demand for the company's services from customers around the world will continue to grow very strongly (Li & Huang, 2025).

5. M&A Performance Analysis

5.1 Analysis of WuXi AppTec's Short-term Financial Performance

The article adopts the event study method to analyse the stock market's reaction to WuXi AppTec's successive mergers and acquisitions as a means of examining the short-term performance of WuXi AppTec's successive mergers and acquisitions.

a. Research process

Selecting event days and window periods. First, we treat the three mergers as a single event. To ensure the sensitivity of the stock market's reaction to mergers and acquisitions, this paper chooses the first announcement date of each firm's merger, denoted by $t=0$. If the announcement date is the date of the firm's suspension, the first day of that extension is used as the date of the event. Therefore, 6 May 2019, 2 February 2021 and 2 March 2021, which are the three acquisition dates of WuXi AppTec, are selected. Given the issue of window time selection, drawing on the common practice among scholars, 10 (-10,10) days prior to the event was used as the window for the study.

Qian and Youmeng (2022) calculating Excess Returns AR. The market adjustment model is used to

obtain excess returns, i.e., the deviation between the actual share price of a stock and the return of the market index is calculated during each event window as a way of reflecting how a stock's share price is affected by mergers and acquisitions.

The formula is: $AR_{it} = R_{it} - R_{mit}$

Where, denotes the individual stock return on day t of the window period for the ith M&A event, and denotes the market index return on day t of the window period for the ith M&A event.

Liu and Wang (2024) calculate the cumulative excess return CAR. The cumulative excess return is obtained by summing the excess returns for each day of the window period and is calculated as:

$$CAR_{it} = \sum_{-10}^{10} AR_{it}$$

b. Findings and analyses

Pharmacopeia's acquisition of Pharmapace Inc. in the US

The merger and acquisition event date is 6 May 2019, this paper from the Choice financial terminal collected WuXi KangDe share price and the SSE index historical data information for collation and analysis to get this merger and acquisition activities AR and CAR changes in Figure 3.

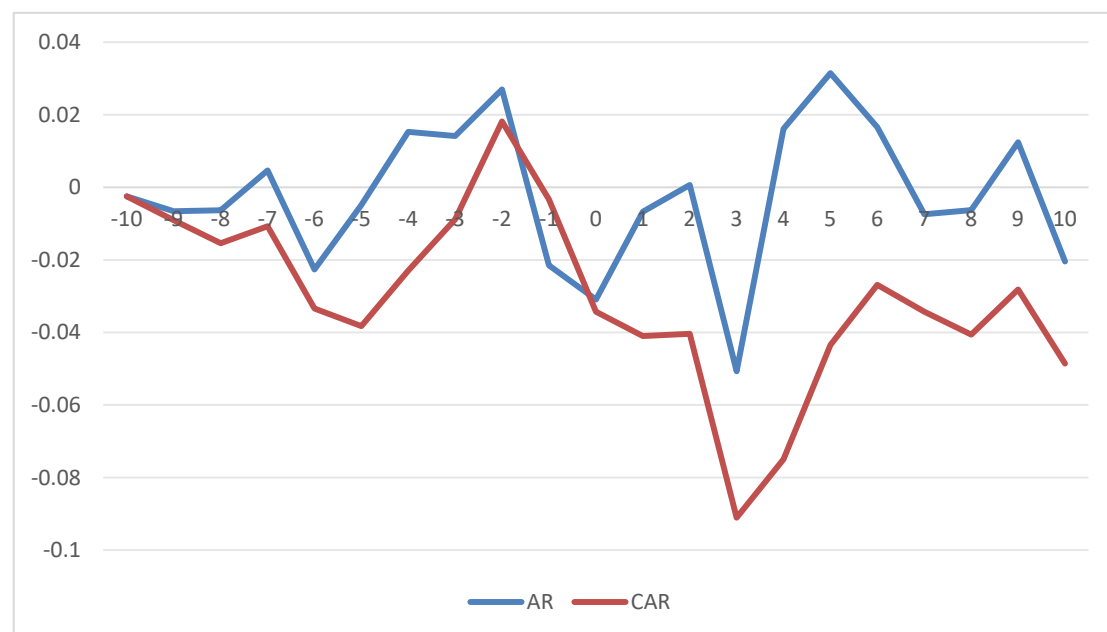


Figure 3. Trend of AR and CAR Changes during the Window of the Pharmapace Acquisition in the US

WuXi AppTec's acquisition of Bristol-Myers Squibb's Couvet site in Switzerland

The M&A event date is 2 February 2021, this paper from the Choice financial terminal collected WuXi AppTec share price and the Shanghai Stock Exchange Index historical data data for collation and analysis of this M&A activity AR and CAR changes in Figure 4.

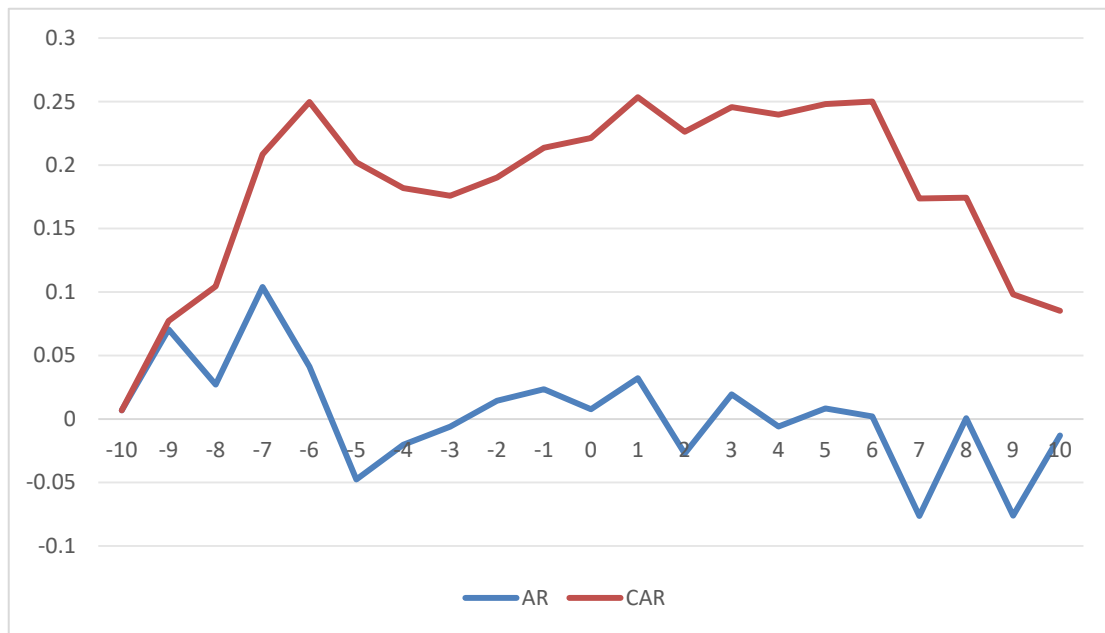


Figure 4. Trends in AR and CAR during the Window of Acquisition of Bristol-Myers Squibb

WuXi AppTec's acquisition of OXGENE

The M&A event date is 2 March 2021, this paper from the Choice financial terminal collected WuXi AppTec share price and the Shanghai Stock Exchange Index historical data for collation and analysis to obtain this M&A activity AR and CAR changes in Figure 5.

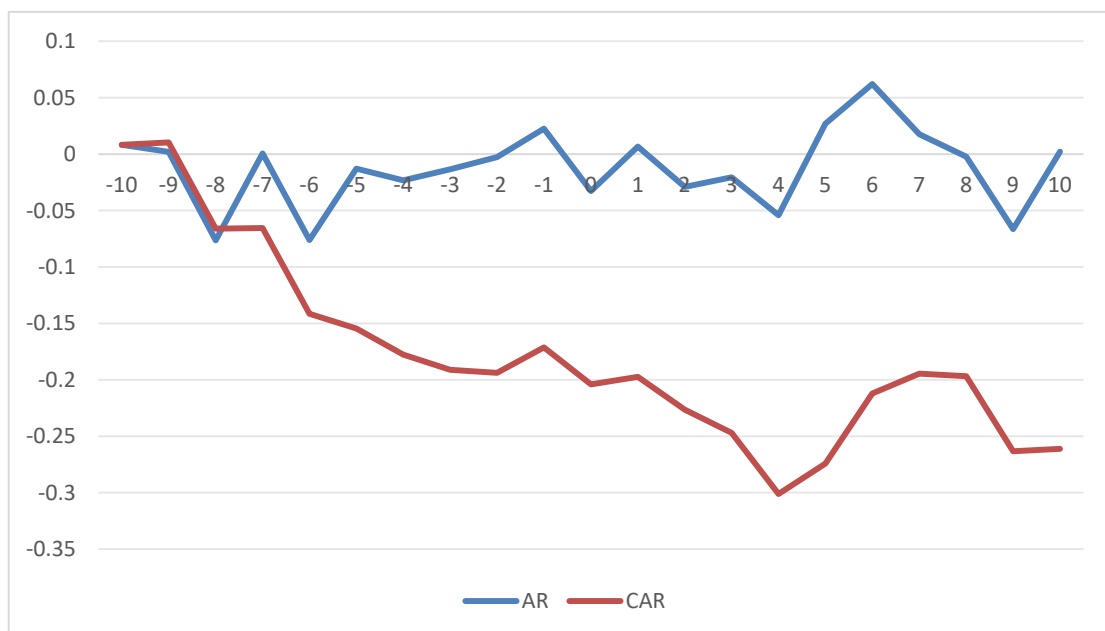


Figure 5. Trends in AR and CAR during the Third OXGENE Acquisition Window

Observing the results of the event study method (see Table 4), only one merger had a positive CAR, while the other two mergers had negative CARs, indicating that WuXi AppTec had negative excess profits in several consecutive mergers, while several of the company's mergers did not result in any gains for the company's shareholders.

Table 4. Cumulative Excess Return Results for the Three M&A Events

Event Number	DATE	(M&A)	Cumulative excess return
1	2019.5.6	Pharmapace USA, Inc.	-4.86%
2	202.2.2	Bristol-Myers Squibb Couvet, Switzerland	8.53%
3	2021.3.2	OXGENE	-26.11%

In addition, the average excess return (AAR) and cumulative average excess return (CAAR) over the window period are further analysed.

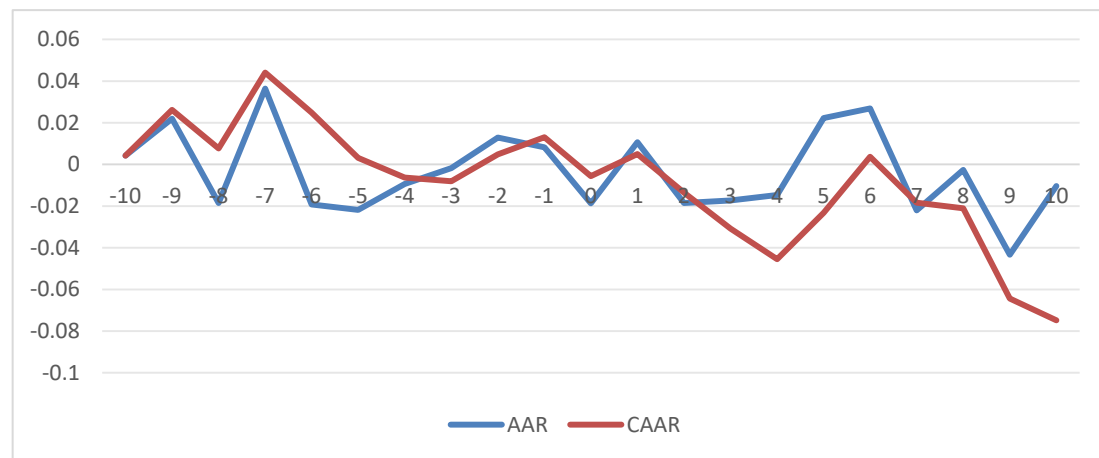


Figure 6. Trends in AAR and CAAR over the Three M&A Event Windows

As can be seen from Figure 6, the AAR fluctuates up and down around the value 0. Among them, AAR > 0 in 8 trading days and AAR < 0 in 13 trading days. 7 days before the announcement, the AAR value of continuous merger and acquisition of WuXi AppTec reaches the highest peak, which indicates that the event has not yet been announced, and investors who know the insider information have already made corresponding investments, which also verifies that the announcement effect is prone to antecedent characteristics. The AAR reaches its lowest value on the 9th day of the event announcement, and the CAAR shows a decreasing trend in general, with positive values from the 10th day before the event announcement date to the 5th day before the event announcement date, reaching a peak value of 0.044 on the 7th day before the time announcement date, and then decreasing to a negative value on the 6th day before the announcement date. It then rises briefly in the 3 trading days before the

announcement and then starts to fall continuously until the 4th trading day after the announcement. It began to decline continuously on the 6th trading day after the announcement date and dropped to a low of -0.075 on the last day of the Practical Research Methodology. Taken together, the above analysis shows that three consecutive mergers and acquisitions of WuXi PharmaTech in 2019-2021 and poor short-term levels of financial performance have resulted in negative cumulative excess returns for the company.

5.2 Analysis of WuXi AppTec's Long-term Financial Performance

a. Solvency analysis

The article selects quick ratio to measure short-term solvency and gearing ratio to measure long-term solvency.

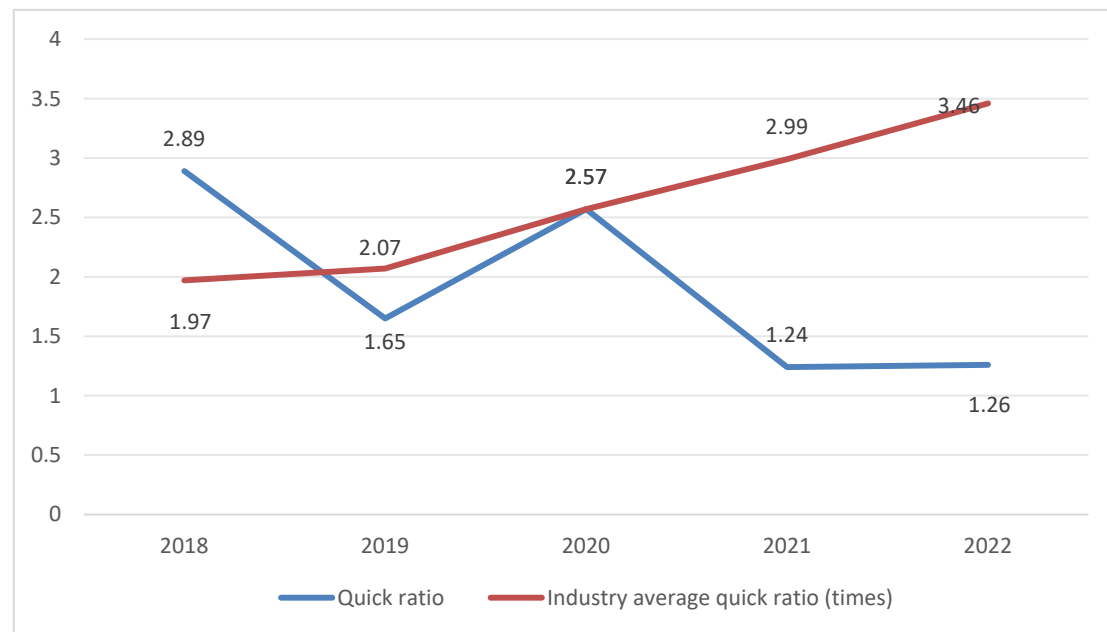


Figure 7. WuXi AppTec Quick Ratio Comparison 2018-2022

Although quick ratio is a positive indicator, its value is not the higher the better, generally speaking, quick ratio should be around 1. As can be seen from Figure 7, WuXi AppTec's quick ratio in 2018 is around 3, while the industry quick ratio has been above and below 2, indicating that WuXi AppTec may have more idle funds or accounts receivable. After WuXi AppTec's merger and acquisition in 2019, the quick ratio declined rapidly, but it is still above 1.5, and the large amount of outflow of funds does not have a threatening change in the short-term debt repayment ability of WuXi AppTec. 2020 WuXi AppTec's quick ratio rises again to around 3, mainly due to the nearly 5-fold increase in net cash flows from financing activities in 2020. 2021 shows a continuous downward trend in quick ratio, which is consistent with the results of WuXi AppTec's successive M&A behaviours, which reduces the quick ratio to a reasonable short-term solvency range through successive M&A.

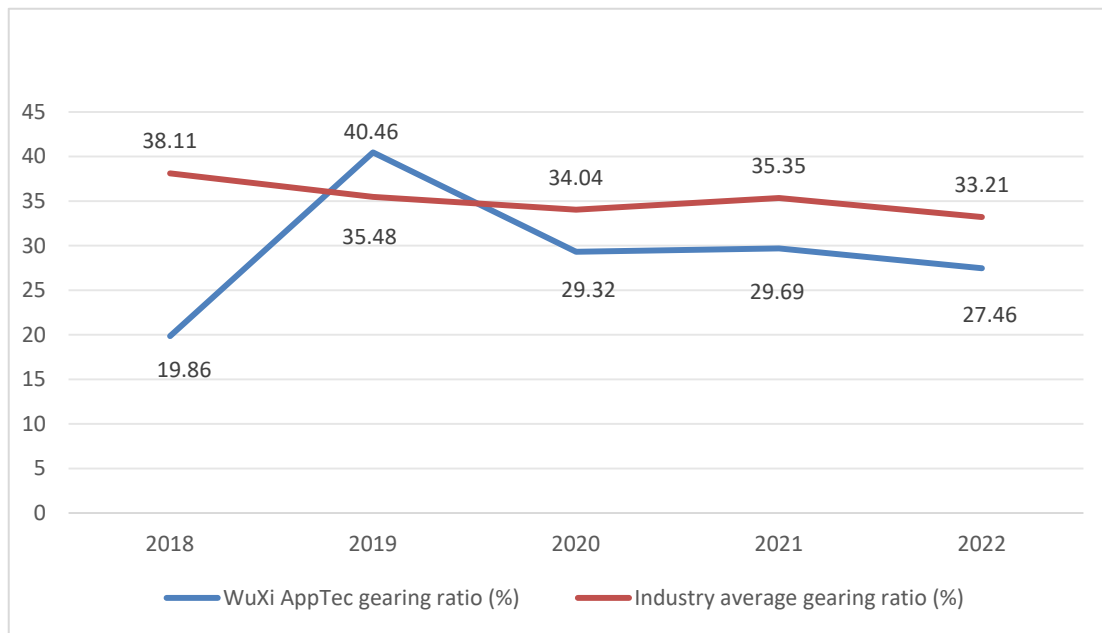


Figure 8. WuXi AppTec Gearing Ratio Comparison 2018-2022

Gearing ratio refers to the ability of an enterprise to use funds provided by creditors to carry out its business activities, and is also a measure of a company's ability to repay its debts in the long term. Usually, the alert upper limit of the gearing ratio of listed companies is 70%, 20% is the alert lower limit. As can be seen in Figure 8, WuXi AppTec's assets and liabilities ratio fluctuated greatly in 2019, but in the following years, it was a relatively stable state, and WuXi AppTec's assets and liabilities ratio was relatively high in the same industry. In the continuous acquisition, WuXi AppTec has not borrowed a large amount of debt, which also reflects its lack of debt management ability. Through the above analysis, it can be seen that WuXi AppTec's continuous M&A behaviour has played a positive role in improving the company's solvency and stabilising its operation, which is conducive to WuXi AppTec's long-term sustainable and high-quality development.

b. profitability

The article measures WuXi AppTec's profitability in terms of return on equity (ROE) and net sales margin.

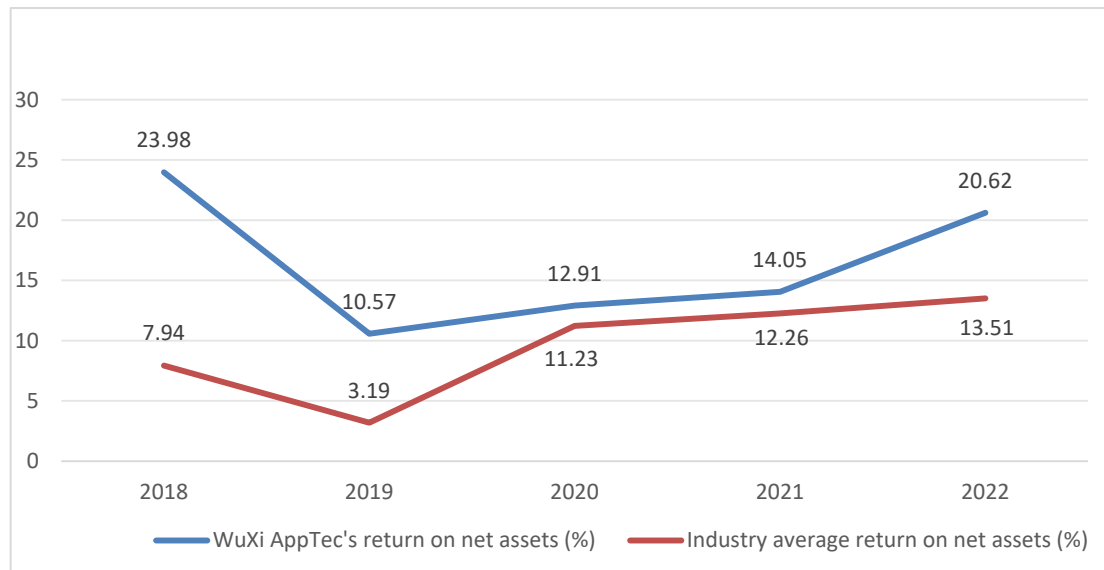


Figure 9. WuXi AppTec Return on Equity Comparison 2018-2022

Return on net assets, which reflects the level of return available to the owner's equity portion of the enterprise. As can be seen from Figure 9, WuXi AppTec's return on net assets has always been above the industry's return on net assets, and only briefly showed a decline in 2018, and has been on the rise after 2019, indicating that successive mergers and acquisitions have had a certain effect of enhancing WuXi AppTec's profitability. In addition, in recent years, the development of WuXi AppTec has been synchronised with the development trend of the industry, indicating that the M&A activities in these years have not had a more obvious impact on WuXi AppTec.2022 The gap between WuXi AppTec and the industry's return on net assets widens, indicating that WuXi AppTec's successive M&A activities have been integrated and completed, and synergistic effects have been realised.

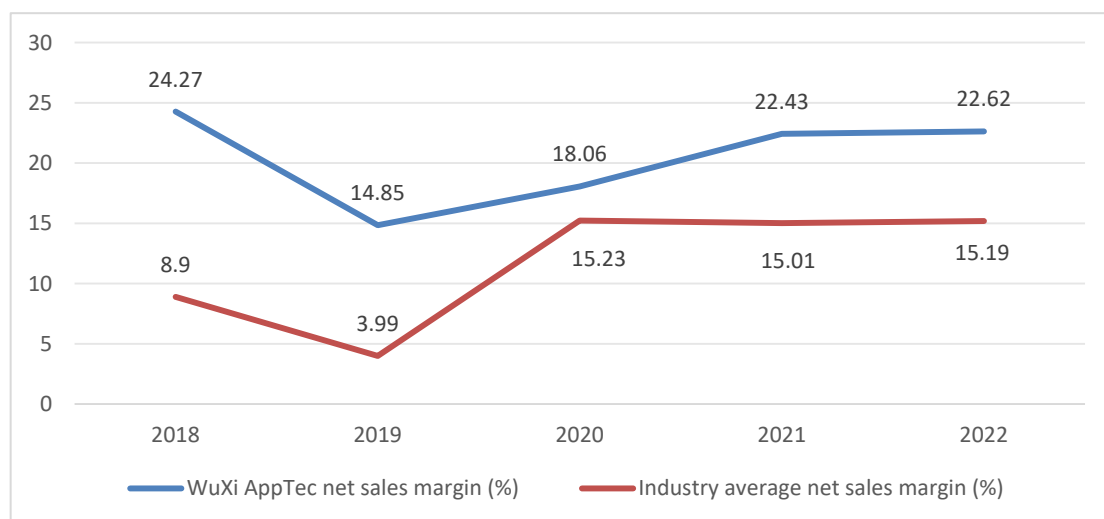


Figure 10. WuXi AppTec Net Sales Margin Comparison 2018-2022

Net sales margin is an indicator of the level of earnings that reflects the revenue of the enterprise, which can reflect the profitability of the enterprise. As can be seen from Figure 10, the net sales interest rate of WuXi AppTec in 2019 is a downward trend, indicating that at this time, the development of WuXi AppTec has a bottleneck, and there is an urgent need to seek new business growth. 2020 is the first year after the completion of the merger and acquisition of Pharmapace in the United States by WuXi AppTec, and this merger and acquisition has changed the structure of the main business of the company, and the company has successfully carried out the chemistry and testing business, and the income has been enhanced but the enhancement is small. 2019 to ah Mingkangde net sales margin declined, and it is mainly because of the sales costs and financial expenses of WuXi KangDe in 2019 are larger. Pharmaceutical and biological industry in 2019 after the sales margin fluctuation is not big, has been around around 15%, WuXi Kangde in a small rise after the maintenance of 22% above and below, indicating that the merger and acquisition of the United States Pharmace company in 2019 and the subsequent successive mergers and acquisitions of the United States Pharmace company injected a new vitality into WuXi Kangde, expanding the scale of the enterprise, and brought a strong impetus to the growth of WuXi Kangde's profits.

c. Analysis of operating capacity

A robust level of operation is the guarantee of debt repayment and profitability of a company, and the article selects inventory turnover ratio and total asset turnover ratio to measure WuXi AppTec's operating ability.

Table 5. WuXi AppTec and the Pharmaceutical and Biotechnology Industry's Operating Capacity 2018-2022

ITEM	2018	2019	2020	2021	2022
WuXi AppTec inventory turnover (%)	5.64	4.54	3.83	2.95	3.68
Industry average inventory turnover (%)	5.85	5.89	5.27	5.38	5.41
WuXi AppTec Total Asset Turnover (%)	0.55	0.50	0.44	0.45	0.66
Industry average total asset turnover (%)	0.58	0.56	0.48	0.53	0.58

As can be seen from Table 5, WuXi PharmaTech's inventory turnover ratio has been below the industry inventory turnover ratio, and has been showing a downward trend from 2018-2021, with the gap with the industry getting bigger and bigger, which indicates that WuXi PharmaTech's growth in the pharmaceutical and biological industry is not restricted but cannot get a substantial increase, and it has to choose to broaden its business. Inventory turnover ratio declined again in 2019 after the mergers and acquisitions, and it was due to the continued increase in WuXi AppTec's main business, raw material purchases, and inventory quantities, as well as the increase in production capacity, which led to a continued decline in its inventory turnover ratio. After the two mergers and acquisitions in 2021, it has

accelerated the rate of sales and thus the inventory turnover ratio has improved. This can show that WuXi AppTec can better manage its assets after mergers and acquisitions, thus improving the company's operating ability, and also can effectively control the company's resources and improve the efficiency of the company's resource utilisation. From 2018-2021, WuXi AppTec's total asset turnover ratio was relatively stable keeping floating above and below 0.5 times, and in 2022, WuXi AppTec's total asset The turnover rate increased slightly, and the total asset turnover rate of WuXi AppTec in recent years was basically in sync with the industry trend. After the beginning of the path of successive mergers and acquisitions in 2019, the total assets reached 64,690 million yuan in 2022 from 29,239 million yuan in 2019, and the total assets increased more, while the increase in operating income was even greater, which led to a relatively large increase in total asset turnover rate in 2022.

d. Analysis of development capacity

The article selects the growth rate of operating income and the growth rate of net profit to analyse the change of WuXi AppTec's development ability.

Table 6. Ability of WuXi AppTec and the Pharmaceutical and Biological Industry to Grow 2018-2022

ITEM	2018	2019	2020	2021	2022
Growth rate of WuXi AppTec's operating income (%)	23.80%	33.89%	28.46%	38.50%	71.84%
Industry average operating income growth rate (%)	46.02%	29.50%	24.94%	34.53%	25.38%
Growth rate of net profit of WuXi AppTec (%)	79.97%	-18.09%	56.23%	71.99%	73.34%
Average industry net profit growth rate (%)	58.04%	-41.27%	78.17%	-77.02%	-10.26%

From Chart 6, it can be seen that from 2018 to 2020, the revenue growth rate of the industry has been declining, which means that the growth of the whole pharmaceutical and biological industry has declined during this period of time. In 2019, WuXi PharmaTech merged and acquired a pharmaceutical company, and since it just entered into a new field, this figure had a significant increase in 2019. In 2020, the performance of the performance has declined again, mainly because in 2019, because of the increase in operating income after mergers and acquisitions, so that the operating income base in 2019 is very high, while the amount of operating income growth in 2020 is very limited, so it will decline in the ratio. 2020, WuXi AppTec has perfected its strategic layout through successive mergers and acquisitions in the previous period as well as has been maintaining a benign financial index, which has enabled it to play a role in the period of the epidemic and to seize the opportunity to get the development. Net profit growth rate can reflect the enterprise's ability to seize market share through its own operation and management. 2019 WuXi AppTec's net profit growth rate changes are largely consistent with the industry in a significant downward trend. Mainly because the base of net profit in 2018 is too large, the net profit growth in 2019 is limited, so its ratio will become smaller. In 2020, the

rapid development of the pharmaceutical and biological industry, the average net profit growth rate of the industry appeared to be a substantial increase, and reached the peak. In 2021, some tiny enterprises in the industry closed down, resulting in the decline of the average value of the industry. However, WuXi PharmaTech's net profit growth rate has been on an upward trend after 2020, indicating that WuXi PharmaTech has seized the growth opportunity after mergers and acquisitions, and the company's future is very bright.

5.3 Analysis of WuXi AppTec's Non-Financial Performance

a. Market Expansion Capabilities

Market share refers to the proportion of a company's sales revenue in the whole industry, which reflects the competitiveness of a company, and in general, the higher the market share of a company, the stronger its market competitiveness. As can be seen from Figure 11, WuXi AppTec's market share has been on an upward trend from 2018 to 2022, broadening its business scope and gaining synergies through successive mergers and acquisitions. The small increase in market share in 2021 was due to the successive mergers and acquisitions by WuXi AppTec of Bristol-Myers Squibb's Swiss Couvet production site and OXGENE in 2021, which greatly increased its Market share will further increase in 2022, reaching a new peak of 20.50%.

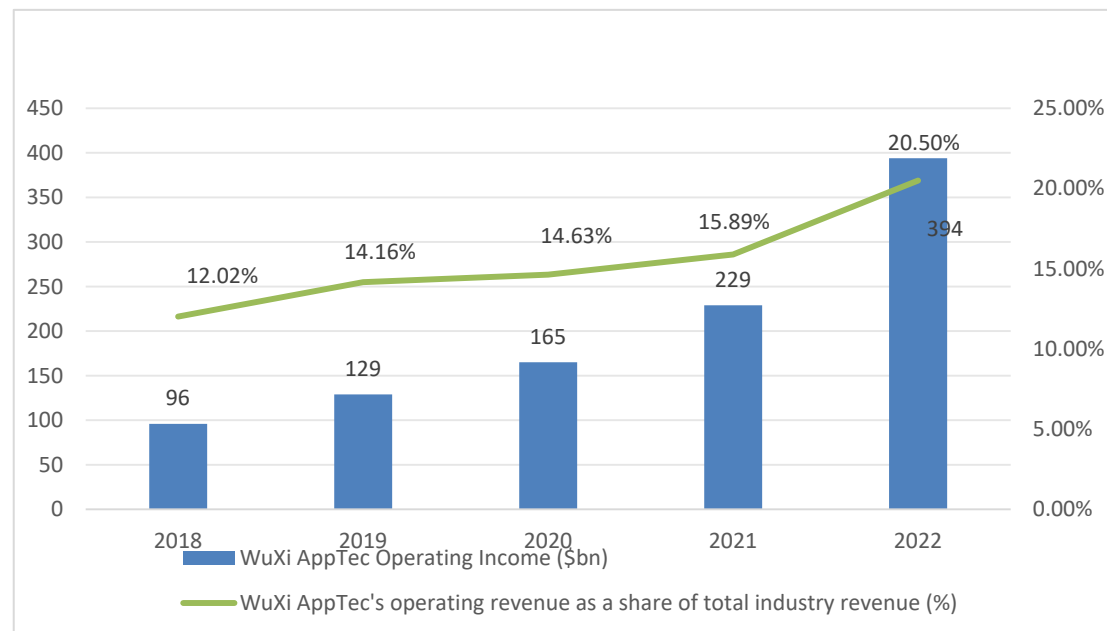


Figure 11. WuXi AppTec's Operating Revenue and Share of Total Industry Revenue, 2018-2022

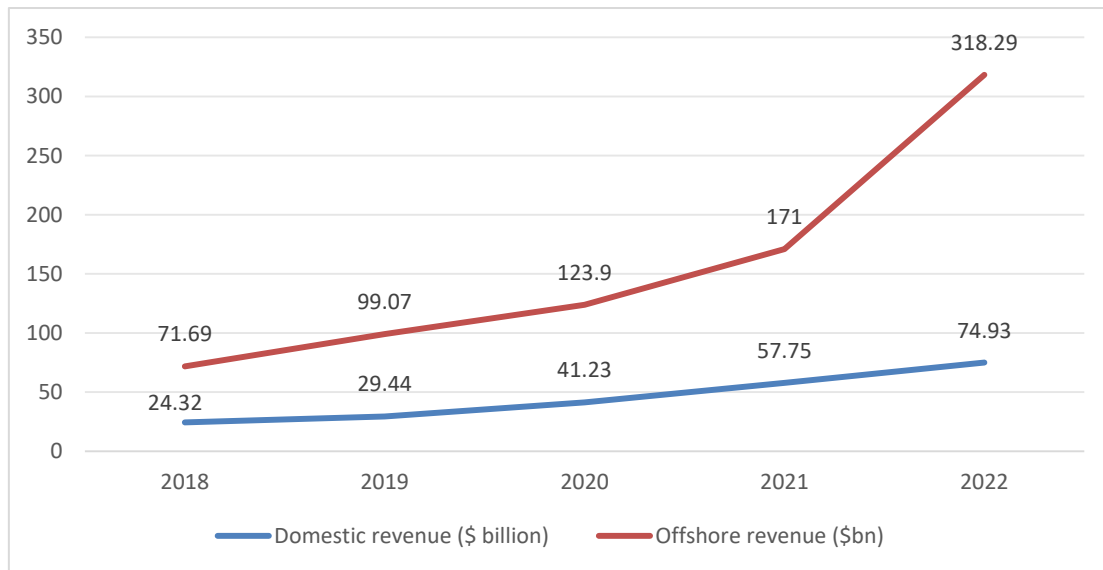


Figure 12. WuXi AppTec's Inbound and Outbound Revenues, 2018-2022

As can be seen from Figure 12, after a series of mergers and acquisitions, WuXi AppTec's overseas revenue has increased significantly, showing synergistic effects, and leveraging the brand effect of the overseas companies, which has greatly contributed to the expansion of WuXi AppTec's foreign markets and enhanced the company's visibility in the international arena. After several mergers and acquisitions, WuXi AppTec has rapidly occupied a share of the market globally by leveraging the strong global presence of the subject company. WuXi AppTec's sales both at home and abroad have been growing steadily, and its overseas sales revenue has reached \$31.8 billion in 2022, more than triple the previous \$7.169 billion, and its position in the international arena has changed dramatically. This shows that WuXi AppTec has greatly improved its ability to expand in the market as it continues to build its brand image through mergers and acquisitions.

b. Technological innovation capacity

R&D investment is a measure of investment in technological innovation, and the amount of human resources is the key resource for technological innovation of enterprises, both of which are evaluation indicators of the technological innovation capability of enterprises.

Table 7. Changes in WuXi AppTec's R&D Investment, 2018-2022 (in billions of yuan)

Year	R&D expenses	Operating income	R&D expense ratio (%)
2018	4.37	96.14	4.54%
2019	5.90	128.72	4.59%
2020	6.93	165.35	4.19%
2021	9.42	229.02	4.11%
2022	16.14	393.55	4.10%

From Table 7, it can be found that from 2018 to 2022, WuXi AppTec's R&D expenses are increasing year by year. In recent years, WuXi AppTec's revenue share has gradually decreased, which is mainly due to the fact that after the two mergers and acquisitions in 2019 and 2021, the company's operating revenue has increased significantly, coupled with the company's strengthening of the marketing system and branding, which has led to an increase in operating revenue, so although the R&D investment has increased, the proportion of the revenue has declined.

Table 8. Changes in the Number of Research and Development Personnel at WuXi AppTec, 2018-2022

Year	Number of R&D staff	Number of R&D staff as a percentage of the total number of people in the company
2018	13940	78.62%
2019	17872	82.19%
2020	21942	83.08%
2021	28841	82.61%
2022	36678	82.7%

Human resource is the core resource for the growth and development of a company, and the structure of the talent largely influences the construction and implementation of the company, which can guarantee the sustainable development of the company, and lays the foundation for the company to enhance its competitiveness, while the outstanding talent is the key to establish the competitive advantage. The functions of a company ultimately depend on the people in the company, therefore, staff culture and experience, etc. will have an impact on the implementation of the functions of the company. The optimisation of human resource structure can enable enterprises to better undertake the functions of enterprises and promote the high-quality development of enterprises. This paper assesses whether WuXi AppTec has optimised its corporate human resource structure during its successive M&A activities through the changes in the number of R&D personnel. In WuXi AppTec's personnel composition, the number of technicians grows year by year during successive mergers and acquisitions, more than tripling from 13,940 in 2018 to 36,678 technicians by 2022. This indicates that WuXi AppTec has increased its focus on the number of high-tech personnel when making consecutive mergers and acquisitions.

6. Conclusions and Suggestions

By combing the background of the medical device industry, starting from the market size, social environment and other aspects, this paper studies the financial performance and non-financial performance of the continuous M & A activities of Yaomingkangde with its continuous M & A motivation as the starting point.

1. In terms of short-term performance, the event study method is used to conduct an empirical study on the continuous M & A behavior of Yaomingkangde listed companies. The results show that the CAR of only one M & A case is greater than 0, and the CAR of the remaining two M & A cases is less than 0, indicating that Yaomingkangde's short-term performance is poor and can not bring positive excess returns to shareholders under the continuous M & A behavior.
2. The financial index method is used to evaluate the long-term performance of Yaomingkangde. The results show that Yaomingkangde's profitability, solvency, operation ability and development ability have been improved in the continuous merger and acquisition.
3. Evaluate non-financial performance from the perspective of market expansion ability, R & D innovation and talent structure. After many mergers and acquisitions, the company's market share has increased significantly. During this period, WuXi PharmaTech pays more attention to scientific and technological research and development, and continues to invest more in R & D. At the same time, in terms of talent structure, the proportion of scientific and technological personnel has maintained a high proportion, ensuring the company's sustainable development. From this point of view, WuXi PharmaTech's non-financial performance has also been greatly improved and achieved a good integration effect.

From the case of Yaomingkangde's continuous mergers and acquisitions, the following suggestions can be given to other pharmaceutical and biological enterprises that need to be transformed and upgraded:

1. Based on the strategic planning, the listed companies are screened. In the process of mergers and acquisitions, we should start from our own development strategy, determine the goal and direction, and carefully select the target company under the premise of maximizing the synergy effect. Before selecting the target company, we should have a comprehensive understanding of our own industry foundation and development strategy, and pay attention to selecting companies with high degree of coordination, high business relevance and high matching degree, which can reduce the integration risk in the later stage. Before the merger and acquisition, enterprises should carry out detailed research from many aspects, and pay attention to the integration after the merger to make up for each other's shortcomings, so as to achieve the coordinated development of the two.
2. Treat overseas mergers and acquisitions cautiously. Yaomingkangde's overseas mergers and acquisitions are in line with its development strategy of layout internationalization. There are time and space limitations in mergers and acquisitions of overseas enterprises. Compared with the acquisition of domestic enterprises, overseas enterprises are more risky. Before mergers and acquisitions, due diligence must be fully and comprehensively done. In mergers and acquisitions, there are often large differences in business models and corporate cultures between the two sides. However, the purpose of mergers and acquisitions of overseas enterprises is to obtain their resources, and they cannot be blindly assimilated. Therefore, enterprises should fully retain the core elements of the acquirer, such as human resources, development technology and hardware equipment, and these core elements are the real value of the acquirer. After the merger and acquisition, when using the target enterprise to carry out the global

marketing network layout, we should also pay attention to the integration of industry, humanities and other related aspects, so as to give full play to the synergistic effect.

3. Focus on the intrinsic value of the target company. In the selection of the target company, choose its own pharmaceutical production or R & D sales channels of the enterprise, the target party mostly has a well-known brand, no longer need to establish a brand and promote the brand and spend resources, can put more resources on the rapid development of enterprises. High-quality target enterprises mean that their own development is quite good. Mergers and acquisitions do not need to inject too much of their own resources, and market competitiveness can be improved. Before and after the implementation of mergers and acquisitions, enterprises must carry out detailed investigations on the internal management of the target party and the industry in the future, clarify how the industry operates, the business situation and market competitiveness of the target party, and take whether they have long-term investment value and development ability as the main criteria for selecting the target of mergers and acquisitions. At the same time, it is also necessary to evaluate its own cash flow ability and management strength to determine whether the enterprise has the financial resources and strength to acquire high-quality enterprises, and how the combination of the two sides can achieve the overall effect of ' $1 + 1 > 2$ '.

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