

**剖析全球各大医药公司在中国的投资策略**

# **China: The Key Pharmerging Market**

**– Deciphering Major Pharma Companies' China Strategy**

**By: Jim J. Zhang, Ph.D.**

**Publisher: JZMed, Inc.**

**April, 2010**

# Table of Contents

<b>Scope of the Report</b> .....	<b>2</b>
<b>About Author</b> .....	<b>3</b>
<b>Executive Summary</b> .....	<b>14</b>
▪ A new era of global pharmaceutical industry: Evolving of new operation models driven by the difficulties encountered by all major pharma companies	
▪ Strategies of major pharma companies entering Chinese market	
▪ Top ten major pharma companies in China: Their activities, current market size and future growth prediction	
▪ Hurdles to entering Chinese market	
<b>Chapter One: A New Era of Global Pharmaceutical Industry: Evolving of New Operation Models Driven by the Difficulties Encountered by All Major Pharma Companies</b> .....	<b>21</b>
Summary .....	22
1.1 Introduction .....	24
1.2 Difficulties faced by all major pharmaceutical companies .....	25
1.2.1 Internal factors .....	25
1. Drying pipelines .....	25
2. Loss of sales revenues due to patent expiry .....	26
3. Escalating R&D cost due to high attrition rate and low productivity .....	29
1.2.2 External factors .....	29
1. Price containment by government .....	29
2. More scrutinizing on drug safety .....	30
3. Still high expectation for the pharma industry .....	30
1.3 Strategies previously taken by major pharma companies to cope with the situation .....	31
1.3.1 Passively trimming their own workforce .....	31
1.3.2 Tactically using external resources .....	33
1.3.3 Outcomes of the previous round of restructures – Problems still not solved .....	33
1.4 Impacts of the financial crisis on global pharmaceutical industry .....	34
1.5 Strategies currently pursued by major pharma companies .....	36
1.5.1 Cost reduction .....	37
1.5.2 Simplifying organization .....	38
1. R&D .....	38
a. Changing R&D models .....	38
(1) Internally, establishing smaller R&D organization	

and pursuing more virtual operation model -----	38
(2) Externally, pursuing more networked partnerships --	39
b. Strengthening technical capability -----	40
(1) Focusing more on genomics and proteomics research -----	40
(2) Reallocating more R&D budget to toxicology study and preclinical research -----	41
c. Reprioritizing R&D focus on late stage development and narrowing therapeutic focus -----	41
2. Manufacturing: Rapidly reducing capacity for small molecule drugs in particular those off-patented ones while still retaining and even enhancing capability and capacity for novel biologics ---	42
1.5.3 Increasing R&D outsourcing -----	45
1.5.4 Changing licensing model of drug candidates from small biotech companies -----	46
1.5.5 Becoming more adaptive to new technologies -----	47
1.5.6 Focusing more on emerging markets -----	47
1.5.7 Licensing generic drugs -----	50
1.5.8 Shifting product portfolio focus -----	51
1.6 Outlook of the future development of global pharmaceutical industry -----	51

**Chapter Two: Strategies of Major Pharma Companies Entering Chinese  
Market ----- 55**

Summary -----	56
2.1 Introduction -----	58
2.2 China's attraction -----	59
2.2.1 World fastest growing pharmaceutical market -----	60
2.2.2 Key growth drivers of Chinese pharmaceutical market -----	64
1. On-going nationwide healthcare reform -----	64
2. Westernization of living style changing disease patterns -----	65
3. Rapid urbanization making more Chinese able to afford high-end medicines -----	65
2.3 Other advantages also attractive to major pharma companies -----	66
2.3.1 Rich natural products -----	66
2.3.2 A large, treatment-naïve patient pool -----	67
2.3.3 Abundant animal species -----	67
2.3.4 Large, well-trained workforce -----	68
2.3.5 Innovative drug R&D on the fast rise in China -----	71
2.4 An overview of the strategies of major pharma companies entering Chinese market -----	74
2.5 In-depth analysis of strategies and activities of major pharma companies in China -----	77
2.5.1 Major pharma companies' investment strategy and activities in China --	77
2.5.2 Major pharma companies' R&D strategy and activities in China -----	80
2.5.3 Major pharma companies' manufacturing strategy and activities in	

China -----	85
2.5.4 Major pharma companies' marketing strategy and activities in China ---	89
2.5.5 Major pharma companies' drug candidate licensing activities in China -	93
2.5.6 Collaborations of major pharma companies with local Chinese organizations -----	94
2.5.7 Major pharma companies' outsourcing strategies and the latest activities in China -----	97
1. R&D outsourcing -----	97
2. Manufacturing outsourcing and API sourcing -----	99
2.5.8 Summary -----	102

**Chapter Three: Top Ten Major Pharma Companies in China: Their Activities, Current Market Size and Future Growth Prediction ----- 106**

Summary -----	107
3.1 Introduction -----	109
3.2 Pfizer in China -----	110
3.2.1 Growth history, current state and future market growth prediction ---	110
1. R&D -----	110
2. Research collaboration and outsourcing -----	111
3. Manufacturing -----	111
4. Sales -----	113
3.2.2 Wyeth in China -----	114
3.2.3 Pfizer's activities in other emerging markets -----	115
3.3 Sanofi-Aventis in China -----	117
3.3.1 Growth history, current state and future market growth prediction ---	117
1. R&D -----	117
2. Research collaboration and outsourcing -----	118
3. Manufacturing -----	118
4. Sales -----	121
3.3.2 Sanofi-Aventis' activities in other emerging markets -----	122
3.4 GlaxoSmithKline in China -----	123
3.4.1 Growth history, current state and future market growth prediction ---	123
1. R&D -----	123
2. Research collaboration and outsourcing -----	123
3. Manufacturing -----	124
4. Sales -----	125
3.4.2 GSK's activities in other emerging markets -----	127
3.5 Roche in China -----	128
3.5.1 Growth history, current state and future market growth prediction ---	128
1. R&D -----	128
2. Research collaboration and outsourcing -----	129
3. Manufacturing -----	129
4. Sales -----	131
3.5.2 Roche's activities in other emerging countries -----	132
3.6 Novartis in China -----	133

3.6.1	Growth history, current state and future market growth prediction -----	133
1.	R&D -----	133
2.	Research collaboration and outsourcing -----	134
3.	Manufacturing -----	134
4.	Sales -----	136
3.6.2	Novartis' activities in other emerging countries -----	138
3.7	Astra-Zeneca in China -----	140
3.7.1	Growth history, current state and future growth prediction -----	140
1.	R&D -----	140
2.	Research collaboration and outsourcing -----	140
3.	Manufacturing -----	141
4.	Sales -----	143
3.7.2	Astra-Zeneca's activities in other emerging markets -----	144
3.8	Johnson & Johnson in China -----	146
3.8.1	Growth history, current state and future market growth prediction -----	146
1.	R&D -----	146
2.	Research collaboration and outsourcing -----	146
3.	Manufacturing -----	147
4.	Sales -----	148
3.8.2	J&J's activities in other emerging markets -----	149
3.9	Eli Lilly in China -----	150
3.9.1	Growth history, current state and future market growth prediction -----	150
1.	R&D -----	150
2.	Research collaboration and outsourcing -----	151
3.	Manufacturing -----	152
4.	Sales -----	153
3.9.2	Eli Lilly's activities in other emerging countries -----	154
3.10	Bayer in China -----	157
3.10.1	Growth history, current state and future market growth prediction -----	157
1.	R&D -----	157
2.	Research collaboration and outsourcing -----	158
3.	Manufacturing -----	158
4.	Sales -----	159
3.10.2	Bayer's activities in other emerging countries -----	161
3.11	Merck (MSD) in China -----	163
3.11.1	Growth history, current state and future growth prediction -----	163
1.	R&D -----	163
2.	Research collaboration and outsourcing -----	163
3.	Manufacturing -----	164
4.	Sales -----	165
3.11.2	Merck's activities in other emerging countries -----	166
<b>Chapter Four: Hurdles to Entering Chinese Market -----</b>		<b>168</b>
Summary -----		169
4.1	Introduction -----	171

4.2 Hurdles of sourcing APIs or contract manufacturing in China -----	172
4.3 Hurdle of outsourcing drug R&D to China -----	175
4.3.1 Imperfect IP protection environment -----	176
4.3.2 Still-need-improved service capability -----	176
4.3.3 Limited skills in innovative drug R&D -----	177
4.3.4 Regulation in clinical trial and drug approval -----	178
4.4 Possibility and hurdles of licensing drug candidates from Chinese biotech companies -----	178
4.5 Hurdles of marketing drug products in China and how to overcome them -----	179
4.5.1 Challenges -----	180
4.5.2 How to overcome them -----	181
4.6 Analysis of the best strategies to enter the Chinese market -----	182
4.6.1 Establishing a wholly owned facility (either manufacturing or R&D) --	182
1. Advantages -----	182
2. Disadvantages -----	183
4.6.2 Forming a joint venture (JV) -----	183
1. Advantages -----	183
2. Disadvantages -----	184
3. Strategies to safeguard IP and ensure product quality -----	184
4.6.3 Establishing a partnership -----	184
1. Advantages -----	184
2. Disadvantages -----	185
4.6.4 Outsourcing -----	185
1. Advantages -----	186
2. Keys to gain these advantages -----	186
3. Disadvantages -----	187
4.7 Strategic differences between managing a partnership and a straight outsourcing project in China -----	187
4.7.1 Partnership -----	188
1. Activities -----	188
2. Purposes of a partnership -----	189
3. Characteristics of a partnership -----	189
4.7.2 Outsourcing -----	189
1. Activities involved in outsourcing -----	189
2. Purposes of outsourcing -----	190
3. Characteristics of outsourcing -----	190
4.7.3 Advantages and disadvantages of managing a partnership and an outsourcing relationship in China -----	191
4.8 Advantages and disadvantages of building own facilities versus contracting out in China -----	192
4.9 How to overcome the hurdles of cultural difference -----	193
4.9.1 Main differences in culture and business conduct between the West and the East -----	194
1. Long-term business development goals versus short term business development goals -----	194
2. Assumed responsibility versus required responsibility -----	195

3. Consistency versus randomness -----	195
4. Business relationship versus personal relationship -----	196
4.9.2 Summary of the Characteristics of Chinese culture in business conduct -----	197
4.10 Strategies to effectively collaborate with Chinese companies -----	198
4.10.1 Select a Chinese partner/vendor carefully -----	198
4.10.2 Pay attention to relationship -----	198
4.10.3 Strategies to avoid conflicts and loss of your IPs -----	199
4.10.4 Strategies to resolve any issues/disputes in conducting business collaboration with a Chinese company -----	200
1. Quality issue -----	200
2. IP breach -----	201

<b>Appendix -----</b>	<b>202</b>
-----------------------	------------

<b>Appendix I. List of Chinese companies and research institutions that have     collaborated with major pharma companies -----</b>	<b>203</b>
---	------------

<b>Appendix II. Research Methodology -----</b>	<b>207</b>
--	------------

<b>Appendix III. About JZMed, Inc. -----</b>	<b>208</b>
--	------------

### List of Tables

Table 1. Blockbuster drugs going to lose patent protection before 2013 -----	27
Table 2. Number of companies having announced restructure during the financial crisis -----	35
Table 3. Current top five major pharma companies in emerging markets (their current sales revenue made from emerging markets and its proportion in their total global sales revenue) -----	49
Table 4. Comparisons between the old operation models and the new ones currently pursued by world major pharma companies -----	54
Table 5. Development history, current market size and future growth forecast of Western-style medicines in Chinese pharmaceutical market -----	61
Table 6. Top major pharma companies' investment in China -----	79
Table 7. Major pharma companies having investment branch in China -----	80
Table 8. Major pharma companies having (or planning to have) Asia-Pacific operation (or R&D) headquarters in China -----	80
Table 9. Major pharma companies having announced investment plans for building R&D centers in China -----	81
Table 10. China R&D centers of major pharma companies: Current size and research focuses -----	83
Table 11. Latest investment activities of major pharma companies in expanding their China manufacturing facilities or building new ones in the country ---	87
Table 12. Planned investment of major pharma companies to build more manufacturing facilities in China -----	89

Table 13. Major pharma companies ranked by their current (2009) China sales revenue -----	90
Table 14. Latest examples of major pharma companies collaborating with local Chinese companies on drug R&D -----	95
Table 15. Examples of major pharma companies training local Chinese hospital personnel -----	95
Table 16. Examples of major pharma companies collaborating with Chinese government agencies -----	96
Table 17. Latest examples of outsourcing and research collaborations between major pharma companies and Chinese companies/research institutions ----	98
Table 18. Summary of major pharma companies' China strategies and activities ----	102
Table 19. Predicted growth of top ten major pharma companies in Chinese market by 2012 -----	104
Table 20. Summary of top ten major pharma companies' complete presence in China -----	108
Table 21. List of Pfizer's current facilities in China -----	113
Table 22. Growth history and future growth prediction of Pfizer's sales revenue in Chinese market -----	115
Table 23. List of Sanofi-Aventis' current facilities in China -----	120
Table 24. Growth history and future growth prediction of Sanofi-Aventis' sales revenue in Chinese market -----	121
Table 25. List of GSK's current facilities in China -----	125
Table 26. Growth history and future growth prediction of GSK's sales revenue in Chinese market -----	126
Table 27. GSK's current sales performance in emerging markets and its future growth prediction -----	127
Table 28. List of Roche's current facilities in China -----	130
Table 29. Growth history and future growth prediction of Roche's sales revenue in Chinese market -----	131
Table 30. List of Novartis' current facilities in China -----	136
Table 31. Growth history, current market size and future growth prediction of Novartis in Chinese market -----	138
Table 32. List of Astra-Zeneca's current facilities in China -----	142
Table 33. Growth history, current market size and future growth prediction of Astra-Zeneca's sales revenue in Chinese market -----	143
Table 34. List of Johnson & Johnson's current facilities in China -----	148
Table 35. Growth history, current market size and future growth prediction of J&J's sales revenue in Chinese market -----	149
Table 36. List of Eli Lilly's current facilities in China -----	153
Table 37. Current market size, growth history and future growth forecast of Eli Lilly's China sales revenue -----	154
Table 38. List of Bayer's current facilities in China -----	159
Table 39. Current market size, growth history and future growth prediction of Bayer's sales revenue in Chinese market -----	161
Table 40. List of Merck's (MSD) current facilities in China -----	164
Table 41. Current market size, growth history and future growth prediction of	

Merck's (MSD) sales revenue in Chinese market -----	165
Table 42. Comparison of different approaches to product quality management between Chinese companies and Western companies -----	173
Table 43. Analysis of current issues in Chinese API supply chain and solutions to overcome them -----	174
Table 44. Comparison between partnership and pure outsourcing models -----	191
Table 45. Major characteristics of Chinese culture in business collaboration -----	197

## List of Figures

Figure 1. Revenue loss during 2009 – 2013 in global pharmaceutical industry due to patent expiry -----	28
Figure 2. Graphic display of the number of companies experiencing restructure during the financial crisis -----	35
Figure 3. Growth trend of Pfizer's manufacturing outsourcing -----	43
Figure 4. Growth of top five major pharma companies in emerging markets -----	49
Figure 5. Evolving of new operation models within the global pharmaceutical industry -----	52
Figure 6. Major elements of China attracting foreign pharma companies -----	59
Figure 7. Fast growth trend of Chinese pharmaceutical market (Western-style medicines) -----	61
Figure 8. Milestones in the development process of Chinese pharmaceutical market -	64
Figure 9. Drug R&D platforms to be built in China -----	73
Figure 10. Four stages of major pharma companies' entrance into Chinese market ----	75
Figure 11. Summary of activities of major pharma companies in China -----	76
Figure 12. Wholly-owned R&D centers established in China by major pharma and biotech companies -----	82
Figure 13. Major pharma companies having manufacturing facilities in China -----	86
Figure 14. Current ranks of top ten major pharma companies in Chinese market based on their current (2009) China sales revenue -----	91
Figure 15. Average growth rate of top ten major pharma companies in last three years (2007 – 2009) in Chinese market -----	91
Figure 16. Predicted sales revenue of major pharma companies in Chinese market in 2012 -----	105
Figure 17. Chronic display of Pfizer's entrance into Chinese market -----	112
Figure 18. Growth history and future growth prediction of Pfizer's sales revenue in Chinese market -----	115
Figure 19. Chronic display of Sanofi-Aventis' entrance into Chinese market -----	119
Figure 20. Growth history and future growth prediction of Sanofi-Aventis' sales revenue in Chinese market -----	122
Figure 21. Chronic display of GSK's entrance into Chinese market -----	124
Figure 22. Growth history and future growth prediction of GSK's sales revenue in Chinese market -----	126
Figure 23. Chronic display of Roche's entrance into Chinese market -----	130
Figure 24. Growth history and future growth prediction of Roche's sales revenue in Chinese market -----	132

Figure 25. Chronic display of Novartis' entrance into Chinese market -----	135
Figure 26. Growth history and future growth prediction of Novartis' sales revenue in Chinese market -----	138
Figure 27. Chronic display of Astra-Zeneca's entrance into Chinese market -----	142
Figure 28. Growth history and future growth prediction of Astra-Zeneca's sales revenue in Chinese market -----	144
Figure 29. Chronic display of Johnson & Johnson's entrance into Chinese market --	147
Figure 30. Growth history and future growth prediction of Johnson & Johnson's sales revenue in Chinese market -----	149
Figure 31. Chronic display of Eli Lilly's entrance into Chinese market -----	152
Figure 32. Growth history and future growth prediction of Eli Lilly's sales revenue in Chinese market -----	154
Figure 33. Chronic display of Bayer's entrance into Chinese market -----	158
Figure 34. Growth history and future growth prediction of Bayer's sales revenue in Chinese market -----	161
Figure 35. Chronic display of Merck's (MSD) entrance into Chinese market -----	164
Figure 36. Growth history and future growth prediction of Merck's (MSD) sales revenue in Chinese market -----	166

### List of Case Studies

Case Study 1. Escalating cost of drug R&D -----	24
Case Study 2. Gradually decreasing drug R&D productivity industry-wide in past decade -----	24
Case Study 3. Low productivity in major pharma companies in past two years -----	26
Case Study 4. A typical example of huge impact of patent expiration on a major pharma company's revenue -----	28
Case Study 5. Example of government forcing drug companies to reduce or cap the price of innovative drugs -----	29
Case Study 6. Slower revenue growth of entire pharmaceutical industry in past decade and next five years -----	31
Case Study 7. Examples of latest restructure by major pharma companies -----	32
Case Study 8. Biotech companies survived the first hit of financial crisis restructuring again -----	34
Case Study 9. Examples of reduction of R&D budget by major pharma companies --	37
Case Study 10. Major pharma companies are shrinking the size of their R&D organization and pursuing more virtual operation model -----	39
Case Study 11. Examples of major pharma companies increasingly utilizing external resources -----	39
Case Study 12. Pfizer increasing outsourcing proportion of its manufacturing business -----	43
Case Study 13. Global pharmaceutical outsourcing: An outlook of its future development -----	45
Case Study 14. Example of major pharma/biopharma companies successfully reducing their R&D budget by outsourcing to low cost regions -----	46
Case Study 15. Market share and performance of major pharma companies in	

emerging markets -----	47
Case Study 16. Major pharma companies licensing sales rights to generic drugs -----	50
Case Study 17. Western-made medicines dominating Chinese pharmaceutical market -----	61
Case Study 18. Future growth potential of Chinese pharmaceutical markets in some key therapeutic areas -----	62
Case Study 19. Fast growth of middle class Chinese population -----	63
Case Study 20. Example of the interest of major pharma companies in natural products derived from medicinal herbs of traditional Chinese medicines (TCMs) -----	66
Case Study 21. A unique class of workforce in China: Chinese returnees and its current state -----	68
Case Study 22. China's industry R&D capability on the fast rise -----	69
Case Study 23. The vast pool of skilled workforce in China is an alternative resource to major pharma companies to increase productivity -----	70
Case Study 24. Chinese government at various levels supporting the innovative drug R&D and development of biotech industry in the country -----	71
Case Study 25. How a major pharma typically got a foothold in China -----	74
Case Study 26. Major pharma companies starting paying attention to innovative drugs discovered by Chinese companies -----	84
Case Study 27. Major pharma companies conducting full scale drug R&D in China -	94
Case Study 28. Astra-Zeneca contracting out IP sensitive R&D projects to Chinese CROs -----	97
Case Study 29. Example of risk-sharing outsourcing model between a Chinese company and a major pharma company -----	98
Case Study 30. Examples of major pharma companies sourcing pharma intermediates and APIs in China -----	99
Case Study 31. Astra-Zeneca will stop manufacturing and outsource all APIs -----	100
Case Study 32. Genzyme outsourcing manufacturing of one of its gene therapy drugs to China -----	102