Chapter 39
Policy Planning to Support Technological Innovation in the Pharmaceutical Industry

Leong Chan
Portland State University, USA

Dan Liu
Portland State University, USA

ABSTRACT

The pharmaceutical industry is often characterized as a research-driven sector because of its exceptionally high ratio of R&D inputs to sales. Development of novel drugs is very difficult because of several issues including heavy investment, high risks, and long development cycle. Government plays an important role in regulating the development of the pharmaceutical industry. This is true for all phases in pharmaceutical development: from R&D to market. This chapter will focus on the discussion of prospective high-tech areas, development strategies, and innovation resources in the pharmaceutical industry. Expert opinions were analyzed based on the conditions in China's biopharmaceutical sector. Policy recommendations are provided to support technological innovation.

1. THE PHARMACEUTICAL MARKET IN CHINA

China's pharmaceutical market is one of the most dynamic in the world. It grew 22% in 2010 to US$116 billion and ranked the fifth largest in the world (Bieri, 2012). With an average annual growth rate above 20% from 2005 to 2010, it is set to overtake Japan as the world's second largest market by 2015 (Giniat, Fung, Weir, & Meyring, 2011). Due to the economic recession in the Western countries, the Chinese pharmaceutical market is steadily moving up toward the leading position globally. However, the Chinese pharmaceutical industry faces huge challenges in the area of technological innovation. Breakthrough technological innovation from the domestic Chinese pharmaceutical sector is rarely seen for decades. Although China is a major exporter of pharmaceuticals, it is specialized in the production of crude drug substances and low-tech generics, rather than novel drugs.

DOI: 10.4018/978-1-5225-9273-0.ch039

The Chinese pharmaceutical market is highly fragmented and very different from the market in developed countries. In 2010, generic drugs had about 76% of the entire pharmaceutical market in China, while only 4% of the market was comprised of innovative drugs still under patent protection. The remaining 20% of the market consisted of off-patent drugs (Figure 1) (Bieri, 2012). The generic drugs market has the largest segment and has mostly been controlled by domestic products. However, the profit margin is low due to intense competition. The innovative drug market has the smallest segment and is dominated by imported products, particularly those produced by MNCs. For the off-patent drug segment, both imported and domestically-produced branded drugs compete to survive.

1.1 The Biopharmaceutical Sector

China's pharmaceutical industry consists of three major sectors:

1. Chemical pharmaceuticals;
2. Biopharmaceuticals; and
3. Traditional herbal medicines.

Although the chemical pharmaceutical technologies have been regarded as the industrial foundations in the last century, biopharmaceutical technologies have been emerging as a prospective area with huge growth potential. Many leading chemical pharmaceutical companies have already tapped into the biotechnology area. There has been a paradigm shift in industrial R&D from high-risk synthetic pharmaceuticals towards R&D in biopharmaceuticals. The top chemical pharmaceutical companies spent tens of billions of dollars to acquire biotechnology companies and in-licensing deals. Pfizer, Roche, Lilly, Astra Zeneca, Glaxo Smith Kline (GSK) and Bristol Myers Squibb have all underlined their strong commitment and highlighted their biological projects in R&D pipeline (Maggon, 2007).

The Chinese biopharmaceutical sector has been developing rapidly in recent years. Since this is still a new area with good prospects, both established pharmaceutical companies and startup firms are trying to

Figure 1. Innovative and generic drug market share in China 2010
Adapted from IMAP (2012).