

Developing a life sciences hub

Life sciences" describes research into health care, plants, animals and anything else involving living things. Advances in genetics and biochemistry have revolutionised the life sciences, opening up significant opportunities for the advancement of health-care and high tech industries. The Thai government wants to develop life science capabilities locally, which could make an important contribution to Thailand's health-care sector and economic development, but life science research is risky and expensive.

In this, the first of three articles, we reflect on the experience of one of Asia's leading health companies, LG Life Sciences (LGLS). We try to find lessons for Thailand in the commercial and policy conditions that contributed to this company's success. In subsequent articles, we will look at clinical research and medical services.

LGLS is one of the highest-valued health-care companies on the Korea Stock Exchange. Its annual sales exceed US\$200 million and it has many medicines under development. Nonetheless, LGLS owes much of its success to a single product which, like most commercial applications of the life sciences, went through a painful development process.

In the late 1980s, LGLS saw commercial opportunity in new antibiotics for diseases that had become resistant to older medicines. It started a research project to identify such antibiotics, but faced a number of major setbacks. First, the project leader died of stomach cancer. His team had difficulty regaining momentum and could not find candidate antibiotics safe enough for human use. Further doubt was cast on the project when a similar antibiotic under development at a rival company also ran into safety problems.

A turning point was reached in 1993 with the appointment of Dr Chang Yong Hong as project leader. Dr Hong had recently returned from the United States where he was the first Korean national to complete a PhD in organic synthesis at Harvard. He started work on the project's 304th candidate antibiotic which proved a potent and well tolerated medicine, which LGLS called "Factive".

With the lab research completed, LGLS looked for a partner to take Factive through clinical trials. It licensed the product to US-based SmithKline Beecham, which completed the trials and submitted the results to the US Food and Drug Administration (FDA) to gain marketing approval for Factive. But the FDA asked for more information and SmithKline returned the licence to LGLS.

The return of the licence could have been a major setback for Factive. However, LGLS was able to find a new partner, another US-based company called GeneSoft. In 2002, LGLS transferred the Factive licence to Genesoft which within a year had secured full approval for the product from the FDA. Factive became the first medicine developed in Korea to

achieve US FDA approval and Korea joined the elite club of countries whose companies have achieved this.

It took LGLS many years, two major partnerships and a number of ordeals to commercialise Factive. This was actually better than average. Most research programmes have to test thousands of candidates to identify a suitable product and usually take over a decade of clinical trials before applying for regulatory approval. It costs \$800 million on average to bring a new medicine to market.

What lessons can be learned from Factive? Given the risks and costs involved in developing medicines, life science companies need assurance that their research investments will be rewarded. In most countries this is provided through patents. A patent is like an agreement between an inventor and society: The inventor shares the details with society and in exchange society gives the inventor an exclusive right to sell the invention for a fixed time period. The agreement gives inventors the incentive to invest in new inventions but also makes the invention broadly available once the patent has expired. Korea and Thailand, as World Trade Organisation members, provide the global standard of 20 years of patent protection.

Although Thailand's patent period is world standard, its patent processing and enforcement are weak. Patent approvals take far longer than in other countries. In addition, Thailand has a serious problem with counterfeiters. An equally serious problem is that patents are often portrayed in Thailand as things that only benefit foreign interests. This view is short-sighted as patents are a critical driver of innovation.

The Factive story also shows the importance of brilliant scientists and international collaboration. If Dr Chang Yong Hong had not returned to Korea to work at LGLS, Factive may not have been discovered. Likewise, without partnerships with US-based companies, Factive may never have received FDA approval.

Thailand is making positive steps in these areas. The Thailand Research Fund has worked in recent years to increase the number of Thai scientists. Likewise, the recent agreement between Thailand's National Center for Genetic Engineering and Biotechnology and the Swiss pharmaceutical company Novartis to develop new medicines from natural products is a promising development.

In the second article of this series we will look at the challenges Thailand faces in building capabilities in clinical research.

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