

# Global Competition and Biotechnology Industry: A Review

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## Abstract

The biotechnology industry is a relatively new a distinct field that involve using living organism to produce desired product. This industry includes firms that develop, manufacture, and market pharmaceutical products, agricultural products, environmental control product, e.t.c. based on advanced biotechnology research. Although the growth in the global biotechnology industry neared double digits the past two years, the threat of entry into the market is weak due to high barriers to entry. However, because of the ease and low-cost production using biotechnology, it has increased competition in some product. Leading European nations with strong biotech sectors such as the UK and Germany are investing heavily in regenerative medicine (RM), seeking competitive advantage in this emerging sector. However, in the broader biopharmaceutical sector the European Union (EU) is out performed by the US on all metrics, reflecting longstanding problems: limited venture capital finance, a fragmented patent system, and relatively weak relations between academia and industry. The current global downturn has exacerbated these difficulties. The crisis comes at a time when the European Union is reframing its approach to the governance of innovation and renewing its commitment to the goal of making Europe the leading player in the global knowledge economy.

**Keywords:** Competition; Biotechnology; Industry.

## **1. Introduction**

Biotechnology uses biological process in the development or manufacture of product or in the technological solution to a problem. In 21<sup>st</sup> century, biotechnology has defined as “the use of cellular and bimolecular processes to solve problems or make useful products” (Biotechnology Industry Organisation, 2008). Biotechnology has assumed global importance in the areas of healthcare, environmental protection, agriculture, chemistry, and material science (Biotechnology Industry Organisation, 2008), with significant commercial potential (Dibner, 1986; Muller and Fujiwara, 2002; Müller and Herstatt, 2004; Ahn and Meeks, 2007; Ahn et al., 2010; Ahn et al., 2012). Industrial biotechnology uses microorganisms and enzymes to produce goods for industry, including chemicals, plastics, food, agricultural and pharmaceutical products and energy carriers.

Global competition is the services or products provided by competing organizations that serve international customers. Competitiveness is the degree to which a nation can produce goods and service that meet the test for international market under free and fair condition (John A. and Young 1985). Access to global customers has increased because of enhanced information technology and communication. Global competition has allowed companies to buy and sell their product and services internationally, which opens the door to increased profits and flattens the playing field in business.

## **2. Down Stream Processing and Metabolic Engineering**

In comparison with conventional processes, industrial biotechnology processes run under relatively mild reaction conditions. Moderate temperatures and the use of aqueous media reduce the energy requirements and the number of problematic by-products. Since product concentration and formation rate are often very low, the resulting products need to be purified and recovered in marketable quantities in a process that is referred to as downstream processing. Product quantity can also be increased by optimizing the manufacturing processes or used, for example by enhancing important activities, switching off less important ones’ engineering) or optimizing enzymes by directed evolution (enzymatic engineering).

Industrial biotechnology uses renewable resources such as carbohydrates from cereals, corn and sugar beet or vegetable oils from sunflowers, rapeseed and oil palms. Increasing efforts are also being made to use waste products as raw materials (Margaret Patrick. 2015.).

## **3. Product and Prospect**

Biotechnology is a science-based business and more solutions that are efficient could equally be found in scientific advancement. Indeed, this promise radically efficient drug development, gene therapy and other products (Ernst and Young, 2010). Products and services that are derived from biotechnology has

been the driving force behind the establishment of biotechnology companies. For the pharmaceutical sector, these products include recombinant vaccines, hormones, vitamins and antibiotics. In plant biotechnology, engineering of insect and disease resistance, as well as storage protein and other nutritional improvements has been the trend. Furthermore, potential benefits from tissue culture, bio-fertilizers, bio-pesticides, and medicinal plants are tremendous. Plants have considerable potential for production of biopharmaceutical protein because they are easily transformed and provide a cheap source of protein (Giddings G et. al 2000). Delivery of a biopharmaceutical product by direct ingestion of the modified plant removing the need for purification is very promising. Such biopharmaceutical proteins and edible vaccines can be stored and distributed as seeds, tubers, or fruits, making immunization programs in developing countries cheaper and potentially easier to administer. (Ernst & Young, 2011).

#### **4. The Biotechnology in Industrial Sector**

Biotechnology has a major impact on almost all major sectors of industry and represents a major element in the transition from an agricultural-based to a knowledge-based economy. Nevertheless, the development of improved technology for agricultural production and its diffusion to farmers is a process requiring investment and time. In industrialized countries, biotechnology is viewed as an all-pervasive profit-generating technology and a strategic component of industrial competitiveness. In developing countries, the translation of this science base into commercial business is very much needed. There are so many products imported in several developing countries that can now be manufactured using biotechnology (Margaret, P. 2015).

Moreover, several developing countries have strategic advantages in some natural biological resources that can be exploited for their development. The challenge is to ensure that these ideas are marketable as value-added products. (Global Biotech Industry Must Reinvent Itself to Survive 2010 and 2011) At the forefront to exploit biotechnology in developing countries should be the industrially scientist. Such a person should have both research and management skills including marketing and intellectual property rights and understanding of scientific regulatory and ethical issues. Biotechnology has been the path by which a number of scientists, researchers and investors have boosted their wealth over the past year (Margaret, P. 2015).

#### **5. Impact of Competition in Biotechnology Industry**

Biotechnology has increased competitive forces with big pharmaceutical companies entering into collaborations and mergers and acquisitions with biotechnology companies; the sector is witnessing intense competition. These deals have injected billions of dollars' worth of capital into the sector. As funds are easily available, new compounds are being developed and approved, adding to the already strong competition in the biotechnology sector. (Ernst & Young, 2011). Price wars are one of the major

outcomes of intense competitive forces in the biotechnology industry. Drug substitutability, drug pricing, and contracts with distributors affect the price wars in the industry.

Gilead Sciences introduced its \$ 1,000 Osvaldo pill and later introduced Harvoni, a combination of Sovaldi and another drug, to treat chronic Hepatitis C patients. Harvoni, priced at \$ 1, 125 a pill, is the first one-pill therapy for Hepatitis C. The entry of Viekira Pak, AbbVie's substitute Hepatitis C drug priced at \$ 991 per pill, did not immediately lead to a price war between Gilead and AbbVie's. This was mainly due to Harvoni's lower dosage period, resulting in Harvoni's cumulative costs proving lower than the cost of Viekira Pak.

However, in December 2014, Express Scripts entered into a contract with AbbVie's and included Viekira Pak instead of Sovaldi and Harvoni as the Hepatitis C treatment in its list of covered drugs. Express Scripts is a leading pharmacy benefit manager (or PBM) and manages the pharmaceutical drug-related insurance benefits of 25 million members. This contract has forced Gilead to announce huge discounts, up to 46%, to safeguard its existing health insurance and PBM clients (Margaret Patrick. 2015.).

## **6. Conclusion**

Biotechnology is now one of the hot product driving the stock markets as well as a frontier of knowledge and job creation. Just as the provision of research grants is a major issue, entrepreneurship and financing for biotechnology companies should also be high on government policy and educational agenda. Biotechnology can only be entrenched in developing countries with the establishment of a strong research base and industrial sectors. Developing countries scientists who summon enough courage to take part in these ventures will become part of the business elite of the future. In addition, it is important for Biotechnology industry to find mean of making their product sticky. The idea behind sticky product is that the customer become tied down to a product or service and cannot easily leave. This is a slightly different from customer retention. Finally, any Biotechnology company or industry that focuses on "stickiness" the stickier their product is the harder it would be for their company customer to switch to their competitors in the global market.

## **Recommendation**

Finally, any country that can assist its scientists and entrepreneurs in successful biotechnology product start-ups will enjoy economic growth. Developing countries are already benefiting and should continue to benefit significantly from advances in plant biotechnology. Insect-protected cotton containing a natural insecticide protein from *Bacillus thuringiensis* (Bt cotton) is providing millions of farmers with increased yields, reduced insecticide costs and fewer health risks. Finally, any country that can assist its

scientists and entrepreneurs in successful biotechnology product start-ups will enjoy economic growth.

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