

## HOW WILL US-BASED COMPANIES MAKE IT IN EUROPE? AN INSIGHT FROM PIONEER AND MONSANTO

Stéphane Lemarié<sup>1</sup>

Pioneer and Monsanto are two major players in the seed and the agricultural biotechnology business. They have both tended to develop an integrated innovation strategy around a limited range of key innovations, which have been United States (US) oriented until now. A set of signals suggests, however, that this picture might change substantially during the next decade.

*Keywords:* appropriability; biotechnology; genetically modified organisms (GMOs); industry structure; innovation; seed; pesticide; regulation.

North America and Europe are the two major world regions in the production of seeds, agricultural biotechnology, and crop protection products such as pesticides. For the agrochemical, seed, and crop protection companies that produce these products, increasing fixed costs of production are a major concern. These fixed costs result from large research and development (R&D) expenditures and from regulatory costs imposed by stricter environmental regulations. Both sets of costs have put pressure on agrochemical, seed, and crop protection companies to maximize the value that they appropriate from their innovations. One way they are attempting to achieve this is by strengthening their positions in North America, Europe, and in other regions where weaknesses are identified.

The leaders in the agricultural biotechnology and seed industries are Pioneer Hi-Bred<sup>1</sup> and Monsanto—both typical North American companies. The objective of this article is to analyze how US-based companies, such as Monsanto and Pioneer, can succeed in Europe. This article therefore presents case studies of the two companies.<sup>2</sup> A short overview of their recent history is given, along with the similarities between their innovation strategies. Finally, an analysis of their positions and perspective on European public policies, as such policies relate to their activity within Europe, is also given.

### The Recent History

When considering the seed and biotechnology industries of today, Pioneer and Monsanto appear to be relatively similar. They rank number one and two on the worldwide seed market; 1999 seed sales amounted to about 1.8 and 1.7 billion US\$ (2.0 and 1.9 billion Euro), respectively. Corn and soybeans dominate the sales of both. However, when one analyzes their biotechnology strategies, some contrasts begin to appear. Monsanto is the incontestable leader in the production of transgenic crops, particularly those exhibiting genetically modified (GM) input traits, such as Roundup Ready and *Bacillus thuringiensis* (Bt) soybeans, corn, and cotton. Pioneer's innovation strategy has focused on output traits and the use of molecular markers. However, on the basis of

---

<sup>1</sup>Stéphane Lemarié is Chargé de Recherche at INRA/SERD, Université Pierre Mendès, Grenoble, France. This article is based on a company monograph written as part of the PITA project. © 2001 AgBioForum.

field trial data (Ditner & Lemarié, 1999), both companies are leaders in crops exhibiting modified input and output traits compared to their competitors.

A snapshot of the two companies in the mid-1990s reveals a very different picture from that of today. In the mid-1990s, Pioneer and Monsanto were leaders of two distinct industries. Pioneer was considered to be the untouchable leader in seed markets. Pioneer's growth is quite remarkable when one considers that it was self-generated with no collaboration, alliances, or acquisitions of other companies.<sup>3</sup> Monsanto was a relatively weak player in the pesticide business and non-existent in the seed business but this weakness was compensated for by its key position in the newly emerging biotechnology industry. Until the commercialization of GM crops, Monsanto defined its strategy as a technology provider (Joly & Ducos, 1993), appropriating value from its technology through non-exclusive licensing agreements with seed companies. Monsanto quickly realized that the value of its genetically modified organism (GMO) arsenal lay not only in its genes but also in their being inserted into the best germplasm. This realization revealed its weaker position with respect to seed companies like Pioneer, and as a result, led to its drive to become a leader in the seed business.

As a result of the interdependencies between biotechnology and seeds, the two separate trajectories of these companies have converged. Because the value of genetic traits could only be captured in the seeds themselves, Monsanto was forced into a series of expensive takeovers of seed companies (table 1). Likewise, the threat that biotechnology posed to the conventional seed business forced Pioneer to make substantial investments in biotechnology research. Ultimately, the investments by Pioneer were not enough compared to their competitors. In 1999, Pioneer was taken over by DuPont which also led to the merger of the companies' biotechnology research programs.

**Table 1: The Main Acquisitions of Monsanto in the Seed Business.**

<b>Company</b>	<b>Market</b>	<b>Year of Acquisition</b>	<b>Price of Acquisition (Billion US\$)</b>
<b>Asgrow Agronomics</b>	Soybean - US	1997	0.24
<b>Holden's</b>	Corn - US	1997	1.00
<b>Sementes Agroceres</b>	Soybean - Brazil	1997	NA
<b>DeKalb</b>	Corn - US	1998	4.40
<b>Cargill International</b>	Corn, Canola - Europe	1998	1.40
<b>PBI Cambridge</b>	Wheat - Europe	1998	0.50

Note. From "Policy influences on technology for agriculture: Chemicals, biotechnology and seeds," Monsanto Monograph Annex C11, by J. Chataway and J. Tait, 2000. Available on the World Wide Web at: <http://technology.open.ac.uk/cts/pita/AnnC11-mono-monsanto.pdf>.

### **Toward Integrated Strategies Around A Limited Range Of Key Innovations**

Compared to their direct competitors, Monsanto and Pioneer are both highly focused companies whose successes lie in a narrow range of products. Monsanto's success in agriculture currently depends on Roundup and related technologies, and more recently, on the Roundup Ready and Bt technologies. The development of these technologies during the last 5 years accounts for a large part the growth in Monsanto's turnover. As already indicated, the success of these products has not only resulted from their technical characteristics but also from strategic investments in the seed component. The combination of technology and seed has been crucial to the market penetration of GM varieties. Monsanto made substantial changes in its marketing strategy in

order to differentiate its Roundup Ready product range and to accelerate the diffusion of the GM varieties (Chataway & Tait, 2000).

Since its creation in 1926 by Henry A. Wallace, Pioneer's main focus has been to increase hybrid corn productivity. Even though its sales of soybean seeds have increased significantly during the last 5 years, hybrid corn seeds still represent a major part of Pioneer's business, constituting more than 75% of its sales. Compared to other leaders in the seed crop market, that is, Novartis (now Syngenta), Monsanto, and Limagrain, Pioneer's product portfolio is more narrow. Technically, its leadership has relied on a high-value collection of elite germplasm of seed corn. However, like Monsanto, Pioneer's success in hybrid corn not only lies in its technical superiority but also in its ability to adapt the elite germplasm to different climate and farming conditions. It has also developed an innovative retailing system involving both distributors and farm leaders, which has given it a competitive edge.

Both Monsanto and Pioneer have been successful in developing integrated innovation strategies based around the creation, development, and marketing of a narrow range of key seed, biotechnology, and pesticide innovations. As already indicated, their innovations have tended to be heavily oriented to North American markets. For example, Monsanto premiered with herbicide-tolerant varieties reflective of North American needs. European firms have tended to concentrate on fungicides rather than herbicides, reflecting European needs. Such biases partly come down to the geography and climate of the two regions. And even though Monsanto has been developing new fungicides during the last few years, the managers interviewed for this study, acknowledged that fungicides are not the core of the company's business.

In the seed business, corn and soybeans are the two major US crops. While corn is an important crop in Europe, cereals are more important in terms of acreage sown. Interestingly, Pioneer is a leader in the European late maturing corn market segment. Late maturing corn is grown in the South of France, Italy, and Spain, which have similar climates to the corn-belt of the US. However, Pioneer is behind European leaders, such as Limagrain, KWS, and Advanta, in the early maturing corn market. Early maturing corn is grown in the Northern part of Europe.

There are exceptions to this integrated, regional strategy of both companies, however. These exceptions give a glimpse of how their strategies have already changed and may continue to do so over the next decade. For example, Monsanto's takeover of Plant Breeding International (PBI) Cambridge in 1998 reflects its willingness to make a strategic investment in wheat which, as already indicated, is grown more in Europe than in North America. Second, both Pioneer-DuPont and Monsanto (through Renessen—its joint-venture with Cargill) are developing output trait and value-added crops which fit more directly with European needs. It is hard to predict how significant these changes will be on the future business of these companies, but the simplistic regional strategy outlined above seems to be already evolving into a more international focus.

Indeed, worldwide expansion to appropriate the value from technological innovation is part of an integrated strategy that both Pioneer and Monsanto are pursuing. Such an expansion requires substantive efforts. In the case of hybrid corn seed, Pioneer has been enhancing its European market access for the last 30 years, from a strategy of licensing to European seed companies to full integration of European subsidiaries. In the case of biotechnology, Monsanto has conducted a large number of field trials in Europe, and has invested heavily in integrating its products into the regulatory environment, that is, by obtaining patents to protect its intellectual property rights and by obtaining marketing approvals.

Clean and environmentally sensitive technologies will be important to the future strategy of both companies. Monsanto and Pioneer managers interviewed for this study underlined the importance of integrating clean technology concepts into their innovation strategy. These companies are not only talking about clean technologies they are making tangible commitments. For example, Pioneer developed an Environmental Task Force (Harvard Business School, 1992) at the

beginning of the 1990s. It is acknowledged, however, by both companies that clean technologies do not mean the same thing in practical terms on each side of the Atlantic. Pesticides residues and soil erosion are more sensitive issues in the US. The recent food crises in Europe (e.g., “mad cow,” dioxin contamination) have led to sensitivity toward food safety issues resulting from intensive agriculture. Clean technology attributes are likely to be differentiated across US and European markets, therefore. This will likely increase the segmentation of input markets. As a result, an innovation suitable to the US market might be less successful in Europe, even though it is based on the same crop and targets the same plant protection problem. Such integrated strategies will need to be adapted to country-specific conditions.

### **Positions With Respect To European Public Policies**

Public policy tools can be designed to influence the innovation and research strategies of companies in various ways. Certain policies favor knowledge accumulation and valorization—such as, publicly funded research investments and property rights protection. For both Monsanto and Pioneer, knowledge accumulation has resulted from collaborative research agreements with external organizations, in particular, biotechnology startups and public universities and research institutes. As the research centers of these two companies are based in the US, most of the collaboration with public research institutes has taken place domestically. The influence of European public research institutes is therefore rather marginal.

Monsanto and Pioneer have both been very active in protecting and enhancing their property rights. In the US, Pioneer generally uses the costlier patent protection system (instead of breeder’s rights) to protect its inbred lines. On the international scene, Pioneer has been very active in the introduction of the concept of “essential derivativeness” which was written into the 1991 revision of the UPOV convention (UPOV being the International Union for the Protection of New Varieties of Plants). Pioneer has also been active in defending its property rights through several court cases. For Monsanto, the enforcement of property rights in the new domain of biotechnology has also been a crucial factor in its investment strategy. Among biotechnology companies, Monsanto is probably the most litigated against but it also happens to be the owner of a major patent portfolio.

The most crucial public policies for these two companies concern those regarding the regulation of GMOs. Each company has acknowledged the difficult regulatory context within Europe. Monsanto and Pioneer have strongly criticized the very complex regulatory system in Europe, which has led to delays and made commercialization very unpredictable. The managers of both companies also generally consider regulatory decisions within Europe to be driven by political motives rather than having a scientific or economic basis. In order to move forwards, both companies have experimented with different initiatives involving direct dialogs with consumer and environmental groups. These experiences were not fully completed by the end of this study, but the general feeling was that there was not enough meeting of the minds between the different parties to make significant advancement on the acceptance issue.

Interestingly, the Common Agricultural Policy (CAP) was not mentioned as having a major influence on the innovation strategy of either firm. It has sometimes been mentioned by other companies (e.g., Limagrain). To a greater extent, the introduction of the Euro, the cross border effect it will have, and the accessions of Central and Eastern European Countries to the European Union were considered more crucial than the CAP.

### **Conclusions**

Pioneer and Monsanto are often viewed as very different companies, first because of their contrasting histories and, second, because of their different product orientations—input versus output oriented. Such contrasts are less material when considering their current positions that

have converged, and when answering the question, “how can they succeed in Europe?” The main similarities between the two companies have been outlined in this paper. First, both firms have developed an integrated innovation strategy based around a limited range of key innovations—glyphosate and Bt for Monsanto, hybrid corn seed for Pioneer. Second, both firms are sensitive to the issue of European consumer acceptance and have criticized the way it has been managed by policy makers.

Two possible scenarios emerge for their involvement in European markets. On the one hand, if they pursue similar strategies to previously, the contribution of these two American leaders to the development of European agricultural biotechnology will be limited. Their focus on a narrow range of key innovations and core markets may limit their involvement within Europe. Moreover, the European reluctance to embrace agricultural biotechnology makes investment in European-specific innovations more risky, and reinforces the natural bias of their innovation strategies. On the other hand, a series of recent signals suggest that the companies are currently in a transition period where the focus on a narrow range of products will be less crucial, and their focus on European markets more likely.

## **Endnotes**

- <sup>1</sup> When the PITA project was conducted, the takeover of Pioneer Hi-Bred by DuPont was not fully finalized. Moreover, we estimated that it would take at least one year before observing significant changes in the organizational structure of the company and its overall strategy. For this reason, we decided to focus on Pioneer. If the same case study were conducted today, it would be conducted at the DuPont level.
- <sup>2</sup> The Monsanto case study was conducted by Chataway and Tait (2000). The takeover of Monsanto by the European company, Pharmacia, was too recent to be fully analyzed.
- <sup>3</sup> By contrast, other leaders in the seed market (e.g., Limagrain) based their growth on the takeover of other seed companies.

## **References**

- Chataway, J. and Tait, J. (2000). Policy influences on technology for agriculture: Chemicals, biotechnology and seeds (Monsanto Monograph Annex C11). Available on the World Wide Web at: <http://technology.open.ac.uk/cts/pita/AnnC11-mono-monsanto.pdf>.
- Ditner, J-M. and Lemarié, S. (1999). What can we learn about the development of GMOs from the American and European field tests databases? Paper presented at the ICABR Conference “The Shape of the Coming Agricultural Biotechnology Transformation: Strategic Investment and Policy Approaches from an Economics Perspective.” University of Rome, Tor Vergata, Rome.
- Harvard Business School (HBS). (1992). Pioneer Hi-Bred International: Developing an environmental statement and strategy (HBS Publication No. 9-193-010). Boston, MA: HBS.
- Joly, P-B. and Ducos, C. (1993). Les artifices du vivant: Stratégies d’innovation dans l’industrie des semences. Economica, Paris, INRA Editions.
- Lemarié, S. (2000). Policy influences on technology for agriculture: Chemicals, biotechnology and seeds (Pioneer Hybrid Monograph Annex C13). Available on the World Wide Web at: <http://technology.open.ac.uk/cts/pita/AnnC13-mono-pioneer.pdf>.