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KWS: GOING BEYOND SUGAR BEET

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KWS, a German seed company, is a world market leader in sugar beet seed. The company is looking for expansion into other crops—maize and cereals—and into other regions of the world—Eastern Europe and North America. As KWS expects biotechnology to bring major benefits to its customers, it continues investing in biotechnology research and development (R&D), although it does not expect changes in public acceptance in Europe in the short term.

Key Words: Europe; innovation; plant biotechnology; seeds; strategy.

KWS SAAT AG[1] is a German plant breeding and seed company, supplying farmers worldwide with seeds for sugar beet, maize, cereals, and oil seed crops. KWS' core business lies in sugar beet (more than 50 percent of turnover), maize, and cereals (table 1). Its cereal activities are located in the company Lochow-Petkus, which is majority owned (81%) by KWS. Other crops include oilseeds (sunflower, oil seed rape, turnip, oil radish, mustard), grasses, potatoes, and fodder beet. The company has a minority stake in a seed potato breeding company called Ragis-Saka. KWS is a global market leader in sugar beet seed, a market leader in maize in Germany, and a major player in maize and cereal seeds in other European countries.

Table 1: Sales of KWS Group by Product Group (% of Turnover).

	1996/1997	1997/1998	1998/1999
Sugar Beet	51	52	53
Maize	29	25	24
Cereals	14	16	16
Oil and Protein Plants	6	6	7

Note. From "KWS SAAT AG Monograph" by J. Bijman and M.J. Bogaardt, 2000. The Netherlands: Agricultural Economics Research Institute. Available on the World Wide Web at: http://technology.open.ac.uk/cts/pita/AnnC9-mono-kws.pdf.

The headquarters of KWS are in Einbeck, in the state of Lower Saxony, Germany. Due to internal growth and some acquisitions, the number of employees increased from 1,500 in 1995 to over 2,000 in 1999. Turnover of the KWS Group was 332 million Euro (table 2). KWS is still very much a European company, with the European Union sales accounting for 70% of total

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sales. Germany alone accounted for 38% of sales in 1999. Sales in other regions of the world were as follows: North America – 14%; Eastern Europe – 11%; and Africa and Asia – 5%.

Table 2: Financial Figures of KWS Group (in Million Euro).

	1994/1995	1995/1996	1996/1997	1997/1998	1998/1999
Sales	229.5	257.9	302.0	338.8	331.5
Net Income	8.9	11.8	15.5	18.6	18.4
R&D Costs[1]	34.0	38.0	45.0	50.0	50.0
Investments	17.3	24.5	31.6	28.8	19.3
Employment	1,503	1,620	1,697	1,893	2,037

Note. [1] R&D costs are estimated. From "KWS Annual Report 1997/1998," by KWS, 1998, Einbeck: KWS; and "KWS Annual Report 1998/1999," by KWS, 1998, Einbeck: KWS.

A Brief History

KWS was founded in the city Klein Wanzleben in Germany in 1864 as a partnership between the Rabbethge and Giesecke families. The partnership became a joint-stock corporation in 1885. The company flourished during the period from 1885 to 1910. By 1900, KWS had become a world leader in the sugar beet seed business, covering a good quarter of world demand (including Russian demand) for sugar beet seed. In the early 1920s, the company started breeding seeds for cereals, fodder beet, and potatoes. At the end of World War II, the company managed to relocate from Klein Wanzleben in East Germany to Einbeck in West Germany and started building up a sales network worldwide. During the 1950s, KWS added maize, fodder, and oil and protein plants to its breeding program. A number of subsidiaries and affiliates have been established in Europe and abroad since 1961. In 1967, KWS broadened the company's base even further by acquiring 81% of Lochow-Petkus, Germany's largest cereal breeding company. In 1992, Lochow-Petkus opened a research station in the French Allonnes. Lochow-Petkus specializes in cereals, especially rye and barley, and has a 20 percent share of the German market. In 1972, KWS initiated research into cellular biology by opening its own tissue laboratory, the first of its kind in Germany. In 1984 KWS founded Planta, a company dedicated to applied plant genetics and biotechnology. In 1993, KWS started field trials with genetically modified crops—it was the first breeder in Germany to take this future-oriented step in plant breeding. After the reunification of Germany in 1990, KWS was able to reacquire its former breeding station at Klein Wanzleben. In 1995 KWS returned to the Ukraine, the largest sugar beet growing area in the world, by acquiring a participation in the company Unisem of Vinnitsa.

Sugar Beet, Maize, And Cereals

Most of KWS' activities are organized along crop lines. There is a division for sugar beet, one for maize, and one for cereals. Sugar beet is by far the most important crop for KWS, generating more than 50 percent of turnover. Major competitors are Syngenta (with its Hilleshög brand) and Advanta. Western Europe is the key market for the international sugar beet seed business. In Germany, the single largest producer of sugar beet in the European Union (EU), KWS is the market leader. The market for sugar beet seed in the European Union is gradually decreasing due to increasing productivity of new varieties and to decreasing acreage (together with a production quota system). Therefore, KWS is seeking expansion in Central and Eastern Europe and in North America. In the United States (US), KWS' subsidiary, Betaseed, has formed an alliance with the American Crystal Sugar Company.

Maize is the second core crop for KWS. The company is market leader in Germany and the fourth largest maize breeder in Europe. It is particularly strong in early maturing varieties, which are grown in the northern part of Europe, in Germany, Poland, the Czech Republic, the Netherlands, Belgium, the northern part of France, and the United Kingdom (UK). KWS wants to expand sales of late-maturity varieties, as they are grown in the southern part of France, in Hungary, and in the US. The reason for this expansion is that maize is the biggest seed market in the world, with a gross margin between 2 and 2.5 billion Euro (compared to a gross margin of 300 to 400 million Euro for sugar beet). As one company executive said,

> The biggest potential is in maize on the worldwide level. If you see our market shares, it is the best opportunity for KWS to grow in maize. And that is our strategy: to stabilize and also to improve where possible in sugar beet. But the biggest potential is in maize and also in cereals. (Bijman & Bogaardt, 2000, p.8).

KWS is expanding in France, the largest maize production country in Europe, and in the US. Expansion in France and other European countries in is collaboration with RAGT, a French seed company. This collaboration covers sales and production of maize and oilseeds.

In the US, the largest single market for commercial maize seed, KWS is also expanding. Originally, US maize seed was sold by Great Lakes Hybrids, a 87% subsidiary of KWS. Besides traditional varieties, Great Lakes Hybrid also sold genetically modified varieties—8% of its maize sales and 55% of its soybean sales were genetically modified in 1998 and 1999. However, in the North American maize market Great Lakes Hybrid was just a small company, and it could not provide KWS with the critical mass it needed for its expansion in 1999. Therefore, KWS had been looking for a partner in North America. In January 2000, KWS announced a merger of its maize and soybean activities in North America with Limagrain. In July 2000, the newly formed company—AgReliant Genetics—was launched. The joint company has one of the five leading maize breeding programs in North America. AgReliant Genetics, with total sales of approximately US$ 80 million, has its headquarters in Westfield, Indiana, and has its Canadian operations based in Chatham, Ontario. Leading varieties of maize, soybeans, and other seeds will continue to be sold under AgriGold, Great Lakes, LG Seeds, and Pride brand names. The new varieties coming out of the integrated breeding program may also be used in parts of the European market.

The cereal breeding operations of KWS are concentrated in the Lochow-Petkus Group. The group consists of Lochow-Petkus, in Bergen, Germany, and its subsidiaries in France (Lochow-Petkus France), UK (Cambridge Plant Breeders Twyford) and Poland (Lochow-Petkus Polska). The main products are winter wheat, hybrid rye, barley for malting, winter oats, and triticale. Besides the traditionally strong position in hybrid rye, Lochow-Petkus is expanding its winter wheat activities. Breeding programs for wheat are located in Germany and in the UK (at CPB Twyford). In March 1999, the expansion of the wheat activities was given a further boost by the acquisition of a 49% stake in the French plant breeder Momont Henette. Lochow-Petkus is also expanding in Poland. Through its 1999 acquisition of 85% of the shares of the agricultural business KonRolPasz Sp.Z.O.O., KWS is establishing a central organization for testing, growing, and processing all the cereal varieties that are important for the Polish market. KWS considers Poland as an important market for the future, “With more than 2 million hectares of wheat and 2.5 million hectares of rye growing acreage, and in view of Poland’s anticipated EU membership, the Polish market will become increasingly important to Lochow-Petkus.” (KWS, 1999).

Innovation Strategy

KWS invests about 50 million Euro in research and development (R&D), which is about 15% of its turnover. The R&D activities include conventional breeding as well as biotechnology and genomics research. Some 400 employees are working in R&D. Of the total R&D investment between 7 and 10 million Euro was spent on biotechnology from 1998 to 1999.

Plant breeding in general is a decentralized activity, with breeding programs in the regions where the varieties are marketed. As such, KWS also has a decentralized innovation strategy. For sugar beet breeding, there is a strong co-ordination from the headquarters in Einbeck. In sugar beet breeding more concentration is possible than for other crops, as varieties developed in one part of Europe can be easily adapted to conditions in other parts of Europe. Thus, although KWS has various sugar beet breeding programs targeted at different regions and different breeding goals (e.g., on Rhizomania resistance and Cercospora resistance), co-ordination and final decision making is located in Einbeck. In contrast, KWS has separate maize breeding programs in each major production region (Europe and the US), as maize varieties have to be adjusted to particular climate conditions.

KWS' main goal in plant breeding is "to breed plants for a healthy environment and a sustainable agriculture; plants which protect themselves against diseases and parasites; plants which offer a wide range of uses, also as renewable resources; and plants which make crops more competitive." (Bijman & Bogaardt, 2000, p.20)

More specific, breeding goals are a reflection of the demands of the main clients, farmers and sugar beet processors. At KWS, breeding and research are aimed at three goals: increasing the yield of crops; improving the stability of the yield; and improving the quality of the agricultural product. The first two aspects are more focused on the needs of farmers. The latter is more focused on the demands of the sugar and other processing industries.

The most important traits that KWS breeds into its plant varieties are yield, quality, resistance, agronomic qualities, and input use efficiency and stress tolerance. Within this list of desirable traits, there is a long-term shift taking place. While for many decades the focus has been on increasing yield, on saving on-farm labor and on improving quality (like processing of sugar beets), the emphasis has shifted towards developing resistance to diseases and pests and to improving nutrient efficiency. This shift is partly due to public concerns about the environmental impact of chemical pesticides. "Since the public concern is against chemistry, resistance breeding has a much higher priority than before." (Bijman & Bogaardt, 2000, p.11).

Biotechnology

> The primary goal [of biotechnology research] is to accelerate the breeding process by integrating new technology (marker technology) and also to pursue new plant breeding aims (genetic engineering). (KWS, 1999, p. 5/6).

KWS considers biotechnology as an important tool for plant breeding. The company wants to have its own expertise in those biotechnology activities that are essential for future plant breeding activities. KWS has concentrated its biotechnology activities in a separate subsidiary, called Planta, which is also located in Einbeck. Planta was established in 1984, to focus on applied plant genetics and biotechnology research activities. The emphasis of Planta's work is on the development and use of technologies that facilitate the breeding of new varieties through tissue culture techniques and genetic engineering. They include maintenance of breeding lines through tissue culture (e.g., maintaining gene banks), and the production of homozygous lines through double haploid methods. Planta generates molecular markers for identifying genotypes and for effective backcrossing in the breeding program. Planta employs about 15 scientists and 80 scientific assistants. Together with national and international partners (like universities and public institutes such as Max Planck) Planta also undertakes basic research relevant to the breeding of sugar beet, maize, oilseed rape, cereals, and potato.

In April 1999, a new 15 million Euro biotechnology center was opened at KWS premises in Einbeck. It is a center of competence for the entire product portfolio of KWS. An important

feature of the center is that both conventional and biotechnology research methods are concentrated at one location, thus allowing a closer integration of these two fields.

In regard to biotechnology and genetic engineering, KWS follows a policy of transparency, showing and explaining what it is doing and why it is doing so. It also has made public its guidelines for working on genetic engineering projects. These guidelines show that KWS acknowledges the difficulties in public acceptance of genetically modified (GM) crops and is an answer to demands from both direct customers (i.e., farmers) and others to know KWS' policy on the use of genetic engineering in crop breeding.

Innovation decision making in a seed company like KWS is strongly bounded by long-term trajectories. This implies that short-term changes in consumer attitudes, for instance regarding genetically modified crops, are not given much weight in innovation decision making. As KWS expects biotechnology to bring major benefits to its customers, it continues innovation along the biotechnology path, although currently with a low profile and stable budget. A company executive summarized this strategy as follows,

> At the moment the way is not open for GMOs [genetically modified organisms] in the supermarket. In reaction to that KWS can not go high speed on developing GMO varieties. We are just continuing the projects dealing with GMO varieties and we continue to apply deregulation of seed release, variety release, but of course we can not do it in high speed and with high effort. But it needs to be continued because we still hope that the market will become deregulated. We think that we eventually will be allowed to sell one. And till that moment we need to have the actual seed varieties and not old ones. Therefore we cannot stop the business. Our biotech R&D programs will not be further extended, but they will be continued on a realistic level. (Bijman & Bogaardt, 2000, p.16).

Public Policy Impact On Innovation

Public policies are very important for KWS' innovation strategy. Agricultural activities in Europe not only continue to be strongly influenced by the Common Agricultural Policy, but also by environmental and international trade policies. Any company supplying seeds to farmers in Europe is indirectly affected by policy decisions. For example, the EU sugar policy has provided high protection for sugar beet farmers and, therefore, a stable market for sugar beet seed companies. With the expected changes in the sugar policy, due to the World Trade Organization agreements about cutting subsidized exports, market growth for sugar beet seed suppliers has become much more difficult. In reaction to this trend, KWS is expanding in other crops—particularly in maize—and in other regions of the world, particularly in North America. The expected accession of Central European countries to the EU is reason for KWS to expand its activities in those countries.

In setting priorities for breeding targets, the focus has shifted from yield to resistance and processing quality. The increasing importance of producing in an environmentally friendly way requires new crop varieties with enhanced pest and disease resistance. Government policies to protect the environment put constraints on pesticide use by farmers and, thereby, induces farmers to shift to crop varieties with enhanced pest resistance.

On the research side of innovation, KWS is faced with public policies regulating biotechnology in the EU and Germany. The paradox of government policies which subsidize and promote biotechnology R&D, on the one hand, and yet restrain the introduction of genetically engineered crop varieties on the other hand, is difficult to comprehend by any seed company seeking to apply the latest advances in biological sciences. KWS is enthusiastic about the German genomics research program called Genom-Analyse in Biologischen System Pflanze (GABI), but it is discontented with the uncertainties in the regulatory policies. At the European level, the slow

reform of Directive 90/220 has had a negative influence on KWS innovation, as it has led to delays in investments in biotechnology R&D. KWS managers emphasize the need for a clear, reliable, precise, and consistent regulatory system at the European and national level.

Conclusions

KWS is still very much a European seed company. Like all major seed companies, its is looking for expansion beyond its home market. The company is also trying to reduce its dependency on sugar beet seed, as very limited growth is expected in this market. Maize is the main target for expansion, in France and in North America, with cereals as a second candidate for growth, particularly in Eastern Europe.

Expansion in the North American market—in a joint venture with the French seed company Limagrain—also includes selling genetically modified varieties. For the European market no such varieties will be developed in the short-term, as the company does not expect that the low public acceptance of transgenic crops will soon pass.

The uncertainty in Europe about biotechnology regulation has slowed down biotechnology projects at KWS' central R&D station in Einbeck. It has made the company very cautious in starting up new biotechnology projects. Still, KWS continues to invest in biotechnology, as not all techniques are controversial (e.g., genetic markers).

Endnotes

[1] The abbreviation KWS comes from Kleinwanzlebener Saatzucht. Klein Wanzleben is a town in Germany where the company was founded. In January 1999, the name of the company changed from KWS Kleinwanzlebener Saatzucht AG into KWS SAAT AG. Saat means seed.

References

Bijman, J. and Bogaardt, M.J. (2000). KWS SAAT AG Monograph. The Netherlands: Agricultural Economics Research Institute. Available on the World Wide Web: http://technology.open.ac.uk/cts/pita/AnnC9-mono-kws.pdf.

European Commission. (1990). Directive 90/220/EEC on the deliberate release into the environment of genetically modified organisms. Brussels: European Commission.

KWS. (1998). Annual report 1997/1998. Einbeck: KWS.

KWS. (1999). Annual report 1998/1999. Einbeck: KWS.