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Midwest Grain Products: a change in strategy due to trade issues

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1. Introduction

The mission of Midwest Grain Products is to efficiently convert grain into world class products Mike Dooley read the mission statement out loud to himself as he took the sign down. He was Flour Plant Manager for Midwest Grain Products in Atchison, Kansas. Mike was going through the plant and replacing the signs with the old mission statement. After months of meetings and planning, a new mission statement had been formulated. He hung up a new sign that read *To meet customer needs by creating and marketing superior value-added products derived from wheat.*

Midwest Grain Products was a vertically integrated, dry and wet, wheat-milling company with plants in Kansas and Illinois. Midwest Grain Products had two years of negative profits and two years of positive profits since 1996. New entrants, increased imports from the European Union (EU), and high raw material costs were three primary reasons for the negative profits. However, their new strategy of differentiation offered some hope for the future. The critical issue was whether sufficient markets existed for these differentiated specialty wheat-protein products and whether their new strategy would return them quickly to profitability.

2. The wheat production, milling, and baking industries

A bushel of wheat weighs 60 pounds. The endosperm, bran, and germ are the three parts of a wheat kernel that are broken apart by a miller. The endosperm (50 pounds) is the source

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Table 1
The relationship of wheat class and protein levels relative to various products

Class	Wheat protein percent					
	9	10	11	12	13	14
Durum						Pasta
Hard white/red				Chinese-style noodles	Loaf bread	
Mixed		Household flour	Japanese-style noodles	Flat bread		
Soft white/red	Cake, biscuit, pastry					

Source: USDA Wheat Yearbook

of white flour and contains the greatest proportions of protein, carbohydrates, iron and also major B-vitamins such as riboflavin, niacin, and thiamine. The bran (8.5 pounds) is included in whole wheat flour (or purchased separately) and contains a small proportion of protein, as well as trace minerals, dietary fiber, and major B vitamins. Finally, the germ (1.5 pounds) is the embryo or sprouting section of the seed. It has a high fat content (10 percent) that, if included in the flour, would spoil it and create a sticky dough.

Very little protein is contained in the germ, but it has trace minerals and the major B vitamins. Protein quality is highest in the bran and germ and lowest in the endosperm. Approximately 80 percent of the protein is gluten. Thus, the greater the level of protein, the greater the amount of gluten.

The wheat kernel is covered with bran coatings that have the greatest amounts of fiber and protein. Under the bran is a layer of aleurone, which also has a large amount of protein. The endosperm is composed of thin-walled starch cells. Within the grains of starch are particles of gluten, which provides the cohesiveness in wheat dough that is desired by bakers.

2.1. Production

The wheat marketing chain is divided into three different stages: production, milling, and baking. Wheat is produced on farms in various regions of the United States (U.S.). The U.S. Department of Agriculture classifies wheat for identification purposes based on characteristics including kernel color (white or red), growth habit (spring or winter), and kernel hardness (hard or soft). There are eight wheat classes: durum, hard red winter, soft red winter, hard red spring, hard white, soft white, unclassed, and mixed. In general, hard red wheat is the only class used in bread making, which makes its protein level (i.e., percentage) of great interest to bakers (Table 1).

Protein level helps determine the wheat's end use. However, the level of protein depends upon several factors. First, the class and variety of wheat are major determinants. Higher protein varieties typically are in the hard red wheat class, whereas lower protein varieties are in the soft wheat classes. However, within each class, protein is extremely variable depending upon the variety. Because there is no value-based marketing program for wheat (i.e., producers were not paid on protein percentage), wheat breeders often develop varieties for

greater yield or tolerance to drought stress rather than more protein, because these are easily identifiable traits that improve a producer's gross revenue. Weather plays a large role in determining the protein content through its effects on kernel size and growth. Thus, it is relatively difficult to forecast with any degree of accuracy what the protein level will be in a wheat crop at harvest.

2.2. Milling

After harvesting, producers deliver the wheat to country grain elevators, where it is aggregated and shipped to main terminal elevators. Here the wheat is sorted, graded, and measured for protein. Then the wheat is milled into flour and other products. At this stage, the miller separates the starch from the wheat grains and also removes the bran and germ. This process involves several steps. First, the wheat is cleaned and moistened. Then it is sent through various pairs of rollers that break the kernels into fine particles and separate the bran and flour. The particles are rolled and sifted until as much flour as possible is created. On average, 45 pounds of flour are milled from the 50 pounds of endosperm. The remaining 5 pounds of endosperm are used as livestock feed.

2.3. Baking

Bakers are able to change the cohesiveness of dough to obtain various specialty products such as raisin and whole grain breads, cakes, and pastries by varying the proportion of gluten. Consequently, the protein level in wheat helps determine what its end use will be. Because it is difficult to forecast what the protein level will be in any given year, bakers require a substitute in years when protein in wheat is low, if they are to maintain the quality of their products. Furthermore, bakers purchase ingredients several months in advance of when they were needed, so they also require a stable source of protein from year to year.

3. Wheat products from wet milling

The dry milling process yields flour that is composed of protein (primarily gluten) and starch. To meet the needs of bakers, vital wheat gluten is developed using a wet milling process that fully separates the starch and gluten. Soaking in warm water coupled with an alkaline treatment softens the flour. A series of screens are used to separate the protein, which then is dried into a powder. These proteins then are separated into gluten and other specialty protein products. Approximately 80 percent of the protein is gluten.

The starch slurry, formed after extraction of the gluten and wheat proteins, is processed further, to extract premium wheat starch, which also is dried into powder and sold in packaged or bulk form. The remaining slurry is mixed with corn or sorghum and water, and enzymes are added to convert the starch to glucose. Yeast is added to ferment the glucose to ethanol, which is distilled from the fermentation slurry, leaving the stillage. This is further separated into thin stillage and condensed distillers solubles by removal of the solids. The residue of the distilling operations is dried and sold as a high protein additive for animal feed.

3.1. Vital wheat gluten

Vital wheat gluten is the only commercially available high protein food additive that has elastic characteristics when added to dough or otherwise reconstituted with water. Gluten has a bland flavor and possesses the ability to absorb more than two times its weight in water. Its elastic properties make it valuable in baking, the production of breakfast cereals, and in fish and meat products. The unique characteristics of gluten are due to its two main proteins, glutenin and gliadin.

Glutenin is responsible for the elastic character of vital wheat gluten. It increases the strength and toughness of bread dough, improves the freeze-thaw characteristics of frozen dough, and is used as a functional protein source in processed and restructured meat products. Too much glutenin yields an overly tough dough.

Gliadin, the smaller of the two molecules, is soluble in water and other liquids, including alcohol, and is responsible for the viscous properties of wheat gluten. These characteristics made it ideal for improving the texture of noodles and pastas as well as crackers, cookies, and food coatings. Gliadin also is used in a number of cosmetics and personal care products. Too much gliadin yields a soft and very expansive dough.

Vital wheat gluten improves the texture, strength, shape, nutritional content, and volume of the product. The cohesiveness and elasticity of the gluten enable the dough in wheat and other high protein breads to rise. Vital wheat gluten also is added to white breads and hot dog and hamburger buns to improve their strength and cohesiveness. For example, vital wheat gluten provides greater hinge strength for hot dog buns.

Vital wheat gluten is a substitute for protein in wheat. When the proportion of protein in a unit of wheat is low, bakers and processors demand vital wheat gluten. On the other hand, when the proportion of protein is high, vital wheat gluten is not as highly demanded. Wheat gluten is used almost exclusively in the food and feed market segments. The food market segment has increased in recent years because of the increasing demand for refrigerated or frozen dough products, which require stronger and more flexible dough. Most vital wheat gluten is used in bagels, hearth breads, and multigrain breads, because it helps support the weight of ingredients such as raisins or nuts. Wheat gluten is sold to baking companies and cereal companies such as Kellogg Co., H. J. Heinz, and Interstate Bakeries.

The overall market for gluten is increasing each year. In 1986, total consumption was approximately 133 billion pounds. This had grown to over 375 billion pounds in 1997, which was the most recent industry figure. Approximately half of this consumption came from domestic production, whereas the remainder came from imports (EU, Australia, Canada).

Several Canadian wheat breeders are beginning to consider functional characteristics of glutenin and gliadin in breeding. However, any practical changes in gluten from breeding are not likely to occur soon. Consequently, no substitutes are available for vital wheat gluten other than the protein inherent in wheat, which is variable from year to year.

3.2. Starch

Premium wheat starch (i.e., not B starch) and unique modified starches are used primarily as additives to improve the physical characteristics of food and industrial products. Food

products include cakes, pastries, and frostings, which used starch to improve palatability and texture. Industrial products such as special laminates for carbonless paper, wallpaper paste, and adhesives, and lubricants in oil drilling operations have been developed from wheat starch. Demand in these two market segments is increasing slowly. Starch products are sold to firms such as Keebler, Pillsbury, and General Mills.

3.3. Alcohol

Alcohol is processed into three main types: food, fuel (i.e., ethanol), and by-products. Food alcohol consists of two market segments: beverage and industrial. Wheat beverage alcohol typically is processed into vodka and gin. Synthetic alcohol products (e.g., household cleaners) dominate the industrial alcohol market segment. Demand is increasing in that segment but not in the beverage food alcohol segment because of relatively stable consumption of alcohol.

Demand for and sales of fuel alcohol are increasing because of regulatory policies on MTBE. State tax credits have stimulated fuel alcohol production. Ethanol is an environmentally cleaner octane additive than MTBE, but production is dependent largely upon tax credits and subsidies.

Distillers' feeds and carbon dioxide are the primary by-products obtained from alcohol production. Distillers' feeds are fed to livestock, and carbon dioxide produced during the fermentation process is trapped and sold.

3.4. Fixed proportions technology

Dry milling of wheat produces flour that then is wet milled. The products from the wet milling process yield approximately one unit of gluten and three units of wheat starch. However, less starch is available, if the goal is to provide more fuel alcohol. Finally, specialty proteins also are separated from the gluten. Thus, a plant needs to find markets for all of its outputs, because it could not produce just gluten or starch alone.

4. Competition in the wheat gluten industry

The most valuable product from wheat wet milling is the vital wheat gluten. The U.S. domestic industry includes four manufacturers: Manildra Milling, ADM, Heartland, and Midwest Grain Products. In addition, imports from Canada and the EU are important sources of gluten. Few public data are available on these firms, because of their diversified status or because they are privately held companies.

4.1. Manildra

Manildra Milling has wet milling plants in Minneapolis (MN) and Hamburg (IA). Manildra, located in Sydney, Australia, is the largest wheat gluten manufacturing firm in the world. By the late 1990s, it was the largest supplier of wheat gluten to food processors in the

U.S. The Manildra Group is the leading supplier of raw ingredients to the food, beverage, confectionery, and paper industries. It has a large research program in Australia to develop uses for wheat proteins and starch and is constructing a modified starch operation near its Hamburg plant. Exports from Australia into the U.S. have decreased in recent years and constituted approximately 35 percent by the late 1990s compared to 45 percent in 1994. Exports overall have increased but at a decreasing rate relative to other competitors in the EU.

4.2. ADM

ADM has a wheat wet milling plant in Shawnee Mission (KS) and also has a plant in Arkansas City (KS) that was refitted recently for dry milling of wheat flour. Wheat wet milling is a small portion of their business, which is primarily corn and oilseed processing, but it is the second largest wheat miller in the United States.

4.3. Heartland wheat growers

In the mid-1990s, an alliance of five producer-owned cooperatives (Farmland Industries and several local marketing cooperatives) formed Heartland Wheat Growers in Russell, KS. The plant was running at less than full capacity by 1999 and was rumored to be in danger of closing.

4.4. EU firms

Imports from EU firms have increased dramatically since the late 1980s (Figs. 1 and 2). Total imports had risen to almost 440 million pounds by 1996 compared to only 220 million pounds in 1990. Firms in the EU consistently had capacity utilization above 90 percent in the 1990s.

Location is one characteristic of the EU that provides it with a competitive advantage. The U.S. is a major supplier of corn because it has favorable growing conditions relative to wheat, which is a less profitable crop. The EU has a northern climate that makes wheat a more favorable crop. Yields also are higher in the EU (Fig. 3). Thus, the EU has developed a wet milling industry that was based on wheat, whereas that in the U.S. is based on corn. The EU always has been a net exporter of vital wheat gluten, whereas the U.S. always has been a net importer. Furthermore, the EU has domestic markets for its starch production but not for all of its gluten. However, wheat wet milling has higher costs than corn wet milling because wheat requires having two separations of starch, but corn requires only one.

4.5. Rivalry

The main competitive factors that affect the wheat gluten industry are price, quality, and customer service. The wheat gluten industry is based on global competitiveness. Price is determined by global supply and demand. Government policies related to gluten production and trade have impacted this industry.

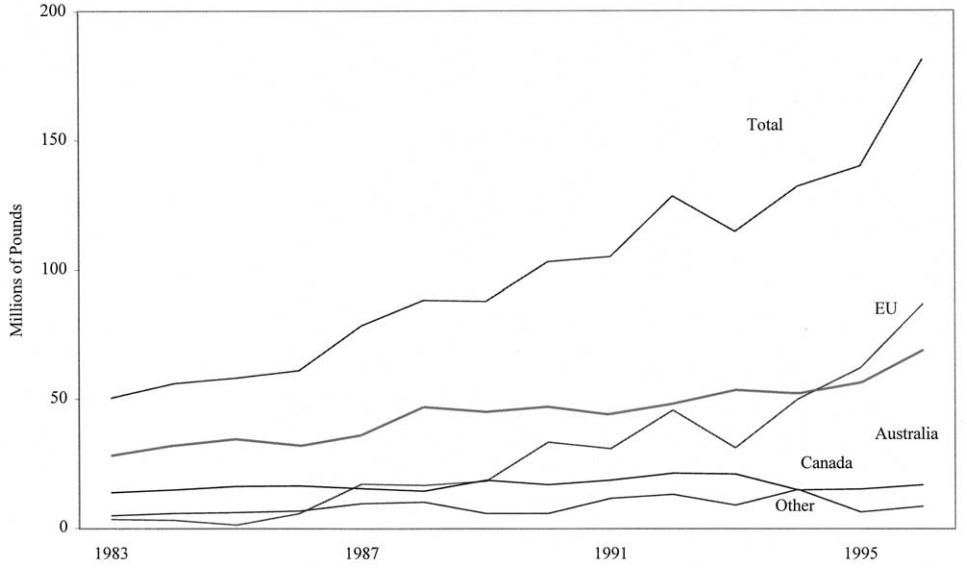

Fig. 1. U.S. Gluten Imports by Country, 1993 to 1997

5. Recent events in the global wheat wet milling industry

Two major events that occurred in the 1990s impacted the profitability of firms within this industry. Both events contributed to decreased profitability. The first event was the large increase in U.S. domestic capacity, and the second event was a trade ruling by the U.S. with regard to EU imports of vital wheat gluten.

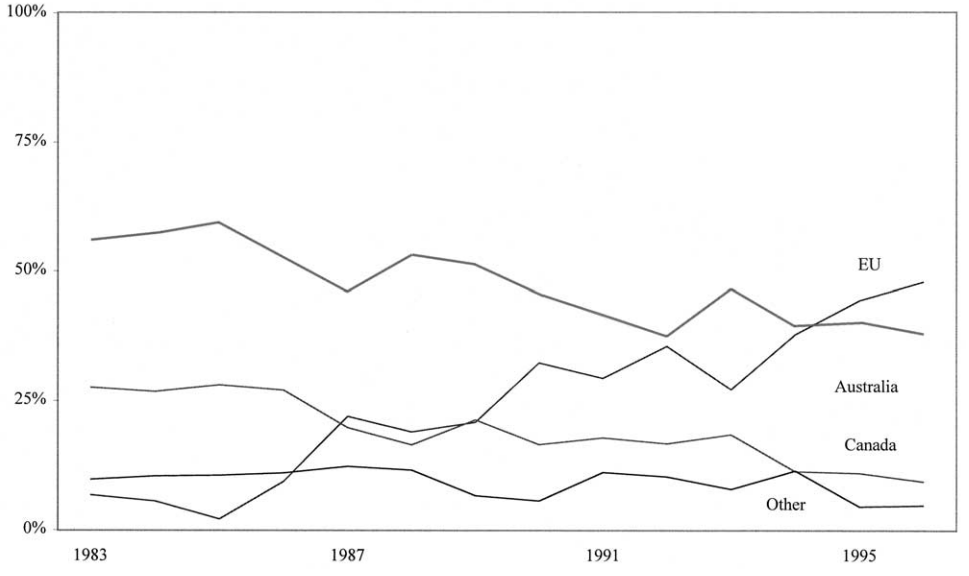

Fig. 2. U.S. Gluten Imports as a Percentage of Total U.S. Imports, 1983 to 1997

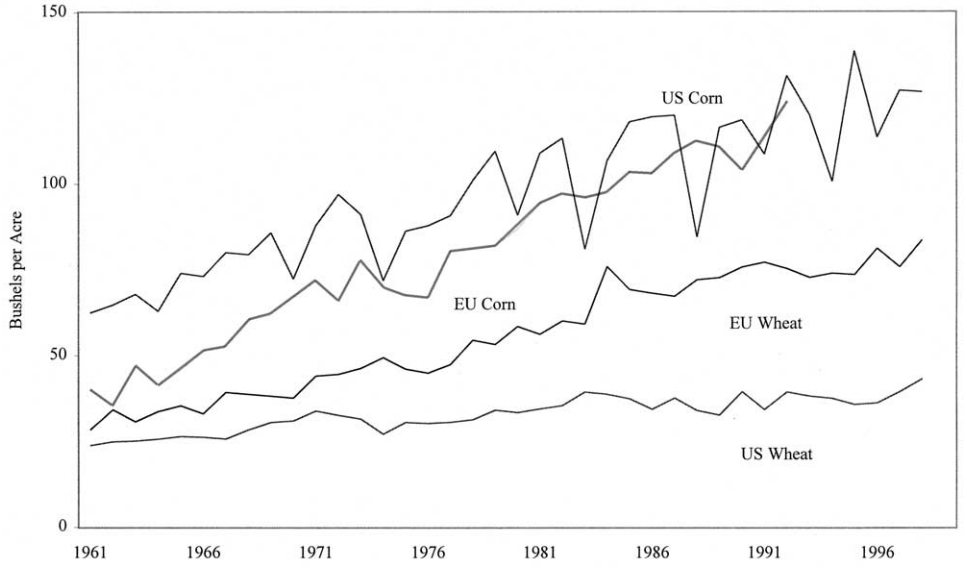

Fig. 3. European Union and United States Corn and Wheat Yields, 1960 to 1999

5.1. Capacity

New entrants in this industry brought an increase in capacity in the 1990s. U.S. plant capacity grew from approximately 163 billion pounds in 1993 to 275 billion pounds in 1997 (i.e., 28 percent increase in 1994 and a 22 percent increase in 1995). Manildra and Heartland Wheat Growers were the major sources of this new capacity. This change likely was due to the attractiveness of the industry in the early 1990s. Utilization of domestic capacity was only 42 percent in 1996, and inventories increased to 11.5 million pounds in 1996 and 9.1 million pounds in 1997 (historical high).

5.2. Trade ruling

President Clinton imposes a three year import quota on EU wheat gluten effective June 1, 1998. Imports of wheat gluten are important sources of supply for U.S. food and feed companies. Australia, Canada, and the EU are the primary sources of imports. Canada and other countries had generally have kept gluten imports constant over time. Over the past 15 years, the EU has increased its U.S. market share from almost nothing in 1985 to nearly 50 percent in 1996. Over this same time period, Australia's market share dropped from 59 to 38 percent, and Canada's dropped from 28 to 9 percent.

During this time period EU firms increased capacity and operated at or near full capacity. On the other hand, U.S. plants operated below design capacity. The processing technology for wheat wet milling is the same across firms, and gluten is a relatively homogeneous product. Consequently, processing costs are likely to be similar. Thus, price differences typically reflect the raw material cost of wheat plus transportation costs. U.S. firms began

asking why EU imports were increasing so rapidly and displacing domestic capacity. Clearly, some form of economic incentives existed that enabled EU firms to become even more price competitive relative to U.S. firms.

On March 18, 1998, the U.S. International Trade Commission determined that "imports of wheat gluten are being imported into the United States in such increased quantities as to be a substantial cause of serious injury to the domestic industry." The International Trade Commission also recommended to President Clinton that a quota be placed on imports of foreign wheat gluten. As a result of that finding and recommendation and pursuant to Section 203 of the Trade Act of 1974, the President issued Proclamation 7103, on May 30, 1998. The Proclamation imposed annual quantitative limitations for three years on imports of wheat gluten from the EU and other Foreign Exporters at an amount equal to the total average imports of wheat gluten shipped into the U.S. by the Foreign Exporters during the three crop years ending on June 30, 1995.

A detailed study by Balzer and Stiegert indicated that even with the quota, U.S. gluten prices likely would remain low in the early part of the 21st century because of excess capacity and competition from Canada, while industry profitability returned in 1999.

6. Midwest grain products

Midwest Grain Products, Inc. is headquartered in Atchison, KS. It is the successor to a business founded in 1941 by Cloud L. Cray, Sr. and is one of the first plants to begin marketing vital wheat gluten in 1955. Grain products are processed at plants located in Atchison, KS, and Pekin, IL. The Atchison facility consists of a flour mill, gluten and starch processing facilities, warehouse, distillery, and corporate offices. The Pekin plant consists of a gluten and starch processing facility, warehouse, and distillery. Purchase of a flour mill in Atchison in 1987 vertically integrated the company from dry milling of wheat into flour to wet milling of flour into starch, gluten, and other products. It became the only vertically integrated domestic firm. In 1995, Midwest Grain products completed a three-year $760 million expansion and modernization project, which included a new distillery at Pekin.

6.1. Product sales

Practically all product sales are to large, institutional processors in the food, beverage, and feed industries. Gross sales tend to be steady throughout the year. However, seasonal variations occur in sales of wheat gluten and beverage alcohol. Wheat gluten sales increase in late spring and early summer because of increased demand for hot dog and hamburger buns. Beverage alcohol sales trend upward in the fall as retailers built inventory for the December holidays. Percentages of sales have remained relatively constant because of the fixed proportions of products resulting from the flour wet-milling process. However, from 1990 to 1999, fuel grade alcohol increased from 16 to 25 percent of sales, whereas food grade alcohol decreased from 13 to 0 percent of sales (Table 2). The beverage alcohol was sold to James B. Beam Distilling Co., Heublin, Inc., and McCormick Distilling Company, which processed it into vodka and gin.

Table 2
Midwest Grain Products sales categories, 1990 to 1999

Category	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Wheat gluten	$31,375	$27,833	$46,941	$54,156	$70,966	$49,957	$39,514	$39,968	$42,489	$56,153
Premium wheat starch	14,907	16,068	17,578	18,423	21,110	23,403	26,354	29,935	27,791	27,173
Beverage alcohol	26,600	25,994	26,437	27,142	29,536	32,573	39,465	43,118	35,934	30,373
Fuel grade alcohol	26,447	35,088	39,043	41,591	41,858	51,499	57,411	72,996	78,764	73,915
Alcohol by-products	16,602	17,010	17,791	19,288	18,146	19,583	28,449	34,553	33,259	25,441
Products	15,668	11,127	8,004	2,826	4,352	3,237	3,445	4,163	5,017	3,046

Midwest Grain Products produces a superior gluten and starch product relative to its competitors. Furthermore, gluten has the highest value of a unit of wet milled flour. For example, approximately $.10 of wheat is used to produce one pound of flour. Flour sells for $.13 per pound, and the millfeed produced when making that pound of flour is valued at $.06 per pound. No public data exists on gluten prices, but an import price can be estimated by dividing the value of imports by the volume (Fig. 4).

6.2. Profitability

Performance began to decline in 1994, and net income was negative in 1996 and 1998 (Tables 3 to 5). For example, net margin decreased from approximately 20.43 percent in 1994 to 2.3 percent in 1996 but then increased to 7.16 percent in 1999. There were several reasons for this decline. First, because of more competitive vital gluten imports and new entrants, Midwest Grain had faced pressure on its gluten prices, which contributed the

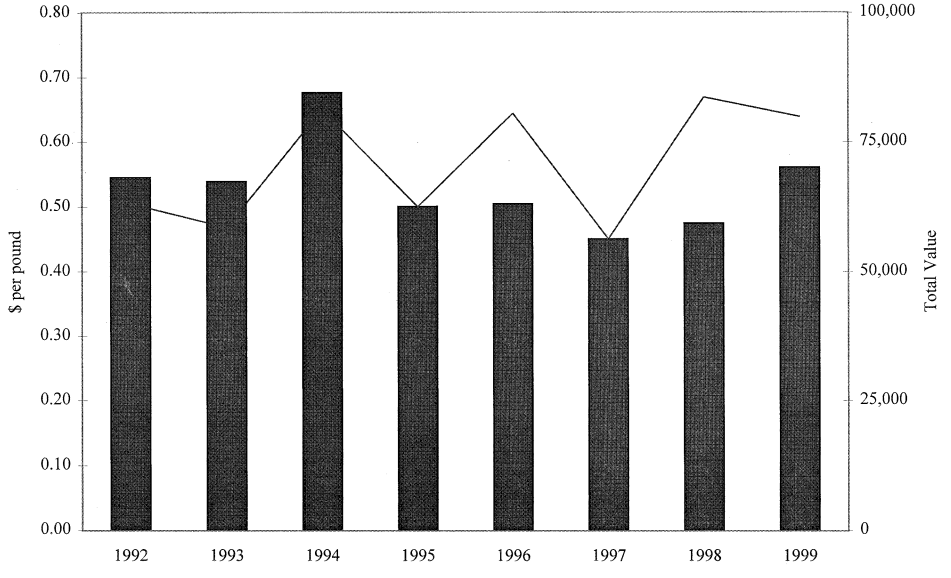

Fig. 4. Total Gluten Import Value and Per Unit Value

Table 3
Midwest Grain Products income statements, 1993 to 1999 ($1,000)

Income	1993	1994	1995	1996	1997	1998	1999
Net sales	$163,000	$186,000	$180,000	$194,638	$224,733	$223,254	$216,101
Cost of sales	131,000	148,000	159,000	190,173	213,733	214,453	200,622
Gross profit	32,000	38,000	21,000	4,465	11,000	8,801	15,479
Selling, general & administrative expenses	11,000	12,000	11,000	9,001	9,169	11,363	11,908
Other operating income				159	370	100	136
Income (loss) from operations	21,000	26,000	10,000	(4,377)	2,201	(2,462)	3,707
Other income (loss), net	(3,075)	375	3,900	1,309	618	658	350
Interest expense	75	125	600	2,556	(2,604)	(1,887)	(1,959)
Income (loss) before income taxes				(5,624)	215	(3,691)	2,098
Provision (credit) for income taxes	8,000	9,500	2,000	(2,218)	84	(1,455)	828
Net income (loss)	$16,000	$16,000	$3,500	($3,406)	$131	($2,236)	$1,270
Earnings (loss) per common share	$1.66	$1.62	$0.34	($0.35)	$0.01	$0.23	$0.13

Table 4
Midwest Grain Products balance sheets, 1993 to 1999 ($1,000)

Assets and liabilities	1993	1994	1995	1996	1997	1998	1999
Assets							
Total current assets	$54,400	$39,300	$42,410	$47,204	$50,184	$55,952	$59,368
Property & equipment	70,000	112,000	134,000	125,149	114,714	105,61	97,916
Other assets	2,600	16,700	1,590	432	432	41	86
Total assets	127,000	168,000	178,000	172,785	165,330	161,97	157,370
Liabilities and stockholders' equity							
Total current liabilities	12,700	18,000	14,000	10,091	13,604	16,12	16,315
Long-term debt	0	25,000	40,000	40,933	29,933	25,53	21,099
Other liabilities	14,511	13,990	13,232	12,539	12,000	11,00	10,700
Stockholders' equity capital				9,204	9,996	8,21	6,262
Retained earnings	109,353	107,117	108,387	100,018	100,149	97,91	99,183
Total stockholders' equity	103,600	114,000	112,000	109,222	108,561	106,32	105,445
Total liabilities and stockholders' equity	127,000	161,978	165,330	172,785	168,000		157,370

Table 5
Midwest Grain Products cash flow, 1996 to 1999 ($1,000)

Cash flows from operating activities	1996	1997	1998	1999
Net income (loss)	($3,406)	$131	($2,236)	$1,270
Items not requiring (providing) cash:				
Depreciation	13,854	14,041	13,892	13,604
Gain on sale of assets	(41)	(18)	(2)	(19)
Deferred income taxes	611	236	(172)	38
Changes in:				
Accounts receivable	3,185	(7,911)	(93)	(287)
Inventories	(5,223)	4,913	(5,430)	(4,020)
Accounts payable	4	1,578	847	38
Income taxes (receivable) payable	(725)	2,836	(1,107)	1,791
Other	(1,238)	618	(183)	298
Net cash provided by operating activities	7,021	16,424	5,516	12,713
Cash flows from investing activities				
Additions to property & equipment	(5,516)	(3,491)	(4,765)	(6,054)
Proceeds from sale of equipment	71	105	4	31
Proceeds from notes receivable	919			
Net cash used in investing activities	(4,526)	(3,386)	(4,761)	(6,023)
Cash flows from financing activities				
Purchase of treasury stock		(792)		(1,195)
Principle payments on long-term debt		(10,000)	(2,037)	(5,364)
Proceeds from issuance of long-term debt	2,025			
Dividends paid	(1,221)			
Net cash provided by (used in) financing activities	804	(10,792)	(2,037)	(7,359)
Increase (decrease) in cash & cash equivalents	3,299	2,246	(1,282)	(669)
Cash & cash equivalents, beginning of year	460	3,759	6,005	4,723
Cash & cash equivalents, end of year	3,759	6,005		4,054

greatest per unit contribution to overall gross profits, even though gluten sales were only 20 percent of total sales. Second, raw materials costs for wheat had increased in 1995 and 1996 because of higher prices, but these then decreased in the late 1990s. Some of these increased costs also were due to its risk management strategy, which resulted in net losses of $3.4 million (1999) and $1.877 million (1997) but a $.243 million gain in 1998.

Third, the inability to run its two plants at full capacity because of the increased imports had increased marginal costs. Its vertically integrated structure did help reduce average costs, but only if the flour mill ran at full capacity. However, the mill had run at an average of 50 percent capacity because of overcapacity in the U.S. flour industry. The company had not had any success producing private label flour for buyers and could not do so in the future. Thus, Midwest Grain Products was not able to reduce its costs by increasing output. Its vital wheat gluten was believed to be superior to other gluten in the industry, because its wheat was milled to a .70 percent ash extraction, with 80 percent endosperm extraction, whereas the industry averages were .52 percent and 76 percent, respectively. In addition, its starch production averaged almost 90 percent capacity utilization in recent years. Thus, Midwest Grain Products was faced with a dilemma. It could produce a high quality flour that enabled it to develop high quality starch, gluten, and other products. However, its flour mill did not run at full capacity and its highly profitable gluten markets had faced price competition from subsidized EU exports.

6.3. Change in strategy

> *It's no longer a goal or a game; now we're fully entrenched. We want to be value added specialists. We are shedding long-held strategies and shaping new plans that will allow the company to emerge as a more profitable, market-driven enterprise.*
>
> Ladd M. Seaberg, President and Chief Executive Officer

The decline in profitability had forced the company to look at its strategy. For a long time, Midwest Grain Products was the low-cost industry leader as evidenced by its having the largest market share and lowest costs. However, this had changed with the arrival of Manildra.

If the firm could not be the low-cost leader, it had to differentiate itself in order to remain profitable. Selling, general, and administrative expenses increased by approximately $.545 million in 1999 above those in the previous year. This was the first step in a three-year plan to increase revenues from differentiated products. Up to $30 million had been budgeted for the research and testing needed to develop and market these products. Much of this increase was due to the firm's change in strategy and new mission statement.

7. Research and product development

Our new slogan at Midwest Grain products is creating better solutions, naturally. After profitability decreased in the mid 1990s, Midwest Grain embarked on a strategy of developing differentiated wheat products as a means of diversification from its other three competitors. Partnerships with grain scientists at Kansas State University as well as industry scientists were established to help develop alternative products for specialty wheat proteins, wheat starch, and other products. A differentiation strategy involved a great deal of risk because of uncertain markets and added investment in research and product development. But it was a viable alternative, if the firm did not have the lowest cost structure. Specialty wheat proteins and starches for food and nonfood applications had potential as alternative sources of revenue for the company. Such a strategy also would make Midwest Grain Products the only vertically integrated, full-line supplier of wheat-protein specialty products.

7.1. Food applications

> *Specialty wheat protein, a meaty addition. Wheatex™ replaces meat.*
>
> Dr. Sukh Bassi, Vice-President of R&D and New Product Marketing

Midwest Grain Products had patented a technology that separated gliadin and glutenin. Gliadin is used to strengthen the texture of noodles, confectionary items, dry mixes, food coatings and binders, cookies, crackers, and other foods. Glutenin is used to strengthen frozen bread dough.

One application of wheat protein in food is as a meat substitute. One product line, the Wheatex™ Series, consisted of texturized wheat proteins for use as meat, fish, and poultry substitutes. Textured wheat proteins to replace textured soy proteins in vegetarian foods and

processed meat products had potential. They had water retention abilities and flavor that simulated to natural meat juices.

Other food applications were improving shelf life of baked goods, enhancing flavor in various products, and increasing tolerance of foods to overcooking. Midsol FP™ Series was a line of products that: 1) substituted for whole eggs and egg whites to improve the texture and strength in pasta products, 2) served as a binder for meat and vegetarian products, and 3) served as a binder to enhance crispness by forming a barrier to moisture and fat in fried products and reduced stickiness in cooking various food products. Finally, Midwest Grain Products developed a wheat protein that could be used as an ingredient in high protein snack bars and beverages.

7.2. Nonfood applications

There were two main nonfood applications for wheat proteins. These were substitutes for animal proteins in cosmetics and personal care products and biodegradable wheat-based resins. The demand for such products that could be labeled natural or pure has increased in recent years. Foam Pro™ was developed as a foam booster to naturally enhance detergent systems such as shampoos, liquid hand soaps and bath and shower gels. Aqua Pro™ II WAA was a solution of amino acids produced from natural wheat proteins that helped provide excellent moisturizing and film-forming properties in both hair and skin systems. Aqua Pro™ II WP was an additive for shampoo, Aqua Pro™ QWL enhanced the functionality of hair conditioners, and Aqua Pro™ II WG was a gliadin formulation used in hair and skin cleansers and conditioners.

Biodegradable resins from wheat gluten and modified wheat starch were substitutes for petroleum-based products. Polytriticum™ 200 could be molded into housewares/cutleries, golf tees, plastic forks and spoons, credit cards, ski lift tickets, and dog chews. It was biodegradable and improved performance.

7.3. Premium wheat starches

Uses for wheat starch included modified wheat starches to replace those from corn, waxy maize, potato, and tapioca for applications in foods, paper, adhesives, and building products. Although a number of the specialty wheat proteins were marketed, others are still in the test-marketing or development stage.

8. Major issues

"*Midwest Grain has a whole new attitude*"

St Joseph News-Press, November 1, 1998

Midwest Grain Products considered three main issues when embarking upon this new strategy. These were: global competition, market research on new products, and stockholder profitability.

8.1. Global competition

The quota existed until June 2001. Given the EU's investment in wheat wet milling and starch subsidy, it was clear that EU firms would continue to export vital wheat gluten at a price that was competitive or lower than that of Midwest Grain Products. Clearly, given the domestic markets for starch and beverage and fuel alcohols within the EU and U.S., only gluten would be exported by the EU. Because corn wet milling provided enough beverage and fuel products to supply domestic markets, gluten would be imported by the U.S.

Moreover, vital wheat gluten made up only a small portion of overall costs for bakery products. Bakers desired a stable low cost price for its ingredients, because ingredients had to be ordered in bulk months ahead of time. Midwest Grain Products always had depended upon a high price for its vital wheat gluten, which it was able to get because of demand and lack of domestic competition.

The focus on a differentiated products strategy would enable Midwest Grain Products to become a full-line supplier of specialty protein-based products. One option might be to consider a long-term arrangement with several major customers to supply wheat gluten on a cost basis plus some margin. This could be adjusted each year depending upon wheat prices. The advantage of such an arrangement would be that buyers would have a stable price and stable supplier. A disadvantage would be that Midwest Grain Products likely would have to accept a lower margin on its vital wheat gluten.

8.2. Market research on new products

Historically, Midwest Grain Products had developed products based on what their existing technology provided. For example, wet milling yielded products in fixed proportions. The demand for gluten had enabled them to remain profitable. Being the low-cost leader also had provided an advantage in market share. However, global competition meant that Midwest Grain Products would need to find other sources of revenue. A strategy based on differentiation meant that the firm needed to manufacture products with features that were different from those of existing substitutes and whose value exceeded their production costs. Such a strategy meant that the firm must be market-driven rather than production-driven.

Specialty wheat proteins accounted for an increasing share of Midwest Grain Products total wheat gluten sales. The percentage had grown from less than one percent in 1998 to five percent in 1999. That share was expected to continue to increase in 2000 because of increased marketing and customer recognition of the advantages of these unique products. This trend was consistent with their overall strategy to focus on marketing and development of specialty wheat gluten and starch products for use in unique market niches.

8.3. Stockholder profitability

The success of a differentiation strategy would mean a return to profitability for the company. Its stockholders included the family of the original management. These stockholders had placed faith in the current management of Midwest Grain Products by approving

the new mission of the company, despite several years of rocky profitability. The firm had a strong equity position that had enabled it to enact the $750 million investment to upgrade and modernize its assets over the 1992 to 1995 time period. Unless the wheat gluten quota was extended past June 2001, a return to profitability meant that revenues from the differentiation strategy would have to be sufficient enough to overcome the potential margin loss on gluten sales.

9. Conclusion

To meet customer needs by creating and marketing superior value-added products derived from wheat

Mike Dooley looked at the sign. It was slightly crooked, so he went over and straightened it out. “We are meeting customer needs,” he thought. “Our vertically integrated system has allowed us to produce a high quality flour, which, in turn, gives us high quality gluten and starch. But some of what we do is dependent upon the import quota on gluten and the government subsidy on ethanol. The future sure looks interesting.”

Acknowledgments

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