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Meat Processing in North America: Successes, Failures and Opportunities.

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Abstract

This paper analyzes historical successes and failures in meat processing using a case study methodology, especially as it relates to possible changes in Canadian market access. Cases include: IPB and economies of size; Canada Packers labor failures; and Tyson and Certified Angus branding strategies.

Keywords

Meat Processing, Beef, Pork, Economies of Size, Branding, Unions

Introduction

Meatpacking has changed significantly over the last few decades. These changes can be seen in every part of the industry. There have been changes in the size of processing plants, the number of firms involved in slaughtering, labor plans, packaging strategies and the relationship between different members of supply chain (Lawrence, *et al.*, 1998). These changes have had profound effects on the industry's performance and they will continue to transform this sector in the future.

The closure of U.S. border to live Canadian cattle due to Mad Cow disease forced all participants in the meat industry to evaluate the current structure. Processors need vibrant cattle and feedlot industries and that means they need appropriate measures to be taken by federal, provincial government and private investors. However, choosing correct and successful investments for the meat industry is a complex and difficult process. These complexities include: a need for qualified labor, inadequate supply of high quality animals for large plants and changing domestic and export demand.

To help ensure profitable investments, this paper will evaluate previous successful and unsuccessful investments and strategies in meat processing industry in North America. The paper is organized into three sections. The first section will evaluate the effect of size and economies of size on production cost. The second illustrates different labor strategies that have been used by meat processing firms and the consequences of strategies on the reduction of labor inputs and costs. The third section presents different marketing strategies that aim to increase demand by establishing confidence among consumers or by supplying the niche needs for some of the discriminating consumers within the meat market.

Size and Scale in Meat Processing

Iowa Beef Packers (IBP) incorporated on March 17, 1960 and became a dominant beef processing firm in North America (Moody's Industry Manual, 1999). In 1968, IBP had six meat

processing plants and these plants yielded sales of \$508 million and a net income of \$6 million respectively. By 1999, IBP owned 13 meat processing plants with a capacity of 38,800 cattle per day in eight different locations. This processing capability enabled IBP to report \$17 billion and \$135 million in sales and net income respectively in 1999. In addition to this growth, IBP was able to reduce its cost to sale ratio dramatically in this period. This cost reduction was achieved through mechanization and economies of size which enabled IBP to spread overhead costs over a greater number of animals (Moody's Industry Manual, 1999).

Meat processing is a high volume, low-margin business. Since the 1960s and the emergence of IBP, the trend in meat-packing plants has been away from multistory multi-species plants and toward specialization in one livestock species and often only one grade and sex. The new generation of very "large-scale vertically integrated beef specialists is also distinctive for their rapid processing speed and very large scale of output (MacLachlan, 2000)." Far fewer meatpackers now slaughter livestock, but their plants are much larger and they have expanded their capacity (MacDonald *et al.*, 2000). For example, in the mid-1980s, it was estimated biggest processing plants in North American might be able to process 600,000 to 700,000 cattle per year; however, by end of 20th century, the largest plants were processing 1,000,000 cattle per year (MacLachlan, 2000).

The search for economies of size led many firms to replace their small, old and inefficient facilities with modern, big and productive plants that had the ability to generate profits by reducing the overhead per unit. This movement can be clearly seen in the dominant meat processing firms in Canada (Brown, McNinch, Taylor, 1997). In the mid 1980s, Lakeside Packers in Brooks, Alberta processed about 4,000 cattle per week but by 1998 they increased capacity to 28,000 head per week (MacLachlan, 2000). This 650% increase in capacity allowed

Lakeside Packers to reduce their operational costs by \$3.7 per head which had a direct effect on Lakeside Packers' long term viability¹.

Economies of size are savings caused by a firm's increase in the number of units it produces per hour or year by expanding. These steps decrease firm costs by allowing them to spread the fixed, sunk and some of variable costs that are not associated with each unit (CEO salary, CFO salary, marketing, research, advertising, promotion and repairs) over a greater number of products (Hayenga, 1997). As a result, economies of size “are usually attributed to a larger firm’s ability to divide tasks among more specialized workers, to use the most advanced technology, and to spread fixed costs across a larger volume of output (Barkema, Drabenstott and Novack, 2001).”

MacDonald and Ollinger (1996) demonstrate the trend of consolidation in cattle and hog processing plants in Table I. They argue that the numbers of small and medium size plants have decreased by 112% and 165% respectively in the past two decades; however, the number of larger processing facilities has increased by 45% at the same time. Furthermore, it was estimated that in 1998, “the four largest beef packing firms accounted for an estimated 80.4% of U.S. Steer and Heifer slaughter and the same four firms accounted for 85% of boxed beef production in the same year (Ward, no date).”

Table I. Structural Change in U.S. Cattle and Hog Processing Plants.

Number of Firms by Size	1977	1982	1987	1992	1996
>500,000	22	35	32	34	32
50,000 to 500,000	114	95	60	53	43
<50,000 ²	333	336	259	213	157

This transformation has also occurred in Canadian meat packing industry. MacLachlan, (2000) argues that small and medium size plants in Canada simply could not compete with the

¹ There is no information about Lakeside Packers revenue in those periods.

² Small plants slaughter at least 50,000 head annually.

high speed, high volume cattle-killing plants. Furthermore, “the announcement of a massive Cargill plant and the expansion of Lakeside Packers served as notice that the beef industry [in Canada] would be operating in an entirely new competitive environment” (MacLachlan, 2000). These large processing firms have 25-30% lower costs than smaller meat packing firms (Barkema, Drabenstott and Novack, 2001). Table II summarizes the rationalization in slaughter capacity in Alberta over the ten-year period ending in 1998. From this table, it is clear that those firms that fail to achieve economies of size by increasing their production were forced to close their doors.

Table II. Rationalization of cattle slaughter and processing in Alberta, 1987-1998

Firm	Location	1987 ³	1998 ⁴
Canada Packers	Red Deer	3,250	Closed
Canada Packers	Lethbridge	3,600	Closed
Canada Packers	Calgary	-	Closed
Dvorkin Meat Packer	Calgary	3,100	Closed
Gainers	Edmonton	2,500	Closed
Burns Meats	Lethbridge	1,800	Closed
Lakeside Packers ⁵	Brooks	3,200	28,000
Cargill Foods ⁶	High River	-	23,100

Tables III and IV show the effect of economies of size on costs in cattle and hog processing plants respectively. Table III demonstrates that a large beef processing plant, with capacity of 1,350,000 cattle per year, has \$4.70 lower operational cost per head than small and medium size plants. The same trend can be seen in hog processing plants. Table IV indicates that a large hog processing plant with a capacity of 4 million hogs per year has an average \$19.80 lower cost per head than plants with a capacity of 400,000 hogs per year.

Table III. Slaughter cost for different cattle slaughter plant 1993⁷

	175,000	300,000	425,000	850,000	1,100,000	1,350,000
Cost/hd ⁸	102.3	101.2	100.0	98.7	97.7	97.5

³ Average weekly Slaughter

⁴ Average weekly Slaughter

⁵ Lakeside Packers was sold to IBP then to Tyson.

⁶ Lakeside Packers and Cargill have 12 shifts per week in these two processing plants.

⁷ This table is based on research conducted by MacDonald *et al.* (2000)

⁸ These estimates are based on full utilization, same technology, input prices and other factors.

Table IV. Slaughter cost for different hog slaughter plant 1992⁹

	400,000	1 million	2 million	4 million
Cost/head	40.55	34.50	29.20	25.70

Malcolm *et al.* (2004) argue that increasing plant capacity by fabricating more cattle per year allows firms to reduce some of their variable costs such as the cost of reducing pathogens. The results of this study can be viewed in table V.

Table V. Available technologies to control pathogens in cattle slaughterhouses¹⁰

Technology	Plant Size ¹¹		
	Small	Medium	Large
Hot water/final carcass wash	\$3.58	\$0.42	\$0.28
Steam pasteurization	\$3.58-\$7.05	\$0.78-\$0.42	\$0.46-\$0.28
Irradiation	\$12.30	\$3.90	\$3.82

Economies of size are also evident in Canadian meat processing. In a study conducted by Martin, Ball and Alexiou (1997), it was estimated that increasing processing capability in a slaughterhouse from 20,000 animal per year to 30,000 and 45,000 animals per year can reduce variable costs by \$7.50 and \$8.47 respectively.

Table VI. Cost Structure for meatpacking firms

	Top 4 Firms ¹²	Other top 40 firms
Manufacturing	8.49	8.50
Selling expense	.33	2.70
General administrative costs	1.92	2.03
Depreciation and amortization costs	.48	.64
Interest costs	.53	.62
Other Costs	2.40	2.57
Total operating expenses	14.15	17.05

An increasingly important factor is multi-plant economies of scale. It has been estimated by Melton and Huffman (1995) that adding a new beef processing plant can reduce the labor and

⁹ This table is based on research conducted by MacDonald and Ollinger (1996)

¹⁰ This table is based on study conduct by Malcolm *et al.* (2004)

¹¹ Large plants: 101-400 head/hr; Medium plants: 40-100 head/hr; small plants:0-40 head/hr

¹² Top 4 firms in this table include: IBP, Excel, ConAgra and Farmland.

capital costs by 8% and 10% respectively. In addition, same effect can be observed in pork processing plants. It has been indicated that adding a new plant can reduce the capital and packaging costs by 33% and 5% respectively in hog processing plant (Melton and Huffman, 1995). Moreover, food safety regulation may be making multi-plant operations even more important because “if one plant is closed for food safety reason, other plants can continue operating, both purchasing cattle and supplying beef and byproducts to consumers (Ward, No date).” As a result, adding a new plant can decrease the variable cost by \$1 per head in most hog and beef processing plants (Hayenga, 1997).

It is clear that large processing plants have lower costs because they are more efficient in using their animal, labor and capitals inputs. “And just as the big three Canadian meat packers put most of the small-scale packers out of business with plant production volumes on the order of 5,000 head of cattle per week, they, too, vanished from the scene in the face of an aggressive new generation of packinghouse titans processing 20,000 head per week or more (MacLachlan, 2000).” However, the potential of economies of size can not be fully utilized unless there is constant flow of live animals through the plant. This means that large firms need to have access to abundant supplies of animals.

Labor Strategies

Although the meat packing industry in North America has changed over the last three decades; the basic service provided by this sector has not changed. This sector is primarily a labor-intensive, low skilled and highly unionized disassembly procedure in which a slaughter animal is processed into salable products (Melton and Huffman, 1995). Labor is the single largest input cost in beef and pork processing plants, as it makes up approximately 50 percent of the total variable costs (Hayenga, 1997). This high cost forces firms to consider different labor strategies. Consider the sad story of the labor relations of Canada Packers.

Canada Packers was formed in 1927 when the Harris Abattoir Company of Toronto acquired three smaller meat packers. Canada Packers became the most diversified meat packing firms in Canada, producing both commodity beef and value added products (**I**nternational **D**irectory of **C**ompany **H**istories, **IDCH**).

Canada Packers continued to expand after War World II and became a dominant player in the Canadian meat processing industry by establishing a research laboratory, and replacing outdated manual processing with automated killing operations. It expanded its facilities in Canada and its international subsidiaries (IDCH). With these production strategies, Canada Packers made a record profit of 30 million dollars in 1981.

However, these successes were overshadowed by one significant failure. As the company entered into late 1980s and early 1990s, its income slipped from \$15.7 million in 1988 to breakeven in 1989, to a loss of \$3.5 million in 1990 (MacLachlan, 2000). There were several reasons for the decline, but a key problem was the impact of the poor use of labor. During 1943 and 1944 Canada packers agreed to representation by the United Packinghouse Workers of America and later the Canadian Food and Allied workers Union. It did not take long for this bargaining unit to have a significant periodic impact on earnings. In 1947, 1979, 1983 and 1986, there were strikes that lasted many weeks. These strikes reduced profit for Canada Packers and allowed competitors to increase their market share (IDCH). This was even worse in the mid 1980's when Lakeside began to expand and the new Cargill plant was built. In addition the union and poor labor strategies initiated many cost disadvantages for Canadian Packers and reduced its ability to compete with meat processing firms which had no union in their plants.

Following unsuccessful attempts to sell all four of the western beef plants en block, the remaining beef plants in Calgary, Red Deer and Lethbridge were shut down in 1991, while the newest plant in Moose Jaw was sold to Intercontinental Packers of Saskatoon in 1991 and acquired by Calgary-base XL Foods in 2000. As a result of heavy unionization in Canadian

Packers beef processing plants and inadequate labor strategies this once dominant company left the meat processing sector.

The most significant change in meatpacking labor strategies is moving away from a traditional labor schedule which consists of one 8 hour shift per day, 5 days per week. These new labor strategies were implemented to minimize the total cost of production by improving labor efficiency and workers' productivity (Ward, 1990). An extra day worked per week can reduce the cost by \$1.53 per head and changing the work schedule to one 10 hour shift per day on a 5 days per week basis would reduce the cost by \$1.78 per head (Ward and Faminow, 1992).

Faminow and Ward (1982) argue that the best labor strategy is to implement an entire second shift to the existing line of operation. This strategy reduces the total cost significantly in meatpacking plants by distributing the overhead, fixed and administration costs over twice as many animals processed in one slaughterhouse. Ward and Faminow (1992) estimated that implementing a second shift to the 8 hours shift per day on a 5 days work schedule would reduce the labor cost by \$9.06 per head in beef plants. It is crucial to note that union contracts, the availability of labor and a constant flow of animals to the plant play essential roles in determining the most successful labor strategy for meat packing plants (Hayenga, 1997).

While double shifts impose added cost, "for example, for doing all cleaning and maintenance in the small hours of the morning, sixteen hours per day operation has become the norm to recoup the enormous capital investment in large-scale beef plants (MacLachlan, 2000)."

By the 1980s, 46% of all workers in meat processing plants were part of unions and these workers had a wage rate of \$10.69 per hour which was well above the \$8.25 per hour that was paid in non-union plants (MacDonald *et al.*, 2000). Melton and Huffman (1995) believe that this wage differential was created by collective bargaining agreements which usually led to increase wage rate and job protection.

By the early 1990s, however, the unionization rate in meat processing plant started to fall. Two reasons have been cited. The first reason was that, many meat processing firms invested heavily to update their plants with equipment and automated machinery (Melton and Huffman, 1995). Most firms adapted this strategy because modernization and mechanization have displayed relatively constant cost reduction rates of 3% and 7% in cattle and hog processing plants respectively (Melton and Huffman, 1995). This constant cost reduction is caused by the ability of equipment such as: captive bolt stunners, mechanical air-powered knives, mechanical hide skimmers and electronic slicers to replace labor intensive procedures (MacLachlan, 2000). These innovations and new processing strategies such as the Can-Pak system, the Computer Assisted Manufacturing (CAM) system and Double-rail Restrainer system caused the employment rate to fall in meat processing plants across North America (MacLachlan, 2000). Less total workers lowered the incentives of the big unions to pursue this membership.

The second reason for declining rate of unionization in meat processing plants is the high turnover rate among the workers in these plants. It has been estimated that “the new generation of packing plants is plagued by high levels of turnover that may approach 100 per cent per year when the workforce is growing (MacLachlan, 2000).” This high turnover is caused by three factors. The first is the demographic changes in slaughter plants across North America. Many firms were forced to hire immigrants from Southeast Asia, Mexico and Central America because there was insufficient supply of cheap labor for meat processing plants in rural areas (MacDonald *et al.* 2000). The second reason for a high level of turnover in this industry is the dangerous working conditions that exist in these processing plants (MacLachlan, 2000). The third reason for high turnover is that many meat processing plants are forced to hire younger workers since most of the current employers are approaching the retirement age. In this new generation of workers, the average age of meat packing worker is somewhere in middle of their twenties and this young

generation view meat packing as a temporary job or a job that allows them to save money for higher education (MacLachlan, 2000).

These forces, and regulatory changes, caused the unionization rate to decrease to 21% in 1987 and it has remained at that lower level through to 1997 (last available data). MacDonald *et al.* (2000) claim that this decline in unionization rate coincided with a real wage reduction from \$10.00 per hour to \$8.65 per hour in the packing facilities.

Branding and Niche Markets

Demand for meat products, especially beef, has declined dramatically in North America. It has been estimated that the beef consumption in U.S and Canada has declined by 42% and 58% respectively in past two decades (Brocklebank and Hobbs, 2004). Ulrich and Brewin (1999) claim that this decline in beef consumption was caused by low quality and inconsistent beef products that did not meet consumers' specification. In addition, beef products have been marketed as generic meat cuts and this factor prevents consumers from choosing beef products based on differentiated quality characteristics (Brocklebank and Hobbs, 2004). To address these problems, many firms have begun to move away from this commodity based marketing and focus on increasing product differentiation based on branded beef.

Founded in 1935, Arkansas-based Tyson Foods Inc. is the world's largest processor and marketer of chicken, beef, and pork (IDCH). This company produces a wide variety of brand name, processed food products including: fresh meats, processed and precooked meats.

Tyson's rapid growth in the fast-food chicken business had put a strain on its production facilities and Tyson needed a brand name for its chicken products to increase its profit and revenue (IDCH). More than half of Tyson's business was with institutions and restaurants, and Tyson's name was not popular in grocery stores. In order to establish market share in supermarkets and obtain brand recognition, Tyson Foods decided to pay 1.29 billion dollars for

Holly Farms and its brand names (IDCH). Holly Farms had begun more than a century before as a cotton compressor. Over the years, it had evolved into a chicken and foodservice firm with a vast holdings and a 19 percent share of the brand name chicken market (IDCH). It had been the first processor to use its own name rather than the retail name on its packaging, which gave the Holly Farms a longstanding credibility with consumers and made it a very attractive purchase.

In its first full year with Holly Farms, Tyson's sales increased 50.7 percent from the previous year (IDCH). As a result, the purchase of Holly Farms and its brand name made Tyson the undisputed king of the chicken industry. The acquisition of Holly Farms' brand name also enabled Tyson to gain a stronger position in beef and pork through Holly Farms' further processing operations and brand name (IDCH).

The Certified Angus Beef (CAB) program started in 1978 and this program is the oldest, largest and most successful supply chain marketing system in the meat industry (Brocklebank and Hobbs, 2004). CAB does not own any carcasses but "they license the feedlots, packers, retailers and restaurants for using the label Certified Angus Beef (Ulrich and Brewin, 1999)." Consumers believe that these products have exceptional quality and these qualities will not fluctuate over time and this belief among consumers is the main reason for this program success. This confidence in CAB products has led consumers to pay premium prices of \$2.33/lb for CAB products (Brocklebank and Hobbs, 2004). These premium prices are observed by meat packers and some of the difference is passed on to ranchers and producers. It has been estimated that these premium prices enable packers to pay additional \$2-5/cwt dollars for Angus cattle. As a result, it is clear that establishing confidence among consumer by developing branded products can be beneficial for all members of supply chain.

Branding beef can play a critical role in increasing beef demand in Canada because "the present Canadian grading system cannot provide the consistency and the quality of cuts that some consumers are willing to pay for (Ulrich and Brewin, 1999)." These marketing systems try to

improve beef quality by combining “the principle of making the initial raw material as consistent as possible through genetics with the principle of making the technical transformation process as consistent as possible (Ulrich and Brewin, 1999).” It is important to note that product differentiation and branding require additional costs and these costs can come from many sources ranging from “higher priced breeding animals to special penning and feeding regimes to separate killing, chilling and packaging systems (Ulrich and Brewin, 1999).” As a result, the success of any program to increase beef demand in Canada depends on the ability of packers “to extract more money from the ultimate consumer . . . depends on their ability to effectively differentiate their products and create a favorable image with consumers (Ulrich and Brewin, 1999).”

“Meat packing consolidated rapidly in the last three decades: slaughter plants became much larger, and concentration increased as smaller firms left the industry (Macdonald *et al.*, 2000).” It has been estimated by MacDonald and Ollinger (2000) that the number of smaller scale packers has declined by 112% from 1977 to 1996 because “industry’s largest plants can deliver meat to buyers at costs 3-5 percent below those of plants only a quarter as big (Macdonald *et al.*, 2000).” This cost disadvantage has forced many small packers to look at alternative marketing strategies and production methods (Wheatley, 2003). Niche markets provide excellent opportunities for small packers to separate themselves from big producers and enter into the high price and more stable markets that big processing firms find too small (Wheatley, 2001).

Bill Niman began keeping pigs, goats and chickens in 1969 on 11 acres of land that he bought for \$18,000 in Bolinas, California, a coastal town an hour north of the Golden Gate Bridge in Marin Country. At the time, he was an elementary school teacher with an interest in old-fashioned techniques and methods of farming and raising animals (IDCH).

From the beginning, Niman focused on sustainability and ecological stewardship. Unlike most livestock companies, which crammed their animals into feed lots and rushed them to slaughter at little more than a year of age, Niman gave his animals plenty of space to roam for

close to two years. In addition, Niman also refused to administer unnecessary hormones, chemicals or feed additives to his cattle and other livestock which was very common among producers in North America (IDCH).

These production strategies enabled Niman to serve the growing niche market for organic, healthy and environmentally friendly products. Consumers in North America were shifting toward organic foods because they were concerned about antibiotic, pesticides and other chemical residue in foods (Brown, 2000). In addition, many consumers believe that organic foods promote a healthier and more sustainable use of the environment and organic foods promote more humane treatment of animals (Brown, 2000).

These concerns and beliefs have increased demands for organic products in the last two decades and Niman was able to take advantage of this shift. In 1997, Niman Ranch had sales of about \$3 million dollars and by 1998 that figure was about \$5 million dollars. However, business doubled by 1999 and again in 2000 to put the company's sales in the range of \$20 million annually (IDCH). Furthermore, Niman Ranch's earnings before income taxes, depreciation and amortization as percentage of sales is between 5.8% and 3.2% where IBP and Smithfield foods earnings before income taxes, depreciation and amortization as percentage of sales are 0.8% and 2.6% respectively. As a result, it is clear that serving this niche market, Niman Ranch has the potential to remain viable in the meat industry (Brown, 2000).

Niche markets in the meat industry refer to groups of customers whose needs are not being addressed by mainstream providers. Small packers who are interested in serving niche markets must first identify the features and needs of these groups and manufacture products that meet these needs (Wheatley, 2001).

Meat products for ethnic markets are another underexploited and lucrative niche market in North America. Ethnic groups require special and different meat products for religious purposes and traditional meals and these products are not usually manufactured by big meat

processing firms (Reynolds-Zayak, 2004). This lack of interest by main stream manufacturers provides an excellent opportunity for small processing firms to fabricate products that fill these consumers' needs. Some noticeable ethnic groups that require special products are: Muslim, Hispanic, Jewish, Chinese and Indian (Reynolds-Zayak, 2004).

These ethnic groups provide very profitable markets for small meat processing firms. For instance, it has been estimated that Kosher food sales were more than \$571 million in 2001 (Reynolds-Zayak, 2004). In 1991, "MGI packers in Kitchener carved out a niche market by converting all of its cattle kill to halal, and by 1997 it become the second-largest beef-kill plant in Ontario. In addition, in the United States, McDonald's Restaurants and the U.S. military require halal products (MacLachlan, 2000)." As a result, this niche market presents a viable opportunity for smaller meat packers.

Consumers' desires and demands to purchase particular products are the driving force behind the opening and development of niche markets for meat products in North America (Wheatley, 2001). This section illustrates that niche markets are expanding and these growth rates will provide a strong base for higher prices for organic, environmentally friendly and ethnic meat products (Wheatley, 2001). Serving the niche markets in North America provide two advantages to small packers. First, it separates the small packers from main stream firms and secondly, niche markets introduce a greater degree of flexibility for small packers to enter and exit these markets since niche markets (Wheatley, 2001). However, packers must realize that consumers are driving forces behind these niche markets; therefore, they must be flexible enough in their operation in order to cope with changing consumer specifications regarding particular products (Wheatley, 2001).

Summary

This research investigated the viability of meat processing by evaluating different types of strategies that have been successful and unsuccessful in meat processing in the past. The first section described the trend in the meat industry to increase plant size to capture economies of size. The second section reported the importance of labor strategies in meat processing plants and discussed Canada Packers' failure to adopt these strategies as the most direct cause of its failure in the industry. Many meat processing firms moved away from traditional work schedules and implemented new strategies which include extended hours and double shifts. Furthermore, many firms invested heavily in labor-saving equipment and processes. The final section focused on marketing strategies, branding and niche markets. These new marketing strategies have the potential to enhance meat consumption in North America by establishing brand loyalty and confidence among consumers and by capturing niche demand.

In conclusion, it is clear that meat industry in North America is changing dramatically. Meat packers must adopt new strategies that enable them to capture economies of scale, negotiate reasonable labor agreements, produce higher quality products, and manufacture more branded and differentiated products. These new strategies will enable meat processing firms to reduce their costs and ensure strong market demand, the essential ingredients for prosperity.

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