

**Environmental Uncertainty and Vertical Integration in a Mature Industry:
The Case of Natural Valley Farms Inc.**

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Abstract

Natural Valley Farms Inc. (NVF), founded in 2003 in the wake of the Canadian bovine spongiform encephalopathy (BSE) crisis, is a meat packing facility exclusively funded by cattle producers. This “value-added” strategy was accomplished through vertical integration and adding a quality-based pricing structure to more closely link cattle producers and consumers. The case study is an example of supply management as a strategic response to a mature industry when market uncertainty is enhanced by a political and economic crisis. More than 350 Canadian projects in response to the BSE crisis were reported in 2003, but most had failed by the time that this case study was completed. Only one of these projects, NVF, took on a fully integrated model where cattle producers have a unique and direct connection with consumers. This paper discusses the culture and structure of the Canadian beef industry based solely on the dyadic relationship between the feedlot and packing segment of the supply chain. It outlines some of the key events of the Canadian BSE crisis and the relevance of past research on environmental uncertainty and vertical integration. A discussion on underlying reasons why vertical integration has been strategically unnatural to cattle producers is also presented.

Introduction

There is no such thing as a completely integrated or a completely unintegrated business. All businesses transact with at least one other business in order to survive, but choosing the optimal degree of vertical integration depends on many factors, including strategy and costs associated with uncertainty. Jensen, Kehrberg, and Thomas argued that “integration of stages is most likely to occur at the point or points in the total production-distribution process where its perishability is greatest” (1962: 380). For the livestock industry this point is generally between livestock production and packing. However, unlike the hog and poultry industries, this has not happened in the cattle industry (Jensen, Kehrberg & Thomas, 1962).

The Bovine Spongiform Encephalopathy (BSE) crisis in Canada increased the amount of uncertainty perceived by cattle producers and buyers. This increased uncertainty appears to have led to an array of initiatives that encouraged cattle producers to vertically integrate into slaughtering and packing plant facilities. While more than 350 of these projects were reported across Canada between May, 2003 and October, 2005, only three federally licensed² ventures were successful. One of these successful ventures, Natural Valley Farms Inc. (NVF), developed a distinctive “Gate to plate” approach to marketing beef products in which cattle producers have extended their focus beyond simply supplying livestock to slaughterhouses³.

² (i.e. allowed to export abroad)

³ While leaders of the project argue that NVF would have been created in spite of the political and economic impact of BSE, they have admitted that BSE altered NVF’s business model.

Many vertical integration projects led by cattle producers have failed in the past and many initiatives that went ahead after BSE will most likely never be realized. In this paper, we present some of the key elements of the Canadian beef industry as they pertain to vertical integration. We also present an outline of the important events that occurred during the Canadian BSE crisis that struck the beef industry in 2003, as well as a brief description of the NVF business model. We then present a review of the main concepts of environmental uncertainty and vertical integration, and extend them through a discussion of the Canadian beef industry, why cattle producers have historically shied away from vertically integrating with the packing segment, reasons for past integration failures, and critical success factors for NVF. The paper concludes with a discussion of implications for beef industry management and future research.

Research setting and method

The intention for this article is to identify and explain key managerial principles for vertical integration in the cattle industry during a key period of environmental uncertainty. Following Yin's (1994) advice on using case studies for exploratory theory development, this study builds on existing theories of vertical integration through a case study that explores potential prospects for cattle producers in a uniquely uncertain environment and the execution of a higher degree of vertical integration in a mature market. Consequently, we collected holistic data referring to the single case of Natural Valley Farms, a successful vertical integration by cattle producers. This case study provided a theoretical perspective by distinguishing between different conceptions of environmental uncertainty and vertical integration and correlating them with NVF's

business model. Moreover, this study used multiple sources of evidence, including archival data, recorded guest speaking notes, and in-depth personal interviews. Key informants from NVF's board of directors and executive committee answered open-ended questions, and reviewed a draft of the case study report prior to completion.

Context

The Canadian cattle and packing industry

The beef industry includes several segments, from cow-calf operations to feedlots to packing plants and food distributors. Two of these segments, feedlots and packing, were analyzed for this case study. Feedlots are confinement-feeding operations where the animals are essentially fed finishing rations before slaughter (Katz and Boland, 2000), and in some cases adding weight to weaned calves before sending them to other feedlots. Feedlots are the main production segment that deals with packers on a regular basis.

The intrinsic structure of cattle production makes horizontal coordination between cattle producers difficult (Lamb & Beschear, 1998). Feedlots are dispersed in a wide geographical area, making vertical coordination difficult. Feedlots are supplied by numerous cow-calf operations, with over 20,000 in Saskatchewan alone. Most have less than 150 heads in capacity, and are often considered hobby farms. This combination was found to have two profound effects on small dairy operations in New Zealand.

Dairy farmers on small and medium sized farms lack “two luxuries often afforded to members of larger organizations, namely the collegiality of colleagues with whom to explore or reframe ideas, and an operating or

production margin that allows negative outcomes or time dependent solutions to be easily absorbed (Sligo, Massey & Lewis, 2005: 459).

Cattlemen running small operations need help to look at a problem differently in order to mitigate imbalances created through their size and industry context (Sligo, Massey & Lewis, 2005). However, being geographically dispersed makes it more difficult to exchange extensive quality information on a daily basis in order to discuss options to current systems and structures, or to develop the trust necessary for collaboration (Sligo, Massey & Lewis, 2005). These factors limit potential collaboration between cattlemen.

Further limiting coordination at the production level is an individualistic cattle culture. Goal compatibility or coordination between cattle producers is uncommon. “Traditionally, cow-calf producers and backgrounders in Canada have been very independent and resist all efforts to cooperate and to develop either horizontal or vertical coordination mechanisms” (Kularantna, Spriggs & Storey, 2001: 12). Individual goals seemed to prevail under the influence of normal environmental uncertainty. Prior to BSE, cattle producers seem to have perceived neither a significant threat nor common, super-ordinate goals that would have encouraged a high level of collaboration.

The next segment of the supply chain, the packing segment, manages a distinct biological and economic reality. The meat packing industry is highly competitive, with low margins (Hursh, 2004). The industry primarily slaughters, cuts, and packages, but sometimes distributes beef products. Market dynamics at the packaging level are

relatively dissimilar to the production level (Joshi and Campbell, 2003). One reason for this dissimilarity is that food distributors, the main clientele for packers, base their marketing strategy on market demand. In this segment it is important to manage market cycles for beef, as beef prices are relatively inelastic. Another reason is that in food packaging, capacity and size matter. Packers and abattoirs are daunting, publicly traded conglomerates that have access to seemingly unlimited resources. In order to compete, packers must have significant knowledge of branding (Hermann, Thompson and Krischik-Bautz, 2002), food safety responsiveness (Spriggs and Isaac, 2001), and administrative assertiveness, none of which are inherently required to effectively manage cattle production operations.

Not including the cattle production segment, vertical integration has been a widely used strategy in the beef industry (Robson and Rawnsley, 2001; Wuyts, Stremersch, Van Den Bulte and Hans Franses, 2004). Public companies like Lakeside Foods (Tyson Foods Ltd.), Cargill, and XL Beef, the only federally licensed slaughtering facility in the province of Saskatchewan at the time of the survey, have successfully integrated several levels of production in order to increase productive efficiency, and ultimately, profitability.

Across the world, a handful of large meat packers are able to dictate how livestock producers must behave to participate in the market (Harvard Law Review, 2004). Through vertical integration and consolidation, these meat packers have created an oligopolistic market, with the top four packers in Canada and in the USA controlling 85%

and 70% of their respective markets (Grier, 2005), distorting power relations between producers and packers.

For cattle producers, the integration story has been different. The normal state for the cattle industry is a low degree of vertical integration of cattle production and meatpacking, with cattle producers being in an inferior position⁴. Competing with publicly traded conglomerates that control the packing, distributing and retailing levels of the supply chain requires an economic surplus. The capital required to vertically integrate creates a barrier to entry for small and medium-sized cattle producers. In addition, different echelons of the supply chain require different managerial skills and practices to address environmental management practices, food safety issues, etc. These corporate requirements may historically have been beyond the entrepreneurial knowledge, skills and abilities acquired through the management of most small and medium enterprises. With this divide, disparities in access to resources in times of uncertainty happen within the feedlot-packer dyad (Grier, 2005).

When beef prices increase, cattle producers benefit. However, when there are too many cattle on the market, excess cattle are essentially worthless to packers (Grier, 2005). Cattle producers are therefore pressured to lower prices, while the meat packers realize high profit margins due to an inelastic supply curve for beef (Katz and Boland, 2000) and financial disincentives to reduce retail beef prices. As Boame, Parsons, and Trant reported to the Canadian government, “Food processors and retailers are normally

⁴ Unlike the beef industry, most vertical integrators in the hog and poultry industry have long been profitable (Jensen, Kehrberg, & Thomas, 1962) and have been able to reduce opportunistic behaviour.

reluctant to reduce the price of a particular meat product, such as beef, in relation to pork or chicken, as shoppers are quick to substitute one meat product for another” (2004: 6).

This leads to an additional problem for cattle producers: Beef production is considered to be a mature industry. Beef consumption in Canada, for example, has decreased significantly over the past 20 years, losing 25 percent of the meat market share to poultry and pork. This lost market share has been attributed to several causes, including cost, safety, and responsiveness. Beef is often the most expensive meat at the counter for consumers. Food borne illnesses attributed to red meat, such as “mad cow” disease, have also greatly contributed to beef’s decline in demand. Others suggest the beef industry’s failure to achieve a greater vertical coordination, and thus transform itself into a more consumer-driven industry (Lamb and Beshear, 1998) has reduced domestic beef sales. While consumers are increasingly concerned about chemical residues and food attributes that relate to health, “the traditional beef marketing system fails to transfer information about what is considered to be the best product to the producer” (Kularantna, Spriggs, & Storey 2001: 119). Therefore, to increase sales the Canadian beef industry historically has had to depend on foreign markets.

The Canadian beef industry, which generated \$7 billion in revenues in 2002, has always had an international reputation for producing a high quality export commodity. In 2002, prior to BSE, exports of Canadian beef and beef-related products to all countries were estimated at \$4 billion (Allen-McGill, 2002). Almost 80 % of these exports were sent to the United States. This makes the beef industry dependent on its American trading

partners (Agriculture and Agri-food Canada, 2002; Canadian Cattlemen's Association, 2003; Canfax, 2003) and producers vulnerable to uncertainties in the US cattle market. The BSE crisis appears to have raised cattle producers' perceptions of these uncertainties.

The Canadian BSE crisis

On January 30, 2003, a 6-year-old Angus cow in the Canadian province of Alberta was sent for slaughter to a provincially licensed meat packer (which cannot export its products). Initially diagnosed as having pneumonia, it was put down before entering the food chain. However, on May 16, 2003, a sample from this cow was tested and was found positive for BSE⁵. The diagnosis was confirmed again by the Canadian Food Inspection Agency (CFIA) and at the UK Weybridge veterinary laboratory (Duchesne, 2003). On May 20, 2003, the CFIA had to announce its first-ever native BSE case, thus igniting an industry-wide crisis. Exports of Canadian beef and cattle were immediately affected as non-tariff trade barriers were enacted across the world (*Le boeuf canadien*, 2003). Most importantly, the United States closed its borders to Canadian beef. Within hours, many other countries, including Japan, Mexico, and Thailand, followed suit. The CFIA immediately started its own investigation, culminating in the testing and destruction of 2700 cattle in Western Canada (*Le plan d'aide*, 2003). Although no other cases of BSE were found, the Canadian beef industry had lost access to its major markets.

As a result of this embargo, the price of Canadian beef plummeted in international markets. Initially, some industry officials denied the seriousness of the situation and the

⁵ This was seven years after the 1996 British report that linked BSE to the Variant Creutzfeldt-Jakob Disease.

long-term impact that this situation would have on the industry. Canadian consumers unexpectedly continued to purchase Canadian beef products. Indeed, many channel members, notably cattle producers, insisted they could maintain the situation that existed prior to the crisis.

Cattle producers also experienced a sudden critical financial situation, compelling many to ask for financial compensation from all levels of government (Monchuk, 2003). Thus, in 2003, members of the Canadian cattle industry were faced with uncertainty and felt vulnerable. Cattle producers blamed abattoirs, meat packers, and the government for a failed system as they realized that the current system favoured mainly mass production and exports (Pauchant and Mitroff, 2002).

In response to this realization, since 2003, initiatives to build abattoirs controlled by producers themselves increased across Canada, with 31 in Saskatchewan alone (Canfax, 2005). However, only 3 projects in all of Canada (less than 0.02% of projects initiated) were reported to have successfully started construction and/or operations. Only two of these were fully financed by cattle producers.

A few underlying factors may have contributed to the failure of many projects. Smaller cattle producers, driven by mistrust and limited connections, initiated many of these schemes, where the capacity was far below 10,000 head. While mistrust provided a powerful motivation to mobilise human capital and financial resources in the short term (Williamson, 1975), it created continuing management problems (Anderson and Weitz,

1986). Under conditions of great uncertainty performance is improved by prioritizing adaptation goals (Achrol and Etzel 2003). However, aside from food traceability systems, where channel members were compelled to work jointly (Loader & Hobbs 1996), most of these initiatives seemed to be characterized by an absence of communication and a lack of trust in the exchange relationship. Moreover, considering that many packers already own cattle for slaughter, these start-up operations had very little bargaining power relative to existing packers (Dahl, 1957).

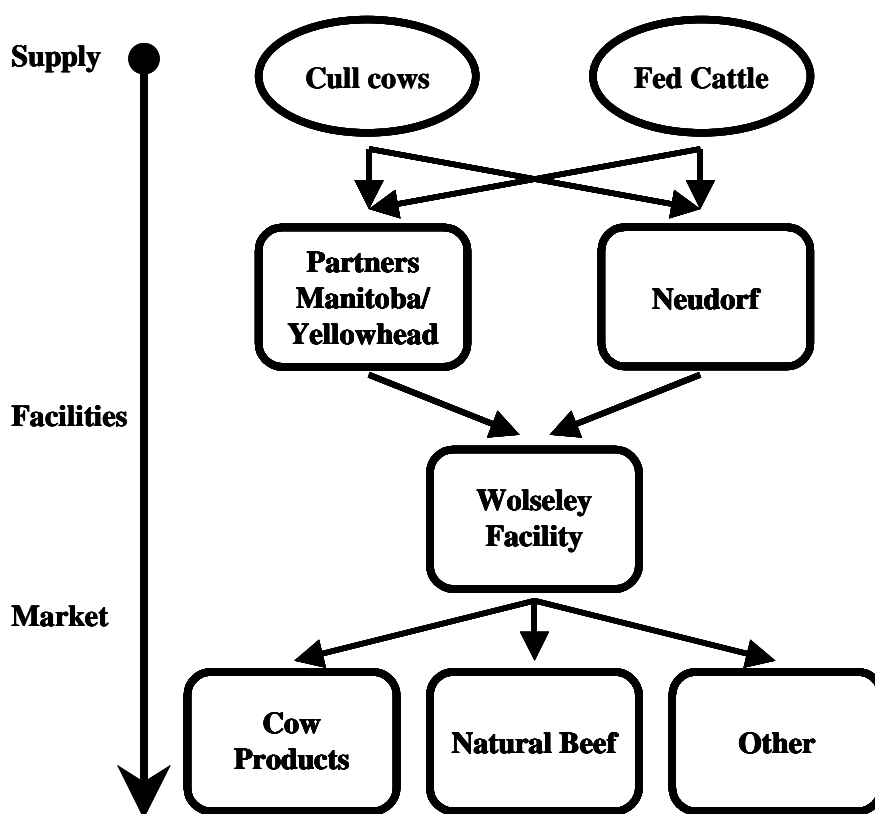
Natural Valley Farms Inc.

Headquartered in a defunct medical supply plant situated on the TransCanada highway in Wolseley, Saskatchewan, a small town of 850 people, Natural Valley Farms is a C\$19 million project founded in 2003 by Cam Taylor, Greg Larson, David Fiddler and Ken Piller. All of the founders had been involved with the cattle industry in some capacity prior to founding NVF. To fund this project, 70 different cattle producers each invested a minimum of \$70,000. Another 1200 cattle producers financially committed to supply the plant.

A processing plant is adjacent to NVF's headquarters in Wolseley. NVF also operates a slaughtering plant in Neudorf (scheduled to start its operations in early 2006), a small town located about 30 kilometres northeast of Wolseley. The Neudorf slaughter facility has a neighbouring feedlot, which holds cattle, thus reducing stress for animals prior to slaughter (see Figure 1). It has a weekly capacity of approximately 1000 head. The packing facility in Wolseley (operations began in June 2005) has a design capacity of

1200 head per week. From Neudorf, beef products go directly to customers, but most carcasses go to the processing facility in Wolseley (NVF, 2005a). NVF has implemented a “Farm gate to plate” concept, where they are able to trace their beef products from the farm of origin to the consumer.

Fig. 1: Natural Valley Farms business model



Since its inception, NVF has marketed “natural beef” even though there is no recognized definition for natural beef in Canada. NVF calves go from maternal feeding onto a grain and forage diet without growth hormones, animal by-products or antibiotics. In cases where animals need to be treated, they are marketed through standard distribution channels. Producers that pool resources with NVF also follow on-farm food

safety practices of the Canadian cattle industry's "Quality Starts Here" program (NVF, 2005a).

For cattle supply, NVF relies on the *Cull Cow Marketing Alliance*, a business liaison between independent cattle producers and NVF. The producer leases a "hook" from NVF for \$200-300. A "hook" simply describes space (or capacity) allocation for the slaughter plant. Each hook entitles the producer to bring one cow per year for five years (NVF, 2005b). NVF suggests that its model is financially beneficial for feedlots. These benefits include additional avenues to market, reduced risk for feedlot operators, and improved connections to markets, allowing operators to better meet long-term market needs and concerns, as through "Natural beef" marketing.

For cattle producers, the hook program has a number of important benefits over traditional buy/sell arrangements. For one, it guarantees a volume of supply for the marketing of animals to the customer. Second, according to NVF, the hook program allows the producer to participate in the profits of processing. Finally, the program significantly reduces working capital requirements, which optimizes the potential for company viability and improves profitability for all those involved through reduced interest costs.

The domestic market is NVF's initial target, but future plans provide for getting Hazard Analysis Critical Control Points (HACCP) certification for the American market, and European Union (EU) certification for food safety standards (NVF, 2005c). NVF is

also focusing on branding to market its products in both domestic and foreign markets as having a unique set of product benefits in both the retail and food service marketplace (NVF, 2005a).

Environmental uncertainty and vertical integration

Uncertainty, a key concept for strategic management in small businesses, results from a lack of knowledge about the outcomes of alternative courses of action (Knight, 1933). Responding to environmental uncertainty is the essence of managerial decision-making (Krickx, 2000).

Perry (1989) has argued that vertical integration is a function of technology, the nature of transactions, and market imperfections presented to managerial decision-makers. Vertical integration, often defined as the combination of two or more stages of a production-marketing chain under a single ownership (Williamson, 1989), is the extent to which a firm transfers risk and controls the production of its supplies and the distribution of its finished products (Carlton, 1979; Mpoyi, 2003). Vertical integration can have many organizational benefits: reduced transaction costs within a supply chain (Williamson, 1989), economies of scale, bargaining power counterbalances, enhanced information sharing that can lead to innovation and differentiation, better defense mechanisms against foreclosures, and more evenly distributed risk allotment across the supply chain (Lawrence, Rhodes, Grimes & Hayenga, 1997).

Krickx's (2000) empirical research into the relationship between uncertainty and vertical integration suggests that the type of uncertainty faced by managerial decision-makers is important when deciding to vertically integrate. Three dimensions of uncertainty may be important for explaining the nature of vertical integration in the cattle and beef industries: Environmental capacity, environmental dynamism, and complexity. Environmental capacity concerns the relative insufficiency of input and output resources to which a channel has access in its environment (Achrol and Stern, 1988; Achrol, Stern and Reve, 1983). Environmental dynamism refers to the degree of change or turbulence characterizing environmental activities relevant to an organization's operations (Achrol and Etzel, 2003). Complexity includes elements of the cattle producers' environment such as competitors, suppliers, and customers. Organizations seek to reduce uncertainty by addressing these different dimensions (den Ouden, Dijkhuisen, Huirne and Zuurbier, 1996; Sturdivant, 1966). Uncertainty can therefore be reduced by gaining greater access to capacity, increasing the quantity of resources, or improving control of their dyadic relationships with suppliers, competitors, and customers. All of these outcomes may be attained through vertical integration.

Vertical integration challenges

The Canadian beef market has been at maturity for decades. This reality affects any prospects for vertical integration. However, the dyadic relationship between feedlots and packers is uncharacteristic of other small businesses in other industries. Feedlots are known to ship livestock to packers with no contract or other guarantees, even if the shipment is worth well over \$2 million at market value. Furthermore, packers often

penalize feedlots on the marbling, tenderness, and final weight of the animal at final destination. Most importantly, values are determined before the quality of carcasses is even known. Feedlots do not control the transactional process, but seemed to be at ease with this arrangement prior to the BSE crisis. Feedlots may have perceived their relationship with packers as a source of discontent, and may have wanted more transactional control. However, no noticeable increase in vertical integration or coordination was observed or documented in the Canadian beef industry prior to 2003, even though the feedlot / packing intersection is the point “in the entire production and distribution chain where this technique would have the greatest chance of reducing risk and uncertainty and enhancing profits or gains” (Jensen, Kehrberg, & Thomas, 1962: 380). The following section explains why vertical integration may have been strategically unnatural to cattle producers.

Barriers to Vertical Integration by Cattle Producers

For feedlots, perceptions of capacity-based tasks in their environment are possibly influenced by product price fluctuations. This may be explained by the fact that cattle producers are essentially price takers. Price taking for producers means that they can alter their rate of production and sales without affecting the market price of their product (Spriggs and Isaac, 2001). Cattle producers transact with an oligopsony where a few buyers dominate the market. This concentration often leads to collusion among packers so that prices are set by agreement rather than by the operation of the supply and demand mechanism. As mentioned previously, this oligopsony persists because there are significant barriers to entry for new competitors. Food safety concerns create major

financial, environmental, and bureaucratic barriers to starting a federally licensed beef packing plant. The capital required for starting a federally-inspected slaughterhouse and packaging plant in North America can be prohibitive. In 1996 a cooperative partnership between all segments of the beef industry value chain in the United States needed \$100 million USD to start US Premium Beef Ltd (Katz and Boland, 2000). In addition, food safety regulations are revised frequently by both provincial and federal governments, making the task even more difficult.

Prior to the BSE crisis cattle producers did not appear to perceive either their level of asymmetric market dependence on meat packers or the financial risks associated with that dependence (Beier and Stern, 1969; Heide and John, 1988; Kumar, Scheer and Steenkamp, 1998; Stern and Reve, 1980). The BSE crisis may have led to an increased perception of that dependence and the consequent assumption of financial risk by the cattle producers. Cattle producers were then encouraged to engage in dependence balancing in order to enhance performance (Heide and John, 1988) by creating Natural Valley Farms. As Heide and John (1988) demonstrated in their empirical work, when two parties are able to influence each other because of mutual dependence, the positive consequences of power are more likely to occur.

Dependency may be implicit for cattle producers. Prior to the BSE crisis they appeared to be oblivious to systemic dependencies, which might be a function of cattle producers' role as price takers. Interviews with ranchers indicated that most cattle producers tender to the highest bidders, or auction directly to the purchasers which form

an oligopsony. Neither these trading practices nor the interview results necessarily imply that cattle producers perceive themselves to be dependent upon interorganizational relationships within a supply chain. However, prior to BSE cattle producers exported the majority of their livestock to one foreign market, the United States, increasing their dependency. Until the BSE crisis there were no plans in place to focus on other markets to lessen dependence on one foreign market.

Systemic managerial principles for vertical integration in the cattle industry

While efforts to decrease dependency seem to have been triggered by the BSE crisis, NVF and its members focused on long-term objectives without linking them to the uncertainties created specifically by BSE. Rather than building a business model dependent upon the border reopening or staying permanently closed to other foreign markets, their approach was based solely on predictable parameters. Domestic consumers were their core marketing priority at the outset. In addition, future plans were set in motion to create a strategy to seek other foreign markets, including the EU.

Plans for a natural beef operation were made well before May 20, 2003. To answer whether or not NVF would have been formed regardless of BSE is highly hypothetical. Indeed, the influence of environmental uncertainty might have had a greater impact on stakeholders outside the NVF founders, such as for governmental agencies that deal with food safety regulations and cattle producers who purchased hocks in advance.

The impact of the BSE crisis on governmental action seems to have been to facilitate opening new slaughter plants. In June 2005, the Canadian Food Inspection Agency (CFIA) announced that it would implement measures to expedite the approval process for new slaughter establishments without compromising food safety (CCA, 2003). These measures were intended to increase the level of support for facilities seeking federal registration and licensing. It is clear that these efforts were aimed at stimulating an increase in slaughter capacity in Canada after BSE.

Perhaps more important for NVF was the impact on cattle producers outside the founding members. NVF is more than just a company vertically integrating cattle production and meat packing. Instead it is a network of over 1200 small businesses. Human and Provan, in doing research into multi-firm networks in the California wood furniture industry, found that forming and maintaining multi-firm networks is a very complex, little understood process, requiring “direct interactions among many member organizations that may never have interacted with one another before” (2000: 327) and may not initially see the value of collaborating.

In SME networks, many member firms are themselves young and evolving and often are reluctant to establish a web of cooperative but uncertain external commitments.... The firms in our networks had to learn to accept the idea that cooperative interaction could create benefits for them and for the network as a whole (Human & Provan, 2000: 340).

In industry cultures prizing independence, competitiveness, and a belief that "sharing is bad" the benefits of horizontal collaboration are not intuitively obvious (Human &

Provan, 2000). Without focusing participants on these benefits, networks tend to disintegrate in a relatively short time. In the BSE situation, the crisis may have provided an unambiguous set of benefits for cattle producers, encouraging them to participate in the formation of NVF.

BSE created such an obvious financial strain that cattle producers were motivated to move ahead with a new strategy. What empowered cattle producers to vertically integrate may have been the information they gained about financial uncertainty created by uncontrollable variables. Through the information contained in the BSE crisis NVF overcame many managerial hurdles that are inherent to the cattle industry and collaborative networks of small and medium-sized firms, which makes this case study atypical for small businesses (see Table 1).

This conclusion suggests that environmental uncertainty can be used as leverage for goal compatibility. NVF started its project prior to May 20, 2003, but it astutely used the BSE crisis to have individual small businesses commit to a common goal. Time was of the essence, and NVF put forth a plan that was quickly executable. Capital magnetism also played a major role in the short-term accomplishments of NVF. Even though many cattle producers were in financial distress, NVF had an accessible financial plan that could draw small businesses with various pecuniary resources. Its start-up costs were meagre compared to other initiatives, where the initial costs often exceeded \$50 million. Also, many investors and prospects were comforted in looking at long-term objectives concurrent to the project to alleviate supply concerns and uncertainty. One supply

alleviation practice included in the program was the hook program, as previously discussed. Finally, NVF focused on developing domestic niche markets and building brands for the future as a first step.

Table 1. Systemic managerial principles for vertical integration in the cattle industry

Conceptual elements	Managerial principles for vertical integration in the cattle industry	Natural Valley Farms
<i>Environmental uncertainty</i>	Use environmental uncertainty as a leverage for goal compatibility (Celly and Frazier, 1996)	BSE provided a context favourable to goal compatibility amongst members
	Create capital magnetism and proper sharing of financial risks for members in financial difficulty (Perry, 1989, Lawrence et al., 1997)	NVF was a financially modest project. Over 1300 cattle producers invested in the project
	Focus on long-term objectives to alleviate supply concerns and uncertainty (Sturdivant, 1966; Achrol and Stern, 1988, Achrol, Stern and Reve, 1983, den Ouden, Dijkhuisen, Huine and Zuurbier, 1996)	Each hook entitles the producer to reserve space for one cow per year for five years
	Have a marketing approach on predictable parameters only (Achrol and Etzel, 2003)	Business model not dependent upon the U.S. border reopening or staying permanently closed to foreign markets; focus on domestic markets. Seeking HACCP and EU certifications to diversify aimed foreign markets, lessening market dependence with U.S.
	Manage the constriction of time provided by a crisis (Elliott, Smith and McGuines, 2000)	Time was of essence, and NVF put forth a plan that was quickly executable
<i>Vertical integration</i>	Build a business model adapted for a mature industry (Mpoyi, 2003)	NVF plans to sell premium products with added value, and use branding as a central marketing strategy
	Adapt the culture and structure of the business to those of the industry (Mpoyi, 2003)	NVF's facilities are near one another, in rural areas, and the design corroborates with the current supply chain of the industry. NVF is managed and financed by cattle producers
	Create meaningful market heterogeneity from meaningless heterogeneity (Alderson, 1965; Priem, Rasheed and Amirani, 1997)	Producers raise beef for NVF without the use of growth hormones or animal by-products. They have also implemented the Farm gate to plate concept, as they are able to trace their beef products right back to the farm of origin
	Share profitability amongst segments of the supply chain, and eliminate the potential for mistrust and dependence perceptions (Reve and Stern, 1979; Heide and John, 1988)	The hook program at NVF allows the producer to participate in the profits of processing. In NVF's model, profits are symmetrical with producers. "Gate-to-plate" concept allows for more control throughout the supply chain
	Establish a web of cooperative but uncertain external commitments by creating a beneficial network (Human and Provan, 2000).	Horizontal collaboration creates an unambiguous set of benefits for participative cattle producers.

NVF will eventually decrease its domestic market dependence by being HACCP and EU certified and diversifying its targeted foreign markets when it is ready to export. At that time, NVF will be certified to export to more markets around the world than any other meat processing plant in Canada. NVF's business model is not dependent upon Canada's trade partners, and adopts a marketing approach on predictable and controllable parameters only.

As for vertical integration, with its business model, NVF was also able to contain the proverbial impact of mistrust and market dependence within the supply chain. It first built a business model adapted for a mature industry by planning to sell a brand that provides premium products with added value. Other cull cows and beef parts will be marketed to fit new niche markets. Second, NVF tailored its corporate structure to the industry: cattle producers themselves established NVF in rural Saskatchewan, with facilities next to feedlots to reduce stress for animals prior to slaughter. Segments within the production part of the current supply chain are reflected in the NVF model. Third, producers involved with NVF raise beef without the use of growth hormones or animal by-products, thus creating meaningful market heterogeneity based on product attributes desired by consumers from the meaningless heterogeneity associated with more than 1200 independent cattle producers. Last, revenue sharing programmed by NVF reduced the potential for mistrust among dyadic relationships within the supply chain. The "Gate-to-plate" adage was pushed to the limit, thus increasing control and building trust across the supply chain.

Conclusion

Cattle producers always had to cope with market failures. BSE made market imperfections more apparent. The creation of NVF is a result of a well-groomed uncertainty management scheme designed to attain a higher degree of vertical integration. Although many cattle producers wanted to facilitate the production of consumer-oriented products while at the same time achieving cost reductions through more efficient production before the BSE crisis, the achievement of such a project came after May 20, 2003, when the Canadian beef industry was hit by international embargoes on its products.

In this case study, we have identified some key managerial principles that can be applied to a thriving vertical integration endeavour in the cattle industry. History has proven that such an undertaking is taxing. Nevertheless, by looking at NVF's business model, it can be seen that environmental uncertainty can facilitate vertical integration projects in the cattle industry, given the right managerial doctrine.

In considering the case of NVF, it would then seem that the analysis of the grounds for vertical integration are formally indistinguishable from the concept of environmental uncertainty. However, it is very unlikely that the structural realignment caused by BSE in the Canadian cattle industry will ultimately result in fewer, larger feedlots with closer marketing ties to packers and consumers. Environmental uncertainty will create winners and losers among traditional cattle producers. Feedlots with larger scale operations and the technical know-how to meet rigorous product requirements with current packers will

thrive in the new beef market. Many smaller businesses will be crowded out. Since more food safety crises are likely to happen again in the future, clear challenges become apparent. Small feedlots might learn from the NVF experience and become more efficient by driving a consumer-oriented agenda for higher quality with added value.

Limitations

To correctly interpret this case study, one has to keep in mind its major limitations. For one, NVF offers a unique perspective in a case study where cattle producers were successful with their vertical integration strategy. This case study, however, does not include cases where cattle producers were not so successful. Key informants for those cases are difficult to contact, as many have gone on to other endeavours and business operators rarely want to recollect failures. Micromanagement facets like leadership, and capital and risk management that might have had an impact on the overall project were also not considered in our survey due to the nature of our macro approach.

In addition, a dyadic relationship in times of uncertainty cannot be analysed in isolation. To analyse only one small business, making a strategic decision of compelling magnitude such as vertical integration in times of uncertainty can be arbitrary. Such a punctuated context creates temporal sampling problems. With food safety and relational exchange, we would need to consider other relationships within a supply chain. Instead of only considering environmental uncertainty in a dyadic relationship, the macro-environment of the supply chain should also be incorporated.

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