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SEVEN FUNDAMENTAL ECONOMIC CHARACTERISTICS EXCLUSIVITY OF AGRIFOOD SUPPLY CHAINS (PART 2)¹

This analysis focuses on defining and describing the unique economic characteristics of agrifood supply chains. The analysis includes seven specific economic characteristics of agrifood supply chains that distinguish them from other industrial manufacturing and service supply chains. The seven characteristics are: 1) risk emanating from the biological nature of agrifood supply chains, 2) the role of buffer stocks within the supply chain, 3) the scientific foundation of innovation in production agriculture having shifted from chemistry to biology, 4) cyberspace and information technology influences on agrifood supply chains, 5) the prevalent market structure at the farm gate remains oligopsony, 6) relative market power shifts in agrifood supply chains away from food manufacturers downstream to food retailers, and 7) globalization of agriculture and agri-food supply chains.

Keywords: agrifood supply chains, exclusive economic characteristics, risk, market power, globalization

Relative Market Power Shifts in Agrifood Supply Chains Away from Food Manufacturers Downstream to Food Retailers

A longer-term agrifood supply chain trend is that market power has been shifting away from

food processors to food retailers and restaurants as downstream businesses closer to the ultimate consumer. The uniqueness of agrifood firms is that this is a much longer process and has more complexity associated with the unique aspects of food. This trend is true in the United States and in other countries. In the United States, leading grocery retailers such as Walmart are now called «chain cap-

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tains» because they possess relatively more influence in many agrifood supply chains when compared to other participants in the same chain, such as food processors (Sporleder and Peterson 2003). Sporleder and Peterson argue that chain captains possess economic market power within some agrifood supply chains sufficient to influence the behavior of participants within the entire chain.¹

Market power concerns are considered by the U.S. Department of Justice often in the event of industry consolidation, where one firm merges with a rival firm in its industry. Complex and sophisticated quantitative tests have been developed to assist courts and regulators in determining firm conduct that may not in the best interest of the public [1]. Evidence from Schumacher and Boland [20] suggests that the persistence of accounting profitability in retail grocery supermarkets was the greatest and most long-lasting of any sector of the food economy. In addition, retail grocery supermarkets and restaurants are integrating upstream into wholesaling while processors are integrating downstream towards wholesalers [12]. However, the authors note that such integration by processors and restaurants into wholesaling has resulted in discounted accounting profits.

Some restaurants, such as McDonalds, while not engaged in vertical integration activities, have expanded their economic influence. This market power stems from their global market share and number of retail locations. Their substantial volume results in increased negotiating leverage with suppliers, access to information on consumer demand for food products through transactional data, and core competencies in logistics and inventory management. This culminates in lower average costs per unit of volume relative to their competitors.

Successful brands can provide enhanced market power over time. Interbrand's list of the top 100 most valuable global brands includes four

restaurant brands (McDonald's, KFC, Pizza Hut, and Starbucks), six food manufacturing brands (Nescafe, Nestle, Danone, Campbell, Kellogg, Heinz), and three beverage brands (Sprite, Coca-Cola, Pepsi). Such brands suggest greater economic influence and tend to be more valuable as a percentage of total market capitalization relative to other industries. Boland, Freberg and Barton (2001) found that common indicators across successful Fortune 500 food economy firms included large market share, valuable brands, differentiated image or products, and a broad product line. The substantial market share enables global food processors, retail and restaurant firms with these brands to pursue other agendas, such as sustainability initiatives to reduce unneeded space in packaging (e.g., reduce size of boxes to minimize the amount of empty space), increase the use of recyclable materials in packaging, and improve the appearance and consistency of produce. While the substantial market share may be true of other industries, the length of the supply chain coupled with the many firms, agencies, and non-governmental organizations in the agrifood industry makes this process much more complex.

Similarly, the size of space used in cages for layer chickens, use of growth hormones in beef production, use of bovine somatotropin (bST) in fluid milk, and other issues have resulted in voluntary changes made by producers upon request from these retail supermarkets and restaurants [18]. Sumner et al. [22] note that new regulations on cages in California will result in eggs being imported into California from other states rather than produced in California. Similarly, bST is no longer used by dairy producers. Scale of operation enables some retailers and restaurant chains to negotiate effectively and act in a manner consistent with chain captains.

Access to information on consumer demand also has led to enhanced relative market power for retail grocery supermarket and restaurant firms relative to food processors [21]. Evidence suggests this holds even in emerging markets in Latin America and Asia [8]. The use of scanner data and loyalty programs has enabled grocery retailers and food processors to better understand consumer buying behavior and purchasing patterns. The near instantaneous use of such data allows these firms to conduct experiments on pricing to better determine how consumers respond to relative price movements. This is especially useful when trying to determine the value of a brand relative to a store brand or private label brand [17].

¹ One specific example is the well-known case of Walmart's packaging scorecard for its suppliers. Walmart is now the largest grocery retailer. The packaging scorecard created by Walmart is their attempt to specify metrics useful to compare the sustainability of practices and the environmental friendliness of packaging among their suppliers. The scorecard evaluates the «green quotient» of product packaging based a number of attributes including 1) greenhouse gas emissions related to production, 2) materials used, 3) product to packaging ratio, 4) cube utilization, 5) recycled content usage, 6) innovation, 7) the amount of renewable energy used to manufacture the packaging, and 8) the recovery value of the raw materials and emissions related to transportation of the packaging materials. Walmart has sufficient market power to dictate that its suppliers will use the scorecard. This is a specific example of the Chain Captain notion within a supply chain.

Globalization of Agricultural Production and Agrifood Supply Chains

Globalization is a complex reality fed by technological changes and inducing dynamics in living standards and consumer demands around the world [13]. Globalization involves a feedback system. Information technology enables globalization, which in turn increases market size, returns to scale, competition, capital flows and therefore political pressure for multilateral trade agreements and market access among countries [2]. Globalization allows for and promotes foreign direct investments by permitting capital to seek its highest return anywhere in the world. The impact of globalization is extraordinary in many ways. Consumers directly benefit through better, faster, and cheaper products.

Global trade in many agricultural commodities is subject to market forces and government policy. These programs generally shield farmers from transitioning out of agriculture and provide income enhancement for farmers through numerous government programs and policies. The programs exist primarily in the United States and European Union countries. Resource adjustment over time is influenced by trade policy.

For example, U.S. farm policy is subject to a five year planning horizon since the authorizing legislation and legislation providing appropriating funds for the authorized programs is done every five years. Furthermore, trade agreements are negotiated by a President through treaties approved by the U.S. Senate. Many of the trade agreements have a provision for agriculture that is written outside of the Farm Bill [24]. All of these policy issues have implications for agricultural production.

It is well-known that some U.S. agricultural programs have provided economic rents to landowners. Dhuyvetter and Kastens [11] suggest that these rents are significant in determining farmland values and farmland leases are attributed to direct payments of income from the U.S. Treasury to landowners. These economic rents are significant enough that producers will not change cropping patterns quickly unless there are significant changes in relative commodity prices, such as during the 2005 to 2008 crop seasons. During these seasons the renewable fuels mandate drove relative corn prices high and consequently producers began moving more acreage into corn. Land retirement programs, such as the Conservation Reserve Program, are another example. This program idled millions of acres of land and slowed resource adjustment in agriculture. This program was part of the U.S. agricultural policy. In recent years, some

of this land was brought back into production when agricultural prices began to increase.

Countries who are members of the World Trade Organization abide by certain rules which include not using agricultural programs that provide incentive distortions to producers and induce them to plant crops at prices not established in global markets. However, countries have undertaken other methods to enhance producer income such as direct payments, crop insurance subsidies, and marketing promotion programs. For all of these reasons, resource adjustment in production agriculture is slow to change over time.

Resource adjustment is not limited to production agriculture. The role of institutions also can limit how quickly agribusiness firms adjust. For example, Boland, Golden, and Tsoodle (2008) noted the high degree of closely-held, family-owned, or cooperative businesses in the U.S. food economy relative to other sectors of the economy. The governance structures of these firms are not unique to the United States. Indeed, family-owned businesses dominate the food economy of many countries and impact the political economy of many countries. Thus, resource adjustment may be slow to change among agribusinesses in many countries.

Globalization increases competition, making it more difficult for firms to raise prices when costs rise. Greater competition also drives managers to add value to goods or services to keep ahead of competitors. As a consequence, production is constantly transferred to the most efficient and innovative firms in a globalized marketplace. Consumers directly benefit through better, faster, and cheaper products. Furthermore, the impact of globalization has been a topic of many case studies in the International Food and Agribusiness Management Review and similar publications (for an example, see [3]).

Globalization affects agribusinesses in several ways. First, firms need to have a strategy for competing globally [5]. Commodity-oriented businesses compete on low-cost of production, handling, distribution, and shipping. Food processors must have a large domestic consumption of the good that is being traded so as to be able to trade the high-valued exports and utilize the lower-valued product in the domestic market. This is often true for products with jointness or fixed proportions such as chicken (legs and thighs vs. breasts), beef cattle (steaks vs. middle meats vs. ground hamburger), wine (reserve grapes vs. regular grapes), and ethanol (fuel vs. distillers grains).

For commodities where low-cost per unit is critical, trade is most prevalent. The United States

has higher cost of production due to relatively high land prices and capital inputs, but enjoys lower shipping and transportation costs. In aggregate, this makes the United States cost competitive with other countries in South America. With regard to processed food products, countries in the European Union have the most integrated level of trade in food products between countries, especially Germany [7]. With regard to agricultural commodities, Brazil is becoming larger due to its unique geographical position with much of its arable land between the equator and 30 degrees south latitude. This enables it to become a larger exporter of horticultural crops, row crops (soybeans) and livestock (beef and poultry).

Implications for Research

Cost competitiveness studies are important for developing a strategy to compete in the food economy. Such cost studies must include the entire supply chain because of the uniqueness of the agrifood economy and include such global dimensions as the sensitivity of competitiveness to changes in currency exchange rates. Examples of this are the Rabobank industry studies. As an illustration, Kiechel [15] discusses why this type of study is an important activity for strategy consulting firms. Examples of how firms and their managers compete in this environment are critical for researchers to understand. For instance, Penrose's [19] pioneering research case on Hercules Powder was one the first to use a case study approach in a scientific manner for research on industry analysis. This is an example of how an academician can conduct an in-depth analysis of a firm and the industry in which it operates in an effort to better understand how strategy evolves. The Industry Studies Association, which was established by the Alfred P. Sloan Foundation, is designed to share such scholarship.

The Nobel Foundation has recognized the achievements of North, Coase, Williamson, and Ostrom in recent years for their work in institutional economics. It is likely that these contributions will find their way into graduate degree programs in agricultural economics and management. The National Food and Agribusiness Management Education Commission reported that only four programs were teaching these institutional economics concepts (Boland and Akridge 2004). Over time, it is likely that this will increase because as numerous authors have noted, there are many applications to the food economy of these concepts (Sykuta and James [23]). For example, the prevalence of closely-held firms such as agricultural cooperatives as an institution globally is one aspect

that requires greater exploration [10]. King et al. [16] summarize much of the literature on cooperatives. As Boland, Golden, and Tsoodle (2008) note, the prevalence of family-owned firms and cooperatives are unique governance structures that are typically not studied within colleges of business programs.

The theoretical and empirical work to substantiate these theories is predominately based upon observation through the use of case studies and other qualitative data techniques. Methods such as research cases of firms within agrifood supply chains need to become part of the standard program for graduate student training in much the same way that econometric and mathematical programming are an important part of graduate training in agricultural economics and management.

This carries over to the choice of doctoral student topics. Boland and Crespi (2010) conducted a census of every dissertation published in agricultural economics and management in the United States over the 1950 to 2005 time period and among many findings, reported less than ten dissertations which used a case study type approach. In fact, there was a significant time gap between Goldberg's 1952 dissertation on the soybean processing industry and the next dissertation that used a similar qualitative approach. Many agricultural economics and management graduate faculty are likely to be uncomfortable with such methods. Two notable exceptions are Wysocki [25] and Burrell [6]. It is important to continue to promote the use of such techniques and educate our colleagues and graduate students on their use. Unfortunately, the majority of agricultural economics and management departments lack critical mass of such faculty.

The training most agricultural economists receive in their doctoral programs enables them to work with large complex time series and/or cross-sectional data sets, such as those often found in large retail groceries. These techniques are within the traditional domain of the agricultural economics discipline. The authors argue however, that a deep understanding of the uniqueness of the food economy, that can be derived primarily from case studies and qualitative analysis, is important for graduate students seeking eventual employment within agrifood industries.

A related issue, although much debated in the professional academies, is the relevance of agricultural economics and management. The short-term budget issues which are really longer-term in nature suggest that universities value the agribusiness management teaching function at the undergraduate level and the production eco-

nomics and quantitative methods function at the graduate level for engaging with agricultural science colleagues on USDA National Food and Agriculture Institute mission research (Boland 2009). Cook and Chaddad [9] provide an excellent historical perspective on agribusiness management research. In general, management research on agribusiness firms is not in that mission with the exception of cooperatives and those programs are heavily funded through faculty chair endowments and centers. Boyd et al. [4] conducted an extensive literature review of management as an input in agribusiness firms and found little empirical evidence demonstrating that it had a significant impact on agribusiness performance. While it is evident that increased resources are needed for graduate program initiatives in agribusiness economics and management, it is difficult to see where they will emerge except through the social sciences rather than the agricultural sciences.

Managerial Implications

The exclusivity of agrifood supply chains provides a rich foundation for managerial implications that focus on industry forces that a firm must take into account when developing corporate strategy. The agrifood supply chain is globalized, requiring managerial knowledge regarding international trade and the complex labyrinth of regulations and stakeholders that influence commodity production in most countries.

Implications abound for the managers of firms in the agrifood supply chain. A clear picture emerges from the exclusivity aspects enumerated here that competition may materialize from sectors previously thought to be unrelated to food production and distribution. Big pharmaceutical companies are an example. The rapid pace of innovation in human medicine from biology and nanotechnology will influence future agrifood supply chains in unprecedented ways. Everything from new food products to new markets will develop and challenge existing firms to be nimble in planning.

The implications for agrifood supply chains and the firms operating within them are numerous. The future will be more complex than the present. The implication of enhanced complexity covers most choices that firm managers must make over time: strategic choices, external choices, organizational choices, and operational choices. The factors that comprise these choices offers some glance at the future decision-makers must face. For example, the number of products offered in the market, the geographic scope of the firm (i.e., number of countries), and the source and sustainability of differentiation (e.g., brands, prod-

ucts characteristics, etc.) are leading elements of strategic choices. Firms successful at growth will be adroit at knowing when to advance new products and services (strategic timing, exploiting new technology to enhance value to ultimate consumers, and at capturing this value). One small specific example of exploiting technology would be a food manufacturer taking advantage of the development of low-linoleic soybeans to produce healthier foods with little or no transfat.

Corporate social responsibility (CSR), defined in a broad sense, emerges from this analysis in several ways. The so-called triple bottom line endeavors will continue to be important to firms in agrifood supply chains as well as firms in manufacturing and service sectors. However, because of exclusive aspects such as globalization and technologies like gene modification of germplasm, CSR emerges as a vital element that agrifood firm managers must recognize and supervise which differs by location within the supply chain, but becomes increasingly important to all the stakeholders of agrifood firms.

The role of trade associations, promulgating soft law self-regulation, will be more important in the future. Trade associations will have an essential future role in codification of best practices within their particular industries. The term codification implies identifying or creating codes, which are compilations of written statutes, rules and regulations that inform trade association members of best practices and of acceptable and unacceptable firm conduct. The dynamics, length, and complexities of agrifood supply chains as discussed in this manuscript will enhance the role of trade associations and other non-governmental organizations in promulgating soft law self-regulation. Soft law self-regulation will take on renewed importance in the future. As a specific example, one only need consider the notion that food and medical technology are merging in some applications to create new food supply chains as a means to deliver certain medical technology to consumers. Complex alternatives will need resolution by managers in an unprecedented way.

The role of food manufacturing research and development is less clear in the future than it is under the current agrifood supply chain. Regulatory issues, the nature and intensity of competition within a particular manufacturing industry, and the speed of innovation within the industry are all external to the firm. The elements of organizational choice and architecture include the internal structure of the firm, the role of research and development and innovation within the firm, and other elements less well-understood by man-

agers such as corporate culture and CSR. Grocery supply chains have trended toward chain captains with increasing market power at the retail level as noted earlier. One implication is that entire supply chains or networks may compete against one another in the future.

The future role of business policy will become more important in agrifood supply chains. The complexity, length, and number of different firms (e.g. producers, first-handlers, manufacturers, wholesalers, food service suppliers, retail groceries, and restaurants), regulatory bodies, and other agents (NGOs) make the agrifood industry much different and exclusive relative to other manufacturing and service industries. Demands by NGOs and others will continue to present dynamic situations that add complexity to the chain.

One recent example of these complexities within agrifood supply chains include the support

received for fundamental shifts in the manner in which nutrition information is presented to consumers [14]. The Institute of Medicine recently called for a four-star front-of-package voluntary labeling of healthfulness on all food products in the United States. The suggestion is to move away from protocols that mostly provide nutrition information to protocols that offer clear guidance to consumers about the healthfulness of the product. Even though such a shift in labeling may appear to be a food processor issue, the reality is that it is a chain issue. It must be managed from a supply chain perspective to be implemented in a credible and cost effective way. Upstream supply chain participants must be vigilant to understand the ultimate needs of downstream customers. The future, no doubt, will be toward enhanced vertical alliances in supply chains in an effort to manage these types of chain issues.

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