

VALUE CHAINS IN THE AGRICULTURAL INDUSTRIES

by

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Preface

The U.S. agricultural industry is in the midst of major structural change — changes in product characteristics, in worldwide production and consumption, in technology, in size of operation, in geographic location. And the pace of change seems to be increasing. Production is changing from an industry dominated by family-based, small-scale, relatively independent firms to one of larger firms that are more tightly aligned across the production and distribution chain.

And the input supply and product processing sectors are becoming more consolidated, more concentrated, more integrated.

Agriculture in the 21st Century likely to be characterized by: 1) adoption of manufacturing processes in production as well as processing, 2) a systems or food supply chain approach to production and distribution, 3) negotiated coordination replacing market coordination of the system, 4) a more important role for information, knowledge and other soft assets (in contrast to hard assets of machinery, equipment, facilities) in reducing cost and increasing responsiveness, and 5) increasing consolidation at all levels raising issues of market power and control.

These profound changes in the agricultural industry present new challenges and new opportunities that require new opportunities that require new ideas and concepts to analyze and implement. They require new learning and thinking. Some of those new ideas and concepts are presented here, not as empirically verified truths, but as “thoughts” to stimulate different and better thinking. They have been developed based on observations, analysis and discussions with numerous managers and colleagues in agribusinesses in North America and Europe. This series focuses on Value Chains in the Food Production and Distribution Industries; companion series are also available on Farming in the 21st Century (Staff Paper 99-9), and Financing and Supplying Inputs to the 21st Century Producer (Staff Paper 99-11).

Our purpose in sharing these “thoughts” is to invite discussion, dialogue, disagreement — in general to encourage others to develop better “thoughts”.

Keywords: Value chains, value decay, product differentiation, information, structural change

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Product Differentiation and Formation and Power In Supply Chains

Agriculture has been dominated in the past by commodity production, but a significant trend in today's agriculture is the development of differentiated products with some of that differentiation occurring within the farm gate. More tightly aligned supply chains facilitate product differentiation, and opportunity to differentiate provides incentive for chain formation. The need for diversity, exacting quality control, and flow control will tax the ability of open commodity markets to coordinate production and processing effectively. Markets increasingly encounter difficulty in conveying the full message concerning attributes (quantity, quality, timing, etc.) of a product and characteristics (including services) of a transaction. Where open markets fail to achieve the needed coordination, other options such as contracts, alliances, integration, or joint ventures will be used.

In general, negotiated coordination results in more rapid transmission of information between stages and enhances the ability of a system to adjust to changing consumer demands, economic conditions, or technological improvements. The higher the specification of end-user attributes, the higher the level of accurate, responsive, messaging needed, the higher the need for a more tightly coordinated supply chain. The ability of the agricultural production and distribution system to be more responsive and to adjust rapidly to changing conditions is increasingly important because the rate of change in economic and social systems worldwide has increased.

The ability to respond quickly to changes in the economic climate is critical to maintaining profit margins as well as to extract innovator's profits. Likewise, quickly recognizing erroneous decisions and making appropriate adjustments are essential. Market coordination of systems characterized by biological lags cannot respond to changing conditions as quickly as an integrated or contract coordinated system. That is, the response at one stage can be initiated only after price signals the need for change, and the change in quantity or quality is realized only after a full production cycle. By their nature, negotiated coordination systems require more frequent and direct communication between the decision makers at each stage on a wider variety of product/service characteristics than is typically possible with more traditional spot markets. Improved information flows and more rapid adjustments allow negotiated coordination systems to function more effectively in rapidly changing markets.

Thus, three interdependent trends in the modern food production and distribution system encourage the movement away from open markets to more tightly aligned supply or value chains: 1) increased specificity of consumer and end-user demands, 2) increased opportunities to produce differentiated products throughout the food chain, and 3) increased complexity of the production process or the opportunities for potential mistakes. As illustrated in Figure 1, increasing specificity of consumer demands and increased opportunity for product differentiation both encourage more tightly aligned value chains, whereas open markets can perform very successfully when the industry is characterized by both low specificity and low differentiation.

The higher the specification of end-user demands, the higher the potential payoff from product differentiation. And the fewer stages or places in a chain where this differentiation can occur, the more important it is to have control over those few stages. Furthermore, these stages also have the most power to capture value in the supply chain. Alternatively, the more the

number of stages or places where the product differentiation can occur or where specific attributes desired by end-users can be added, the more the opportunity for substitution and the less critical it is to control each of these stages.

The third dimension of complexity of production is not unrelated to consumer specificity and differentiation. More differentiation and specification in general requires a more complex production process and thus the potential for more errors or mistakes in that process. With increased complexity and potential errors, more structured systems of control are essential to reduce those potential mistakes. And this increased control is easier to obtain in more tightly aligned supply chains in contrast to open access markets (Figure 2). The systems necessary to implement quality control or food safety and traceability throughout the entire production/distribution process from genetics to end-user is but one example of the necessity for tighter alliances and linkages throughout the stages of the chain to obtain expected performance.

As one attempts to evaluate what stages of the chain need to have tighter alliances with other stages, this concept of complexity or alternatively the ease of programming specific decisions is again relevant. Thus, where the probability of obtaining the most mistakes or errors is higher, the larger the incentive for tighter chain linkages including ownership. In contrast, if the production processes are not particularly complex and can be easily monitored and controlled, outsourcing or market systems of coordination may be as or more effective than tight alliances or ownership.

These arguments suggest that in traditional commodity markets where specific attributes are not demanded, supplies are fully adequate and can be obtained from various sources, and information flows between the various stages is minimal, traditional spot commodity markets can function quite effectively and efficiently. As one deviates from these conditions — which is increasingly the case with more specificity in raw materials and information flows, and with fewer potential sources of acceptable supplies — various forms of negotiated coordination systems become more effective and necessary for efficient functioning of the production and distribution system.

Figure 1. Product Differentiation and Supply Chain Coordination

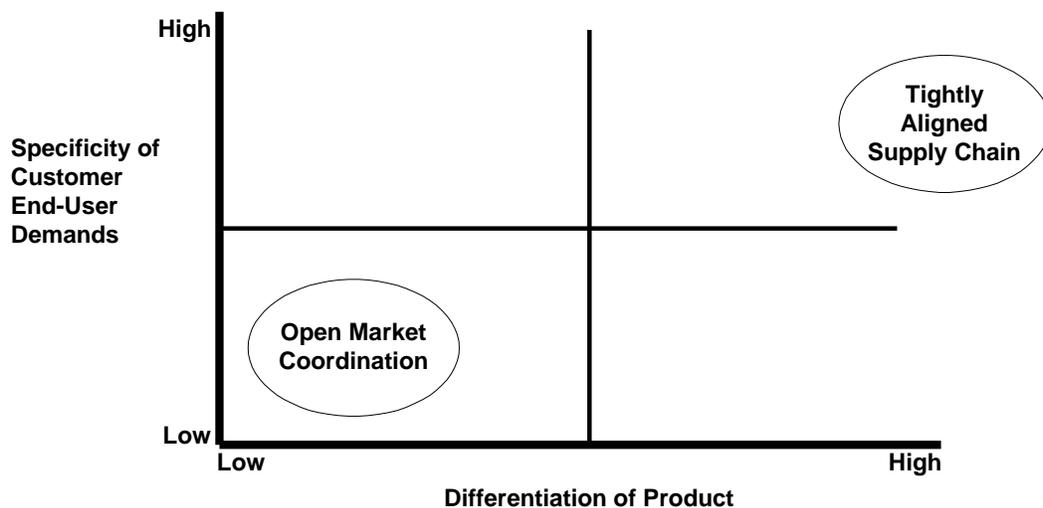


Figure 2. Complexity of Production and Supply Chain Coordination.

