

Dimensions of Agricultural Value Chains

#1 in "The Evolution of Agricultural Value Chains" series

Abstract

The agricultural sector is increasingly characterized by tightly aligned supply or value chains that extend from genetics through producers, processors, and end users. Vertical linkages in the supply chain and qualified supplier approaches in the agricultural sector are relatively new for crops and livestock. Understanding some of the critical dimensions of a supply or value chain will help us understand the implications of this new way of organizing the food production and distribution system.

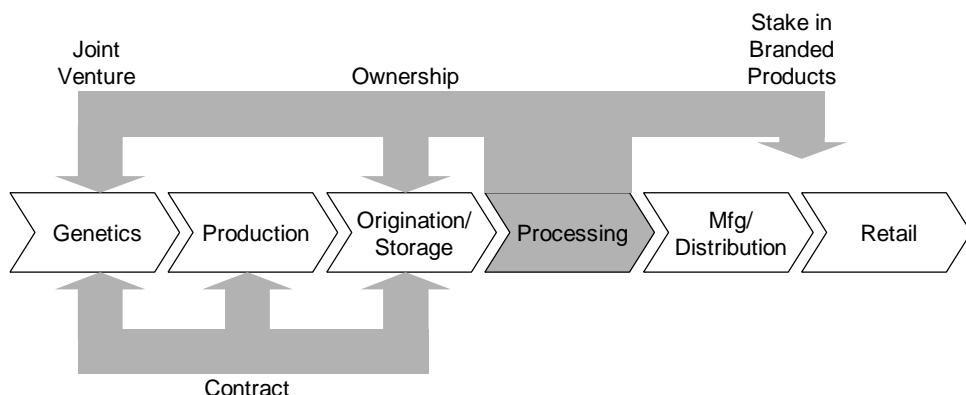
Key Words: aligned value chains, qualified supplier, vertical alignment, incentive systems, information flow, alliances

Introduction

There is much interest in understanding the impact that value chain alignment has on the firms involved. One of the challenges of this is that it becomes more difficult to define or even classify firms as their roles are changed by the new relationships. Traditionally we define a business in terms of their function (what they do), their domain (sphere of activity or influence), and their boundaries (geographic coverage). By its nature, vertical alignment re-defines the roles of the value chain participants, blurring the traditional lines that have been used to define an individual firm. This paper identifies some dimensions that can be used to help describe and define the role of a firm within an aligned value chain.

As an example, consider the challenges in defining the role hypothetical Acme Processors Inc. (API) which is depicted below.

Acme Processors Inc. Integration Illustration



API is a processor that is involved in a joint venture with a genetics company, has ownership in grain origination and storage facilities, and has ownership and brand relationships on the manufacturing and retail end. In addition, the production is done under contract among the genetics company, producers, and the originators.

While the ability to measure has importance in and of itself, the dimensions used to measure also provide us with a common language that is used to describe and debate about the structure of the industry. For example, while the diagram above provides information about the general relationships among the segments touched by API, it is a challenge to quickly articulate their scope and role in the industry. As

new value chain relationships emerge, we will need to constantly update our way of thinking about how to view and measure them.

Dimensions of Value Chains

There are many possible dimensions to consider when trying to understand a business or group of entities engaged in a coordinated value chain. Six dimensions of agricultural value chains are proposed and discussed below.

Value Creation Activities

The first dimension relates to the relative contribution of value to the overall process. New relationships in the value chain can provide new opportunities for value creation. Consider how API might be able to change the nature of value created along each step of the value chain through better vertical communication and coordination.

	Genetics	Production	Origination/ Storage	Processing	Mfg/ Distribution	Retail
Traditional Value Chain	Agronomic yield, pest resistance	Raise "#2 Yellow"	Store and maintain	Convert generic to generic	Maximize efficiency	Sell generic
Future Value Chain	Quality traits	Guaranteed supply and composition	Coordinate, improve, and store	Blend and convert specific to specific	Maximize specialization	Sell specific

In the past, it was sufficient to measure the value added in terms of physical metrics, e.g. processing efficiencies. In the future, measures of contribution will need to expand to include the value that might be realized from providing advance information about product quality or gains that can be realized from better coordination of timing of delivery, etc.

Product Flow

The second critical dimension of a value chain is the specification of the product flow features of the chain. These features would include:

- transportation and logistics necessary to move products between processes,
- details of flow scheduling to make sure that products are available at various stages of the process without accumulating excessive inventory,
- enhancement and maintenance of various quality attributes, and
- full utilization of plant and equipment in all stages of the value chain to reduce down-time or bottle-necks.

At the same time, a critical issue in managing the product flow in a supply chain is managing slack or flexibility to accommodate unexpected interruptions or events. Concepts of statistical process control, inventory management, and logistics management are critical to understand this product flow dimension of a value chain.

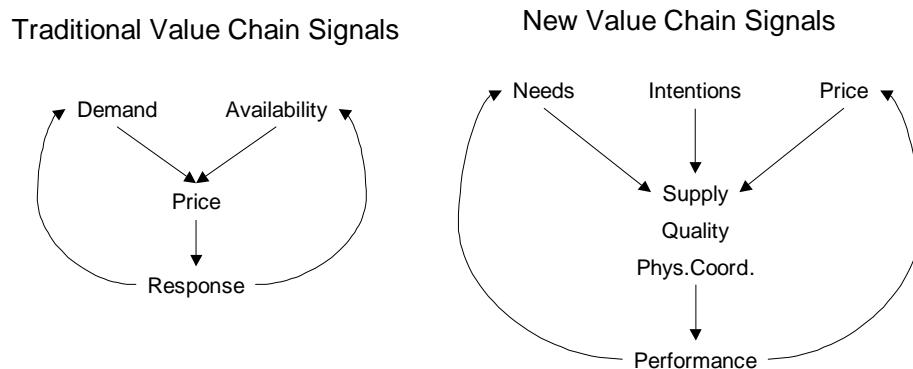
Financial Flow

The third important dimension of a value chain is the financial or cash flow across the participants and processes. Recent development of electronic funds transfer technology has improved the efficiency of

financial and funds flows compared to earlier systems of billing and check-writing. An additional element of this dimension is the sharing of financial performance information across the stages or processes and participants in the chain. Such information is typically presumed to be proprietary in nature, but more open sharing of financial information among chain participants may be critical to optimizing the financial and physical performance of that chain and proving a fair allocation of returns for value created.

Information Flow

A fourth critical dimension of a value chain is the information flow across the chain. Information flows across traditional agricultural supply chains revolve around availability and demand which is reflected in the offered price. Collectively, these are used as signals that hopefully stimulate other sectors to provide the products that are needed. The new value chains can focus on needs, intentions, and price as a way to drive the supply, quality, and physical coordination. Finally, actual performance of the product and processes can be shared with the sectors that may be able to influence improvement in future performance.



Important elements of the information flow dimension include:

- timing and accuracy of messages (whether messages are signals or noise),
- strength of these messages,
- cost of messaging, and
- assurance that potentially sensitive or confidential information is only exposed to those who need that information to improve the functionality of the value chain.

Technology developments that will enable the increased flow of information are probably some of the most significant drivers of change in agricultural value chains. These include functional advances and cost reduction for computing technology, remote sensing, and enhanced network capabilities. As this trend continues, the value that individual firms can add through enhanced information flow will continue to evolve.

Incentive Systems

A fifth important dimension of a value chain is the incentive systems that are used to reward performance and share risk. Such systems might include price premiums, profit sharing, minimum pricing arrangements, window contracts, cash flow or financial assistance contracts, loan guarantees, qualified supplier recognition programs, cost sharing arrangements, long-term commitments, and knowledge or market access. New incentive mechanisms will evolve as the value chain participants begin to adopt and use new information technologies and build new relationships across the chain.

Conflicts may be encountered with incentive systems that do not adjust with market conditions and result in the inequitable sharing of losses and profits. This will drive participants to develop more flexible incentive systems such as contribution based percentage sharing of final product gross revenue.

Governance

A sixth and final dimension of a value chain is the chain governance/coordination system. Alternative governance or coordination Systems might include open access markets and various forms of contracts, strategic alliance, joint ventures, franchising arrangements, networks, cooperatives and vertical ownership. The choice of governance/coordination system will have a significant impact on who has power and control in a value chain and how risks and rewards are shared.

The structure and linkages that tie the emerging value chains together will be much more complex than they have been in the past. The six dimensions outlined above can provide a basis for describing and evaluating the agricultural value chain of the future.

Strategic Questions

New tools and approaches will be needed to understand the changing roles of firms participating in aligned value chains. AEC works with firms throughout the value chain to help them with the following types of strategic questions:

- The speed and magnitude of value chain change will depend on the ability to share selected information with selected parties. What controls, legal or otherwise, will need to be in place to provide assurance that information will not be used inappropriately?
- Creating incentive systems that are based on a share of the final gross revenue will require a fair accounting of the investment and value added. What kinds of systems or standards will need to be developed in order to provide a sound basis for the sharing of return across a value chain?
- A broader understanding of the entire value chain will be necessary for all parties to gain a sense of fairness in the arrangements that are used. What is the scope of the knowledge that is needed to accomplish this and how will it be provided?
- What governance systems need to be developed to enable aligned value chains to be formed and sustained? For example, who/how will we govern strategic alliances, vertical ownership, contracts, joint ventures, etc.?

This article was developed by Ag Education & Consulting as a way to share our thoughts about the future of the agriculture sector. For reprints of this or other series of articles, please contact us or visit our web site listed below:



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