

**FINANCING AND SUPPLYING INPUTS TO THE 21<sup>ST</sup> CENTURY  
PRODUCER**

by

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# FINANCING AND SUPPLYING INPUTS TO THE 21<sup>ST</sup> CENTURY PRODUCER

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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 21<sup>st</sup> century is 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 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 Financing and Supplying Inputs to the 21<sup>st</sup> Century Producer; companion series are also available on Farming in the 21<sup>st</sup> Century (Staff Paper 99-9), and Value Chains in the Food Production and Distribution Industries (Staff Paper 99-10).

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

Keywords: technology platforms, agricultural finance, marketing strategy, input suppliers, grower segments, financial markets

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## **Technology Platforms In Biotechnology**

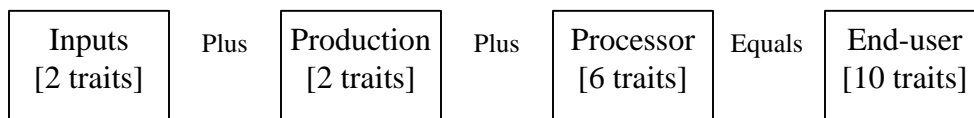
In many of the non-agricultural industries, the common denominator for new product introductions has been the manufacturing or technology platform. For example, in the automobile industry similar if not identical engineering platforms are used for different models of vehicles. This commonality improves efficiency, reduces manufacturing costs, and accelerates time to market. Increasingly, the technology platform concept is being used in agribusiness firms not only to introduce new products, but to motivate acquisitions and strategic alliances. Understanding the logic and use of technology platforms may help us anticipate the linkages that are occurring in the food and agribusiness industries, and in the biotechnology industry in particular.

Mergers, acquisitions and strategic alliances in the biotechnology industry are occurring for many reasons including access to capital and financing to fund the R&D activities, access to distribution channels to reduce the cost and increase the speed of bringing product to market, and access to new knowledge and technology that can be more quickly acquired from others than developed internally. In biotechnology industries this latter motivation has important technology platform dimensions.

The first technology platform dimension helps explain the joint ventures and strategic alliances between human drug and pharmaceutical companies and agricultural chemical and genetics companies. The common denominators between these two industries are the science and knowledge based used, and the ultimate user and value base for the products. Both human pharmaceutical companies and agricultural biotechnology companies have at the core of their product development the sciences of microbiology, chemistry, and genetics. Understanding and manipulating the genome is critical to both. And they are both focused on the health of individuals, one from a medical and disease prevention perspective and the other from a nutritional perspective. These commonalities suggests that a common technological platform may be useful in developing integrated nutritional and medicinal programs to improve human as well as plant and animal health.

The second technology platform concept builds on the value chain approach to satisfying end-user demands. Integrated, sequential creation of end-user attributes through various stages of a value chain may be more likely to be successful than trying to create all of the desired attributes in one or two stages. For example, if ten traits are to be delivered to the end-user, two could come from input suppliers, two could be added at production and six in processing as suggested by Figure 1. But the efficiency of creating the attributes in down-stream activities (i.e. processing) will be significantly higher if the raw material coming into that process has the desired traits from previous processes. Thus, the technology platform concept of trait creation across a value chain is not much different than that of the assembly line in a manufacturing plant where the sequencing of processes is critical to efficiency and effectiveness of product development. With specific reference to biotechnology, this approach suggests that some attributes may be more effectively created by biotechnology manipulation in processing (for example enzyme manipulation in cheese fermentation) than in either production or input biotechnology manipulation, but that the efficiency or effectiveness of biotechnology applications closer to the end-user will be impacted by the raw material used in that process which can be manipulated by biotechnology in previous stages. The key issue is integrating these between stage technological manipulations to obtain the end-user product most effectively and efficiently.

**Figure 1. Trait or Attribute Development Along a Value Chain**



Increasingly, technology platform and value chain notions are being integrated with individual companies focusing on specific industries. Thus, value chains that use an integrated biotechnology platform across all stages of the value chain are being developed for the food, health/pharmaceutical, and industrial end-use markets as suggested by Figure 2. This integration of value chains and biotechnology platforms will be expected to generate numerous additional strategic alliances, mergers and acquisitions between companies who have traditionally been perceived to be in vastly different and unrelated industries.

**Figure 2. Integrated Value Chain Platforms for Various End-Use Markets**

Value Chain Linkage	Food	Health/ Pharmaceutical	Industrial
Inputs/Genetics			
Production			
Processing			
Examples	<ul style="list-style-type: none"> <li>• Monsanto</li> <li>• Optimum Quality Grains</li> </ul>	American Home Products/Monsanto	DuPont Pioneer