

## **AGRICULTURAL INNOVATION AND NEW VENTURES: ASSESSING THE COMMERCIAL POTENTIAL**

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Innovation and new ventures have been part of the food production and distribution industry for decades if not centuries. In recent times, new ventures under the banner of value-added agriculture have become the mantra for producers, politicians, and agri-businesses that are searching for better margins and higher incomes than provided by traditional commodity production and distribution. But, the commercial potential of value-added ventures and innovations is not obvious, often is not realized, and may be frequently overestimated. In fact, studies of new business start-ups in agriculture and other sectors indicate that a high proportion of those businesses fail during the first twelve months of operation, and many are not sustainable even after this most vulnerable start-up period (SBA).

The objective of this paper is to provide a framework for assessing the commercial potential of innovation in agriculture. We highlight the four critical components of market analysis essential to successful innovation and new ventures, those are the assessment of customers, competitors, sustainable competitive advantage, and internal capabilities. We identify and describe where concepts of economics

contribute to the analysis of these components, and how the management literature intersects with and enhances the contributions of economics in the innovation-assessment process.

### **A Framework for Assessing Innovation in Agriculture**

The assessment of innovation and/or new business ventures is clearly rooted in economics and strategy. Successful innovations must be rare, durable, difficult to imitate, and have few substitutes. If the innovation does not meet these sustainable competitive advantage criteria it is much less likely to create a successful new venture, and likely to be commoditized with little chance of obtaining economic profits (Rumelt, Direckx and Cool, Grant 1991, Barney 1991, Williams, Peteraf). As such, value-added ventures in agriculture that have a higher probability of success will focus on differentiated product, nonperfectly competitive, downward sloping firm-level demand curve markets. Unfortunately, most entrepreneurs in value-added agriculture come from the perfectly competitive, price-taker, nondifferentiable, commodity markets frame of reference. Thus, the concepts of customer analysis, competitor analysis, and core competencies of the firm are often ignored in favor of production economics, efficiency analysis, and general markets behavior.

We propose the assessment model depicted in figure 1.<sup>1</sup> Our analysis starts with the financial metric of return on assets as the key measure of economic profitability—the goal is to produce above-average return on assets.

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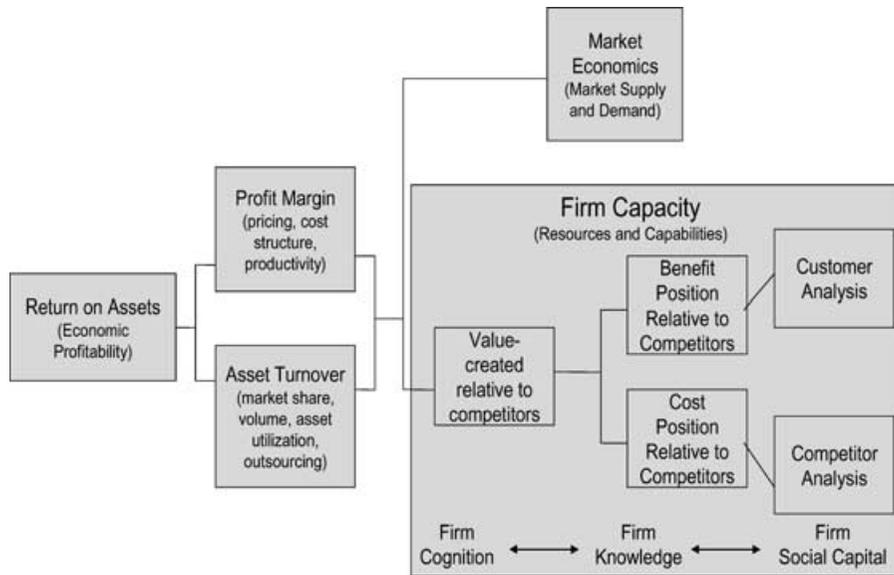
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The authors thank reviewers for their helpful comments on an earlier version of this manuscript. Funding for this project was provided by the Agricultural Innovation and Commercialization Center, Purdue University in cooperation with USDA's Rural Business Cooperative Service.

This article was presented in a principal paper session at the AAEE annual meeting (Denver, Colorado, August 2004). The articles in these sessions are not subjected to the journal's standard refereeing process.

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<sup>1</sup> The model used in this paper is influenced by the framework developed by Besanko et al. (2000).



**Figure 1. Framework for assessing innovation**

Return on assets is fundamentally driven by profit margins (through prices, cost structures, and productivity) and asset turnover (through market share and volume). Profit margins and asset turnover are driven by market economics and the ability of the firm to create greater customer value than competitors. In differentiated markets, where innovation and new ventures are more likely to be sustainable, the firm’s ability to add value above that of competitors is a more important driver of firm success (Besanko, Dranove, and Shanley). The focus of this paper will be on the drivers of a firm’s value-creation capability.

A firm’s value-creation capability in differentiated markets is driven by its ability to position itself competitively via greater benefits to customers and/or lower costs than competitors. Ultimately, a successful new venture is one that can find ways to maximize gains from trade where these gains are captured by providing more value to customers (consumer surplus) than the cost to produce that value. Some firms have more internal capacity for recognizing these opportunities for gains from trade and implementing strategies to create and capture that value. These internal capacities are driven by the firm’s knowledge, cognition, and social capital.

**Customer Analysis**

Customer analysis is critical to determine the new venture’s benefits to customers. The fun-

damental economic concept used in this determination is consumer surplus: how does the firm’s new product/service provide more consumer surplus than competing firms’ products? The argument is that if the firm’s product provides no more consumer surplus than the competitors’ products (all firms’ products are on the same indifference curve), then customers have no reason to choose one firm over another, and economic profits will be zero (Besanko, Dranove, and Shanley). Thus, understanding consumer surplus is critical to evaluating the potential of innovations in agriculture. Traditional economic analysis has focused on the determinants of market level consumer surplus and not on the determinants that shape individual consumer surplus where individual firm value can be created. This is an area where the management literature is rich.

Research on successful new product innovations suggests that the most important success factor is developing a product/service that provides unique benefits and superior value to the customer (Cooper 1999). The definitions of unique benefits and superior value are from the perspective of the customer; successful innovations provide superior consumer surplus to a set of customers relative to competing companies’ products. Cooper (2001) argues that innovations with a strong customer-oriented market focus are more likely to succeed. Thus, discovering what customers perceive as beneficial and valuable is a key to assessing the likelihood of success for a new innovation.

The two fundamental questions in customer analysis are: What products/service will customers want to buy? And, which customers are the best prospects for our products/services? There are numerous ways to approach these questions. The traditional economic approach has been to observe consumer buying behaviors and deduce preferences from a revealed preference framework. Christiansen and Raynor argue that this view is too narrow because it misses two fundamental issues. First, the revealed preference framework misses potential customers that do not currently purchase the product due to a consumer budget constraint, lack of technical knowledge to use the current products, or no need for the product. Only those customers who truly have no need for the product should be removed from the set of prospects. Those who have a budget constraint (or place less value on the features of the current products), and those customers lacking technical knowledge to use the current products represent potential customers where competition may be less intense. Second, revealed preference views the product itself as the decision choice. In Christiansen and Raynor's view, the decision point for the customer is the problem they are trying to solve, or the outcome achieved by purchasing the product/service. The idea is that customers don't buy products for the products' sake; instead, customers 'hire' products to solve a problem. The third limitation of the revealed preference approach is where similar products to the innovation are unavailable in the market. For example, there was no real comparable competitor to bT corn or recombinant bovine somatotropin in the marketplace at the time of their introduction. The key to successful innovation is to discover unique ways to solve problems that customers have that are not solved with existing products.

Innovative products/services can come from enhanced features or benefits of products that potential customers already use or would like to use, or from innovations in the customer purchasing process (McGrath and MacMillan).<sup>2</sup> Understanding the benefits and features of existing products that customers either dislike or place little value on provides the opportunity to create innovative solutions. These benefits and features may be directly related to the product, or with its consump-

tion. For example, although Roundup-Ready soybeans have similar agronomical characteristics as traditional soybeans, it introduced time- and dollar-savings opportunities that enhanced customers' consumer surplus. This type of innovation may attract current customers of competitors, and also expand the primary industry demand by bringing customers who value its enhanced features. That it was adopted implied that it increased the consumer surplus associated with a product vis-à-vis competitors' products. The innovation may allow the new venture to enhance competitiveness by charging premium prices or increasing its market share or both. The adopted strategy would fundamentally depend on the firm's demand elasticity, its cost structure, and competitors' reactions to the innovation.

### Competitor Analysis

Competitor analysis can provide insights for the prospective entrepreneur in two critical areas: (a) assessing and/or forecasting industry profitability and (b) evaluating competitor reaction/response. Porter's Five Forces Model provides a framework that draws on traditional industrial organization tools to conduct competitor analysis focusing on new entrants, substitute products, bargaining power of suppliers, bargaining power of buyers, and rivalry among existing firms.<sup>3</sup> Rivalry is the amount of direct competition in an industry—this is, what most entrepreneurs (and agricultural economists) consider when they assess competition.

Industry profitability is directly influenced by the five forces, providing a perspective on the industry's structure and conduct, and thus its competitiveness and profit potential. Intense rivalry, buyer power, or the threat of entry can limit above-average returns in the long-run for typical firms in an industry. High fixed cost structures that discourage exit and encourage price discounting by rival firms suggest that periods of below-normal returns will likely exist for longer, more sustained periods compared to other industries (Besanko, Dranove, and Shanley). Thus, this analysis can assist in assessing not only the long-run profitability of an industry and typical firms in that industry, but also the variability of profits and

<sup>2</sup> McGrath and MacMillan (2000) provide a useful set of practical tools for entrepreneurs to use in discovering areas where customer problems can be addressed that may lead to more successful products/services.

<sup>3</sup> More recently, Chakrovorti (2004) and others have challenged and expanded Porter's model to argue that in some cases rivals or competitors might best collaborate, for example, to establish standards or create critical mass of sufficient volume for market penetration or acceptance.

the duration of above- or below-normal profits and consequently, the risk characteristics of the industry.

Using the Five Forces Model to assess the strategic behavior and reaction of competitors has been less apparent to those in the agricultural industry because of the industry's historical fragmented structure and commodity product focus, the basic characteristics of perfect competition markets. In this sense, analyzing the response of a particular competitor is not particularly useful or meaningful and understanding, predicting, and anticipating competitors' behavior is ineffective. However, declining prices and wealth in the agricultural industry is breaking down the commodity perspective as entrepreneurs search for new strategies of promote their competitive advantage.

Grant (1998) suggests a four-step framework that facilitates the analysis process:

- I. Identify competitors' current strategy—Evaluating not only the strategic direction expressed in explicit statements, but also the realized strategy as evidenced by new product introductions, acquisitions, investment projects and new construction, or staffing decisions.
- II. Identify the competitor's objectives—In many cases objectives are revealed in actions, for example, aggressive discounting implies that a firm is more focused on longer-term market share and market position than shorter-term margins or profitability.
- III. Identify competitor's assumptions about the industry—Determining the implicit assumptions underlying specific decisions (e.g., they would not build that plant unless they assumed demand was growing or competitors will be reducing production capacity) is useful in predicting competitor behavior as well as developing appropriate strategic responses.
- IV. Identify competitor's capabilities—Particularly important for companies entering a new market dominated by well-established incumbents who not only have industry experience, but the resources and "staying power" to withstand sustained periods of financial losses and initiate other disruptive behavior to discourage new entrants to the market.

Competitor analysis provides useful insights for those contemplating value-added ventures because it assists in predicting rival's re-

sponses and the resulting market and profitability characteristics of the industry. It can also be helpful in minimizing incumbents' impact on the new entrant by developing effective strategic responses, such as focusing on customer niches not dominated by current market participants, offering products and services that complement rather than compete directly with incumbents, or pricing strategies that are not disruptive which could precipitate aggressive discounting and price wars (Heil and Robertson, Chakravorti).

### Sustainable Competitive Advantage

Hofer and Schendel identify the process of assessing competitive advantage as identifying key success factors. In essence, identifying key success factors combines customer analysis, competitor analysis, and capabilities to determine specific offerings to the market and business models to generate profits from those offerings. Christensen and Raynor have extended these concepts to frame three generic strategies to introduce innovation or initiate new ventures (table 1). They, in essence, identify three different categories of innovations that provide the basis for adding value: (a) sustaining innovations that offer current customers improved performance on accepted product/service attributes, (b) new market innovations that offer new customers products/services they previously did not have the financial resources to acquire or the human resources to effectively use, and (c) low-end market innovations focused on less demanding current customers and delivered to them at a lower cost. This categorization of innovations assists in understanding how a new product, process, or technology creates value for a customer by emphasizing different performance characteristics, new uses, and/or new offerings. Each category is now discussed, using an example to highlight its application in agri-food industries.

Sustaining innovations target the more demanding customers in the current market, create value for them by offering improved performance on the attributes they most highly value, and enhance the supplier's competitiveness through higher profit margins. John Deere's GPS and auto-steering tractors are examples of a sustaining innovation. They offer discriminating farmers enhanced performance with time-saving and efficiency-improving features. In contrast, new market innovations

**Table 1. Characteristics of Alternative Categories of Innovation**

	Categories of Innovation		
	Sustaining Innovations	New Market Innovations	Low-End Market Innovations
Target customers/ market	Most attractive current customers	Noncustomers and nonconsumption	Over-served current customers
Value creation	Improved performance on highly valued attributes	Improved performance on attributes such as simplicity, convenience, health quality	Low cost that meets lower acceptable threshold of performance
Competitor response	Targeted marketing and advertising  Brand promotion	Product line extensions focused on enhanced performance	Price discounting
Business model	Higher margins through increased differentiation/segmentation	Low margins but high asset turnover and rapid growth in volume	Reduced cost in meeting lower performance threshold and expanded market from discount pricing

Source: Christensen and Raynor.

target those who have previously not had the financial resources or the skills to acquire and use the products/services. They emphasize product/service attributes of simplicity and convenience at modest cost and create value for the supplier through low margins but high asset turnover and rapid volume growth over time. Wendy's Restaurant's introduction of salads to meet the health-conscious consumer's needs is a good example of new market innovation because it transformed people who perceived its meals as unhealthy into customers by offering them a perceived healthy alternative that was at once convenient, simple, and modestly priced. Low-end market innovations focus on segment of the current customers that is over-served by the current product/service offerings and delivers a product or service at a lower cost that meets but does not exceed the minimum performance expectations of this customer segment. These innovations create value for the supplier through a combination of reduced cost of providing the product/service because of the lower performance expectations and increased market share that results from lower prices. Generic chemicals, and in particular, glyphosate, is a good example of low-end market innovations in the agricultural industry.

Characterizing an innovation/new venture by this typology assists in assessing the commercial potential in terms of value created for both customer and suppliers, as well as how

that product/service offering can best be positioned relative to current and future competitors in the market. These are the key elements of the value creation element illustrated in figure 1 that lead to above average return-on-assets. The typology also helps the firm understand how the innovation will likely generate profit through high profit margins, or high asset turnover, allowing management to focus on the most important action variables when implementing the innovation. It is evident from the foregoing that although economic analysis provides the bedrock of the analysis and assessment of an innovation, it is not enough in engendering firm competitive strategies.

### Internal Capabilities

Neoclassical economics has traditionally viewed the firm's resources as land, capital, labor, and management. Management's role is to combine the other resources to create output. The resource-based view of the firm suggests that while these tangible resources are important, sustained competitive advantage is attained through the deployment of intangible resources such as organizational knowledge, cognition, and social capital (Penrose, Amit and Schoemaker, Barney 1991). These form the internal capabilities of the firm.

Knowledge is revealed in the firm's ability to use information and know-how to develop superior organizing principles, processes, skills,

and competences in the value-adding process relative to competitors (Kogut and Zander). Because people know more than they can explain, organizational knowledge may be characterized into two categories: tacit and explicit knowledge (Polanyi 1974, 1983). Ryle explains tacit knowledge as “knowing-how” (or embodied knowledge) and explicit knowledge is “knowing-that” (or theoretical knowledge). Dretske expands the notion of tacit knowledge beyond just a certain technical or physical “knowing-how” to encompass knowing *how, what, and when* to do in order to obtain desired end-states.

Tacit knowledge is often the key to a firm’s sustainable competitive advantage. This inherent know-how can create processes or competences that are costly for rivals to imitate because they are undecipherable to those outside the organization (Chomsky). Often these competences may be nonsubstitutable in the value-adding process. As a simple example, consider a firm pursuing a value-added venture in pork production including raising, slaughtering, packing, and retailing pork. The firm may have the similar tangible resources (land, labor, capital) as its competitors, but, its superior marketing skills help it to develop a superior brand identity in the marketplace. Wisconsin-based Johnsonville Sausage Company has been particularly successful in using its tacit knowledge in sausage making and marketing to build and sustain a competitive advantage for its branded sausage products.

Cognitive ability explains why two firms may respond differently when presented with the same information about impending market conditions (Barr). It explains why some producers decided to undertake organic production twenty years ago, allowing them to benefit from first-mover advantage in that market. It involves making sense of external circumstances, determine the organization’s best response and lead the changes necessary to capitalize on changing external conditions (Weick). In the context of the pork venture described above, the firm’s cognitive abilities in recognizing and anticipating changes in consumer preferences and its response to these anticipated changes are critical to maintaining a sustainable competitive advantage. Cognitive capability is the resource that allows a firm to correctly anticipate and then position itself to meet changing consumer needs. In the recent consumer excitement about low-carbohydrate diets, a few food companies have success-

fully enhanced their profitability by positioning themselves with “low-carb” products while many missed it. Krispy Kreme, a major donut company that had been extremely successful in the past, found itself missing the low-carb shift and have to retrench investments.

The management philosophy and business environment influence the cognitive capabilities of the organization. For example, Weick and Roberts find that managing for efficiency can adversely affect the firm’s cognitive ability. They argue that managing for reliability enables a firm to develop a mental process that is more encompassing of the external and internal influences on performance. Agricultural entrepreneurs may struggle with this concept since the classic managerial focus of most agricultural firms has been efficiency. Yet, because value-added ventures seek to move away from the commodity, near-perfect competition market into differentiated product markets, managing only for efficiency may adversely affect their ability to succeed. This requires the development of new and different cognitive abilities.

Interactions among individuals with diverse backgrounds and experiences, within an organization, can develop a stronger organizational-level cognitive ability (Bogner and Barr). The interactions among organizations within an industry often create a similarity of beliefs and actions that contribute to patterns in individual actions that generate a consistent group action. An organization that “breaks out from the mold” by reconfiguring a different cognitive framework can create an opportunity to innovate and enhance its competitive advantage. Given the history of group action in agriculture, the foregoing suggests that agricultural entrepreneurs must develop broader business interactions to build the necessary cognitive capabilities to help them “break out from the mold.”

Social capital is fostered by the variables that support the existence and effective functioning of all human societies—trust and trustworthiness, reciprocity, and respect. As a result, it cannot be easily acquired but has to be nurtured and facilitated over time through affect and other relationships (Mizruchi and Stearns). Lin defines social capital as “resources that are embedded in a social structure that are accessed and/or mobilized in purposive social actions.”

Ultimately, social capital is the “who you know” factor of entrepreneurship. It defines the entrepreneur’s access to both tangible and

intangible resources that are not under his control. For example, firms involved in strategic alliances respond to each other's needs more rapidly than firms operating in the open market. Thus, if a value-added pork firm has a special long-term relationship with pork producers, it may succeed in achieving favorable delivery terms, and changes in nutrition regimes in response to changes in consumer preferences. The social capital embedded in the relationships entrepreneurs build support their ability to create inimitable advantages for sustained competitive advantage.

The three pillars of internal capabilities are intimately related, reinforcing each other in their effects and value. Together, they facilitate an organization's ability to assess innovations, leveraging both internal and external physical resources to create new combinative and transformation capabilities for the organization. The argument that emerges from the foregoing discussion is that the higher the internal capabilities of an organization, the more successful it is in assessing innovations and using its current tangible resources and those of others in developing new ventures to enhance its competitiveness.

### Final Comments

Value-added agriculture is a popular concept today. But the creation of successful new ventures is not a forgone conclusion. Successful new ventures/innovations in agriculture must combine a solid understanding of consumers and competitors to develop a strategy for achieving sustainable competitive advantage. The concept of sustainable competitive advantage suggests that an innovation must be rare, durable, costly to imitate, and non-substitutable. This is a very high bar for any new venture to achieve and suggests that not all (and maybe in fact few) value-added ideas in agriculture will lead to successful long-term businesses.

We have identified key economic concepts that help create a framework for assessing the commercial potential of innovations. In particular, the concepts of consumer welfare and individual firm demand elasticities and what determines those elasticities combined with competitor analyses and the resource-based view to determine the innovation's value proposition to the market. We argue that much of the agricultural economics profession's focus has been on analysis of markets as opposed

to firm-level issues. Certainly market analysis can provide important contributions to the development of a firm's value proposition, but firm-level analysis can often provide more specific information for the development of a viable value-added businesses.

This discussion has also identified some key management concepts that can enrich the economic framework used to assess the commercial potential of innovations. While economics is the fundamental framework for assessment, economics typically stops short of providing actionable strategies for entrepreneurs or firms to pursue. The management literature, utilizing the fundamentals provided by economics, provides the tools to transform the assessment into actionable strategies to facilitate innovation and implementation. These include the competitive analysis framework (Porter), generic innovation strategies (Christensen and Raynor), sustainable competitive advantage framework (Barney 2001; Day and Reibstein). Real contributions come from combining the economics and management concepts in ways that can improve the probability of an innovation's commercial success.

Ultimately, it is the entrepreneurial ability to implement the strategies that emerge from the analysis that leads to success. Entrepreneurial ability, we argue, is the intangible resource manifested in knowledge, cognition, and social capital. Perhaps, one of the most important contributions that agricultural economists can make to the development of value-added agricultural businesses is in helping entrepreneurs refine their knowledge, cognition, and social capital resources. This can be done by educating entrepreneurs to more formally use the economic and management concepts identified here. Educating entrepreneurs on these concepts can improve the intangible resources so often identified as key to the long-term success of a new venture.

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