TEN CONVERSATIONS ABOUT IDENTITY PRESERVATION: IMPLICATIONS FOR COOPERATIVES

Peter Goldsmith
Assistant Professor

Karen Bender
Senior Researcher

Department of Agricultural and Consumer Economics
University of Illinois at Urbana-Champaign

Paper Presented at
NCR-194 Research on Cooperatives Annual Meeting
October 29, 2003
Kansas City, MO, USA

TEN CONVERSATIONS ABOUT IDENTITY PRESERVATION: IMPLICATIONS FOR COOPERATIVES

Peter Goldsmith
Assistant Professor

Karen Bender
Senior Researcher

Department of Agricultural and Consumer Economics
University of Illinois at Urbana-Champaign

Contact address:
Dr. Peter Goldsmith
Food and Agribusiness Management Group
Department of Agricultural and Consumer Economics
University of Illinois
433 Mumford Hall
1301 West Gregory Drive
Urbana, Illinois 61821
217-333-5131
217-333-5538 (Fax)
http://www.ace.uiuc.edu/faculty/goldsmith/

Research funded by the Illinois Soybean Program Operating Board (ISPOB), Illinois Council for Food and Agricultural Research (CFAR), and the Illinois-Missouri Biotechnology Alliance (IMBA)

Parts of this manuscript have appeared in Goldsmith, Peter D. and K. Bender. "Ten Conversations About Identity Preservation." Under Review. Journal of Chain Network Science. September, 2003.

TEN CONVERSATIONS ABOUT IDENTITY PRESERVATION: IMPLICATIONS FOR COOPERATIVES

Peter Goldsmith
University of Illinois
pgoldsmi@uiuc.edu

Karen Bender
University of Illinois
kbender@uiuc.edu

Abstract

Motivation
While it appears the modern economy demands ever increasing amounts of differentiation, opportunities for grain producers to create and capture significant new sources of value remains elusive. Opportunities appear to loom large to help remove risk and improve quality in the grain supply chain through preservation of product identity, producers, producer groups, and cooperatives are frustrated at the low level of value available to them from IP demand. Why do premiums remain low? And, what is the role of group action in these new differentiated markets?

Objectives
This research report helps to explain this apparent paradox underlying the economics of the value proposition for IP grains.

Methodology
Needs assessments were conducted on procurement executives using a semi-structured instrument.

Results
The study demonstrates that understanding identity preservation business opportunities requires an understanding of the buy-side proposition. Respondents described how they balance the risk mitigation and market uplift features of a supply offering with the risks of narrowing the supply base. A model of the buyer's calculus is constructed.

The results show how for producers and producer groups to drive value up the chain they need to shift away from solely a new product focus. Instead attention needs to be directed towards technologies, delivery systems, and organizational models that when bundled with new products make end-users more competitive.

A second insight was the limited role of group action in meeting end-user needs. Where value markets existed, internalized groups rather than "arm's length" group transactions were the norm.

Plan for Discussion

The cooperative movement was grounded in group action giving individual producers power in the market. The motivation to unite was very clear. In the post-industrial agri-food system though, why do buyers want to purchase from a group? What is the role of the group, from a buy-side perspective, in the modern economy? How should effective groups be structured?

Key Words

Identity preservation, supply chain management, value creation, group action

Ten Conversations About Identity Preservation

Peter Goldsmith
and
Karen Bender

Introduction

Dynamics in the global food system, along with a cascade of technologies, drive demands for capturing information and sharing information vertically within the supply chain. Food safety, genetic engineering, and animal welfare all have contributed to the need for enhanced information flow within the supply chain. Identity preservation in grains and oilseeds is an emerging issue that may influence the structure of agriculture in the longer term. Firms within the food supply chain must decide what information to provide and how to provide it. This applies to collecting information from upstream suppliers as well as to supplying information to downstream customers. Components of this vertical information situation include farmer supplier identity preservation to capture value and the buyer information needs concerning geographic location of production or seller identity in order to manage risk. The question posed in this research is this: What is the proposition for producers and producer groups from this new market in vertical information?

Opportunities appear to loom large to remove risk and improve quality in the grain supply chain through preservation of product identity. Bender (2003) identifies six specific factors affecting the use and development of IP systems: biotechnology, precision agriculture, measurement technology, food safety, competition, and the role of

nontraditional players. Yet producers and groups are frustrated at the low level of value available to them from IP demand. Sporleder and Goldsmith (2003) report that most premiums for producing enhanced grains have settled in the range of 5% with a few products (e.g., non-GMO soybeans) garnering 10%. Why do premiums remain low? While demand for high-information grains appears to be growing, where and how along the supply chain is the value created and captured? Though it appears that the modern economy demands ever-increasing amounts of differentiation, opportunities for grain producers to create and capture significant new sources of value remain elusive. We developed the following research project to better understand this apparent paradox underlying economics of the value proposition for IP grains.

Methodology

While much research has been conducted on the costs of identity preservation, little work has been conducted on the value proposition of IP. The cost-based research view (see Bullock and Desquilbet, 2002; Kalaitzandonakes et al., 2001; Maltsbarger and Kalaitzandonakes, 2000) is flawed because it looks at these new market conditions only from the top down (i.e., the supplier's viewpoint). The analysis is simpler because it takes known costs and systems of operation and adds the additional features required to preserve the identity at the margin. This static approach, which looks at adding costs to suppliers' systems, does not allow for adaptation, new investment, new entrants, substitutes, or buyers' perspectives. The conclusion from this approach has been that IP is costly to the system and burdensome to those least able to afford the additional costs (i.e., farmers and first handlers). Using this logic increased levels of quality, traceability,

identity preservation would be constrained and under supplied in the market place. In essence this is consistent with anecdotes of market failure whereby buyers want "more" but are not willing to pay for it, resulting in sub optimal levels of service.

The research in this report proposes an alternative analytical perspective that the value proposition drives the cost model. If demand is high, suppliers will be drawn to the market, the innovation process will be frenetic, and the cost model will be dynamic. If demand is soft, few supplier resources will be mobilized, and innovation will be much more incremental. The cost model therefore becomes a function of the value proposition. From such a perspective, the high costs for farmers and first handlers using a cost-plus approach (described previously) accurately reflect the underlying value (small) contributed from incremental behavior. To better understand the IP proposition, one must begin with demand, the needs of end users, which then reveal the underlying pulling forces serving as incentives for suppliers to partake and the system to adjust. Beginning with end users and working backward reveals not only how the system adjusts in an attempt to service its needs but also the countervailing opportunities as end users "troll" for input or process substitutes.

To understand the needs of end users, researchers conducted needs assessments[1] with senior executives who were responsible for purchasing raw commodities. Semi-structured interviews, most of which lasted between two and three hours, were conducted in the executives' offices. For proprietary reasons, interviews were not taped, but two

[1] See; Johnson et al. 1987; Soriano, 1995; Yin, 1994; Goldsmith et al., 2002 for a detailed discussion of the methodology.

researchers were present at each interview. Subjects were drawn from contacts within the industry and were known personally by at least one of the researchers. U.S. raw agricultural inputs were the main source of the subjects' supply base. Subjects were directly responsible for the purchase of either soybeans, corn, or small grains; demand was either feed or food, conventional or organic.

The semistructured interview was composed of two categories of questions. In the first category (90% of the interview), researchers methodically asked a series of questions for the buyer to describe how inputs were purchased. Buyers were not directly asked about identity preservation. The needs assessment approach minimizes interview bias because the focus is on a subject well known to the interviewee, in our case raw agricultural product procurement. Needs, the procurement process, and market for substitutes became evident working through a detailed description of each buyer's "problem." Maps emerge of the procurement system that forms an overview of the norms of the industry, which in our case describe the state of demand for product information (both of the supplier and the buyer) and the role agricultural producer-suppliers play or could play in meeting end-user needs and making them more competitive.

In the final minutes of the interview (10%) subjects were asked for their opinions about how research and policy could help U.S. farmers be better suppliers. Were there gaps where supply could be indirectly improved? Was there research in which land-grant universities could engage that would make U.S. suppliers more valuable and in turn make the subject firms more competitive in their markets? Similar questions were asked about

other agricultural institutions such as USDA (GIPSA), Extension, and the commodity groups.

An Identity Preservation Primer

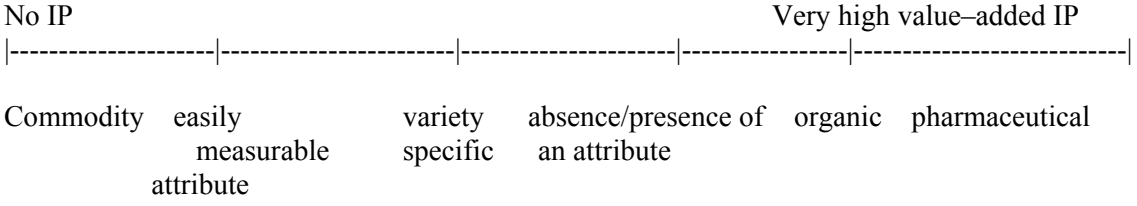
A starting point for understanding the varying structure and characteristics of current identity-preserved systems is to review the types of identity preservation systems currently utilized in the United States. Two primary distribution systems have traditionally existed for corn and soybeans. One distribution system has focused on commodity crops, and the other distribution system has focused on very high-value traits. The distribution system for commodity crops is focused on homogeneity, where homogeneity drives the system toward average quality and thus limits the opportunity to match the level of specific attributes available in different crop lots to the needs of different buyers. This distribution continues to service the supply of the majority of the corn and soybean crop production.

A small percentage of trade in corn and soybeans has been in high-value crops, such as certified organic corn and soybeans. An identity-preserved supply chain used for these high-value crops typically consists of a specialty grain firm contracting variety-specific grain production, with particular production and/or management requirements. The farmer stores this production on a farm and frequently delivers it directly for loading onto a container for export shipment, delivers directly to the processor, or delivers for direct loading onto trains for domestic shipment. The goals are to minimize the number of handlings to reduce quality deterioration and to minimize the potential for commingling with nondifferentiated corn or soybeans.

A problem resulting from the reliance on two primary distribution systems is that neither channel can cost-effectively supply many of the more recent differentiated value-enhanced crops. Many of these new value-added crops are produced in larger volumes, relative to the very high-value trait crops. With the growing attention placed on biotechnology and genetic modifications and value-added crops, a need for market channels has developed that will allow distribution of a product that is identity-preserved, but in a less rigorous system than is used for very high-value crops.

Figure 1 represents a continuum of marketing channel systems, which range from commodity market channels to the very high value–added identity preservation systems. Many of the newer marketing systems developed for value-added corn and soybean markets lie between the traditional commodity and very high value–added IP market channels. Examples of these value-enhanced crops include high-oil corn, white corn, waxy corn, and high-oil soybeans. In addition, these intermediate marketing channels are currently being used for nongenetically modified crops. The supply chain used for these crops is less production- and management-intensive than for very high value–added IP crops, but it still requires segregation to preserve the identity of the differentiated crop that is not required in the traditional market channel.

Figure 1. Marketing channel continuum



This continuum suggests that the marketing channel closest in character to the commodity marketing channel is for value-added crops with easily measurable attributes. Examples of value-added crops with easily measurable attributes include high-oil and high-protein soybeans, high-protein wheat, and high-starch corn. For these attributes, near-infrared (NIR) measurement technology exists, which can be utilized at fairly low cost at the place of first delivery (primarily country elevators) to measure the level of attribute in each lot. Varietal specification is not required for these attributes, and measurements at delivery can be used to segregate based on attribute level. For example, in some years there are market demands for higher-protein wheat, and wheat may be segregated into lots below and above a certain protein level. In most cases, there is a minimum level (percentage) of attribute that must be achieved to receive a premium, and higher premiums may or may not be paid for increasing levels above this minimum. While some contracts exist for easily measurable attributes that require specification of a particular variety, many of these markets do not require the specification of variety. Therefore, producers are free to choose any variety that they find might meet the desired attribute level.

As one continues along the continuum from easily measurable attributes, the next marketing channel is characterized by the use of variety-specific contracts. For these contracts, producers are required to produce a specific variety or are allowed to choose from an approved variety list. Producers may need to be compensated for "yield drag" of the specified varieties, and often must submit seed tags or invoices for proof of which variety they planted. These varieties are segregated on delivery to the elevator or

processor, but rapid low-cost tests to check for varietal purity are not currently available. Varietal purity tests are typically based on visual inspection of pod and seed characteristics and are generally conducted in a lab environment.

The next marketing channel identified on the continuum is value-added crops that are purchased because of their lack of a specific attribute. This is a more complicated scenario because of the difficulty in testing sufficient quantities of the crop to ensure that the attribute is absent. The attribute most frequently marketed through this channel is nongenetically enhanced crops. For soybeans, the only current test is for determining the presence of the Roundup Ready® trait. For corn, the testing is more costly because there are multiple biotech events that have been introduced in corn.

The last markers along the continuum are for the certified organic and very high value–added IP market channels. The market channel for organic was previously described. Examples of crops that would utilize the very high value–added type of marketing channel are pharmaceutical crops. The characteristics of the very high–value added IP systems continue to evolve, as only small quantities of these crops have been moved through any commercial system. However, one can expect that these IP systems will be the most rigorous of any marketing channel.

What we attempt to demonstrate with this continuum is that there are characteristics that differentiate the need for, and use of, different marketing channels. The differentiating characteristic used in this continuum is the ease and availability of testing to provide

quality assurance when the value-added product is delivered to the elevator or processor. Other marketing channel characteristics might change the order of product categories somewhat, but the result would be similar in that no single marketing channel would be sufficient to supply the breadth of value-added crops in today's marketplace.

Results and Discussion

Information Needs

Four underlying transaction features appear to be central to the concept of vertical information need. The first is the incentive for sellers to want to maintain their identity as their products go forward as differentiated or even branded. This would afford them a premium in the market. For example, one of our conversations involved an organic grain supplier who had built a complex system to deliver indefatigable quality to very discerning foreign food manufacturers. By preserving the identity, the firm is able to capture the tremendous value created through its proprietary grain-assembly process. In this case information flows downstream from the supplier to the buyer.

The second is for the buyer to demand information from upstream suppliers to mitigate risk, such as in the StarLink™ case. In that case, because food-grade corn is especially at risk because of pollen drift problems, firms need assurances and process verification that minimizes the risk of contamination of foreign pollen. Three of the firms we interviewed handled food-grade corn, and this was a concern. For none of the firms was the risk or benefit high enough to necessitate full integration. All managed the risk through

proprietary grain assembly systems utilizing 5% premiums and coordination with farmer suppliers. Here the information flow is bidirectional from the buyer specifying expectations and from the supplier demonstrating responsiveness.

Third is the case in which maintaining separate the identity of the supplier is unnecessary, though segregation of the product is valuable. This is a common practice among our interviewed firms, whereby suppliers were given production protocols but the grain from the program was then commingled. The identity of the producer was not preserved, nor was the geographic origin of value in the marketplace. Two examples of this process involved two food firms that would populate a region with high-quality seed, training, and recommendations about cultivation practices. The firm, though, never took a position with producers employing active coordination or contracts. Producers were paid for quality off of a proprietary pricing grid. The probability of receiving a higher price was increased through the use of the recommended best management practices. In this case vertical information flow is one way: from the buyer back to the supplier.

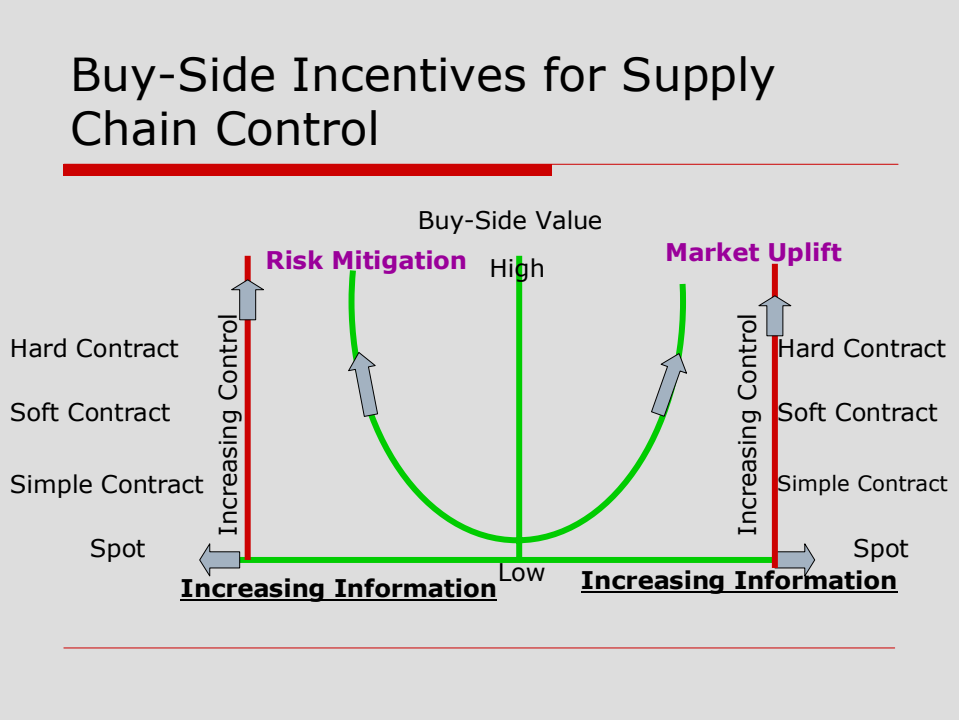
Finally, when the need for vertical information flow is minimal, products are commingled or blended so that anonymity prevails and simplicity may be preferred over IP. This is the traditional commodity exchange model.

Identity Preservation Half-Pipe

Preference for information flows may differ between buyers and sellers. For example, sellers may think that their differentiated product warrants a premium in the marketplace as compensation for additional costs incurred in production and handling. The buyer may not be willing to pay for the product because the added information is insufficient to afford the necessary market price premium, or uplift (figure 2, right-hand side of half-pipe), or to mitigate significant risks (left-hand side of half-pipe).

Imagine a farmer producing a high-quality white corn for an end user, such as a snack food manufacturer. Does preserving the identity of the supplier of white corn make the snack food more valuable in the end user's market? Can the end user exercise more pricing control because of the source of white corn, the notion of market uplift? And is the supplier unique in the ability to provide the input? If so, the vertical information has currency, the supply base is limited, and price premiums will prevail. Ingredient branding is an example of the presence of market uplift. IBM is willing to pay the premium to Intel and share their brand (Intel Inside™) because it affords IBM pricing power in the marketplace, and there is only one Intel. While going on the spot market for computer chips is possible, the branded or identity-preserved chip has currency and captures value in the marketplace for IBM. A similar example for a food product is the ingredient branding of NutraSweet™ in ice cream.

Figure 2. Identity preservation half-pipe: incentives for supply-chain control by buyers in relation to likely governance structures



Similarly, the demand for vertical information may be high to attenuate buyers' risk, even if the corn were unbranded (common). For example, Gerber Foods invests in its supply chain by developing IP systems to ensure that no GMOs are present.

Alternatively, market uplift and risk may both be trivial, making intensive vertical information flows unnecessary (low on the half-pipe, figure 2). This is the most common case where segregation of the product is valued while the identity of the producer or processor is unimportant. In this case the vertical information flow is product specific; it is the product, not the supplier or product bundle, that garners the premium. For example,

a seller of corn may produce several corn varieties, channeling each to a different destination, each pulled by a separate program with a premium. Segregation is important for value creation and capture, but the supplier's identity is of minimal value.

Vertical Information Needs and Transaction Governance (Contracting)

Correlated to the buyer's needs is an associated transaction governance structure type of contract (left side of figure 2). The lower the value to the end user, either because the need is low or ample substitutes exist, the less restrictive the contract and more informal the relationship between the farmer supplier and the buyer.

The majority of U.S. grains and oilseeds markets require minimal vertical information flows, and the spot market is the primary form of governance (Martinez and Davis, 2002; Martinez and Reed, 1996). Contracting, though, has become a common governance mechanism for segregated grains and oilseeds (Martinez and Davis, 2002). The United States, as opposed to Europe, continues to struggle to develop markets and pay significant premiums (>5% of the commodity price) where identity is preserved. More common are segregated markets utilizing annual contracts and modest premiums (<5% of the commodity price), such as Frito Lay with white corn.[2]

We have identified three important classes of contracts that pertain to the identity preservation proposition: hard contracts, soft contracts, and simple contracts. Hard contracts

[2] Recently, premiums have doubled to 10% of the commodity price in Illinois for non-GMO soybeans.

are tight specification (either process or outcome) contracts that incur penalties for compliance failure or even indemnification of the buyer. An example of a hard contract is the way in which Burger King governs its transactions with its perishable food suppliers. Burger King specifies and offers for bid its perishable food needs. The seller, in accepting the contract, not only agrees to supply the specified product but also is liable for breech of contract (Barrier, 2002). In the case of the Hudson meat recall (see Martin, 1999), Burger King as the buyer was immediately relieved of all its purchase obligations. Hudson Foods was liable for the added costs of procurement, and brand damage and damage control (i.e., additional advertising) (Barrier, 2002). Such hard contracts are not uncommon between processors and food manufacturers or retailers, but the contracts do not exist upchain between farmers and their customers.

This research has been unable to document a case in which litigation ensued because a producer failed to meet a supply contract.[3] One of the interviewed firms told the story of a major U.S. cooperative failing to meet its obligation to supply a high-quality food-grade grain contract. The co-op failed to fulfill its obligation because commodity prices rose and the membership opted to market their crop in the spot market. The most notable aspect of the anecdote was that the food manufacturer was not compromised by the behavior of its supplier. Historical company procurement norms, even in quality markets, dictate that the company not become overcommitted to one supply source because of structural supply risks (e.g., weather or disease) that exist in the grain trade.

[3] Other than the hedge-to-arrive situations in Minnesota and Ohio in the late 1990s.

Because supply has been and continues to be variable, either in terms of quality or quantity, the buy side is hedged, perhaps through buffer stocks, and maintains alternative supply sources. One difficulty for farmers in their attempt to capture more value in the supply chain is supply variability. This inherent problem forces buyers to engage in numerous strategies to protect themselves from being caught in a short supply situation. Though farmers attempt to provide high-quality supply using new business models, such as the new generation cooperative, they often neglect to develop the resources and organizational structure to address the most fundamental of buyer needs: the mitigation of supply risk. In many cases buyers are being asked to increase their risk exposure in order to gain access to new, quality products. Is the reward worth the increased risk? For farmers and their cooperatives to move up the half-pipe and capture more value, they need to address supply risk and buyer exposure.

Soft contracts involve process and quantity specification, but compliance failure involves no legal liability. Organic contracts in Illinois are highly specific and third-party verified, but they involve no legal liability for failure to deliver. In the case of poor performance, producers forego the premium and drop off of the select-supplier list. The market for suppliers, even for organic, is contestable with numerous suppliers around the globe willing to supply. Procurement executives report that information technologies make monitoring disparate supply sources easier every year. One buyer was even exploring a Web-based bin monitoring software system that would allow remote quantity and quality assessment of potential inventory held in remote locations on farms.

The most common contracts are unspecified soft contracts. These specify minimal management processes (e.g., variety or hybrid list and quantity), and third-party verification is not employed. Often these proprietary programs are designed and maintained by first handlers and processors to divert grain through their own channels. Premiums are moderate (~5% of the commodity price), and failure to comply is met without significant price or access penalties.

End users also describe an even less intrusive procurement program. Common in food-grain supply chains is the strategy of "pump priming" without contractual obligation. Here, end users do not work directly with farmers but focus more on a region improving the quality and reliability of the local supply base. This is done by supporting research in the region, distributing specific varieties or hybrids, and supporting management education in terms of best management practices and the varieties or hybrids usage. This raises the modal quality level in the region, and the farmers then can sell into the firm's proprietary price grid. No farmer is excluded ex-ante from delivering through the program. This allows the buyer the best of both worlds: higher quality without a substantial reduction of the competitiveness of supply through contracting. End users do run the risk of other buyers free-riding. This occurs when a firm attempts to raise the quality of grain in a region through pump priming and more than one buyer is present in the market. When grain quality is raised, all buyers in the market would benefit.

Finally, also occurring is the delivery of enhanced grain products without a contract-wildcatting. In this instance, producers operate outside company programs by attempting to produce contract-type quality and market to buyers post-harvest for a premium.

Law of Four

As discussed previously, the only hard contracts were between the food manufacturer and the food processor. Implementing hard contracts is possible because an ample number of suppliers of the processed input all were competing for the business of the manufacturer or retailer. In these cases superior market power resides with the end user. Goldsmith et al. (2002) reported a similar situation in the U.S. meat supply chain. The Law of Four prevailed in that case, where meat suppliers competed for access to retail supply chains or networks. Under the Law of Four, the ideal industrial structure for buyers of processed inputs is four firms.

With a one firm monopoly there is excessive market power allocated to the supplier and muted incentives for supplier innovation. With two firms collusion would result, limiting any improvement in competitiveness. Three firms as an oligopoly is also competitively fragile.

With four firms, though, there is sufficient competition and active innovation *but* an adherence to a de facto industry standard. The industry standard (common norms, language, and product and process specification) is valuable to a buyer because it

simplifies procurement, allows for product and supplier substitution, and provides credible market (price) discipline. With four suppliers, buyers substitute fairly easily if there is an interruption of supply (which is common in agriculture) or unfavorable pricing by one of the suppliers. The ability to shift suppliers is a threat that mutes incentives for buyers and sellers to invest in bilateral relationships and overly specific assets. While the investment specificity may be small, there are significant incentives for suppliers to invest in order to keep pace with competitors. Investments tend to be of the type that can be leveraged across alternative buyers.

Having *more* than four suppliers complicates and adds costs to procurement. Developing and maintaining an industry standard and norms is more difficult, product supply across firms is more heterogeneous, and suppliers may be less able to leverage economies of scale in service to their clients.

The Law of Four was not found to be present anywhere between farmers and first handlers or processors overly reducing the supply base. Processors prefer a competitive industry supply structure among their suppliers. In such a case farmer product and service innovation are valued less than the ability to purchase a commodity—a product that is inexpensive, easy to procure, and fully substitutable. Agricultural production is unique because of its supply risk due to weather, pests, and perishability. Simply reducing the number of farmer suppliers does not mitigate supply risk but actually may increase risk because farmers are not spatially diversified. Until business models are developed that address supply risk, buyers will prefer more suppliers (a competitive industry structure)

to fewer suppliers (monopolistic competition). First handlers or processors, as opposed to farmers and farmer cooperatives, have become global firms providing weather, hemispheric, and seasonal hedges for their customers. Only just recently has a U.S. farmer cooperative (Cenex Harvest-States) begun originating grain from Brazil.

One of the most important features of the commodity system is the availability of ready supply. The narrower the product specifications, the more limited the supply and potentially the greater the supply risk. Soft contracts are hybrid mechanisms that allow buyers to refine procurement to improve homogeneity and product performance without overly constraining their supply base. For example, many of the interviewed firms had an "A" list of farmer suppliers. These were the best suppliers in the region. Farmers would move off the list for non- or poor compliance and be replaced by other farmers ready to adopt the system and command the premium. The availability of willing and able suppliers did not constrain buyers, as evidenced by the use of soft contracts. If supply were hard to acquire then buyers would be forced to move up the governance continuum to harder contracts or even vertical integration. In our conversations we found no evidence of this.

Incentives for Vertical Information Flows: The Buyer's Problem

The most significant finding from the conversations was how different the perspectives were between the buy and sell sides (figure 3). While suppliers are selling a product, such as white corn, the buyer's proposition is much more fragmented. Firms buy numerous

inputs, and raw agricultural products are simply one of those inputs; each input in turn is valued idiosyncratically for attributes[4] associated with end use.

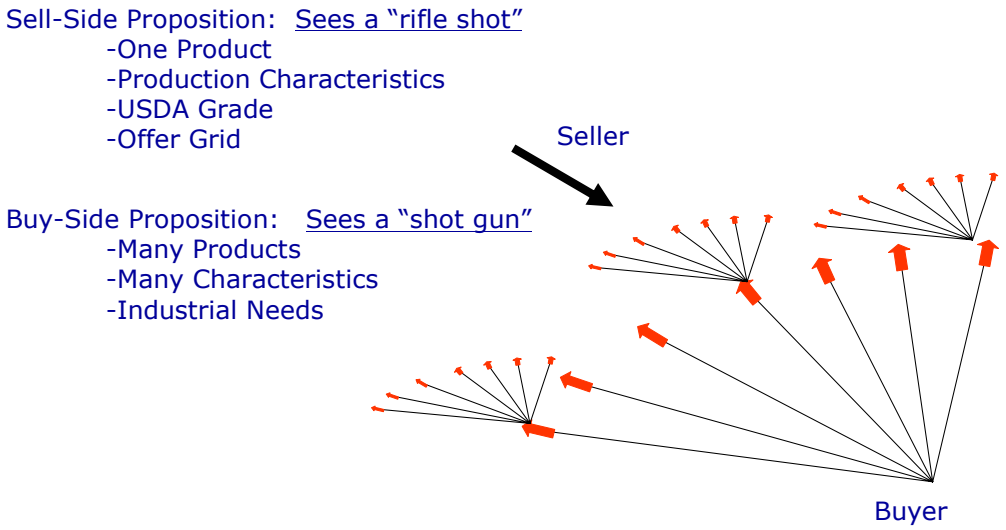
Ceteris paribus, preserving the identity downstream or knowing the origin or identity of the upstream suppliers is costly. This cost can arise from third-party verification systems, system complexity, asset-specific investments to accommodate monitoring, and the bureaucracy (Sporleder and Goldsmith, 2001). Segregation without identity preservation is less intense in terms of vertical information flow, and therefore less expensive on a per-unit basis. Obviously the efficiency advantage of the commodity system is its low informational costs in which products are readily substitutable and buyer and seller options are most flexible.

The valuation of product components and the underlying incentives of the sell-side agent can differ significantly from those of the buy-side agent. Vertical information flows are costly for buyers in numerous ways. Undifferentiated commodity purchases afford great flexibility through substitutability, common understanding of grades and standards, and the ability to commingle. Buying from a competitive commodity market also affords buyers the opportunity to manage price risks through buffer stocks and futures markets. Commodity purchasing is quick, low cost, and repeatable, with supply chains that exhibit well-established trade customs. Investment in vertical information capture and analysis adds new and uncertain costs and perhaps sunk investments to facilitate procurement.

[4] This is consistent with Lancaster's (1966) notion that products really are consumed for the set of attributes. Understanding these attributes reveals the underlying demand.

Because of this trade-off between information quantity and quality and cost, buy-side firms are selective as to which inputs warrant investment (i.e., investments that are truly strategic). Economic agents in the supply chain prefer to avoid asset-specific investments.

Figure 3. Differing perspectives: looking down the chain vs. looking up the chain



Analysis of commodity-retail price spreads demonstrates the declining role of the commodity input in the consumption experience. One value of commodities to end users is that they are low cost. The buyer creates and captures value by taking a low-cost input and converting it into a higher-value product (turning a sow's ear into a silk purse). Higher-cost or premium inputs have to be justified in terms of their market uplift or risk mitigation features. This makes incentives antithetical between the buyer and the seller. The buyer then constantly

scans for alternatives to reduce costs, either through engaging substitutes (e.g., high-oil corn and oil substitutes) or promoting greater supply (e.g., food-grade grains).

Finally, production agriculture is fraught with risk. Endemic to grain and oilseed production is variability caused by weather, seasonality, and hemispheric differences. Buyers have scant incentive to directly engage sellers who avoid the incorporation of upstream risk into their operations. Buyers prefer, when possible, to shift risk to the farmer supplier. This risk shifting by buyers to farmer suppliers through commodity markets has not limited the number of ready suppliers, either locally or globally. The study firms, from organic buyers to livestock feeders, reveal a thick market of farmers eager to supply their needs. Also, as agro-industrial capital becomes more global the commodity supply is enhanced.[5]

For example, in terms of risk mitigation, when the Grocery Manufacturers Association explored how to address pharma farming in the Midwest (see Schuff, 2002 for the case of Prodigene) to serve their European clients, their response was simple. They would not invest in high-cost procurement systems with traceback in the United States. Instead they would simply move off shore with their soft contract and commodity procurement model. They appear capable of finding the competitively produced supply outside the Midwestern United States.

[5] This is especially relevant to nonperishable commodities and in light of the rapid increase in on-farm storage in both the United States and South America.

Implications for Cooperatives

The buyer's problem is a calculus weighing the costs of leaving a commodity procurement system against the benefits of intensifying the supplier relationship and narrowing the supply base. Where do cooperatives fit in?

The role of cooperatives has historically been to serve producers, correcting for market failures, providing farmers market access, and aggregating supply. Before the mid 1980's co-op theorists had gone to great lengths equating cooperatives with proprietary firms. Hemberger and Hoos (1962) serves as a good example. In the 1980's and into the 1990's several writers broke with these traditional models of cooperatives questioning the organizational structure and demonstrating the detrimental the impacts of organizational structure on competitiveness (Staatz, 1983; Sexton, 1986; Cook, 1994; Goldsmith, 1995; Sporleder and Goldsmith, 1997.) These writers pointed out structural flaws with the traditional cooperative model due to agency and property rights problems limiting their ability to compete and survive.

As we move into the 21st century with a structurally different agri-food system, a post-modern question arises as to the role of group action in the economy. Specific to large traditionally structured cooperatives, recent high profile bankruptcies, mergers, and buyouts raise questions of the competitiveness of that model to compete in the global agri-food system. On a positive note there is tremendous energy and activity among agri-food business startups involving group action (See Merritt, 2003). These groups, in response to modernity,

not necessarily the above authors' writings, have addressed prior organizational design flaws allowing a greater ability to compete (Goldsmith, 2004). Finally, many of the early 20th century concerns of non competitiveness that gave rise to the cooperative movement are arising today with the greater concentration and scale in the global food system. Is there a role again for group action to mitigate such market power?

While many new group action models have emerged, among them new generation cooperatives and limited liability companies, success of these new businesses has not been robust. One motivation behind the recent rounds of USDA Rural Business Development funding for agricultural innovation centers was to help improve the success rate of the many value-added businesses attempting to get underway.

The implication is that while producers and practitioners may have embraced new organizational designs; correcting many traditional weaknesses, it appears to not have been enough. Something else is missing. As discussed above, the rise of differentiation in the agri-food system and the need for greater security along the food channel has not resulted in significant opportunities for producers and their producer groups.

One problem may be that earlier theoreticians may have only gotten half the problem right. While they correctly pointed out the organization design flaws for competing in a dynamic market where strategic advantage is increasingly driven by intangible rather than tangible assets (process over product), the perspective of these researchers may have been

misdirected. Their research focused on correcting organizational design flaws for greater service and relevance to member owners, (i.e. how to address the member heterogeneity question). The theoretical work broke with the neoclassical models of the cooperative as a firm but did not break completely with the orientation of the co-op towards the membership; hence the incorrect perspective. Historically the role of the cooperative was to find markets or inputs for members' businesses. Using this kind of logic it would be almost oxymoronic to think that the interests of the co-op should not reflect the needs of the patron-owners. That is how cooperatives are traditionally defined.

But then where do end-user needs fit in? Industrial marketing theory is a demand driven theory not a supply driven theory (Kohli and Jaworski, 1990; Webster, 1992). End-user needs and demands drive the transaction relationship and the design of the supply chain necessary to serve those needs, hence the notion of "building the chain backwards." Cooperatives on the other hand are inherently supplier driven. Producers get together to find greater opportuntities in the marketplace. Therefore the task of the 1980's and 1990's for cooperative theoreticians was twofold not singular: not only address the governance/organizational design question but as importantly reconcile how these organizations were to fit within modern supply chains. The first task was addressed while the second was left unaddressed. This lack of attention of the perspective of the cooperative business may explain why new producer businesses still find it so difficult to create and capture value.

The essential question to be addressed is then as follows; why does the agri-food buyer want to purchase from a group? What does the group add to the economy? How is it necessary? More specifically, in the business-to-business relationship what does the fact that the product was supplied by a group add or detract from the relationship. Farm markets, organic suppliers, and the Slow Food Movement (see http://www.slowfoodusa.org) are excellent examples where the group is necessary to make a viable market. The group provides the critical mass necessary to provide the quantity and diversity of products to sustain the marketplace. On the industrial side the proposition for group action is less clear, Goldsmith and Gow (2003) describe how a New Zealand lamb cooperative effectively penetrated the fresh lamb market in the US. Wholesale and retail food cooperatives (e.g. Topco, Inc.) allow small firms to work together to appear "big" in the marketplace while still maintaining independence. Other research in the grain and meat sectors has shown little need on the part of buyers to procure through cooperatives (See Goldsmith et al, 2002; and Goldsmith and Bender, 2003).

One example that highlights the conflict between an end-user and a member orientation is the geography problem endemic to many agricultural groups, both new and old. Many cooperatives are supplied by a group of producers from a relatively narrow geography. From the buyer's perspective why is this advantageous? How does location uniformity mitigate risk or provide market uplift to end-users?

> 'Our customers tell us they are going to buy the best product for the lowest price, and they don't dare where it comes from. …Our customers expect us to provide all kinds of citrus all year around. With this change, Sunkist is acknowledging that our growers can't always supply what

> our customers want.' (Gargiulo, CEO Sunkist Growers Inc. in Smith, 2003).

Cooperatives like Sunkist are evolving from a supply-driven perspective to a business marketing perspective; taking cues and organizing their businesses based on end-user needs. Such a shift has tremendous implications for the identity of the cooperative and the expectations about the cooperative by the members.

For a buyer, geographic concentration of an agricultural input adds to their procurement risk. As discussed above one strength of commodity market procurement model is full product substitutability where buyers are able to manage the weather and disease risk elements within their supply chains. While many cooperative ventures have developed excellent new products they have done little to manage this supply risk. For example there is strong evidence in the agri-food system of buyer indemnification by suppliers associated with supply reliability. While our research could find numerous examples down-chain from agriculture, especially with food manufacturing and food retailing, no examples were found up chain with raw agricultural input suppliers.

Conclusion

Understanding identity preservation business opportunities requires an understanding of the buy-side proposition. Though end-user benefits are on the horizon with the next generation of biotechnologies, their emergence is not enough to guarantee farmers greater returns. End users will always balance the risk mitigation and market uplift features of a supply offering

with the risks of narrowing the supply base. This is the buyers' calculus. To drive value up the chain, producers and producer groups need to shift away from focusing solely on the products of the future. Instead, then need to focus on the technologies, delivery systems, and organizational models that, when bundled with new products, solve end-user problems and make end users more competitive.

The geography problem serves as a good example of the challenges facing groups as they adapt to modernity. Many research questions now need to be addressed about how groups are going to balance the needs of both masters. For example, how will marketing cooperatives shift their strategic focus from finding markets for producers' products to a wholesaling focus sourcing the products and providing the services that makes their customers more competitive?

References

Barrier, William. Senior Director. Global Product Consistency, Burger King. Personal communication. October 2002.

Bender, Karen L. "Product Differentiation and Identity Preservation (IP): Implications for Market Developments in U.S. Corn and Soybeans." Economic Research Service, USDA and the Farm Foundation. Washington. January 27-28, 2003.

Bullock, D.S., and M. Desquilbet. "The Economics of Non-GMO Segregation and Identity Preservation." *Food Policy* 27 (1) Feb. 2002: 81-99.

Cook, Michael L. "The Role of Management Behavior in Agricultural Cooperatives." *Journal of Agricultural Cooperation* (1994):42-58.

Goldsmith, Peter D. "Creating Value in a Knowledge-Based Agriculture: A Theory of New Generation Cooperatives." *Cooperatives and Development: Theory and Applications for the 21st Century*. Edited by Christopher D. Merrett and Norman Walzer, Forthcoming. 2004.

Goldsmith, Peter D. and Hamish R. Gow. "Strategic Positioning Under Agricultural Structural Change: A Critique of Long Jump Co-operative Ventures." *The International Food and Agribusiness Management Review*. Under Revision, July, 2003.

Goldsmith, Peter D. and K. Bender. "Ten Conversations About Identity Preservation." Under Review. Journal of Chain Network Science. September, 2003.

Goldsmith, Peter D., A. Salvador, D. Knipe, and E. Kendall. "Structural Change or Logical Incrementalism? Turbulence in the Global Meat System." *Journal of Chain and Network Science,* 2 (2) 2002: 101-115.

Goldsmith, Peter D. "Business Behavior as a Function of Business Structure: A Transaction Theory of Cooperative Firms. *The Ohio State University*. Unpublished PhD dissertation. 1995.

Helmberger, Peter and Stanley Hoos. "Cooperative Enterprise and Organizational Theory." *Journal of Farm Economics* 44(1962):275-290.

Johnson, Donald E., Larry Meiller, Lorna Miller, and Gene F. Summers (Editors). *Needs assessment: Theory and methods*. Ames, IA: Iowa State University Press, 1987.

Kalaitzandonakes, N., R. Maltsbarger, and J. Barnes. "Global Identity Preservation Costs in Agricultural Supply Chains." *Canadian Journal of Agricultural Economics* Dec. 49 (4) 2001: 605-621.

Kohli, A.K. and B.J. Jaworski. "Market Orientation: the Construct, Research Propositions, and Managerial Implications. *Journal of Marketing*. 54 April, 1990: pp. 1-18.

Lancaster, K. "A New Approach to Consumer Theory." *Journal of Political Economy* 74 (1966): 132-157.

Maltsbarger, R., and N. Kalaitzandonakes. "Direct and Hidden Costs in Identity Preserved Supply Chains." *Agbioforum* 3(4) 2000.

Martin, J.D. "Hudson, Employees Plead Not Guilty in Beef Recall." *Feedstuffs,* 71(3). 18 January 1999.

Martinez, S.W., and A. Reed. "Farmers to Consumers: Vertical Coordination in the Food Industry." *Agricultural Information Bulletin* 720. USDA, ERS. June 1996.

Martinez, S.W., and D.E. Davis. "Farm Business Practices Coordinate Production with Consumer Preferences." *Food Review,* Spring 2002: 33-38.

Merritt, C., M. Holmes, J.Eggert, and B. Garrett. "Directory of Closed-Membership Producer Cooperatives." *Illinois Institute for Rural Affairs*. 2003. pp. 128.

Schuff, S. "ProdiGene's field test woes spark backlash from food processors, grocers." *Feedstuffs,* 47(74). 18 November 2002.

Smith, Claire. "New global strategy: Year-round demand has Sunkist tapping foreign markets." *Rural Cooperatives*. September/October 2003: pp. 4-5.

Soriano, Fernando I. *Conducting Needs Assessments: A Multidisciplinary Approach*. Thousand Oaks, CA: Sage Publications, 1995.

Sporleder, Thomas L. and Peter D. Goldsmith. "The Risk Mitigation Aspects of Agricultural Cooperatives." In *Cooperatives: Their Importance in the Future Food and Agricultural System.* The National Council of Farmer Cooperatives and the Food and Agricultural Marketing Consortium. pp. 69-82.

Sporleder, T.L., and P.D. Goldsmith. "Alternative Firm Strategies for Signaling Quality in the Food System." *Canadian Journal of Agricultural Economics,* 49(4) (2001): 591-604.

Sporleder, T.L., and P.D. Goldsmith. "Differentiation Within the Grain and Oilseeds Sectors: The Evolution and Reengineering of Supply Chains." Proceedings: *Product Differentiation and Market Segmentation in the Grains and Oilseeds: Implications for Industry in Transition.* Economic Research Service, USDA and the Farm Foundation. Washington, DC: January 27-28, 2003.

Sexton, Richard J. "The Formation of Cooperatives: A Game Theoretic Approach with Implications for Cooperative Finance, Decision Making and Stability." *American Journal of Agricultural Economics* 68(May 1986):(214-225).

Staatz, John M. "The Cooperative as a Coalition: A Game Theoretic Approach." *American Journal of Agricultural Economics* 65(1983):1083-89.

Webster, F.E.. "The Changing Role of Marketing in the Corporation." *Journal of Marketing*. 56 October, 1992. 1-17.

Yin, Robert K. *Case Study Research: Design and Methods*. 2nd Edition. Sage Publications. Thousand Oaks, CA, 1994.