



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Industry Concentration Impacts on Business Strategies Used by Small Produce Wholesalers

Roger A. Hinson, Professor
Agricultural Economics and Agribusiness
Louisiana State University Agricultural Center
101 Ag Administration Building
Baton Rouge, LA 70803
Phone : (225) 578-2753 fax 2716
Email rhinson@agctr.lsu.edu

Ramona Sinoha, graduate assistant
Agricultural Economics and Agribusiness
Louisiana State University Agricultural Center
101 Ag Administration Building
Baton Rouge, LA 70803
rsinoh1@lsu.edu

Dixie Watts Reaves, Associate Professor
Virginia Tech
Agricultural and Applied Economics
307 Hutcheson Hall
Blacksburg, VA 24061-0401
email: dixie@vt.edu

*Selected Paper prepared for presentation at the
Southern Agricultural Economics Association Annual Meetings
Orlando, Florida, February 5-8, 2006*

Copyright 2006 by Roger A. Hinson, Ramona Sinoha, and Dixie Watts Reaves. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Abstract

Opportunities for small produce wholesalers are affected by concentration in the supply chain, and availability and use of information technology for cost and service issues. Case studies evaluated perceptions, technology adoption and use, and strategies. Ongoing relationships, contracts and bids were common, and a differentiation strategy was chosen.

INTRODUCTION

The produce industry is considered one of the most dynamic industries in the food marketing system. Since 1997, fresh fruits and vegetables sales by system participants (grower/shippers, distributors or middlemen, retailers, and foodservice providers) have increased substantially. Grower/shipper sales increased from \$17.8 billion in 1997 to \$19.7 billion in 2000. Wholesalers' sales increased from \$46.3 billion in 1997 to \$56.3 billion in 2002, retailers' sales increased from \$34 billion in 1997 to \$39.7 billion in 2002, and foodservice sales increased from \$35.4 billion in 1997 to \$39.2 billion in 2000 (Kaufman et al., 2000; Perosio et al., 2001). There are many reasons associated with the increase in produce sales in the U.S. including growing awareness of good nutrition, growing importance of convenience, and growing importance in locally grown items and exotic produce.

In recent years, the vertical flow of produce has changed dramatically. Traditionally, distribution of fresh fruits and vegetables mostly was done by small and medium sized distributors and wholesalers (Kaufman et al., 2000). Today, the market for wholesalers' services, particularly smaller firms, is changing as wholesalers are bypassed by self-distributing retailers who purchase directly from grower-shippers (Harris et al., 2002). Grower-shippers and retailers are now performing activities traditionally performed by wholesalers, such as trimming, cut-up and consumer packaging (Calvin et al., 2001). In 1987, about 38.1% of all produce wholesalers' sales went to retail stores, but this share declined to 34.6% by 1997. At the same time, wholesalers rely more on sales to foodservice customers.

Some important concerns for the industry are the increasing concentration among the largest players, changes in supply chain management (SCM), technological changes, and sustaining increases in consumer demand. Large firms are getting larger and small firms (i.e.,

produce wholesalers) are losing market share due to greater availability and diversity of products, increasing competition through the supply chain, and other factors (McLaughlin et al., 1999; McCluskey and O'Rourke, 2000). SCM issues (Perosio et al., 2001) include cold chain maintenance, pallet bar coding, returnable containers, demand forecasting, flow through/cross docking, vendor partnerships, e-commerce, category management, vendor managed inventory, decreased order time, and maintenance of margins. Other general issues include food safety, HACCP standards, product traceability, and quality specifications.

There has been a variety of research studying economic importance of small and medium sized enterprises (SMEs). Morris et al. (1996) studied SMEs in the wine tourism in Australia, and Kwoka and White (2000) discussed the new industrial organization for SMEs in the U.S. In these studies, it was noted that important economic benefits are provided by SMEs. Research in the produce industry has focused on produce grower-shipper and retailers, with less emphasis on produce wholesaling. The objectives of this paper are to determine the perception of the impact of concentration at retail on small and medium sized produce wholesalers in the Southern United States. Two more specific objectives include (i) understanding produce wholesalers' awareness of the impact of concentration, and (ii) identifying business and marketing strategies used by small and medium sized enterprises (SMEs) in the wholesale produce industry.

LITERATURE REVIEW

Concentration in the food industry

Theory suggests that structure affects firm behavior. One measure of market concentration is the concentration ratio (CR), measured as the share of market held by the top 4 and 20 firms. Concentration in all sectors has increased over time as measured at these levels.

Among wholesalers, general line grocery merchant wholesalers had the highest ratios at both levels, but the retail trade segments were consistently higher than wholesale with levels at or above 50% at the CR₂₀ level (U.S. Census Bureau, Economic Census, 2002). The produce wholesalers and retailers had the lowest ratios, probably because these specialized firms serve small, local markets.

Changes in vertical coordination

Produce can flow through different channels on its way to the final consumer. Consumer expenditures now are approximately equally spread between the foodservice (restaurants, institutions, etc.) and the traditional retail food store channel. For both channels, system coordination is changing from spot markets and personal, long term arrangements to a system more oriented to the bid/contract arrangement used by the technology-oriented firms. As a result, wholesalers are not being used as before, but still account for an important portion of the produce market. In 1997, they captured over 58% of all grocery and related products sales, manufacturers' sales branches and offices accounted for 25% and agents and brokers accounted for 19%. Retail stores and other wholesale grocery chains still account for the largest proportion of wholesalers' sales (Perosio et al., 2001).

Technology and Supply Chain Management (SCM)

The success of many firms is built on the use of information technology that contributes to customer service and cost control. Non-traditional food retailers, particularly Wal-Mart, have succeeded in applying this technology to the food section. Traditional retail grocers have been pressured, and are adopting internet based technologies such as electronic commerce, scan-based trading, collaborative planning, forecasting, and replenishment (King and Park, 2004).

In the produce industry, buying through the supply chain is at the center of innovation and technological transformation (Perosio, 2002). Supply chain management integrates a series of functions shared by growers/shippers, various middlemen and retailers in the distribution system (Perosio et al., 2001). SCM is a source of business competitiveness, allowing decision makers to manage production and logistics to minimize inventories, costs, and supply chain response time (Hinson, 2005). Technology for data interchange is necessary for SCM for both vertically integrated systems and for chains composed of independent companies. Appropriate application of SCM and technology are key components of business success.

Electronic data interchange (EDI) allows fast transmission of information through the supply chain. Perosio et al. (2001) and Hinson (2005) identified EDI applications such as purchase orders, acknowledgments, forecasts, advanced shipping notification, invoices and/or payments, and carrier shipments status. EDI use has increased and is expected to increase further among retailers. As of 2001, 31.6% of retailers used EDI initiatives to facilitate purchase orders and all sizes of retail firms expected that the use of each type of EDI would increase by 2006 (table 1), and other efficiencies are possible. Firms of all sizes expected to begin or to increase the use of these technologies.

Perosio et al. (2001) found evidence of consolidation among retailers that resulted in fewer produce buyers. The amount of produce procured directly from grower/shippers by retailers increased. The overall number of produce suppliers used by retailers was declining. The use of technologies was increasing but at a slower rate. Responses from grower/shippers revealed that the strategies used by suppliers to stay competitive included customer base segmentation, working closely with retailers in planning and budgeting for mutual growth, and acting as brokers for their customers. Grower/shippers were integrating HACCP programs, 3rd party

certification, inspections, and trace back programs into their business. Small food retail stores represent opportunities for produce wholesalers despite technological changes and trends toward larger retail firms. Perosio et al. (2001) reported that while large retailers rely on contracts to purchase their products, small retailers rely on different procurement strategies such as full line grocery wholesalers or direct purchase from grower-shippers when purchasing produce.

In a related study of produce focused on the foodservice industry, the role of fresh produce was documented in 2002 with its expected change by 2005 (Perosio et al., 2003). Broadline distributors and produce distributors/wholesalers had different opinions about the importance of twelve supplier attributes. They agreed that large supply, prompt notification, honor guarantee, alliances, best reputation, HACCP, traceability, and personal relationships were relatively important. Broadliners and produce distributors also differed regarding procurement patterns, as the former spread business across many different suppliers, while the latter depended mostly on grower/shippers. Broadliners received most orders from foodservice providers and placed orders via personal touch (face-to-face, phone, fax), and expected to use the internet more for both receiving and placing orders. Produce distributors relied on telephone, but they expected electronic technology by 2005. The authors also reported nine areas of opportunities / strategies: (1) supply chain diversity; (2) produce expertise; (3) become a preferred supplier (alliances with buying groups, certify food safety); (4) use of internet websites; (5) new item; (6) collaboration; (7) effective supplier strategies; (8) non-commercial opportunities; and (9) the foodservice segment.

McCluskey and O'Rourke (2000) identified the relationships between large buyers and small and medium sized suppliers in the Pacific Northwest, projected changes in these relationships as large buyers strengthen their competitive positions, and suggested strategies for

SME suppliers. Retailers want reliable suppliers, quality products, assistance in marketing, and reliable information and efficient logistics from suppliers. Opportunities for SMEs to sell to large retailers remain. Major food retail stores want to keep suppliers on their vendor lists despite stringent requirements such as fees, safety testing, and EDI systems. Four aspects SME produce suppliers need to consider in order to meet retailers' requirements and to offset retailers' growing market power include: (1) understanding changes in the demand for food; (2) emphasizing standardization of EDI; (3) consolidating; and (4) cutting cost by forming alliances.

Blundell and Hingley (2001) studied the growth of SMEs engaging in vertical inter-firm relationships in the UK produce industry. Large, competitive retail customers are not an unambiguous threat to SMEs if they (SMEs) were willing to move toward a relational approach. Retail managers saw SME produce suppliers as having the potential to deliver benefits not available from larger suppliers, in the areas of helping ensure retailers' demand for continuous quality, motivation to collaborate; developing new products and being a source of innovation and differentiation, and having the capacity for growth.

Hinson (2005) studied a third party logistics (3PL) provider to highlight the SCM change. Adoption of SCM applications across customers in 1999 and 2001 was evaluated. Small customers used fewer technologies because they were not willing to share data, leading to problems such as inventory control. Larger customers were implementing applications such as automated replenishment. Use of advanced technology by integrated operations, and retailer's market share growth, represent a competitive challenge for small produce firms.

King and Park (2004) examined the effect of large stores, new formats, industry structure, operating practices, and trading-partners' relationships on small retail stores. While small stores can compete, they are different in organization, operation and markets. Store format, service

offerings, and remodeling disruptions affected store productivity. Basic data sharing information technologies seem to be prerequisites to practices that improve store productivity. These small stores are a critical market for produce distributors.

Strategies

Firms may choose strategies that guide long and short term operations. Among these, Porter (1998) has discussed the choice of competitive strategy from the standpoint of (1) attractiveness for long-run profitability and factors that determine profitability, and (2) factors of relative competitive position (generic competitive strategies), within an industry. He identified three generic competitive strategies as

- *Cost leadership.* A firm with low cost strategy would serve many industry segments, and might operate in related industries, with advantages that arise from economies of scale, proprietary technology, and easy access to raw materials,
- *Differentiation.* A firm-using this strategy would be unique through attributes valued by buyers. These factors are the product itself, the delivery system, and/or the marketing process.
- *Focus.* In this strategy, a firm chooses a reduced competitive range within the industry. It selects a segment and implements its strategy to serve this group exclusively.

In assessing the role of SMEs in the produce industry, vertical coordination and collaboration in the supply chain, status of and changes in relationships among the channel members, and the role of 3rd party logistics providers, appear to be important. Large players use more SCM applications than do others. Across firm sizes, EDI is more commonly used than the sophisticated SCM applications. Both have enabled retailers to engage in more formal

relationships with grower/shippers and large wholesalers. Overall, large retailers have increased market control, leaving smaller shares for small and medium sized wholesalers.

METHODOLOGY

This study uses a qualitative, multiple case study analysis approach. A survey instrument/interview guide, adapted from the McCluskey et al. study but with a focus on the wholesaler rather than the grower/shipper, was developed. For SMEs, the instrument was designed to capture firm characteristics, degree of use of chain management technologies, and business strategies.

Respondents were selected from the Blue Book (Produce Reporter Company, 2005) to generally represent different kinds of companies and products. Companies were contacted by telephone to gain their agreement to participate. The initial target for contact was the company's top executive. In larger companies, the task of responding was handed to a director of produce, or other manager with similar title. A copy of the instrument was sent by email. A period of time for the respondent to become familiar with the document was agreed upon, and in a subsequent telephone conversation the instrument was completed. The instrument included both closed and open ended questions depending on the nature of the issue. Primary data were collected from four produce wholesalers.

RESULTS

KIND OF COMPANY AND USE OF INFORMATION SYSTEMS

In this section, questions referred to the firm's operation. Three firms classified themselves as multi-line wholesale suppliers and one as a single line supplier (table 2). The multi-line firm serves primarily independent stores and small grocery chains, and had sales of more than \$50 million, with about 300 customers. The other firms were substantially smaller,

one in the \$25 to \$50 million range with about 1000 customers, one in the \$10 to \$25 million range with about 100 customers, and the other in the \$5 to \$10 million category with about 300 customers. All four had the capacity to add customers. Two of the four were experiencing growth in number of customers, while the other two were declining. For two of the firms, 4 customers accounted for about half of sales, while one's value was about 40% and the other about 20%. The maximum number of days of advance notice needed to ship produce to customers ranged from day of order to 2 days. Two firms indicated they participate in some form of stock replenishment programs with their customers, and firms that responded 'yes' said these programs do not affect payment terms.

This question investigated the payment terms policy of each firm. Three firms responded that they typically have an agreement with their customers for payment after a given number of days, while the third was adopting that policy.

Two of the firms indicated they currently use electronic data interchange (EDI), while two did not. The largest firm said that 100 % of customers use EDI, the other user had about 25 % participation. One firm uses EDI for inventory control and pricing (to keep abreast of market fluctuations), while the other three firms do not use EDI for chain management decisions. One multi-line firm does use EDI with suppliers, to keep up with weather-crop conditions, to communicate with the corporate office, and to get governmental information for compliance requirements. Finally, three of these firms offered customers EDI options that could be accessed through the company website.

USE OF SPECIFIED EDI AND/OR SCM INITIATIVES

For perspective about change in EDI use, firms provided the percentage of total produce sales that was/is handled using EDI initiatives for the years 2000 and 2005 (table 3). The larger

multi-line firm used these activities most – all produce was source tagged in both years, an automated purchase order system (APOS) had been fully adopted by 2005, and some cross-docking and pallet bar coding was in place. Among the other three firms, source tagging increased to 100% in 2005 for two firms. These two also reported a small amount of cross-docking and a small number of customers using APOS. The 4th firm reported almost no use of these initiatives either in 2000 or 2005.

SPECIAL REQUESTS

Interviewees were asked about special requests applicable to packaging and organic/environmentally friendly products. All four firms said that special packaging could be provided, but most of the requested changes actually were done by suppliers. With regard to organic, natural, or environmentally friendly produce, three of the four firms had the capability to meet these requests. Two larger firms received special requests and thought these products would be requested more frequently, but the two smaller firms perceived no interest in this kind of product by its customers. One indicated that other firms are already specializing in this type of production.

CONTRACTUAL AND/OR PARTNERING RELATIONSHIPS

In this section, the kinds of relationships that exist between these firms and their customers are reported, with particular emphasis on whether the firm is engaging more with customers in extended agreements or relationships. Firms were asked to indicate the method (ongoing relationships and contracts, product specification and bids, and cold calls) that best describe the largest and smallest dollar share of sales. All firms reported that relationships/contracts accounted for most sales, and cold calls were lowest (table 4). The largest firm indicated that all sales resulted from their bidding based on specifications. Two of the

smaller firms had more contracts both shorter than and longer than 1 year. One firm indicated that 55 to 60% of sales were through contracts of less than one year, with the remainder of sales being spot market transactions. Spot market sales appeared to be 'last resort' sourcing, accounting for about 10% of sales, for two firms.

The procedure for establishing selling price was reported. All firms responded that selling price is based on cost plus markup. One firm reported that it posts a weekly price, so management must look to market conditions to determine whether suppliers' prices might move up or down during the week. The multi-line firm said selling price also depends on regional distribution, number of locations, service provided and product specifications. The next-to-smallest firm indicated that there were many factors that entered the pricing decision, including expenses related to the product, "what the market will bear", price and availability of competitors' products, and forecasts of near-term changes in product availability.

OPPORTUNITIES AND CHALLENGES

Firms were asked about the opportunities and challenges they see over the next few years. The three larger firms indicated their relationship with large customers is growing stronger, forming partnerships and developing a good business relationship with their customers. One specifically stated that large firms that were profitable were sought out and they received attention and focus. On the other hand, the smallest firm said its relationship with large customers was declining because large foodservice companies and institutions such as hospitals and medical centers were out-sourcing/contracting to national caterers, and that kind of customer demanded EDI.

All four firms believe they have advantages to offer to large customers during the next five years. The larger multi-line firm said it will look for ways to cut costs and to be better in

logistics and technology. The next-to-smallest firm indicated that its logistics provide an advantage, since it is centrally located and that overnight delivery is a reality. The smallest firm is looking to provide more frequent service (daily), and for ways to provide competitive prices, and fresh quality products.

CURRENT AND FUTURE ISSUES IN THE PRODUCE SUPPLY CHAIN

The firms rated the importance of a set of issues that affect the produce supply chain today (2005) and in 5 years using a scale of one (low priority) to five (high priority). The firms agreed that food safety, traceability and quality specification would be high priority by 2010, even though their ratings of importance in 2005 varied. Three firms felt that maintenance of margin would have high priority by 2010, with two firms having it as high priority in 2005. Vendor partnerships and ecommerce were given the top rating by two of the firms and a 4 by the other two for 2010, and these items were given lower importance ratings for today. Items that were not important today and are not expected to become critically important in 5 years were pallet bar-coding, RFID, and returnable containers. For three of four firms, flow through/cross docking was low priority, while vendor managed inventory was low priority for two of the firms.

BUSINESS STRATEGY

Finally, we asked the firms to indicate which of the three basic strategies (cost leadership, differentiation, and focus strategies) best describes their approach. All four firms identified themselves as using the differentiation strategy (table 6). The larger multi-line firm also identified the focus strategy, and indicated that it positions itself as being strong with local products and purchasing from local companies, providing high service and quality product, and serving local stores. The other three companies believed their differentiation came from high levels of service and quality, strong specialty product availability, freshness, and daily service.

SUMMARY OF INDIVIDUAL FIRM RESPONSES

Firm 1. This single-line, produce supplier had some capability in electronic technology applications in the form of a website and a web-based order system. Few customers (only 10%) chose to use this technology, and these uses would not be classified as SCM initiatives. While the company remained in traditional kinds of relationships with customers, some 40% of sales were bids based on product specifications, and there were some contracts longer than 1 year.

In its rating of issues, none of the SCM issues were high priority, but by 2010 food safety, traceability and maintenance of margin would be rated 'most important'. In terms of relationships with large firms, firm1 believed that a larger distribution area, development of food safety programs, and the SCM advantages and efficiencies would help. However, the relationship with large customers was reported to be weakening because they demanded contractual agreements. Firm1 identified its strategy as differentiation, accomplished by providing high level of service, fresh produce, and a high quality line of specialty products. This firm appeared to be succeeding in the market, having just moved into a new and larger facility.

Firm 2. This multi-line supplier was largest, with produce accounting for a 7% share of sales and the four largest customers representing 45% of sales. It had the capacity to increase sales. The relationship with large customers was growing stronger because there were 'good business relationships'. Firm 2's size facilitated technology applications. EDI was used by all its customers (for inventory control, stock replenishment, or pricing) and suppliers. Cross docking was used when possible (but was minimal), and APOS implementation had moved to 100% in 2005. Most of this firm's sales involved ongoing relationships and contracts, and all sales were bids based on product specifications. Advantages to its large customers included low costs, better logistics processes, and innovative technology. It rated 6 of the SCM items, some of them SCM

initiatives, as current high priority issues, and food safety, HACCP, and e-commerce also were highest rated in 5 years. Firm 2 identified both differentiation and focus strategies - differentiation through local products, high service and quality products, and focus by purchasing more from local companies and serving home grown stores.

Firm 3. This single-line supplier was smallest, and while it could serve more customers its base was declining. EDI was supported to make transactions more effective, and application was also used for inventory control, stock replenishment, and pricing. The company had moved all customers to APOS by 2005, and used EDI in some other ways. Most sales were part of ongoing relationships and contracts. Bids based on product specification accounted for most sales, and contractual relationships were common. Important current issues included food safety and quality specifications. SCM items were expected to be more important by 2010. This firm noted that there may be 60 local, regional and national companies in its market space. Large customers demanded EDI applications, and this firm's relationship with large customers was growing weaker as they consolidated functions such as purchasing. Advantages to large customers included daily delivery, competitive pricing, freshness and quality produce. The company specified differentiation as its strategy, accomplished by providing daily service and uniqueness of items to customers.

Firm 4. This single-line supplier was one of the smaller firms, but had capacity to serve more customers. It had few EDI applications other than some cross-docking and APOS. Selling was through established relationships and there were short term contracts with some customers. It differed from other firms in the items that were rated as highest importance issues in 2010, rating demand forecasting, flow through/cross docking, and category management as high importance, while none of the other firms did. It agreed with other firms in the high importance

of food safety, produce traceability and quality specification. Its strategy was differentiation, by setting itself apart through attractive product and one-day delivery guarantees.

Concluding remarks

This paper notes that the future of small produce wholesalers is uncertain as increasing numbers of retailers become self-distributors and purchase directly from grower/shippers. The declining wholesale sector results from concentration at retail, and the drive for efficiency that includes EDI and supply chain management issues. Still, authors have reported that opportunities for small firms in the produce industry remain despite the challenges. Two of those areas are small retail food stores and the foodservice sector. And, to remain viable and competitive, some ideas for small firms include working through alliances and using information technologies, consolidating, and understanding demand such as the increasing importance of food safety.

Interviews indicated that these firms were quite aware of the competitive environment. In addition, responses were similar to those reported by McCluskey and Perosio. Service is very important to retain customers, but efficiencies through information technology and SCM induce more firms to choose suppliers with those capabilities. Other firms, such as these cases, were trying to differentiate themselves in specific ways to retain and gain customers.

REFERENCES

- Blundell, R.K. and M.K. Hingley. 2001. "Exploring Growth in Vertical Inter-Firm Relationships: Small-Medium Supplying Multiple Food Retailers." *Journal of Small Business and Enterprise Development*, 8(3), pp. 245-265.
- Calvin L., R. Cook, M. Denbaly, C. Dimitri, L. Blaser, C. Handy, M. Jekanoski, P. Kaufman, B. Krissoff, B. Thompson, and S. Thornsby. 2001. "U.S. Fresh Fruit and Vegetable Marketing: Emerging Trade Practices, Trends, and Issues." US Department of Agriculture, ERS No. 795.
<http://ers.usda.gov/publications/aer795/aer795a.pdf>
- Cook, R.L. 1990. "Challenges and Opportunities in the U.S. Fresh Produce Industry." *Journal of Food Distribution Research*, 21(1), pp. 67-74.
- Dimitri, C., A. Tegene and P. Kaufman. 2003. "U.S. Fresh Produce Markets: Marketing Channels, Trade Practices, and Retail Pricing Behavior." US Department of Agriculture, AER No. 825.
- Harris, J. M., P.R. Kaufman, S.W. Martinez, and C. Price. 2002. "The U.S. Food Marketing System, 2002 Competition, Coordination, and Technological Innovations into the 21st Century." US Department of Agriculture, AER No. 811.
- Hinson, R.A. 2005. "The Role of 3rd Party Logistics (3pl) Providers in Produce." *Journal of Food Distribution Research*, 36(2), pp. 12-19.
- JT Research LLC. 2005. "Produce Wholesaler." Customized & Standard Industry Reports, Produce Wholesaler SIC 5148, March 2005,
http://www.industryresearch.com/consumer_economy/food/produce_wholesaler_2005.html.
- Kaufman, P.R., C.R. Handy, E.W. McLaughlin, K. Park, and G.M. Green. 2000. "Understanding the Dynamics of Produce Markets, Consumption and Consolidation Grow." US Department of Agriculture, ERS, *Agricultural Information Bulletin* No.758.
- King, R.P. and T.A. Park. 2004. "Modeling Productivity in Supermarket Operations: Incorporating the Impacts of Store Characteristics and Information Technologies." *Journal of Food Distribution Research* 35(2), pp. 42-55.
- Kwoka, J.E. Jr. and L.J. White. 2000. "The new industrial organization and small business." Paper presented at the Conference on Research Issues in Industrial Organization and Small Business Office of Advocacy, Small Business Administration.
<http://www.stern.nyu.edu/eo/wkpapers/workingpapers00/00-03White.pdf>

- McCluskey, J.J. and A.D. O'Rourke. 2000. "Relationships between Produce Supply Firms and Retailers in The New Food Supply Chain." *Journal of Food Distribution Research*, 31(3), pp. 11-20.
- McLaughlin, E.W., G.M. Green, and K. Park. 1999. "Changing Distribution Patterns in the U.S. Fresh Produce Industry Mid/Late-70s to Mid/Late-90s." E.B. 99-03, College of Agriculture and Life Sciences Cornell University, Ithaca, NY.
- Morris, R. and E.C. Bunbury. 1996. "Cooperative Marketing for Small Business Growth and Regional Economic Development: A Case Study in Wine Tourism." Edith Cowan University.
<http://www.usasbe.org/knowledge/proceedings/1997/P182Morris.PDF>
- Perosio, D.J., E.W. McLaughlin, S. Cuellar, and K. Park. 2001. "Fresh Track 2001, Supply Chain Management in the Produce Industry." R.B. 2001-05, College of Agriculture and Life Sciences Cornell University, Ithaca, NY.
- Perosio, D.J., E.W. McLaughlin, S. Cuellar, and K. Park. 2003. "FreshTrack™ 2003. A Menu of Opportunity: Produce in the Foodservice Industry." Cornell University Food Industry Management, Produce Marketing Association.
- U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. 2004. "2002 Economic Census, Wholesale Trade", Industry Series, US Department of Agriculture, ERS.

Table 1. Percentage of all retailers' use of EDI technology and 2006 expectations

EDI	Large firms			Small firms		
Year	<u>1996</u>	<u>2001</u>	<u>2006</u>	<u>1996</u>	<u>2001</u>	<u>2006</u>
Purchase order	17.2	31.7	42.1	28.2	31.5	46
P.O. acknowledgement	5.6	22.9	34.4	10	13.4	39.4
Forecasts	3.4	7.5	15.4	0	0	26.7
Advanced ship notification	3.4	12.2	22.1	0	0	26.7
Invoices and/or payments	4.1	11.1	34.3	12.9	19	37.5
Carrier shipment status	3.3	13.1	26.8	0	1.4	26.7

Source: Perosio et al. (2001), Cornell University

Table 2. Firm Description and Use of Electronic Data Interchange with Customers by SME Produce Wholesalers.

<u>Firm</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Are you a single (1) or multi-line (2) supplier?	1	2	1	1
Sales in 2004 (million \$)	25 to 50	> 50	5 to 10	10 to 25
Produce as percent of total sales	95	7	100	100
Number of customers	900		278	20
Foodservice				
Wholesalers	45		5	25
retailers	85	300	10	50
Have current capacity to add customers? *	1	1	1	1
Number of customers is increasing (1), steady (2) or decreasing (3)	3	3	1	3
Share of sales to 4 largest customers	20	45	50	40
Days Advance notification needed to ship	1	2	0	0
Participate in stock replenishment programs? *	2	1	1	2
Participation in stock replenishment programs affects payment terms? *	2	2	2	nr
Use EDI in some way *	1	1	1	nr
What portion of customers uses EDI?	10	100	25	nr
Who chooses software for EDI? (we =1, customer=2, 3 rd party=3)	1	1	1	nr
Use EDI for inventory control/stock replenishment? *	2	2	1	nr
Use EDI for pricing?*	2	2	1	nr
Use EDI for other functions? *	2	1, with suppliers	1	nr

* yes=1, no=2; nr = no response

Table 3. Percentage of Total Company Produce Sales in 2000 and 2005 Handled Using Specified EDI and/or SCM Initiatives.

<u>Firm</u>	<u>1</u>		<u>2</u>		<u>3</u>		<u>4</u>	
<u>Initiative</u>	<u>2000</u>	<u>2005</u>	<u>2000</u>	<u>2005</u>	<u>2000</u>	<u>2005</u>	<u>2005</u>	<u>2005</u>
Source tagged (security)	80	100	100	100	0	0	0	100
Cross docked	2	2	<5	<5	nr	nr	10	25
Continuous replenishment	0	0	0	0	nr	nr	0	0
Vendor Managed inventory	0	0	0	0	0	0	0	0
Automated Purchase order system	0	1	25	100	0	100	0	15
Bar Coded	0	0	2	2	nr	nr	0	0
Radio frequency id. tagged	0	0	0	0	nr	nr	0	0

nr = no response

Table 4. Contracts, Relationships, and Number of Customers of Produce Wholesalers.

Firm	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Sales shares (largest =1 or smallest =2)				
through relationships / contracts	1	1	1	1
through product specification / bids	nr	nr	nr	nr
through cold calls	2	2	2	2
% of sales contracts <1 year	25	0	25	58
% of sales contracts >1 year	20	14	25	0
% of sales from bids given product specifications	40	100	50	0
% of sales that are spot market transactions	10	10	25	42

Table 5. Ratings of Current and Future Issues in the Produce Supply Chain.

Firm	<u>1</u>		<u>2</u>		<u>3</u>		<u>4</u>	
	2005	2010	2005	2010	2005	2010	2005	2010
Food safety	4	5	4	5	5	5	4	5
HACCP	4	5	3	5	5	5	3	4
Nutrition	3	4	4	4	2	4	2	4
Produce traceability	3	5	5	5	3	5	4	5
Quality specification	3	5	5	5	5	5	5	5
Cold chain maintenance	3	4	5	5	5	5	3	4
Pallet bar coding	2	2	2	4	1	3	2	3
Radio frequency	1	2	0	4	0	0	2	3
Returnable containers	1	2	2	2	1	3	3	4
Demand forecasting	3	4	3	4	2	4	3	5
Flow through/cross docking	1	1	2	3	1	2	4	5
Vendor partnerships	2	4	5	5	2	4	4	5
e-commerce	2	4	3	5	3	5	3	4
Category management	2	4	3	3	2	4	4	5
Inventory turns	3	4	5	5	3	5	3	4
Vendor managed inventory	1	2	0	3	4	5	4	5
Decreased order time	3	3	3	4	5	5	3	3
Maintenance of margin	3	5	5	5	5	5	3	4

Table 6. Strategies Used by Produce Wholesalers

Firm	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Differentiation	yes	yes	yes	yes
How?	service, quality, strong specialty, freshness	local product; service, relationships	daily service, unique items as requested	attractive product, one day delivery
Focus	no	yes	no	no
How?		local/regional stores		