

Computerized Marketing For Fresh Produce-- A Development For Today

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Introduction

Computerized marketing of agricultural products has received considerable attention in recent years. Computerized marketing involves the use of computers to receive, store, process, and send information about a commodity being offered for sale. Potential buyers have access to the descriptive information about the products being offered for sale through the computer. Computers are programmed to negotiate the sale by using a generally accepted negotiation practice such as auction, bids and offers, firm offer, or private negotiation.

Computerized marketing separates two commonly combined functions of the marketing process:

1. negotiating the sale, and
2. physical transfer of the product.

It provides a mechanism for centralizing the price negotiation without physical assembly of buyers, sellers, and products at one location. Computerized market systems take many forms, but they all follow one general model. First, sellers

must describe the product in accordance with standard grades or industry nomenclature. Second, offers to sell are disseminated to potential buyers on a computerized system connected by modern communication devices. Third, buyers bid on the product until acceptable terms are reached with a seller.

Several studies have been done with support from the U.S. Department of Agriculture [GAO] to study the feasibility of computerized marketing for selected commodities. The scope of these studies has evolved from studies designed to implement and analyze a pilot computerized marketing system for selected commodities to studies designed to evaluate the potential acceptance of a computerized marketing system for a selected commodity group and then to conceptualize a computerized marketing system and evaluate the feasibility of the system conceptualized.

This report summarizes a major study to determine the feasibility of a computerized marketing system for fresh fruits and vegetables (produce). This study was developed with objectives consistent with those studies which

analyze potential acceptance of computerized marketing and then conceptualize and evaluate the feasibility for successful development of a system for fresh produce.

The economic importance of fresh fruits and vegetables has been increasing in recent years. Despite this, McLaughlin and Pierson [p. 31] reported that the produce distribution system, perhaps more than most other food product categories, is marked by a lack of system coordination, and the coordination processes in existence are often poorly understood. Computerized marketing has been studied by various researchers for various commodities. This innovative marketing tool has been hailed as a tool which can contribute to improved system coordination and result in improved operational and pricing efficiency in a marketing system.

This report summarizes the objectives and research procedures used in the study, discusses the current status of computerized marketing for agricultural products and reports the principal conclusions reached in the study.

Objectives and Research Procedures

The primary objective of this study was to determine the feasibility for development of a successful computerized marketing system for fresh produce. Henderson and Holder [pp. 51-53] identified the keys to successful implementation of a computerized marketing system for any group of commodities as: accommodate the needs of the buyers and sellers; be innovative; minimize the disruption of established trading practices; obtain sufficient volume; don't overbuild; encourage participation of outside buyers; and acquire staying power. Purcell identified the do's and don't's for successful implementation of computerized marketing. His list of do's includes: do get early involvement of persons and institutions which will be directly involved in the system; do keep the system as simple as possible; do

educate the buyers, sellers, and other institutions; do try to involve existing institutions; do develop a system of performance guarantees if none already exists; do establish a selling agency if one doesn't already exist; do guarantee the viability of the first sales on the system; do be patient; and do make sure the grading is accurate.

The procedures used to determine the feasibility for computerized marketing of fresh produce were derived from the experiences of previous projects [GAO, p. 16] intended to determine feasibility for computerized marketing of other commodities. The first procedure in this project was to determine the attitudes of the different market participants to determine which segments and/or which commodities show the highest need and likely acceptance of computerized marketing. After the appropriate segments and commodities were identified, then the second procedure was to conceptualize a system that was perceived to have the highest potential for acceptance in the industry. The final step was to determine feasibility from the cost of operating the conceptualized system compared to conventional methods used for trading produce today and from the support the conceptualized system obtained from institutions in the industry.

The attitudes of the different market participants were determined from a survey administered throughout the United States. The survey was administered to all types of participants in the marketing system to determine for which segments, if any, a system should be developed.

Once the survey was completed, a national advisory committee was formed to assist in interpreting the results from the survey and to assist in conceptualizing a system. The advisory committee was composed of people representing the various institutions in the industry. This satisfied a "do" identified by Purcell [p. 54], i.e., early

involvement of persons and institutions which will be involved with the system.

Finally, the feasibility of the system conceptualized is being determined by method of a cost analysis. The cost of the conceptualized system is being estimated and compared to conventional methods used for marketing produce today. This phase of the study has not as yet been completed and will not be discussed in this paper. However, an earlier study by VanSickle, Adrian, and Epperson indicated a strong potential for computerized marketing to be cost efficient for selected fresh fruits and vegetables.

A related objective in the project was to begin the education of the institutions and persons that will be involved by using the system. Several workshops and seminars were performed for the purpose of education and also to get feedback from institutions outside the advisory committee on how the system should operate.

Why the Fresh Produce Industry?

There are several reasons the fresh produce industry deserves consideration for implementation of computerized marketing. First, the fresh produce industry is an important component of our general agricultural economy. The total value of fresh produce sales to U.S. consumers in 1982 totaled more than \$15.4 billion from supermarkets alone. Consumers obtain about 76 percent of their fresh produce from various types of supermarkets and other retail outlets, 22 percent from food service establishments and 2 percent from farmers' markets, u-pick operations and roadside stands. These figures indicate that total produce sales to consumers in 1982 totaled more than \$20 billion.

From the standpoint of the consumer, interest in nutrition, diet, and healthfulness has increased the consumption of fresh vegetables from 98 pounds per capita in 1975 to 111 pounds per capita in

1982. From the standpoint of the grocery store, a nationwide survey by Chain Store Age Supermarkets showed that, when consumers were asked to rank thirteen factors they viewed as most important in choosing a grocery store to shop, "quality produce" was listed as the highest priority in every market area surveyed, ahead of such other factors as "quality meat," "low prices," and "cleanliness."

The produce department is also viewed as important in contributing to the economic well-being of the store. In 1982, the produce department had the highest gross margin among the major grocery departments with an estimated average gross margin of 32.5 percent. While the produce department contributed only 8.0 percent to the total sales of the store in 1982, it contributed 10.7 percent to the total gross profits. The produce department is estimated to contribute somewhere between 25 and 35 percent of the total net store profits [McLaughlin and Pierson, p. 37]. Expansion of the produce department has become the norm instead of the exception. Average store space allocated to produce is about 9 percent, with a range of 3-4 percent for older stores and 11-13 percent for newer store layouts.

These facts are important because they support the statement that produce is an important part of our agricultural system. This importance supports the idea that computerized marketing deserves consideration in the fresh produce industry.

A second reason for considering computerized marketing for fresh produce is that early studies have identified potential benefits to implementing a computerized system for fresh produce. VanSickle, Adrian, and Epperson determined that computerized marketing could save up to 90 percent of the cost of negotiating the sale of selected fresh produce commodities. Another study by Henderson and Holder identified six benefits that almost always exist that

contribute to improved operational and pricing efficiency in those industries that have tested or are operating computerized marketing systems. These benefits include improved market information, improved operating efficiency, greater pricing accuracy, increased competition, higher grower prices, and improved market access. These benefits represent potential gains to the participants of the fresh produce industry.

A third reason the produce industry is being considered for computerized marketing can be viewed in the evolutionary process that must take place before successful implementation can be achieved. Ward outlined the evolutionary process as: first, technology must exist to facilitate the types of transactions required in the marketing function; second, the computerized marketing system must prove economically feasible; and, finally, participants must accept and adjust to the computerized marketing system.

Technology does currently exist for a computerized marketing system in fresh produce. Computerized market systems will evolve and change as better communication and hardware and software systems are developed. The only technology that does not exist is the specific software system that must be developed for operation in the fresh produce industry. The reason this software does not exist, however, is not because of a lack of knowledge in computer software writing, but rather it is because of a lack of knowledge about the requirements for computerized marketing of fresh produce by those individuals who can write the software. This study was intended to bridge this technological gap by defining the requirements that software writers could use in developing a system for fresh produce.

The second phase of the evolutionary process deals with economic feasibility. This has already been commented on in the second reason for considering fresh produce for computerized marketing, i.e., early studies have indicated that poten-

tial gains do exist for the use of computerized marketing for fresh produce. One contributing factor to economic feasibility is the volume of produce available for trading on a system. Volume is available in the fresh produce industry and, what is even more revealing, a large volume can be found in a small geographic area on a year-round basis by considering just Florida, Texas, and California. These three states accounted for 68 percent of the total production and 73 percent of the total value of principal vegetables for fresh market in 1982. This limited distribution could make implementation less difficult because it would lower the burden in the educational phase of implementation and would also provide users opportunities to share time and equipment costs.

In short, computerized marketing is being considered in the fresh produce industry because the industry contains many of the characteristics that have been determined to be necessary for successful implementation.

The Status of Computerized Marketing Systems in Agriculture

Electronic marketing of agricultural products dates back to 1961. In May 1961, a teletype auction for selling hogs in Ontario, Canada, was organized that still operates today. This system has been highly successful and has been copied widely in North America since that time.

The first and most successful computerized marketing system that has been developed, however, is the TELCOT which trades cotton in Texas and Oklahoma. TELCOT is operated by the Plains Cotton Cooperative Association of Lubbock, Texas. This producer cooperative offers cotton over a computer-linked system to cotton gins and buyers' offices internationally. This system began operating in 1975 and has grown to the extent that is now offering complimentary services such as crop

contracting to members and nonmembers of the cooperative.

The Egg Clearinghouse, Incorporated, (ECI) computerized marketing system was developed in 1978. ECI was originally established in 1971 to trade eggs by manually matching telephoned bids and offers. The trading system has evolved through several phases and now operates with a computer system that links buyers and sellers in the central and eastern United States. Although the volume of trading is not as large as anticipated, the ECI continues to operate and is considered to be a major factor in the price-setting mechanism for eggs in that trading area.

Other projects have been conducted since these early developers that have studied various phases of computerized marketing. Many of these projects have been supported with partial funding by the U.S. Department of Agriculture, through the branch of the Agriculture Marketing Service [GAO, p. 16].

The Hog Accelerated Marketing System (HAMS) was one of the largest projects supported by the USDA. The HAMS project was one of the earlier projects that implemented a pilot computerized marketing system to test the feasibility of a system for slaughter hogs. The results of the project showed that a much higher volume of hogs traded than occurred in the pilot project would be necessary before computerized marketing would be feasible. The study did determine, however, that trading could be done with the aid of the computer and that accurate descriptions of the hogs could be developed that traders would use for marketing hogs.

Another effort of the USDA has resulted in the National Electronic Marketing Association (NEMA). NEMA evolved from a project that was intended to determine the feasibility for computerized marketing of lambs and slaughter cattle. The project was initiated in 1980 and successfully developed a system for trad-

ing lambs. The system was not successful for slaughter cattle because of a lack of buyer's interest. After original funding for the project stopped in 1982, the system was privatized and became known as NEMA. Since that time NEMA has expanded and currently operates computerized trading systems for feeder cattle, slaughter cattle, and hogs.

Another effort at computerized trading was done in the wholesale meats industry. The Computer Assisted Trading System (CATS) was developed and tested in 1981 and 1982. The CATS was unique in the method of trading that was proposed for use in the industry. The CATS used private negotiation on the computer as the means for trading wholesale meats. Because the system allowed the traders to make all final decisions on trades, the developers of the system called it a computer-assisted marketing system. Like the HAMS, CATS demonstrated that the commodity could be traded on the computer. Again, however, there was insufficient volume to make the system feasible. The major obstacle in the adoption of the system was the lack of participation by the packers.

A final system that was developed to test the feasibility of computerized marketing was the Cattle Exchange (CATTLEX) developed in Texas. CATTLEX was tested for trading feeder cattle with feedlots being the primary buyers and stocker/operators being the primary sellers. CATTLEX was ended as a pilot project because of the familiar reason that there was insufficient volume to make it economical from a cost viewpoint.

Related efforts by several private and public companies have resulted in market information systems for various commodities. However, these systems have stopped short of having the negotiation for trades on the system. AutEx Systems conceptualized a computerized system for the produce industry that allows users to communicate directly with other traders on the system. The

primary purpose of the system was, however, information transferral between produce buyers and sellers. AutEx recently sold its interest in this produce information system to FreshNet, Inc. The system has not been implemented as of this writing. A similar system is being developed by Vance Publishing Corporation called PRONET. PRONET will allow users to communicate on the system and will contain ancillary services which include the Red Book (a directory and credit-rating service for marketing people in the produce industry published by Vance Publishing Corp.), marketing information, and feature stories of current events in the produce industry. Again, however, negotiation for trades has not been incorporated on the system. PRONET is scheduled for implementation in the summer of 1985.

The Potential Acceptance of Computerized Marketing by Marketing People In the Produce Industry

The potential acceptance for computerized marketing by marketing people in the produce industry was determined from a survey. The survey was intended to determine industry attitudes toward computers and computerized marketing, and to determine whether particular market participants and/or products indicate a greater potential and need for computerize marketing.

The acceptance of market participants in a computerized marketing system is important to insure economic feasibility. Many of the early systems that were pilot-tested failed because an adequate volume was not traded on the system after it was developed. The survey was intended to determine whether market participants would use a computerized marketing system should one be developed.

The survey was administered with personal interviews in a "mirror image" approach. The mirror-image survey technique asks related questions from the unique perspective of each individual surveyed so that similarities and con-

trasts in the operations and views of the different participant groups could be identified.

The marketing channel for fresh produce marketed in the United States is shown in Figure 1. The market channel participants were divided into three broad categories for survey purposes: buyers, dealers, and sellers. The participants were separated into these categories to determine which points in the marketing channel showed the most interest in computers and computerized marketing. The sellers category included growers, packers, cooperative packers and shippers, and independent shippers. The dealers category included buying and selling brokers and consignment merchants. The buyers category included institutional and retail wholesalers and integrated retail-wholesalers. Any member of each of these groups could function as buyer, seller, and/or dealer. The delineation into the groups was done by determining the major functions of each participant.

Survey Design

The survey was designed to determine the level of potential acceptance and use of a computerized marketing system for fresh produce. The survey was organized to first collect demographic information about the individual surveyed. After collecting the demographic information, series of questions were asked to determine the present use of computers and/or microcomputers by the market participants. Those individuals that indicated no use of computers currently were asked to indicate the likelihood of obtaining a computer in the near future for various uses. After collecting this demographic and computer usage information, a brief description of computerized marketing was read to the individual surveyed and the individual was asked whether they were receptive, had no opinion, or were not receptive to the concept of computerized marketing for fresh produce.

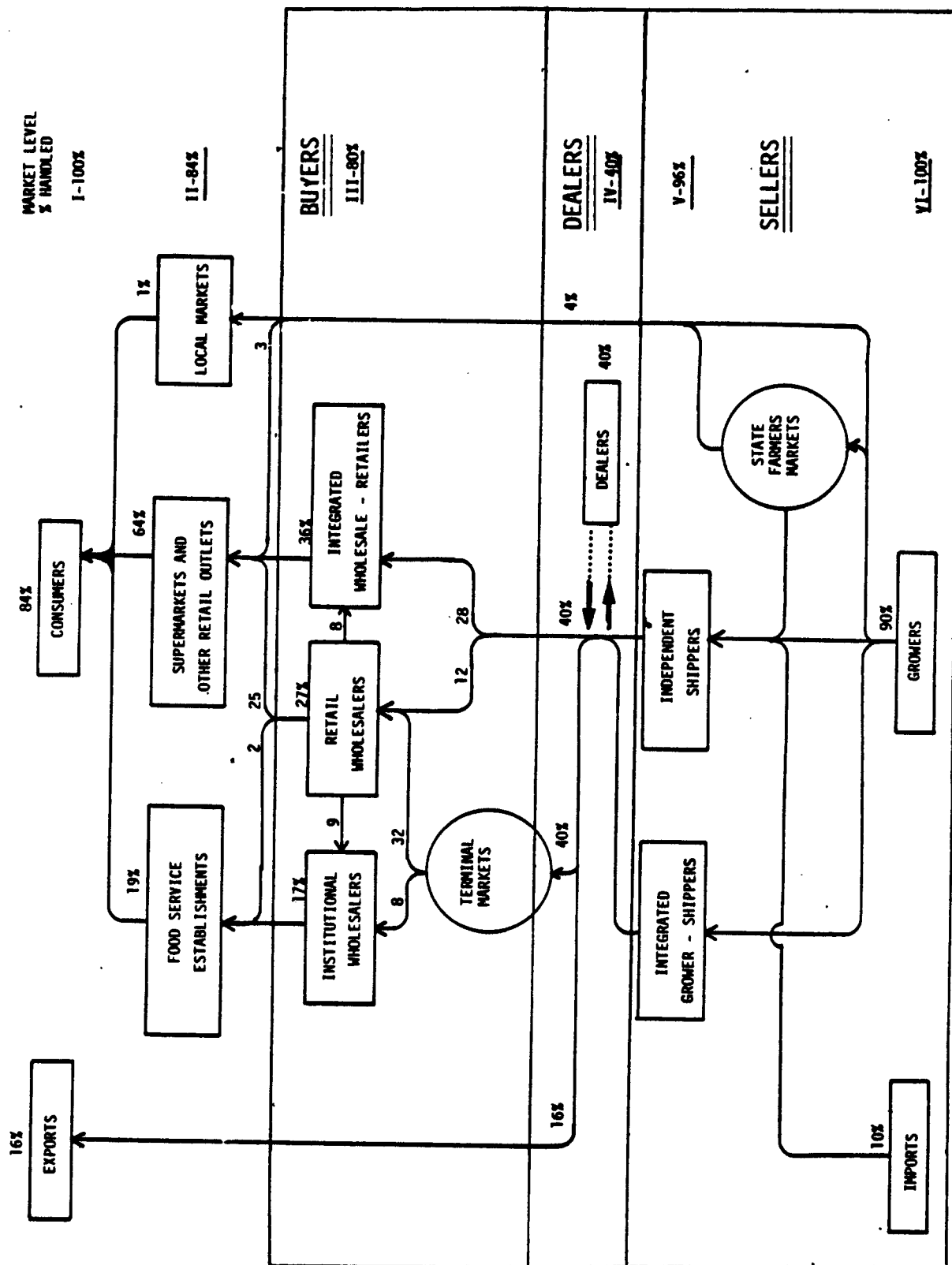


Figure 1. United States fresh produce marketing system.

The survey was also designed to determine the need for education about computerized marketing in the industry. After determining the initial receptiveness to computerized marketing, series of questions were asked to determine the preferences of the people for various alternatives in developing a computerized marketing system. These questions derived dual benefits by revealing information on the opinions of those interviewed about how to develop the structure of the computerized marketing system and also in educating them on the flexibilities in developing a system for produce. A description of potential benefits [Henderson and Holder, pp. 44-47] from using computerized marketing was then read and a follow-up question was asked again to determine attitudes toward computerized marketing. This question asked the individuals to indicate whether they would pay more for a computerized marketing system for the marketing of their produce than they currently pay for marketing services; if not more, whether they would pay the same; and if they would not pay the same, whether they would pay anything.

Structuring the survey in this manner allowed testing the hypothesis that further education about the flexibility and potential benefits for computerized marketing changed attitudes toward computerized marketing. This was done by comparing the results indicating how much they would be willing to pay for a computerized marketing system to the results derived in determining the initial attitudes toward receptiveness.

In addition to collecting information for determining attitudes toward computerized marketing, the survey was structured to determine the necessary information to include in the system to facilitate trading. This included questions designed to determine the information required for product description and the market information needed by traders. Other information was collected to determine the individual's preference for the structure of the institution that

managed the computerized marketing system should one be developed.

Data Analysis

The major shipping and receiving points for vegetables marketed in the United States were visited between July and December of 1983. Individuals were selected to interview at each of these locations from lists of market participants obtained from extension agents, growers, university personnel, the Red Book, and the Blue Book. The Red Book and Blue Book are directories and credit rating services for the produce industry. A total of 511 interviews were conducted over the course of the survey period with 309 interviews used for analytical purposes. A total of 202 surveys were deleted from the data analysis because of various problems contained in the data.

Actual data analysis was done in the contingency table, chi-square framework, using the Statistical Analysis System [SAS Institute]. The analysis determined if differences existed in responses by demographic characteristics of the respondents. The demographic characteristics tested for differences in results included type of marketing participant, age of respondent, and size of operation as measured by the total sales revenue.

Survey Results

The demographic data serve to describe the market participants surveyed in the study of attitudes. Table 1 lists the number of market participants surveyed that resulted in usable data and the sales revenue distribution for each type of market participant. The results show that of the 309 surveys used in the analysis, 118 (38 percent) were categorized as buyers, 58 (19 percent) were categorized as dealers, and 133 (43 percent) were categorized as sellers of produce. The distribution of sales revenues shows that, in general, buyers were the largest of the major

Table 1. The number of market participants and sales revenue distribution for each participant group

Participant group	Number	Sales revenue				
		Million dollars				
		<1	1-5	5-10	10-50	>50
-----percent-----						
Buyers	118	2	25	18	35	21
Dealers	58	4	36	20	30	10
-----percent-----						
		Million dollars				
		<.25	.25-.5	.5-1	1-3	>3
-----percent-----						
Sellers	133	8	6	11	32	43

Table 2. The sales arrangements made by market participants for produce traded

Participant group	By grades	USDA certified	Arranged by	
			Agent	Self
-----percent-----				
Buyers	91	56	37	63
Dealers	74	57	18	82
Sellers	81	31	45	55

groups, followed by dealers, and then sellers.

Table 2 shows the types of sales arrangements made by the different market participants. Of the buyers interviewed, 91 percent indicated that the produce they purchased specified USDA standards in the terms of sale. Dealers and sellers indicated less produce being sold with USDA standards being specified in the terms of sales with 74 and 81, percent respectively. The amount of produce actually believed to be inspected and certified by USDA inspectors also varies across the market participant groups. Buyers and dealers believe that 56 and 57 percent, respectively, of the produce traded is actually certified for grade, while sellers believe that only 31 percent of the produce is actually certified for grade.

The results in Table 2 also show that the amount of the sales arrangements made by the individual surveyed versus that done by agents hired for that purpose varies across the market participant groups. Buyers purchase an average of 63 percent of their own produce, purchasing the remaining 37 percent through an agent. Dealers arrange the highest percentage of their produce transactions at 82 percent, while sellers arrange the lowest percentage of their own produce transactions at 55 percent.

Table 3 shows the attitudes of the market participants toward the future growth of the produce industry. These results show that dealers had the most optimism about the future of the produce industry with a total of 84 percent believing that industry growth would be positive. Buyers and sellers also indicated an optimistic future for the produce industry with 78 and 74 percent, respectively, showing they believed the growth of the industry would be positive.

Table 3. Attitudes of market participants toward future growth in the produce industry

Growth	Buyers	Dealers	Sellers
	-----percent-----		
Negative	5	6	6
Zero	17	11	21
Positive	71	80	68
Very positive	7	4	6

Tables 4 and 5 deal with attitudes about the present marketing system and the sources and value of information used in the marketing process. Table 4 shows that most of the market participants are satisfied with the present marketing system and feel they get fair prices in their produce transactions. Despite this apparent satisfaction with the present marketing system, 35 percent of the sellers felt there should be more information made available in the marketing process that could assist them in marketing. Buyers and dealers also expressed concern for more information with 24 and 12 percent, respectively, indicating a need for more information. The participants were also asked to indicate any strengths or weaknesses they felt existed in the industry. The interesting point in these results is that all groups indicated more weaknesses than strengths.

Table 5 indicates the sources and value of information used by the market participants. The results indicate that buyers and brokers are generally regarded as the best source of market information. The second best source of information for buyers and dealers was shippers and truckers. These were considered important sources of information because they were recently or are presently located in the produce shipping area. The shippers and truckers can tell the buyers and dealers about crop and weather conditions in the shipping point areas, important factors for developing expectations for future market conditions.

Table 4. Market participants' satisfaction with the present marketing system and pricing, and the proportion who identified strengths and weaknesses

	Buyers	Dealers	Growers
	-----percent-----		
General satisfaction with:			
marketing system	92	92	85
fair prices	89	92	84
Want more information (total):	24	12	35
marketing information	14	9	21
other	10	3	14
Identified strengths (total):	47	8	11
brokers	16	0	1
total market structure	21	5	6
other	10	3	4
Identified weaknesses (total):	79	21	38
brokers	10	2	8
pricing	25	7	15
quality	15	3	0
transportation	15	7	0
other	13	2	15

Table 5. The value of information sources to market participants
in the fresh produce industry

Information source	Buyers	Dealers	Sellers
Television	0.2	0.0	0.1
Trade magazines	0.7	0.4	0.5
Commodity organizations	0.1	0.0	0.3
Federal-State Market News	1.2	1.5	1.2
Growers and packers	1.2	0.7	1.2
Buyers and brokers	2.5	2.5	2.5
Shippers and truckers	2.1	2.6	1.0

Scale: 0 to 3; 0 = no value, 3 = high value.

Table 6. The percent of market participants who have a computer
and the distribution for likelihood that those who don't
will get a computer within one year

	Buyers	Dealers	Sellers
	-----percent-----		
Have a computer	68	33	51
Will get a computer in one year			
No	13	22	19
Less than 50 percent	7	12	7
Even	3	16	11
More than 50 percent	1	9	5
Yes	6	5	8

Ranking a distant third for buyers and dealers and a distant second for sellers as a source of information was the Federal-State Market News Service. Because of the response given to this source of information, the participants were asked why Federal-State Market News information ranked so low. The answer most often given was that this source of market news was too old when received to be of value in making marketing decisions.

Because the volume of produce traded on a computerized marketing system is important to insure feasibility, it is important to determine industry attitudes toward computers and computerized marketing. Table 6 shows the distribution for the market participants that have computers in their operation presently and for the likelihood that those who do not presently have a computer will acquire a computer for their operation within a year. The results show that 68 percent of all buyers surveyed own or lease a computer presently, compared to 33 percent for dealers and 51 percent for sellers. When those individuals who indicated a 50 percent or greater probability of obtaining a computer within one year are added to those already using computers in their operation, the results show that 80 percent of all buyers, 66 percent of all dealers, and 74 percent of all sellers either are presently or are seriously considering using computers in their business operation.

The conclusion drawn from Table 6 is that a fear of computers does not exist, in general, in the produce industry. These results cannot be used to draw conclusive results about computerized marketing, but can be used to say that the industry is recognizing the value of computers for other functions in their operations and the fear of computers has or will not stop them from using it.

After demographic and computer usage information was collected a short description was read to the individuals about computerized marketing. Computerized

marketing was described in the following manner:

Computerized marketing is the use of computers to send, receive, and store information used in buying and selling produce. The computer is used to perform marketing functions like negotiate the sale of the produce and arrange transportation.

After this description, the individuals were asked to indicate whether they were receptive, had no opinion, or were not receptive to the concept of computerized marketing. The results in Table 7 show that sellers were the most receptive to computerized marketing with 32 percent indicating they were receptive. The results showed that 31 percent of the buyers were receptive to the concept while dealers were least receptive to the concept with only 16 percent being receptive. The individuals that indicated they were either receptive or neutral to computerized marketing are considered to be open to the concept of computerized marketing. Individuals indicating a neutral response are categorized as open to the concept because they did not indicate a negative response to the short description, indicating a willingness to study more information before judging the concept. The group with the highest response of openness was sellers with 66 percent, with the lowest response being dealers with 30 percent. The chi-square analysis for the initial attitudes toward computerized marketing indicates significant differences in attitudes between the major participant groups.

Other results from the survey deal with determining attitudes on how a computerized marketing system should operate if developed. The results in Table 8 show the attitudes of the participants toward who should operate the computerized market system. The options given the participants were sellers,

Table 7. The initial attitudes of market participants toward computerized marketing

Participant group	Receptive to computerized marketing			
	No	Neutral	Yes	Open
	-----percent-----			
Buyers	47	21	31	52
Dealers	71	14	16	30
Sellers	35	34	32	66

Chi-square statistic for independence of attitude and participant group equals 23.1, significant at the α equals .005 level.

Table 8. Attitudes toward who should operate the computerized market system

Operator of System	Buyers	Dealers	Sellers
	-----percent-----		
Buyers	1	6	3
Sellers	5	2	9
Buyers and sellers	33	17	37
Handler	1	0	0
Private firm	34	32	31
Government	16	13	13

buyers, buyers and sellers, produce handlers, a private company, and a government body. The attitudes show that the top two choices for each group were buyers and sellers as a group, and a private company. Buyers were split between buyers and sellers (33 percent) and a private company (34 percent), dealers tended to favor a private company over buyers and sellers (32 to 17 percent), and sellers tended to favor buyers and sellers over a private company (37 to 31 percent).

The participants were also asked to indicate whether they would use the system if it were available for less than an annual basis or for only select commodities. Table 9 shows that 66 percent of the buyers and 80 percent of the dealers would not use the system if it were not available on an annual basis. Sellers were not asked to respond to this question.

Table 9. The willingness of market participants to use computerized marketing for less than annual basis or for only select commodities

	Buyers	Dealers
	-----percent-----	
Less than annual basis:		
No	66	80
Maybe	9	8
Yes	24	12
For select commodities:		
No	34	73
Maybe	6	4
Yes	60	24

Finally, the participants were read a description of potential benefits that could be derived from successful application of computerized marketing for fresh produce. The potential benefits were described in the following manner:

Previous studies of computerized market systems have revealed six benefits that have consistently been observed. These include:

1. Improved market information. There has been more availability of accurate, complete, and timely market information to assist in the marketing process.
2. Improved marketing efficiency. The costs of searching for trading partners, successfully negotiating and completing transactions, and physically moving products from seller to buyer have been lowered.
3. Greater pricing accuracy. Prices of products traded on electronic market systems have more accurately reflected true market values.
4. Increased competition. Electronic market systems have allowed more producers' offers to be made available to a larger group of buyers.
5. Higher grower prices. Higher grower prices have resulted from improved marketing efficiency and increased competition.
6. More equitable market access. Sellers gain from the exposure of their products to a larger number of buyers while buyers gain the ability to select purchases from a broader array of sellers.

After these potential benefits were read, the participants were asked if

they would pay more for computerized marketing than they currently pay for marketing services; if not more, whether they would pay the same; and if not the same, whether they would pay anything for a computerized marketing system. The results shown in Table 10 indicate that 31 percent of the buyers were willing to pay more for a computerized marketing system, 15 percent would pay the same, and 9 percent would pay something less than they currently pay for marketing services. The results show that 21, 14, and 2 percent of the dealers would pay more, the same, and less, respectively, for computerized marketing, while 34, 39, and 8 percent of the sellers would pay more, the same, and less for computerized marketing, respectively.

Table 10. The willingness of market participants to pay more, the same, or less for computerized marketing than they currently pay for marketing services

Participant group	Less	Same	More	Open
	-----percent-----			
Buyers	9	15	31	46
Dealers	2	14	21	35
Sellers	8	39	34	73

Chi-square statistic for independence of participant group and attitude equals 46.8, significant at α equals .001.

Those individuals indicating they would pay more or the same for computerized marketing are considered to be open to the concept. Those who indicated they would pay the same were considered open because they indicated a willingness to pay the same amount they currently pay for marketing services for a system that is currently untested for produce. The results show that 46 percent of all buyers, 35 percent of all dealers, and 73

percent of all sellers were open to the concept. The chi-square statistics indicate that sellers were significantly more open to computerized marketing than were buyers and dealers and that buyers were significantly more open than were dealers.

The chi-square analysis was used to determine if the follow-up attitudes were independent of demographic characteristics. The demographic characteristics tested included type of market participant, location, age, and firm size. The United States was divided into six major areas to test for differences in location. These included the western (Arizona and California), northwestern (Washington and Idaho), midwestern (Illinois, Ohio and Michigan), eastern (Massachusetts, Maryland, Pennsylvania, and New York) and southeastern (Florida and Georgia) United States. Age of respondent was divided into three broad categories: less than 35, 35 to 50, and over 50 years of age. Firm size was segregated in the same manner as shown in Table 1.

The chi-square analysis for these characteristics indicated that follow-up attitudes were independent of location and firm size. The analysis did indicate, however, that age and type of market participant were not independent of follow-up attitudes. The contingency table for age (Table 11) shows that younger people were generally more open to computerized marketing than were older people.

Finally, a comparison of the results for initial attitudes and follow-up attitudes indicated the value of education in forming attitudes about computerized marketing. Two chi-square tests were done to determine if attitudes and education were independent. The first chi-square test was performed by classifying those who were open (not open) to computerized marketing for initial attitudes as the expected value for the open (not open) response in follow-up attitudes. The chi-square

statistic for this test (4.85) indicated education and attitude were independent. A second chi-square test was performed by classifying the initial neutral attitude as the expected response for paying the same, the initial receptive response for paying more, and the not open initial response as the expected not open follow-up response. The chi-square statistic for this test (13.84) indicated that education and attitude were not independent. Table 12 shows the comparison of attitudes for this second test. The table shows that buyers' attitudes become more negative¹ after education while dealers' and sellers' attitudes become more positive.

Table 11. The percent of each participant group open to computerized marketing, by age group

Age	Buyers	Dealers	Sellers
	-----percent-----		
Less than 35	63	33	79
35 - 50	48	37	75
Over 50	31	35	50

Chi-square statistic for independence of age and attitude equals 8.54 for buyers (significant at α equals .01), 0.02 for dealers (not significant), and 7.26 for sellers (significant at α equals .05).

Conclusions

The results of the demographic information indicate, in general, that market participants are optimistic about the future of the produce industry and are satisfied with the general structure of the industry. The results also indicate that the market participants realize weaknesses exist in the marketing system for produce and that traders and shippers in the industry are the best sources of market information.

Table 12. The attitudes^a of market participants before and after a discussion of potential benefits

Participant Group	Negative	Neutral	Positive
	-----percent-----		
Buyers:			
Before	47	21	31
After	54	15	31
Dealers:			
Before	71	14	16
After	44	21	35
Sellers:			
Before	35	31	32
After	27	39	34

^aAttitude was classified negative if the participant was nonreceptive initially (would pay none or less after discussion), neutral if neutral initially (would pay the same after discussion), and positive if receptive initially (would pay more after discussion).

Chi-square statistic for differences between before and after equals 13.84, significant at α equals .01 level.

The results concerning the attitudes of the participants toward computers and computerized marketing show that the industry recognizes the value of the computer for performing various functions in their operation and that a general fear of computers does not exist. The participants generally indicated a favorable attitude towards computerized marketing with sellers having the most favorable attitude, followed by buyers and then dealers. The analysis also showed younger participants to be more favorable than older market participants.

The results of the analysis were used to draw some important conclusions about the potential for computerized marketing in the produce industry. A National Advisory Committee for Computerized Marketing of Produce was developed to assist in interpreting the results of the analysis. The Advisory Committee contained participants from each of the major participant groups. A total of 30 members representing buyers, dealers, and sellers from several sections of the United States served on the Committee.

The Committee concluded that a computerized marketing system should be developed for the produce industry. Because of the general level of satisfaction with the present marketing structure, it was determined that the system should be developed to perform many of the same functions performed by the present marketing system. The Committee decided that the present marketing structure should remain intact, but that the computer should be used as an aid to assist in the function of informing participants about produce available for sale and about the need of buyers for produce to purchase. The Committee also decided that the computer should be used as an aid in searching for particular produce items to purchase or for particular buyers to sell produce, and in monitoring the marketing and transportation of produce purchased or sold.

These instructions were used to conceptualize a computerized marketing system for produce. The system was conceptualized by visiting several buying and selling offices, and learning the functions performed by the buyers and sellers in trading produce. This information was used to insure that functions were included that buyers and sellers would use in marketing produce.

The system that has been conceptualized by the Advisory Committee has been titled "Computer-Aided Marketing of Produce" (CAMP, for short). The point of emphasis in this title is that this is an aid to be used in the marketing of pro-

duce, not a system that will perform the marketing function. This system is not intended to replace the telephone or the salesperson, but is intended to make the use of the telephone and salesperson more efficient.

The CAMP system is being pursued for implementation. The results of the survey indicate that produce marketing people will give strong consideration to using the system. These results and the existence of the computer revolution indicate that CAMP or a similar system will successfully trade produce by computer in the future.

Endnote

¹Further analyses showed that institutional wholesalers' attitudes become more negative while retail wholesalers and integrated retail wholesalers' attitudes become more positive. Because most buyers surveyed were institutional wholesalers, their results biased the overall buyers category toward their results.

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