

The Development of Computer Aided Marketing In the Produce Industry*

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Computer aided marketing of agricultural products has received considerable attention in recent years. This concept has been recently developed for the produce industry. This report summarizes the results of a major study to determine the feasibility of a computerized marketing system for the produce industry. The objectives of the study were to analyze the potential acceptance of computerized marketing in the produce industry and then conceptualize and evaluate the feasibility for successful development of a system.

Computer aided marketing in agriculture was first used for trading cotton in Texas and Oklahoma in 1975. TELCOT was developed by the Plains Cotton Cooperative Association of Lubbock, Texas. TELCOT had expanded to where it now trades cotton internationally.

Several other computer aided marketing systems have since been developed in agriculture (see VanSickle, Adrian and Epperson, 1985). Some of these systems have succeeded while others have failed. The major reason for failure has been lack of trader interest. Most of these systems proved that the technology existed for development of a computer aided marketing system, and that the products could be adequately described. The lack of

trader interest, however, kept these systems from becoming economically feasible. This lack of trader interest underlies the importance of determining the industry attitudes toward the present marketing system, computers and computerized marketing.

The economic importance of fresh fruits and vegetables has been increasing in recent years. Despite this, McLaughlin and Pierson [p. 31] report that the produce distribution system, perhaps more than any other food product category, is marked by a lack of system coordination. Most produce is sold over the telephone, and the difficulty in obtaining and managing useful marketing information contributes directly to this lack of system coordination.

Computer aided marketing of produce was studied because of the potential it held for contributing to improved economic efficiency in the produce marketing industry. VanSickle, Adrian and Epperson (1984) determined that computerized marketing could save up to 90 percent of the cost of negotiating the sale for selected fresh fruits and vegetables. Other researchers have identified benefits that existed in computerized marketing

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applications used in other sectors of agriculture.

Hypothesized Benefits

Henderson and Holder identified six benefits that almost always existed in those industries where computer aided marketing programs have been tested. These benefits include improved market information, improved operational efficiency, greater pricing accuracy, increased competition, higher grower prices, and improved market access. These benefits represented potential gains to the produce industry.

Improved Market Information

Computerized marketing facilitates the collection and dissemination of current market information. Most information used in the produce industry today is acquired through telephone conversations with other traders. Computer aided marketing facilitates more efficient dissemination of current, accurate market information.

Improved Operational Information

Operational efficiency relates to the cost of getting produce from the farm to the consumer. VanSickle, Adrian and Epperson estimated that 90 percent of the cost of negotiating the sale could be eliminated with computerized marketing. In addition to negotiating costs, other costs should also be lowered by allowing traders to make more informed marketing decisions with respect to location, time and quality preferences.

Increased Competition

Implementation of computerized marketing should also result in increased competition. Because most produce is traded over the telephone, competition is limited by the number of conversations traders can effectively carry with each other. Computerized marketing may not (probably will not) result in more traders, but it should result in more quantity and quality communication between traders.

Higher Grower Prices

The most consistent benefit measured in previous computerized marketing systems has been higher grower prices. Higher grower prices result from at least two factors, increased competition and improved operational efficiency. The impact of increased competition will result in higher grower prices if growers gain bargaining power as a result of more buyers bidding for their product. Many of the previous computerized marketing systems tested have been implemented in thin markets, resulting in a shift in bargaining position to growers and, consequently, higher prices. The impact of increased competition in the produce industry should be positive for growers, but the impact will probably be less noticeable than in previous systems since the produce industry is not generally considered to be a "thin" market.

Because of improved operational efficiency, grower prices should increase because it costs less to get produce to market. At least part of this cost savings should be passed to growers in the form of higher grower prices.

Improved Market Access

Computerized marketing should also ease the problems of accessing major produce markets. Because market access is limited by communication of information, improvements in communications should make market access easier.

Research Procedures

The potential trader acceptance of computer aided marketing of produce was determined from a survey of the industry. 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 contrasts in the operations of the different participant groups could be identified. The market channel participants were divided into three broad categories for survey purposes: buyers, dealers and sellers. The participants

were divided into these categories to determine which points in the marketing channel showed the most interest in computers and computer aided 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 any group could function as buyer, dealer and/or seller. The delineation into the groups was done by determining the major functions performed by each participant.

After the survey was completed and analyzed, the next procedure was to conceptualize a computer aided marketing program for produce. A National Advisory Committee for Computerized Marketing of Produce was developed to assist in interpreting the results of the survey and conceptualizing a system they felt would provide users the most benefits and have the highest potential for success. Gaining early involvement of persons and institutions which will be directly involved in the system was identified by Purcell as an important ingredient to assure the highest potential for success in a computerized marketing system. The National Advisory Committee contained participants from all levels of the marketing channel. A total of 30 members representing buyers, dealers, and sellers from several sections of the United States served on the committee.

The final procedure in the study was to expose the conceptualized system to the industry through several presentations throughout the United States. Feedback was obtained at these meetings to determine the potential impact the system would have on the produce marketing industry economic efficiency.

Survey Results

The survey was designed to collect demographic information about the individual surveyed, the present and expected use of computers by the market participants, and the attitude of the participants about the concept of computer aided marketing.

Actual data analysis was done in the contingency table, chi-square framework, using the Statistical Analysis System [SAS Institute]. The analysis was performed to determine if differences existed in responses by demographic characteristics of the individuals surveyed. The demographic characteristics tested included type of marketing participant, age group of individual, size of operation and geographic location.

The major shipping and receiving points in the United States were visited between July and December of 1983. Individuals were selected to interview at each location from lists 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 during the survey period with 309 surveys used for analytical purposes. A total of 202 surveys were deleted from the analysis because of various problems in the data.

The results of the survey indicated a positive potential for development of a computer aided marketing program for the produce industry. Table 1 shows the participants surveyed that resulted in usable data and the general attitude of the participants toward the present marketing system. The results show that of the 309 surveys analyzed, 133 were categorized as sellers (43 percent), 58 were categorized as dealers (19 percent), and 118 were categorized as buyers (38 percent). The results also show that all participants were generally satisfied with the present marketing system and feel that fair prices are reached in most produce transactions. Despite this satisfaction, however, each participant group identified more weaknesses than strengths in the present marketing system, with information being one of the major weaknesses existing in the produce industry.

Because of the necessity for traders to use some form of computer communication in a computer aided marketing program, it was important to determine the attitudes of the industry toward computers and computer aided

marketing concepts. Table 2 shows the distribution for the participants that have computers in their operations currently and the likelihood for those not having a computer of purchasing a computer within the next year. Noting that these results were derived in 1983, the trend toward adoption of computers in the produce industry is evident from the results. The results show that 68 percent of all buyers used a computer in their operation in 1983, compared to 33 percent of all dealers and 51 percent of all sellers. When individuals who indicated a 50 percent or greater probability of obtaining a computer within the year after the survey are added to those already using computers, the results show 80 percent of all buyers, 66 percent of all dealers and 74 percent of all sellers either are or were seriously considering the use of computers in their business operation.

Finally, the concept of computer aided marketing of produce was discussed with the participants. After the discussion, the participants were asked to indicate their willingness to use a computer aided marketing system if it cost less, the same, or more than they currently pay for marketing services. The results shown in Table 3 indicate 31 percent of all buyers would pay more for a computer aided 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 computer aided marketing while 34, 39, and 8 percent of the sellers would pay more, the same, and less, respectively. The chi-square statistics for type of respondent and attitude were significant, indicating that sellers were significantly more favorable to computer aided marketing of produce than were buyers and dealers, and that buyers were more favorable than were dealers.

The chi-square analysis was also used to determine the independence of attitude and selected demographic data. The results listed in Table 4 show the attitude of each participant group by age of respondent. For purposes of the analysis, individuals were cate-

gorized as open if they would use computer aided marketing if it cost the same or more than current marketing practices. The chi-square statistic for age and attitude was significant, indicating that younger people were generally more favorable to the concept of computer aided marketing of produce. The chi-square statistics for independence of attitudes with location and firm size were not significant, indicating no significant differences in attitude across geographic areas or different firm sizes.

Conceptualizing the Computer Aided Marketing System

The results of this analysis were used with other information collected in the survey to draw important conclusions about the potential to develop a computer aided marketing program for produce. The Advisory Committee concluded that a computer aided marketing system should be developed for the produce industry. Because of the high level of general satisfaction with the present market system, the committee determined that the computer aided marketing system should be developed as a tool to complement the present marketing system.

The approach used to conceptualize a computer aided marketing system was to learn as much as possible about the present marketing practices with emphasis on the methods used to obtain information. The case study method was used to learn about present marketing practices. The case study involved choosing several traders that would allow us to study every facet of their marketing operation.

Much useful information was learned during the case study of traders participating in this second phase of our project. Table 5 shows the percent of transactions that took place during different periods of the day. The results showed that almost two-thirds of all produce is traded between the hours of 8 a.m. and 11 a.m. Since most produce is traded through telephone conversations, we also logged the information that was transferred during the telephone conversations. Table 6

Table 1
 Market Participants' Attitudes Toward
 The Present Marketing System and Pricing,
 And the Proportion Who Identified Strengths and Weaknesses

	Buyers	Dealers	Growers
Number in survey	118	58	133
General satisfaction with:	(-----percent-----)		
marketing system	92	92	85
fair prices	89	92	84
Identified strengths	47	8	11
Identified weaknesses*	79	21	38
Want more information	24	12	35

Table 2

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

	Buvers	Dealers	Growers
	(-----percent-----)		
Have a computer	68	33	51
Will get a computer:			
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

Table 3

The Willingness of Market Participants to Use Computerized Marketing If It Cost More, the Same, or Less 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

The open category is equal to the sum of the same and more categories.

Chi-square statistic for independence of participant group and attitude equals 46.8, significant at 0.001.

Table 4

The Percent of Each Participant Group Open to Computer Aided 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 .01), 0.02 for dealers (not significant), and 7.26 for sellers (significant at .05).

shows that sellers spend almost half their time on the telephone trying to find a buyer for the produce they need to sell. Buyers spend slightly more than half their time on the telephone transferring market information and searching for sellers. Finally, Table 7 shows the costs incurred by traders for telephone services used in the process of marketing fresh produce. These results showed that buyers and sellers spend an average of \$2,960 and \$3,700, respectively, each month for telephone services. Table 7 also shows that the buyers participating in the case study averaged 163 transactions per week with a peak of 32 transactions for any one day. The sellers participating in the case study averaged 276 transactions per week with a peak of 86 transactions for any one day.

Table 5

The Percent of Transactions Which Took Place During Specified Time Intervals

<u>Time period</u>	<u>Buyers</u> (----percent----)	<u>Sellers</u> (----percent----)
Before 8 a.m.	5	12
8 a.m.-11 a.m.	61	60
11 a.m.-2 p.m.	24	19
After 2 p.m.	8	9

Table 6

The Breakdown of Telephone Time That Buyers and Sellers Spend Marketing Produce

<u>Function</u>	<u>Buyers</u> (----percent----)	<u>Sellers</u> (----percent----)
Searching for buyer/seller	20	43
Negotiating	14	13
Transferring market information	35	11
Cultivating relationships	15	11
Completing trades	7	10
Arranging transportation	9	10

Table 7

The Average Number of Transactions Negotiated and The Average Telephone Cost Per Month For Buyers and Sellers of Produce

	<u>Buyers</u>	<u>Sellers</u>
Average number of transactions:		
per week	163	276
peak per day	32	86
Average telephone cost per month	\$2100	\$2800
High	\$2960	\$3700
Low	\$1840	\$2100

These results indicated the need to develop a computer aided marketing system that would help manage information used in buying and selling produce. A large amount of money is spent in telephone services for obtaining and transferring information vital to marketing. In addition, the importance of timely and efficient dissemination of information became apparent, as evidence in the number of transactions that take place in the short period that most produce is traded.

These results and the experience that was gained in the case study were used to conceptualize a computer aided marketing system for produce. The key components of the system included the abilities to: (1) enter and broadcast offers to the industry nationwide or to selected clientele, (2) enter and broadcast needs to the industry nationwide or to selected clientele, (3) search for sellers and buyers from the produce offers and needs broadcasted, (4) negotiate the sale of produce, and (5) monitor produce that has been booked, from purchase to receiving. Other ancillary services were suggested for the system that included market, weather and credit information.

The conceptualization of the computer aided marketing system took about a full year to complete. The process of conceptualizing involved a research team putting together ideas for developing the system, and then presenting the ideas to the Advisory Committee assisting in the project. Several meetings were held with the Advisory Committee to gain their ideas for the system.

Trader Benefits With Computer Aided Marketing

At the end of the conceptualizing process, the system that was designed by the Advisory Committee was presented at several meetings throughout the United States. In addition, a private company decided to implement a computer aided marketing program for the produce industry based on the results derived from the feasibility study. Computer Aided Marketing Programs, Inc. (CAMP, Inc.) is presently in the process of implementing

the concepts derived in the research project. All development funds are being provided by CAMP, Inc., without use of public funds.

The presentations to industry groups by the research team and by members of CAMP were used to gain feedback about potential benefits from using the CAMP system. These benefits can be identified with those recognized by Henderson and Holder and related to the information collected in the survey and case study.

Improved Marketing Information

The CAMP system improves the dissemination process for marketing information by making it available in a more understandable format on a more timely basis. The importance of marketing information supplied by CAMP has varied across the market participant groups. Those individuals who are "one step removed" from the actual price setting mechanism have expressed strong interest in computer aided market information. Those "one step removed" include many growers and buyers who use brokers for much of their trading. Those actively involved in the marketing process seem less concerned with computer aided market information, feeling they already have a good handle on the current market situation because of their trading activity.

Improved Operational Efficiency

Perhaps the greatest area of interest in the produce industry for computer aided marketing has been in its contributions to improved operational efficiency. Improved operational efficiency results from many of the activities that CAMP provides. Information transferral between firms is made easier with computer aided marketing. The sending of price quotes, confirmations of sales, truck manifests and invoicing are all made more efficient and accurate with computer aided marketing. Transferring information in a computer aided marketing program allows traders more time to pursue marketing matters beyond information transferral. This is the area that has attracted the most attention with both buyers and sellers.

Greater Pricing Accuracy

This benefit has attracted less attention than most of the other benefits. This attitude could have been predicted from the survey since the overriding majority of buyers and sellers feel fair market prices result from the present marketing system. There has been some trader sentiment, however, that some of the variability may be removed from market prices because of more accurate market information being disseminated.

Increased Competition

Much like the previous benefit, increased competition has not been identified by produce traders as a major benefit resulting from computer aided marketing. Large established buyers of produce have not generally used the computer aided marketing system to search for additional supplies of produce. Smaller buyers, however, have used the system to do more direct buying of their supplies. These additional buyers are adding competition to the marketplace for at least the short-run. Sellers have used the computer aided marketing system to advertise produce in search of additional buyers. These activities have resulted in increased competition and will continue to add competition as the concept gains wider adoption. As the computer aided marketing system gains widespread acceptance, competition will be increased because of the improved communications provided.

Higher Grower Prices

This benefit has received little attention in produce as a potential benefit of computer aided marketing. Most traders feel that higher grower prices and lower prices paid by buyers will result because of improved operational efficiency.

Improved Market Access

Improved market access has been an area that many sellers feel computer aided marketing holds great potential. This result is not surprising since sellers spend, on average, 43 percent of their time on the telephone

searching for buyers (Table 6). Computer aided marketing gives sellers more opportunities to reach new markets. Many traders (both buyers and sellers) are using computer aided marketing for this benefit alone.

Conclusions

Computer aided marketing of agricultural products has made great strides in recent years. The computer and information revolutions have led industry concerns to look for marketing alternatives that integrate the two. The produce industry is currently adopting the Computer Aided Marketing Programs, Inc. produce marketing system. Many traders have begun using CAMP services with many others expressing interest.

A project was recently initiated to quantify the benefits to using CAMP services. The potential benefits identified by other researchers, the Advisory Committee and industry people will serve as guidelines in quantifying benefits. The hypothesis to be tested is that computer aided marketing directly contributes to improved marketing efficiency in the produce industry.

Regardless of the outcome for quantifying CAMP benefits, this project has demonstrated the importance of cooperating with the industry in research of new marketing alternatives. Without the direct involvement of the industry Advisory Committee (a full year of meetings and reports), the success of this research would have been much more limited.

The experiences of this project are also important because they outline processes that lead to successful implementation of this innovative marketing concept. These experiences can be used to determine the feasibility for development of computer aided marketing programs in other industries and also give direction for developing new systems.

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