

**e-commerce Strategies Among
Agribusiness Input Firms**

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Wall***

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Rastislav Ivanic, Jay T. Akridge, Frank J. Dooley, Cole Ehmke, and Sharon Wall*

Abstract

e-commerce has emerged as a set of new technologies and business practices with the potential to dramatically affect many parts of the agribusiness industries. In this paper, results of a Center for Food and Agricultural Business (CAB) survey of practices and opinions of agribusiness managers with regard to e-commerce are reported. Survey results include general opinions about e-commerce, barriers and catalysts in implementing e-commerce, characteristics of firm web pages, as well as demographic information on the responding firms. In general, large firms have more fully developed web page and e-commerce strategies. Likewise, those firms who are early and aggressive users of web pages are more bullish on the future of e-commerce in agriculture. Among firms at different levels of the distribution channel, dealers hold the most reservations about farmer adoption of e-commerce. Much will be learned during the next few years as these e-commerce strategies unfold and firms better understand where this information technology adds value and where it does not in the agribusiness markets.

Keywords: E-Commerce, Internet, World Wide Web, Agribusiness, Input Supply

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e-commerce Strategies Among Agribusiness Input Firms

Introduction

The agribusiness industry, like many other industries, faces the challenge of transforming its business models and practices to adapt to and account for the rapid development and growth of e-commerce. Some reports suggest that e-commerce, defined for the purposes of this study as the broad application of information technology to facilitate product, money and information flows, is having a significant effect on business-to-business (B2B) transactions.

E-commerce presents many challenges to those managers within the business-to-business marketplace – certainly not least of all – agribusiness, particularly as the development of new information technology and software applications is expanding at both the input supply and production levels in agriculture. Managers must sort through this flow of new technology and strive to develop e-commerce strategies that work effectively in their organizations – all the while taking customers, employees, and competitors into account. Many firms forge ahead as quickly as possible, partly in fear of losing customers to more agile and adept competition.

In this report, we discuss the results of a survey sponsored by Purdue University's Center for Food and Agricultural Business (CAB). Focused on e-commerce use within the agribusiness input supply industries, the survey results include general opinions about e-commerce, barriers and catalysts in implementing e-commerce, shifts in distribution patterns, characteristics of web pages, as well as demographic information for those agribusiness firms surveyed.

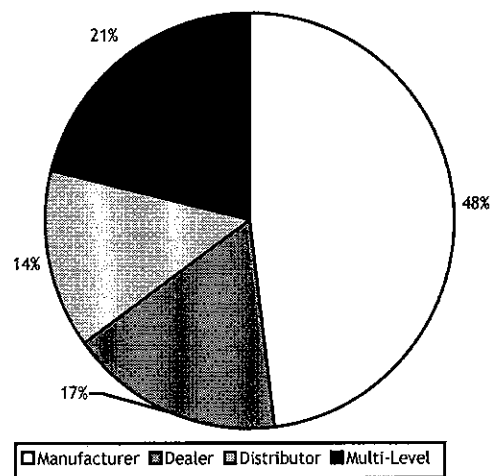
The survey was conducted in August 1999 and distributed to 4,954 agribusiness managers from 3,321 firms via fax on August 26th (See the Appendix to this report for a copy of the questionnaire.) The sample of respondents was drawn from the CAB database of over 17,000 agribusiness contacts. Respondents were selected based on their job function classification of “communications,” “operations/manufacturing,” “sales,” “marketing,” “sales and marketing,” or “undefined function.” (The undefined function classification in the CAB database is used to describe such positions as “general manager,” “president/CEO,” or “vice president,” as opposed to vice president of sales, where the individual’s responsibilities were related specifically to one management function.) Given the criteria used to select names from the CAB database, agribusiness professionals at the executive, upper and middle management levels were surveyed.

Of the 4,954 faxes, 1,001 were not received, reducing the base to 3,953. A total of 755 completed surveys were returned and useable, providing a total response rate of 19.1 percent. In this report, we limit our analysis to manufacturers, distributors, and dealers, thereby reducing the number of useable surveys to 643 (16.3 percent).

The Respondents

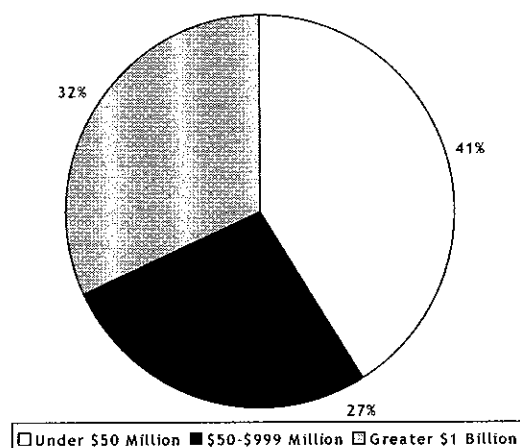
Of the total respondents, manufacturers accounted for 48 percent (Figure 1). Those remaining are divided among distributors, dealers, and multi-level firms at 14, 17 and 21 percent, respectively. Of the 139 multi-level firms, 35 had operations in all three channels, 73 were manufacturer-distributors, 10 were manufacturer-dealers, and 21 were distributor-dealers.

Figure 1. Respondents by Channel Position.



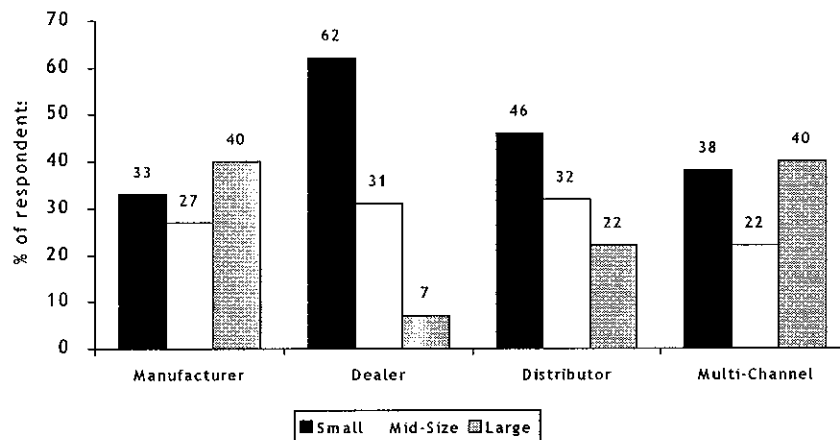
To determine whether results were influenced by firm size, respondents were classified as small, midsize, or large based on 1998 annual sales. Small firms, with annual sales under \$50 million, accounted for 41 percent of the respondents (Figure 2). Almost a third of the firms were large, with sales of over \$1 billion, while the remaining 27 percent were classified as midsize. Cross-tabs were developed for other demographic variables against firm size.

Figure 2. Annual Sales Distribution of Respondents (1998 annual sales).



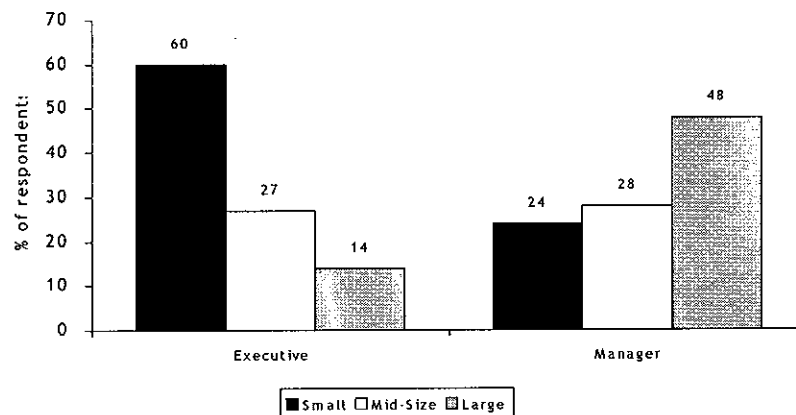
The channel position of the firm varied with the size of the firm and this variation across size classes was statistically significant. Most dealers (62 percent) are classified in this study as small firms, while manufacturers and multi-level firms tend to be classified as large firms (40 percent) (Figure 3). The size distribution of distributors falls between that of dealers and manufacturers.

Figure 3. Size Distribution of Respondents by Channel Position.



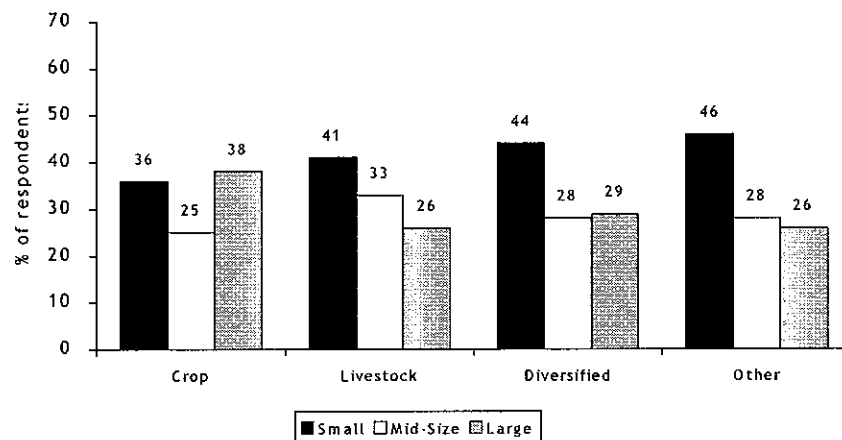
The position or responsibilities of the survey respondents within their firm were classified as either executive (president, CEO, owner, vice president, general manager, division president, CFO, controller, or treasurer) or manager (marketing, sales, production, operations, distribution, logistics, human resources, research and development, or other). The composition of managers versus executives varied statistically across the firm size classes. Respondents from small firms were more likely to be executives (60 percent), while respondents from larger firms tended to be managers (48 percent) (Figure 4).

Figure 4. Size Distribution of Respondents by Job Level.



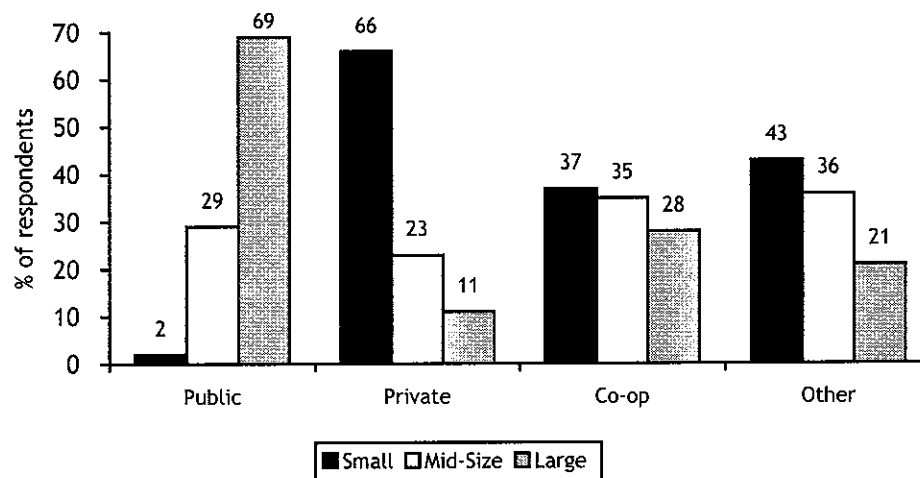
Firms were also classified by their primary product or service lines. The distribution of those responding was as follows: crops (38%), livestock (11%), diversified (39%) or other (12%). The classification 'other' included consulting, financial services, and media personnel. Product focus varied statistically by size class, although the difference across classes is not as pronounced as for some of the other demographic variables. Relative to the other sectors, more of the crop firms tended to be large (Figure 5).

Figure 5. Size Distribution of Respondents by Product Focus.



Firms were also classified by organizational structure. One-half of the firms responding were privately held, 30% were publicly held, 17% were cooperatives, and 2% were classified as other. The organizational structure of the firm varied with the size of the firm and this variation was statistically significant. Most public firms reported over a billion dollars in sales (69 percent), and thus were classified as large, while most private firms were classified as small (66 percent). The size distribution of cooperatives is quite even across the three size classes (Figure 6).

Figure 6. Size Distribution of Respondents by Organization Type.



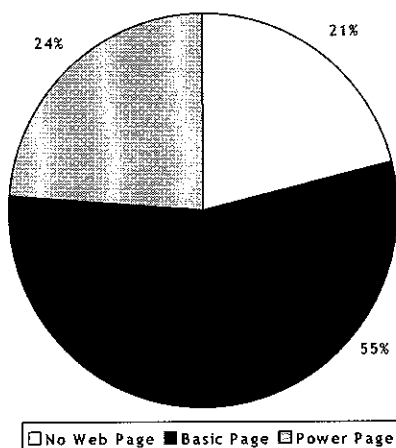
Agribusiness e-commerce Strategies

In this survey, the presence (or lack thereof) and complexity of a firm's web page is used as a measure of the firm's strategy for approaching e-commerce. To understand the extent of web page development and usage in agribusiness, respondents were asked on two levels about their firm's web page. First, whether or not a web page existed for the firm, and second, if the firm had a web page, what features were incorporated in that web page. Most respondents (79 percent) reported the existence of a firm web page (Figure 7). However, some 21 percent of those responding were employed by firms without a web page at the time of the survey.

Those respondents reporting the existence of a web page were then asked to give information on eleven specific features possibly found on their pages. Of those eleven features, six basic features were found on web pages of most firms. These include the following: technical information about products; technical information about prices; background information about the firm; a dealer directory (information about where products are sold); links to trade associations; and links to other information sources. The remaining five, more sophisticated, web page features listed on the survey were: online ordering, online payment, online communities, custom content, and password protection.

To allow for comparison of other opinions about Internet opportunities and barriers, respondents were segmented by type of web strategy. Firms with at least two of the features considered sophisticated were classified as having power web pages. Twenty-four percent of all firms reported having power pages, while another 55 percent reported basic web pages (Figure 7). Again, at the time of the survey, 21 percent of the respondents reported that their firm did not have a web page.

Figure 7. Types of Web Strategies.



Password protection and online communities were found in 79 and 70 percent of the power web firms, respectively (Table 1). Forty-two percent of the power web firms receive online orders, with traditional forms of pay; an additional 26 percent receive online orders and payment. In contrast, for firms with basic pages only six percent receive online orders with traditional pay,

and two percent online orders and payment. Firm web strategies for Power Page and Basic Page respondents are contrasted in Table 1.

Table 1. Web Page Features by Firm Web Strategy.

Feature	% of Firms with Feature	
	Basic Firms	Power Firms
Contains technical information about products sold	76.8	88.5
Provide pricing information about products sold	14.0	30.8
Provide background information about the company	94.2	95.6
Provide a dealer directory (information where products are sold)	35.1	51.6
Provide links to industry trade associations	41.9	65.4
Provide links to other data/information sources (e.g., USDA, etc.)	40.7	68.1
Allow for online ordering, but use traditional means of payment	6.0	42.0
Allow for online ordering and payment	2.0	26.0
Include online communities (e.g., chat rooms, bulletin boards, message centers, virtual coffee shops, etc.)	6.0	44.0
Include areas with content customized to different audiences or individuals	17.0	79.0
Include password protected areas, only accessible to registered customers or suppliers	8.0	70.0

Differences in firm web strategies across the demographic variables were explored. Statistical differences across organizational type and channel position were observed. Public firms were more likely to have a web page (94 percent) as compared to coops (74 percent) and privately held firms (68 percent) (Figure 8). Public firms (36 percent) were also more likely than private firms (12 percent) and coops (23 percent) to have power pages. With respect to channel position, compared with other types of firms, dealers were the least likely to have a web page or a power page (Figure 9).

Figure 8. Firm Web Strategy by Organization Type.

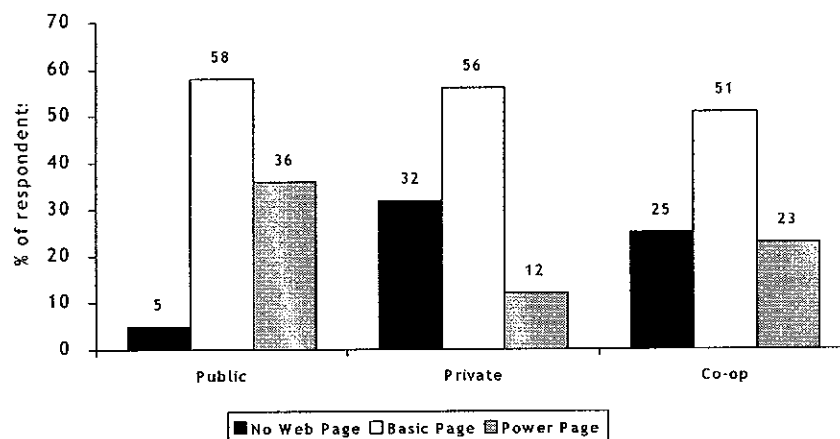
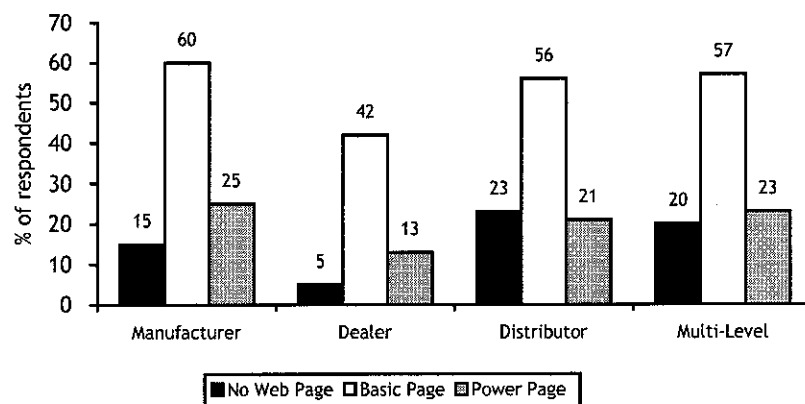


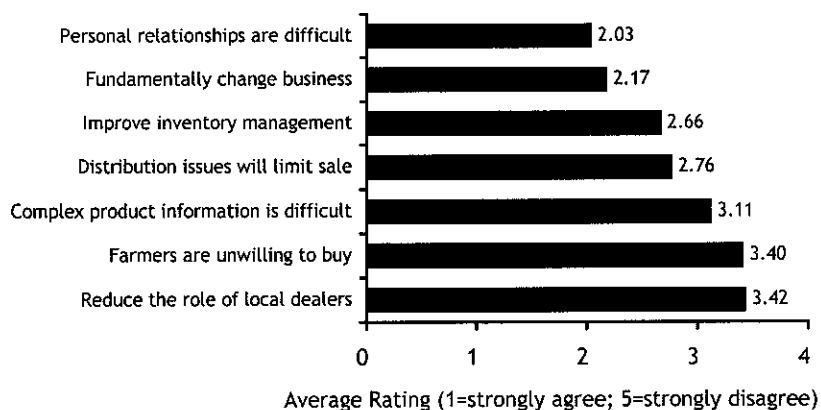
Figure 9. Firm Web Strategy by Channel Position.



Potential for e-commerce

To better understand agribusiness manager perceptions about the potential for e-commerce, respondents rated seven opinion statements on a Likert scale from 1 (strongly agree) to 5 (strongly disagree), depending on level of agreement. Chi-square tests were conducted to explore differences in these general opinions across firm size, channel position, and web strategy. Figure 10 summarizes the average response for each of the seven opinions considered. Then, individual statements are discussed where statistically significant differences exist.

Figure 10. General Attitudes Concerning e-commerce Potential (total sample).

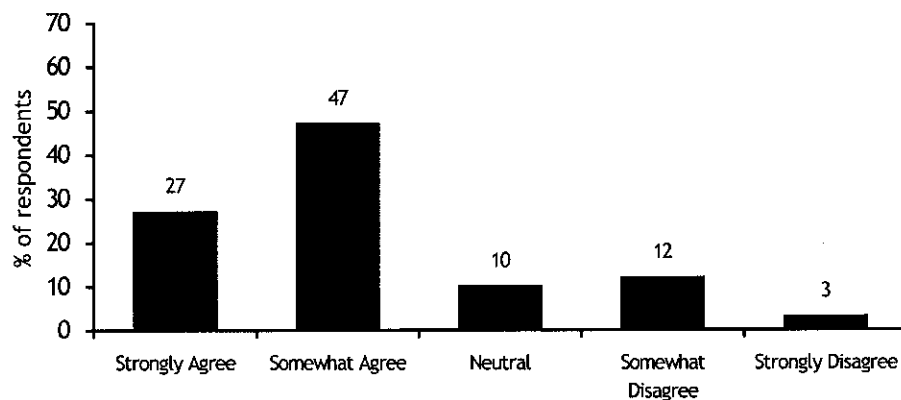


Most survey participants agreed that the Internet would fundamentally change the way business was conducted. However, general agreement among respondents also indicated that agribusiness managers believe personal relationships are more difficult to establish over the Internet. In addition, on average, respondents tended to agree that e-commerce will improve inventory management, though logistics will be a limiting factor in e-commerce expansion.

Respondents disagree with the statements that farmers are unwilling to buy products on the Internet (52 percent either disagree or strongly disagree), and that the role of dealers will be diminished because of e-commerce (53 percent either disagree or strongly disagree).

Three out of four respondents agreed with the statement “E-commerce will fundamentally change the way we do business in our industry in the next three years” (Figure 11).

Figure 11. *e-commerce will fundamentally change the way we do business in our industry in the next three years.*



For this statement, statistical differences were observed across firm size and web strategy classes. Larger firms are much more likely to strongly agree with this statement (38 percent) compared to small or mid-size firms (21 or 22 percent, respectively) (Figure 12). Firms with no web page were less likely to see fundamental changes emerging from e-commerce relative to those with a basic page or power page (Figure 13). Yet even among firms without a web page, the majority (63 percent) strongly agreed or agreed with this statement, and believe that e-commerce will cause significant change in their industry.

Figure 12. *e-commerce will fundamentally change the way we do business in our industry in the next three years (by firm size).*

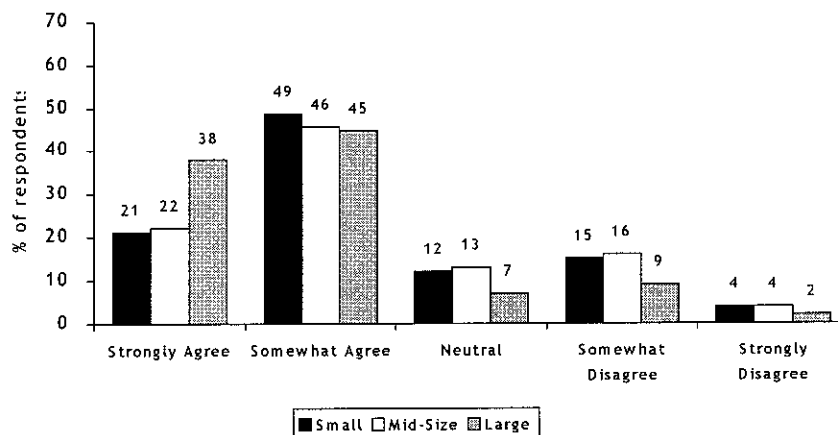
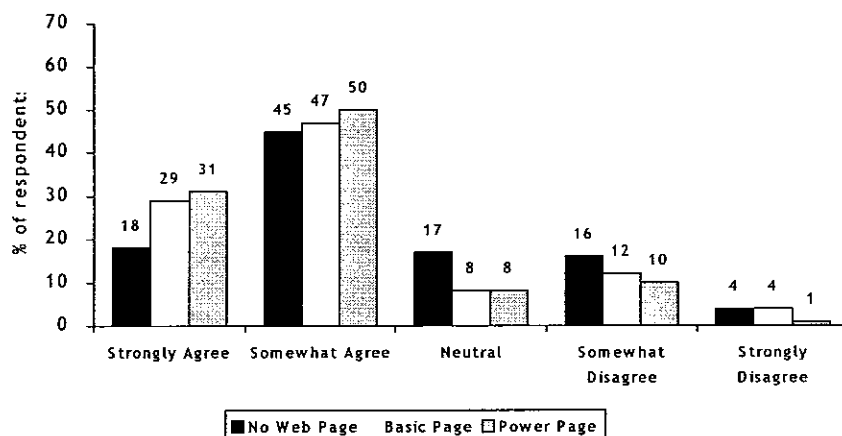
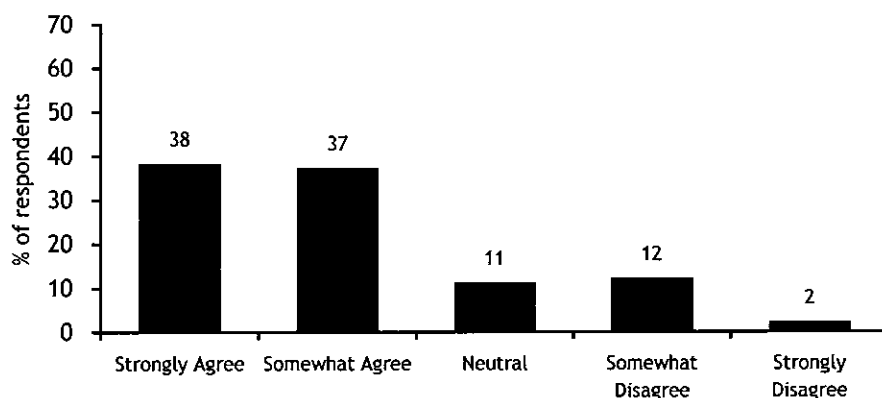


Figure 13. *e-commerce will fundamentally change the way we do business in our industry in the next three years (by web strategy).*



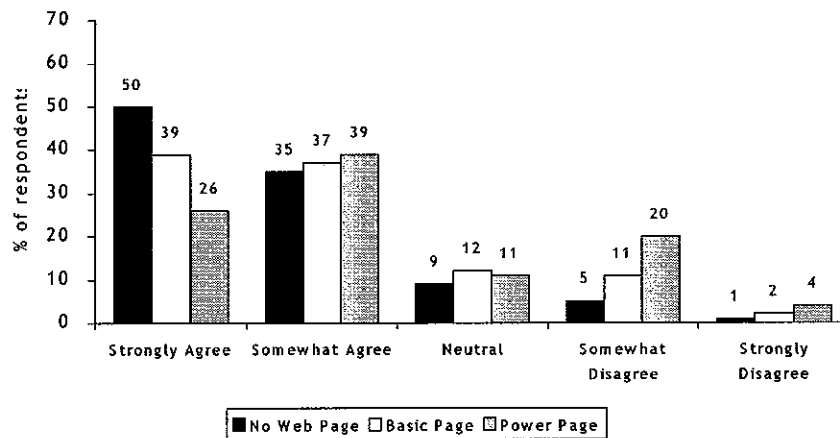
The vast majority (75%) of respondents agreed with the statement “Personal relationships are more difficult to develop over the Internet”. Some 38% of the respondents strongly agreed with this statement while only 2% strongly disagreed (Figure 14).

Figure 14. *Personal relationships are more difficult to develop over the Internet.*



The opinions on this statement did differ across web strategy classes. Even though a majority of users (76%) and power users (65%) agreed that relationships are more difficult to develop in an e-commerce environment, they were more likely than non-users to disagree with the above statement. Some 24 percent of the power users disagreed with the statement concerning difficulty in developing personal relationships over the Internet, compared to only 6% of the respondents with no web-page (Figure 15).

Figure 15. *Personal relationships are more difficult to develop over the Internet* (by web strategy).



Overall, respondents were modestly optimistic about their ability to better manage inventory via Internet resources (Figure 16). When asked their opinion of the statement “E-commerce will improve my company’s ability to manage inventory levels in the next three years”, the responses were significantly different across both the size and web strategy classes.

Figure 16. *e-commerce will improve my company’s ability to manage inventory levels in the next three years.*

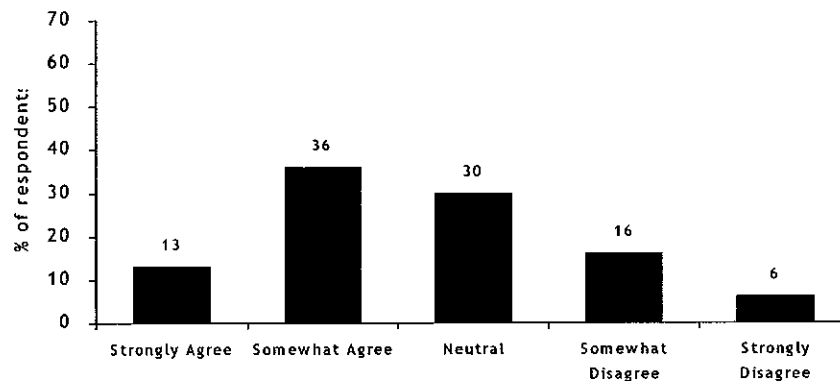
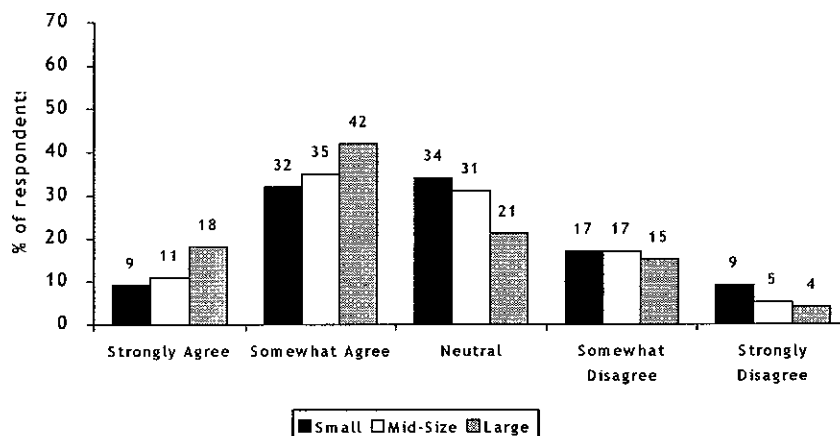


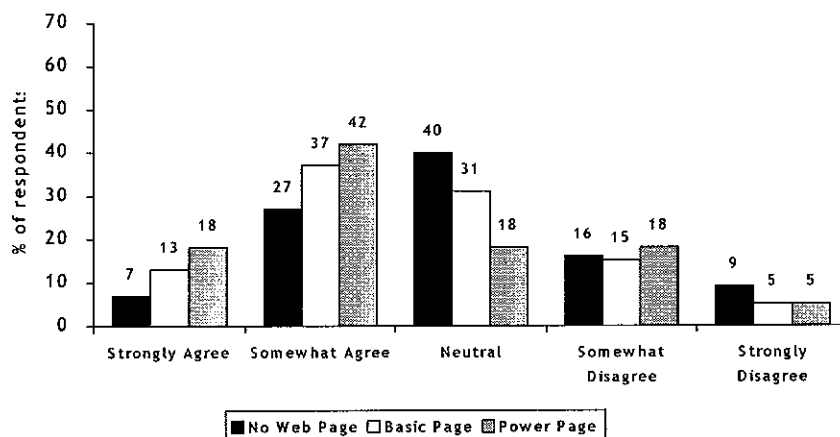
Figure 17 shows that the larger the respondent, the more likely they felt optimistic about using e-commerce to manage inventory. Sixty percent of the large firms agreed with the statement on use of the Internet for inventory management, versus 41 percent of small firm respondents.

Figure 17. e-commerce will improve my company's ability to manage inventory levels in the next three years (by firm size).



More advanced web users also indicated greater optimism about the advantages of e-commerce for inventory management. When comparing power users with non-users, 60 percent of power users agreed with the statement, whereas only 34 percent of non-users saw the Internet as an important tool in inventory management (Figure 18).

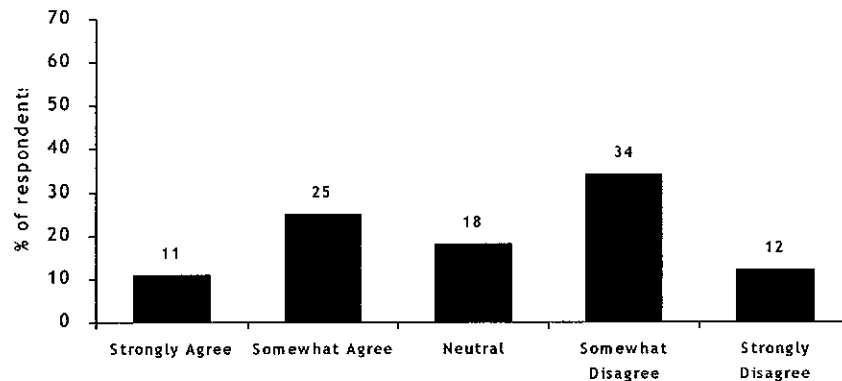
Figure 18. e-commerce will improve my company's ability to manage inventory levels in the next three years (by web strategy).



Largely, respondents were not concerned about the challenges of providing complex product information to customers over the Internet. Some 46 percent of survey respondents disagreed with the statement "Information about increasingly complex products is difficult to provide over

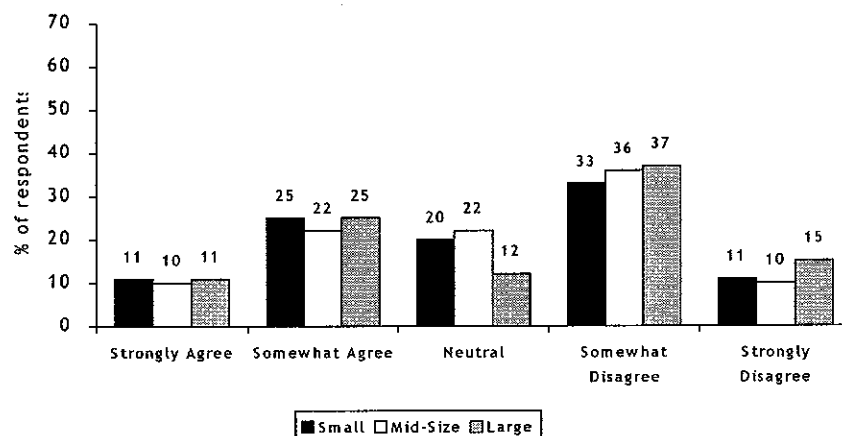
the Internet” (Figure 19). However, responses varied significantly depending on the firm’s web strategy and size.

Figure 19. *Information about increasingly complex products is difficult to provide over the Internet.*



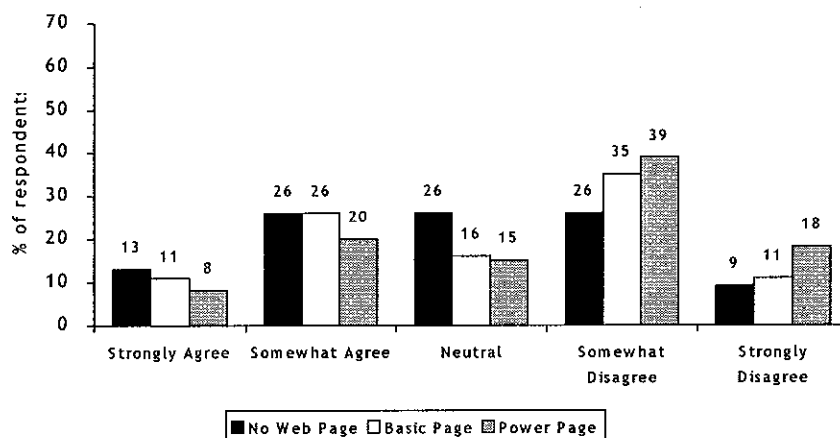
Larger firms tended to see fewer problems with information complexity as fewer large firms disagreed with the statement relative to small firms -- 52 versus 44 percent, respectively (Figure 20).

Figure 20. *Information about increasingly complex products is difficult to provide over the Internet (by firm size).*



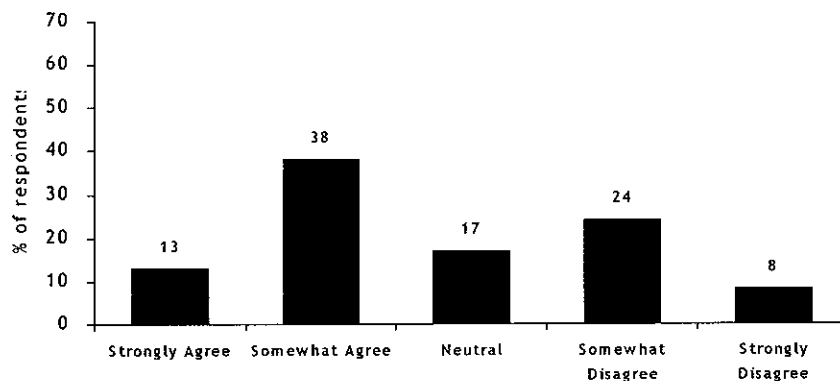
Further, the advanced web users most strongly disagreed that Internet's inability to provide complex information would be a barrier to adoption. Fifty-seven percent of these respondents disagreed the statement, as opposed to 35 percent of the non-users (Figure 21).

Figure 21. Information about increasingly complex products is difficult to provide over the Internet (by web strategy).



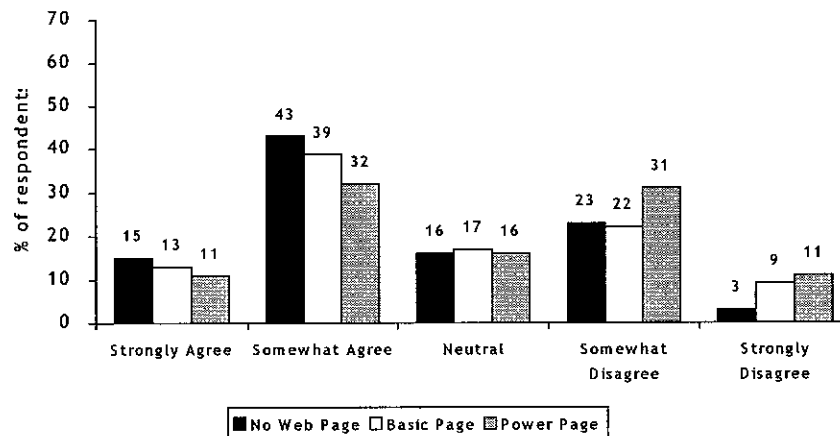
Overall, survey participants agreed (51 percent) that logistics issues might limit the sale of agricultural inputs over the Internet. Only 8 percent of respondents strongly disagreed with the statement "Distribution (logistics) issues will limit sale of my industry's products over the Internet" (Figure 22).

Figure 22. Distribution (logistics) issues will limit sale of my industry's products over the Internet.



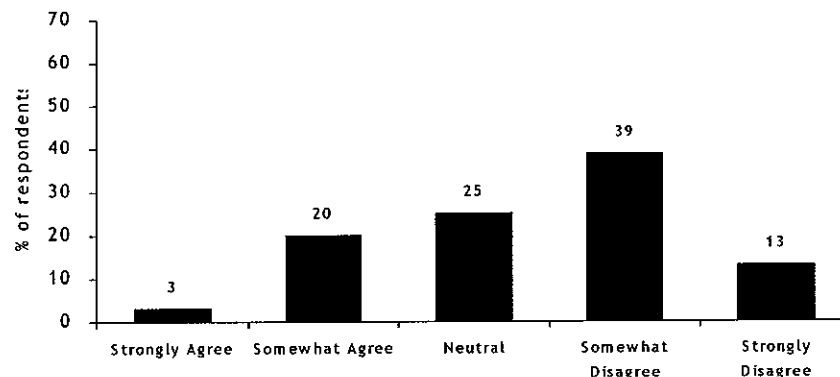
While differences were statistically significant when comparing web strategy employed, firms with more advanced e-commerce strategies tended to agree less, and disagreed more strongly with the statement on distribution/logistics challenges. Forty-two percent of the power users disagreed that logistics would limit product sales via the Internet, versus 26 percent of the nonusers. In addition, 43 percent of advanced firms agreed with the above statement, while more than half (58 percent) of nonusers agreed (Figure 23).

Figure 23. *Distribution (logistics) issues will limit sale of my industry's products over the Internet (by web strategy).*



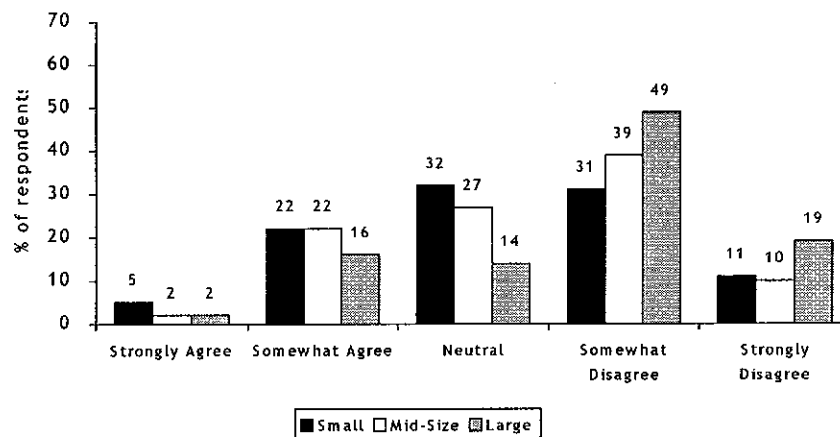
Overall, survey participants agreed that producers would be involved in purchasing products and services via the Internet (Figure 24). Fifty-two percent of respondents disagreed or strongly disagreed with the statement "Farmers are unwilling to buy products on the Internet", while only 23 percent agreed with the statement, and only 3 percent strongly agreed (Figure 24). Statistical differences were observed in responses across firm size and web strategy classes.

Figure 24. *Farmers are unwilling to buy products on the Internet.*



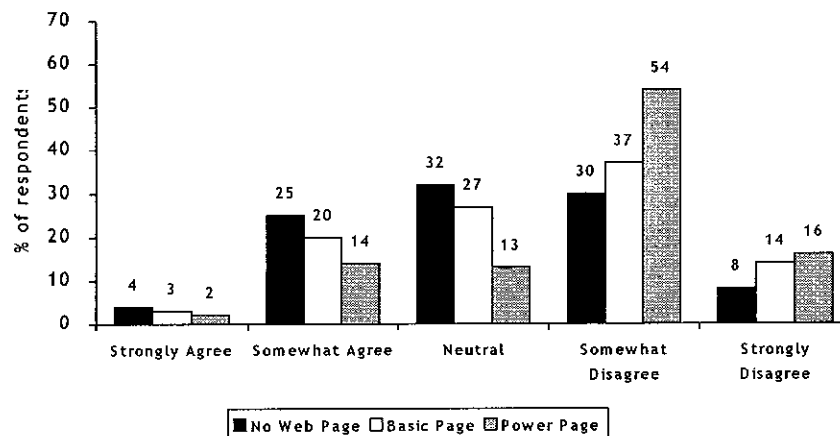
Moreover, the larger the company, the less likely the respondents were to assert that farmers would be unwilling to use the Internet to make product purchases. Sixty-eight percent of the large respondents disagreed with the statement on farmer reluctance, versus 42 percent of small respondents (Figure 25).

Figure 25. Farmers are unwilling to buy products on the Internet (by firm size).



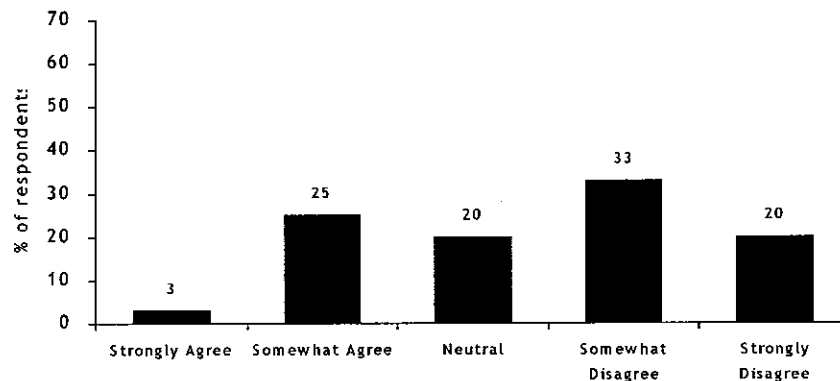
Experienced web users disagreed even more strongly. Seventy percent of the power users disagreed with the statement users about farmers' unwillingness to purchase products via the Internet compared to 38 percent of the non-users. Very few respondents strongly agreed with the statement (Figure 26).

Figure 26. Farmers are unwilling to buy products on the Internet (by web strategy).



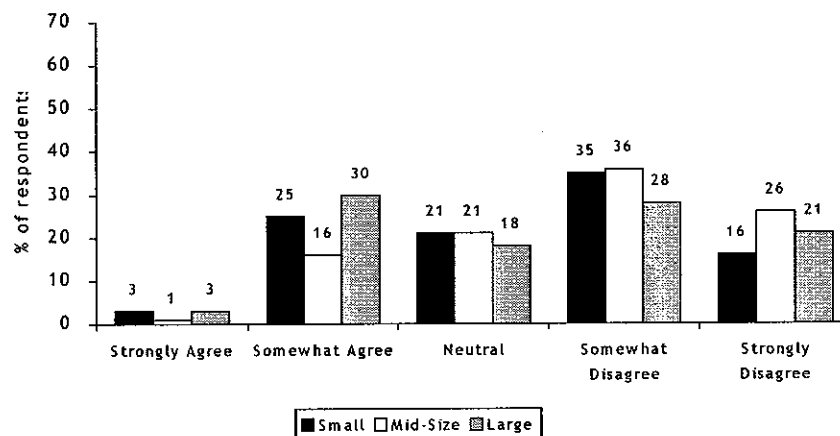
In general, respondents did not see the Internet diminishing the role of the local dealer. Some 53 percent of respondents disagreed with the statement "The emergence of e-commerce will greatly reduce the role for local dealers in our industry in the next three years", while only 28 percent agreed or strongly agreed with this statement (Figure 27).

Figure 27. *The emergence of e-commerce will greatly reduce the role for local dealers in our industry in the next three years.*



Statistical differences were observed across the three size classes. The mid-size respondents were most optimistic about the future role of the local dealer. 62 percent disagreed with the statement above, where only 51 percent of smaller respondents and 49 percent of larger respondents disagreed (Figure 28).

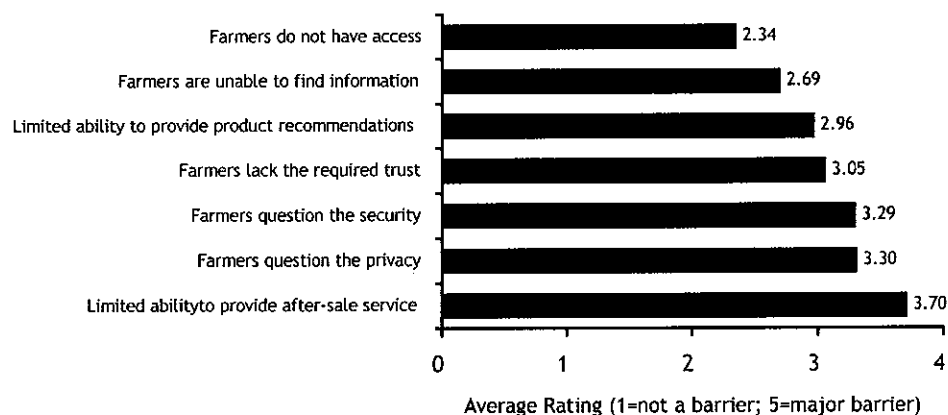
Figure 28. *The emergence of e-commerce will greatly reduce the role for local dealers in our industry in the next three years (by firm size).*



Barriers to e-commerce Usage

To gather an understanding of managerial perceptions of key barriers to growth in e-commerce, survey respondents were asked their opinions about seven factors that might prevent e-commerce from being more widely available, accepted, and used by agricultural producers. Respondents were instructed to rate their opinions on a Likert scale of 1 (not a barrier) to 5 (major barrier) for this series of factors, which included: access to the Internet; ability to find information; ability to provide product recommendations; trust in Internet purchasing; security concerns; privacy issues; and ability to provide service after the sale. Figure 29 summarizes the average rating respondents gave each of these potential barriers.

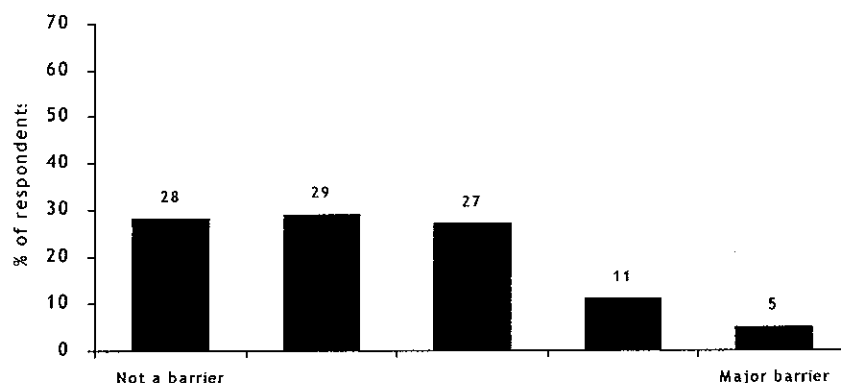
Figure 29. Importance of Barriers to e-commerce (total sample)



On average, respondents did not view access to the Internet as a major barrier for e-commerce growth in agriculture. Nor do they believe that the Internet is a less convenient source of information. Conversely, respondents were concerned about their ability to provide after-sale service in an e-commerce environment, and to a lesser degree, saw privacy and security issues as possible barriers to more widespread adoption.

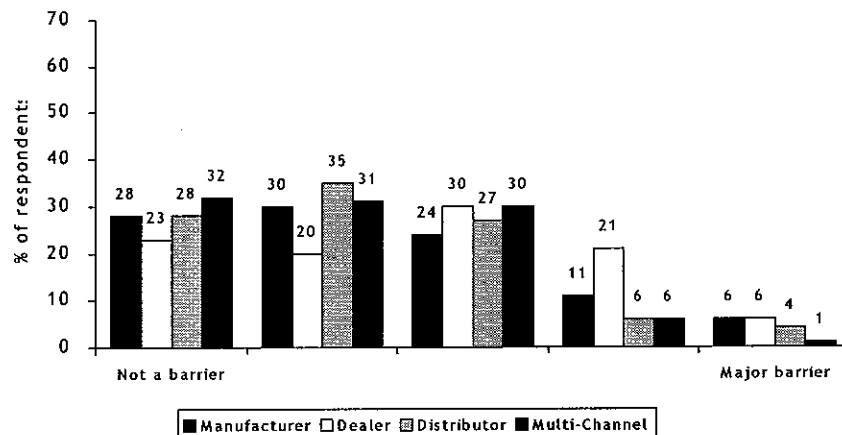
Generally, farm access to the Internet was not considered a significant barrier to e-commerce growth in the industry by survey respondents. Fifty-seven percent of the participants responded with a 1 or a 2 on the five-point scale where 1 was not a barrier, and 5 was a major barrier, to the statement "Farmers do not have Internet access". Only 5 percent of those responding believed that Internet access was a major barrier to e-commerce growth (Figure 30). Differences in responses were statistically significant based on firm position within the distribution channel as well as firm size.

Figure 30. *Farmers do not have Internet access.*



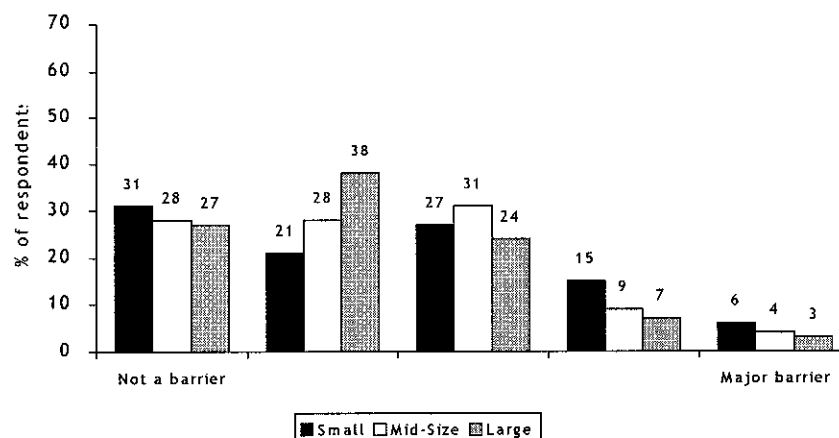
Dealers were most likely to view Internet access as a barrier to e-commerce expansion (Figure 31), with 27 percent indicating that access was a barrier. Also important to note is that those firms active in at multiple distribution levels were least likely to see Internet access as a barrier (7 percent) to growth in e-commerce.

Figure 31. *Farmers do not have Internet access (by channel position).*



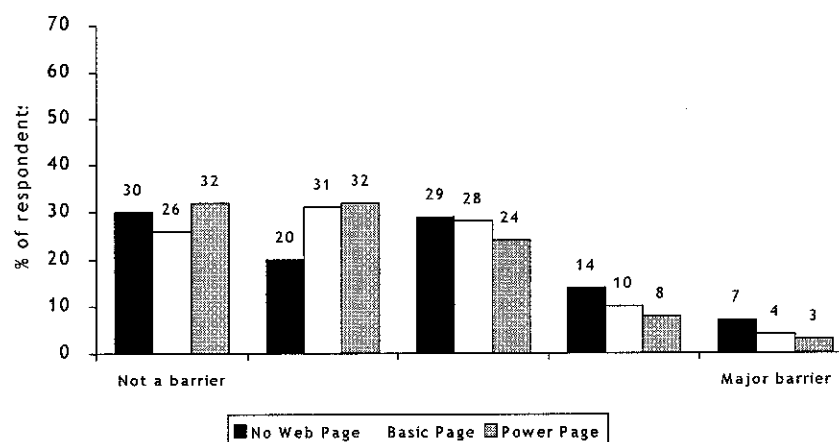
Opinions on Internet access also differed across firm size classes. Respondents representing larger firms were less likely to view farm Internet access as a barrier (65 percent reported 'not a barrier') than smaller firms (52 percent). Small firms were also most likely to see Internet access as a barrier (21 percent) (Figure 32).

Figure 32. Farmers do not have Internet access (by firm size).



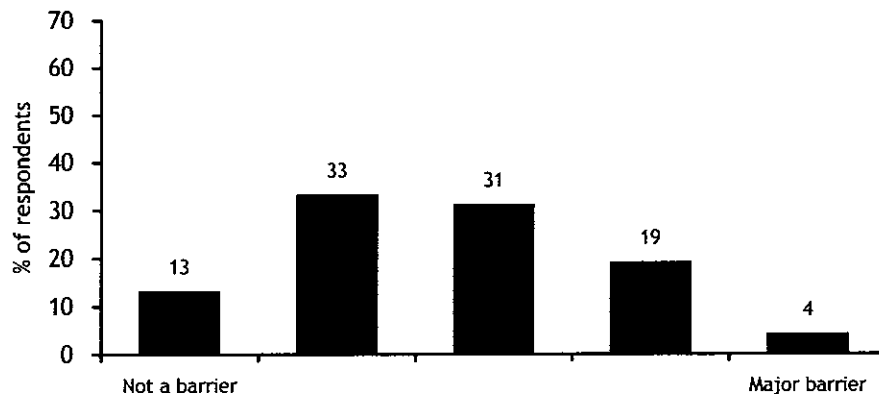
Similarly, those firms with more advanced web page features were less likely to view Internet access as a barrier -- 64 percent of the power users saw little problem with Internet access, in contrast to 57 percent of the basic users and 50 percent of the non-users (Figure 33). Conversely, only 11 percent of power users saw Internet access as a barrier, relative to 14 and 21 percent, respectively for users and non-users, respectively.

Figure 33. Farmers do not have Internet access (by web strategy).



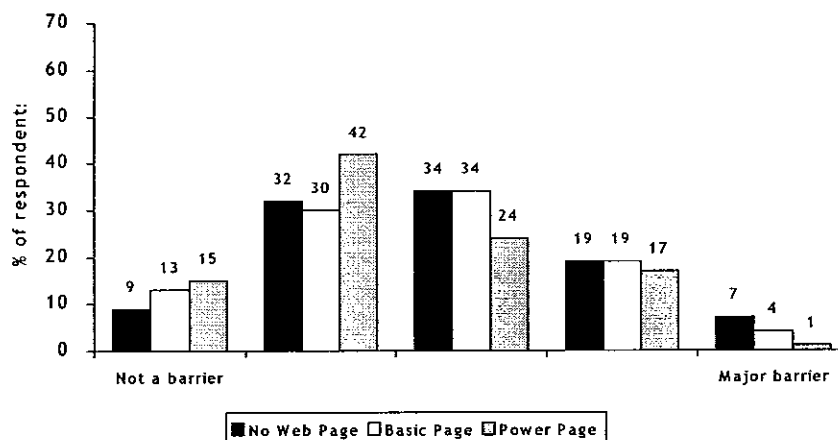
Overall, survey respondents did not view farmer's ability to find information on the Internet as a significant barrier to e-commerce growth in agriculture. In responding to the statement, "Farmers are unable to find desired information on the Internet", 13 percent of the respondents reported 'not a barrier,' while only 4 percent reported 'major barrier.' Conversely, most reported responses which are somewhat neutral (2-3-4), indicating that there may be an opportunity to provide farmers with an Internet mechanism for quickly and accurately finding needed information (Figure 34).

Figure 34. *Farmers are unable to find desired information on the Internet.*



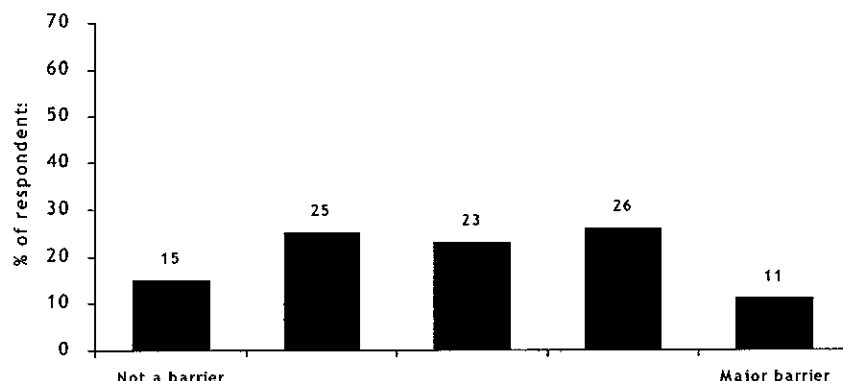
While division of responses by firm size as well as channel position yield no interesting differences, the differences between Internet non-users and advanced users are statistically significant. Not surprising is the fact that power users are least likely to see the ability to find information as a major barrier (1 percent), and most likely to expect that it is not a barrier (9 percent) (Figure 35).

Figure 35. *Farmers are unable to find desired information on the Internet (by web strategy).*



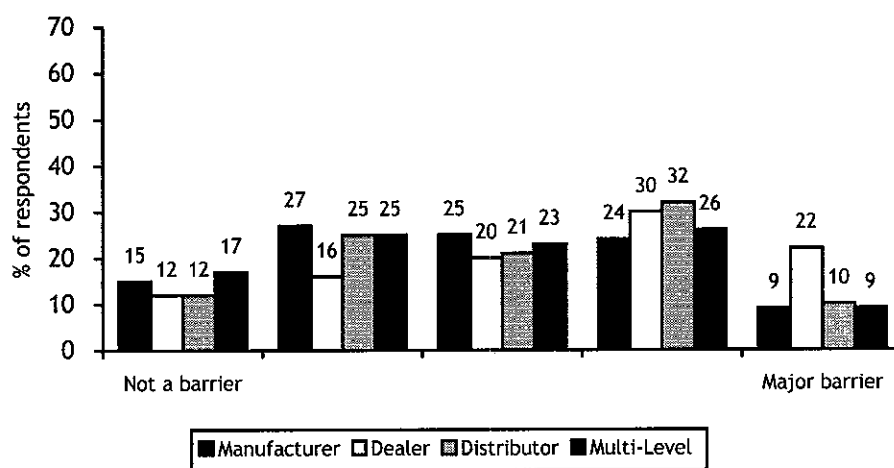
In responding to the statement "The Internet offers limited ability to provide product recommendations to farmers", respondents were mostly neutral in assessing whether or not this issue was a barrier to e-commerce expansion (Figure 36). However, differences across firm position in the distribution channel as well as by web strategy were statistically significant.

Figure 36. *The Internet offers limited ability to provide product recommendations to farmers.*



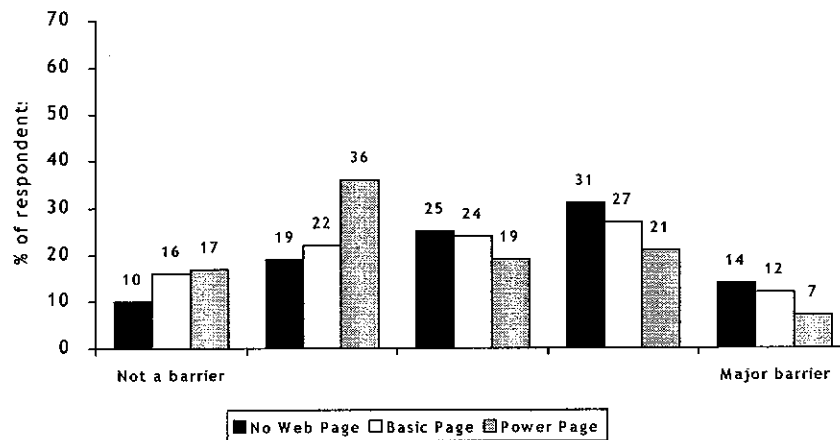
Dealers were most likely to perceive limitations in the ability of the Internet to provide product recommendations (22 percent) relative to the other three groups (Figure 37). In general, opinions across the other three groups on this question were quite similar.

Figure 37. *The Internet offers limited ability to provide product recommendations to farmers (by channel position).*



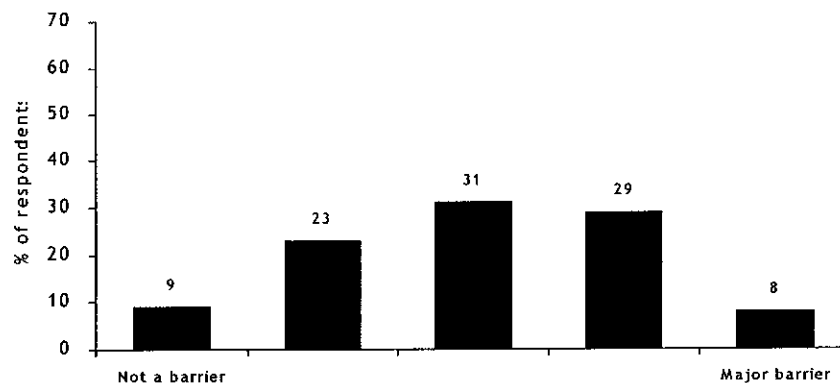
As might be expected, 53 percent of the power users do not see the Internet's limited ability to provide product recommendations as a barrier, relative to only 29 percent of non-users. Similarly, only 7 percent of power users view this as a major barrier, in contrast to 14 percent of non-users (Figure 38).

Figure 38. *The Internet offers limited ability to provide product recommendations to farmers (by web strategy).*



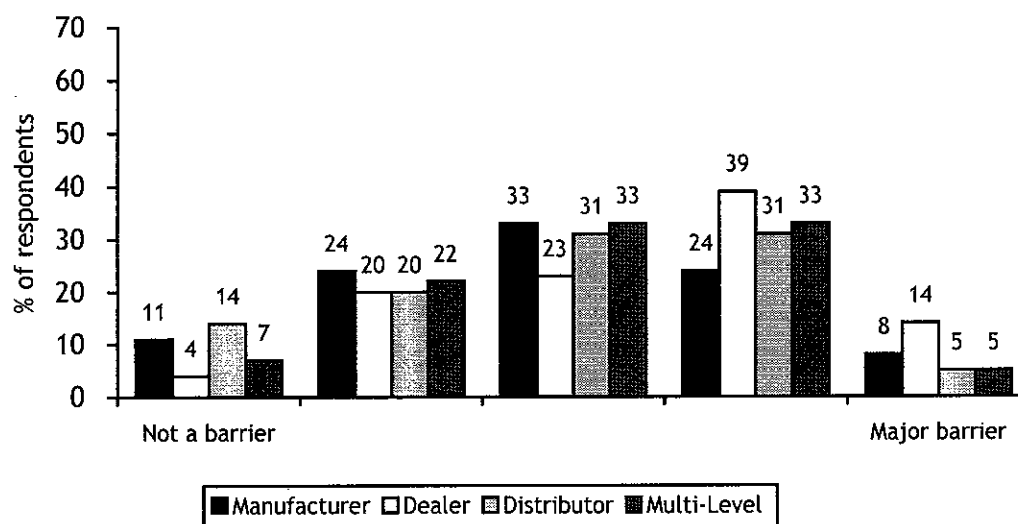
In general, survey participants were neutral in their opinions about the impact of farmers' trust in purchasing over the Internet on e-commerce expansion. In responding to the statement, "Farmers lack the required trust to make Internet purchases", Figure 39 shows that 8 percent of respondents viewed trust as a major barrier, while 9 percent were not concerned with trust to any degree. Statistically significant differences were observed based on firm position in the distribution channel as well as on web strategy.

Figure 39. *Farmers lack the required trust to make Internet purchases.*



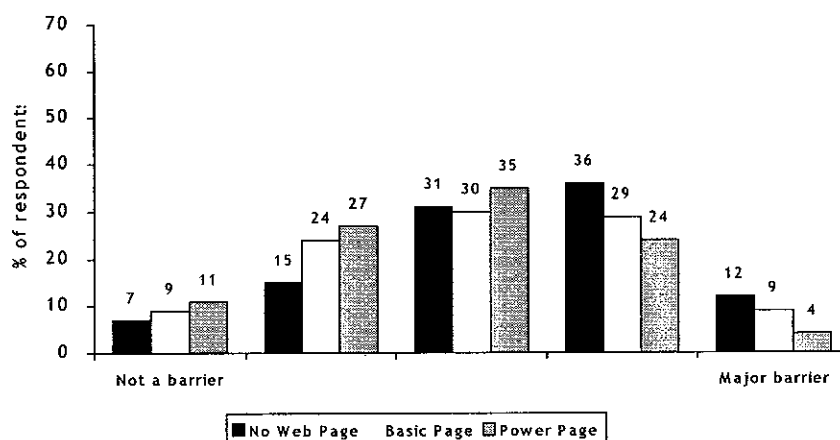
Trust was most likely seen as a barrier to e-commerce growth in agriculture among the dealer respondents in the survey (53 percent). Dealers were also the least likely to say that trust was 'not a barrier' (4 percent) (Figure 40).

Figure 40. Farmers lack the required trust to make Internet purchases (by channel position).



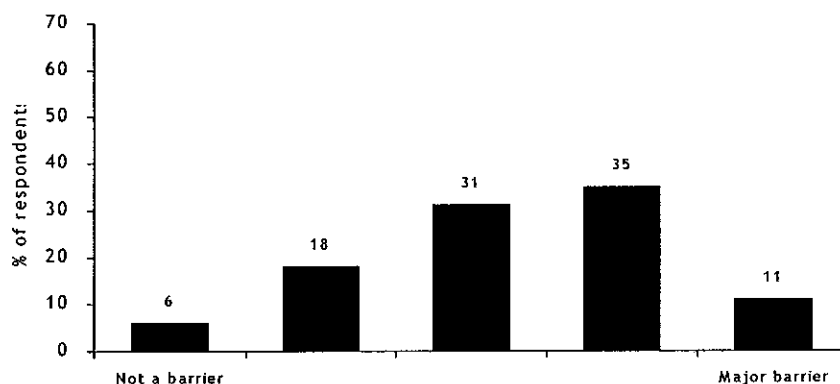
Respondents classified as power users, showed systematically less concern about trust as a barrier to e-commerce expansion in agriculture relative to the other two groups (Figure 41). Only 28 percent of the power page respondents viewed trust as a barrier while 48 percent of non-users held a similar view.

Figure 41. Farmers lack the required trust to make Internet purchases (by web strategy).



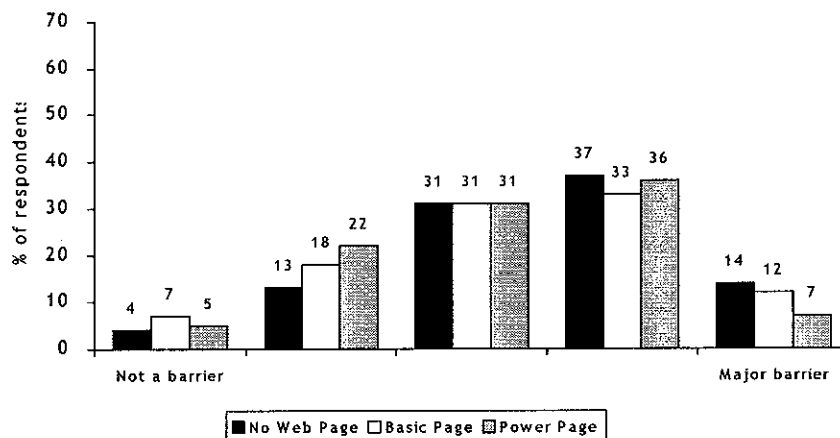
The belief that farmers may question the security of e-commerce is common across the group of agribusiness managers surveyed. When asked to respond to the statement "Farmers question the security of e-commerce", 46 percent of the respondents identified security as a barrier, while only 6 percent viewed it a 'not a barrier' (Figure 42).

Figure 42. *Farmers lack the required trust to make Internet purchases.*



When comparing opinions on e-commerce security issues between power users and non-users, only 7 percent of the power users see security as a barrier, in contrast to 14 percent of non-users. Firms with more advanced web pages tend to view security as less of a barrier to e-commerce expansion (Figure 43).

Figure 43. *Farmers question the security of e-commerce (by web strategy).*



Respondents reported similar opinions about farmer perceptions of e-commerce privacy issues. Reacting to the statement “Farmers question the privacy of e-commerce”, 46 percent of the survey respondents indicated that reservations farmers had about Internet privacy issues were

a barrier to e-commerce expansion in agriculture (Figure 44). In addition, Figure 45 shows that respondents with more advanced web strategies are less likely to view privacy issues as a major barrier (10 percent), relative to non-users (14 percent) (Figure 45).

Figure 44. Farmers question the privacy of e-commerce.

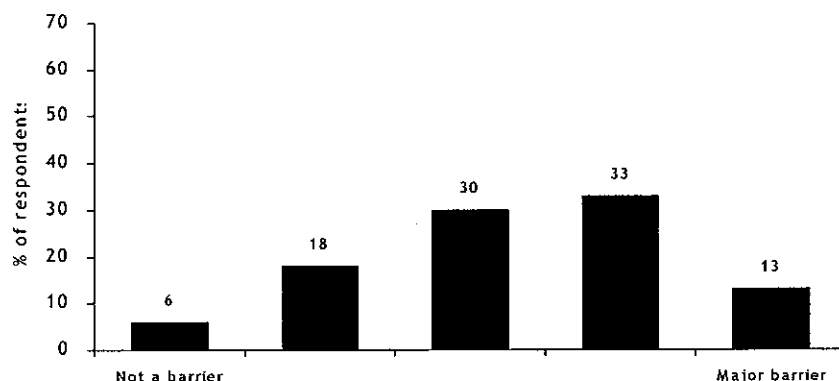
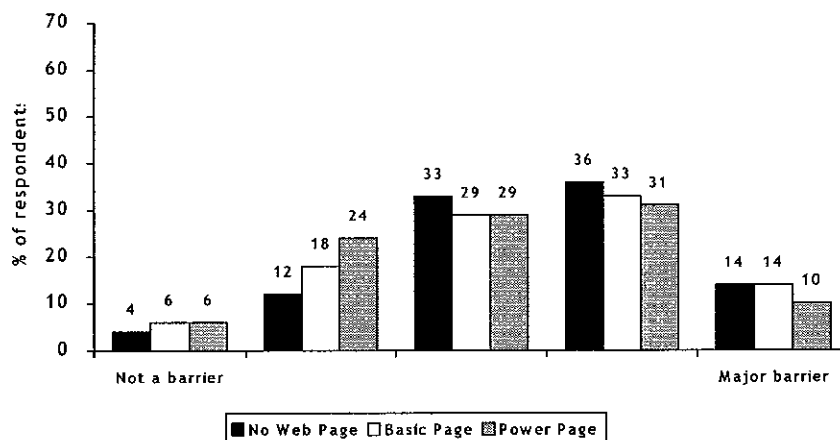
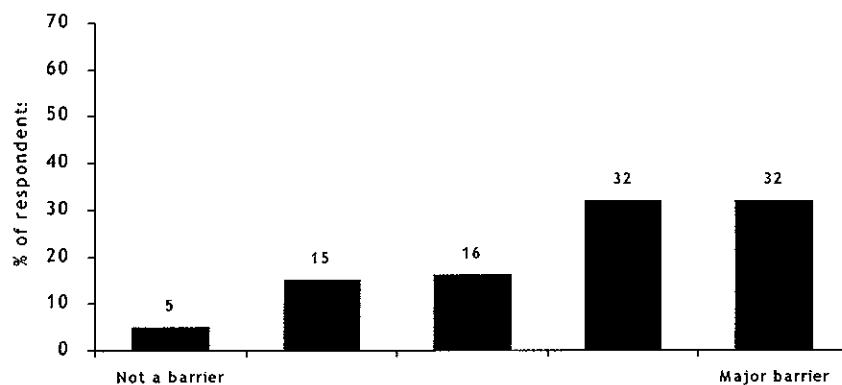


Figure 45. Farmers question the privacy of e-commerce (by web strategy).



Survey respondents generally perceived the Internet's limited ability to provide service after the sale as a potential barrier to e-commerce in agriculture. Responding to the statement "The Internet offers limited ability to provide after sale service to farmers", 32 percent of those surveyed reported a "major barrier," while only 5 percent reported "not a barrier" (Figure 46).

Figure 46. *The Internet offers limited ability to provide after sale service to farmers.*



Statistical differences were found among those firms operating at different levels in the distribution channel, as well as those employing different web strategies. Dealers were more likely to identify service after the sale as a major barrier (50 percent), in contrast to those respondents with presence in multiple channels (29 percent) (Figure 47). In addition, those respondents with more advanced web pages were more optimistic about overcoming Internet service after the sale issues, as 28 percent leaned toward 'not a barrier,' compared to non-users at 13 percent (Figure 48).

Figure 47. *The Internet offers limited ability to provide after sale service to farmers (by channel position).*

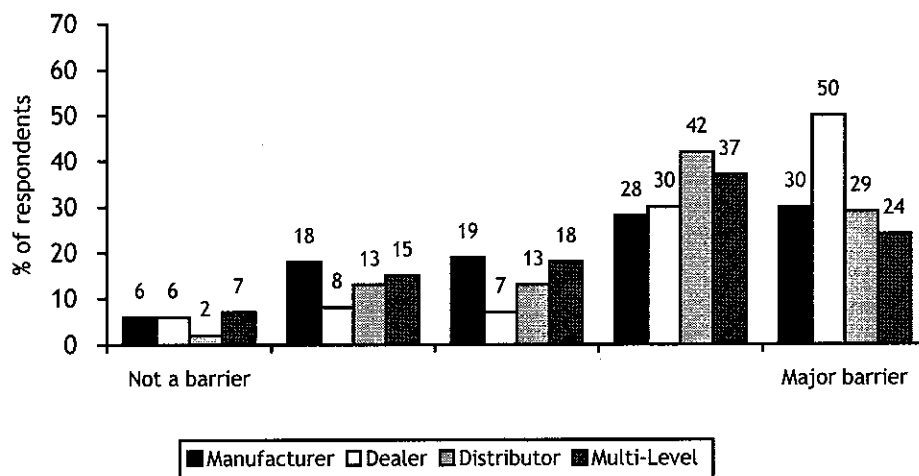
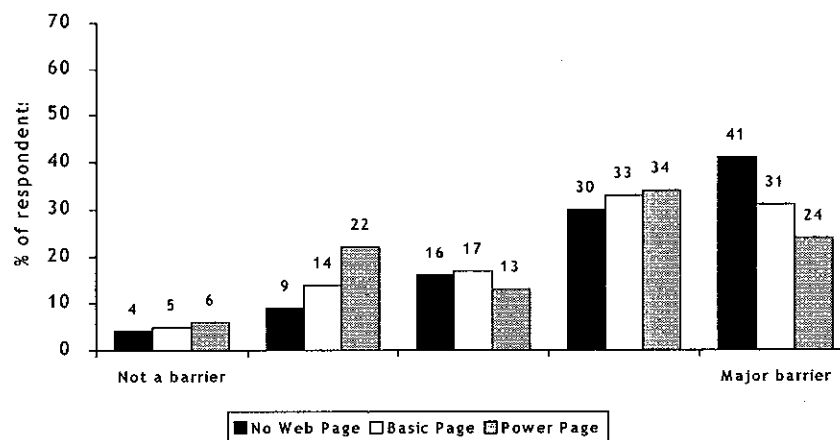


Figure 48. *The Internet offers limited ability to provide after sale service to farmers (by web strategy).*

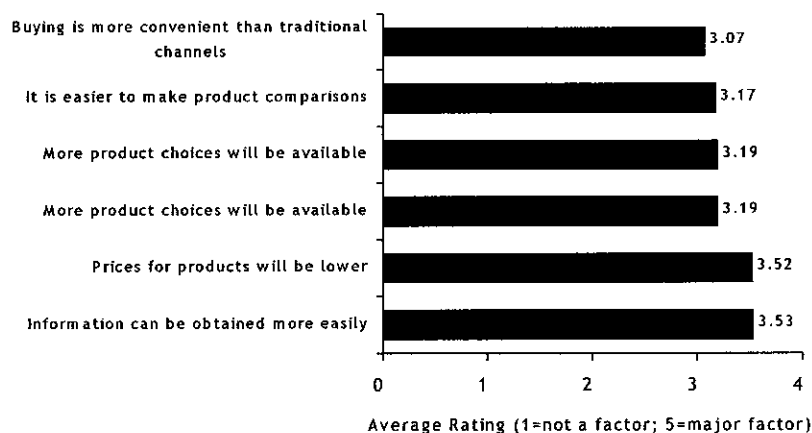


Other Factors Influencing Development of e-commerce

To assess agribusiness opinions about the speed of adoption of e-commerce and purchasing over the Internet by farmers, respondents were asked to rate a series of statements on the level of their influence on adoption rates. Participants rated each statement based on a five-point Likert scale from "not a factor," to "major factor." The five potential influencers or catalysts included lower prices on the Internet; increased ease of obtaining information; expanded product choice; additional convenience in buying relative to traditional channels; and ease of product comparisons.

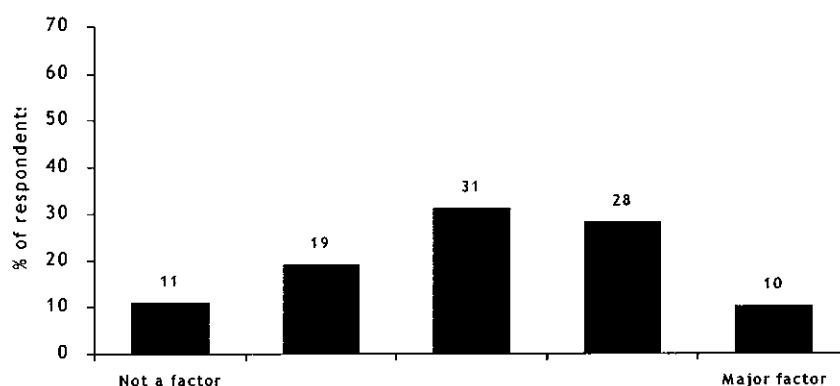
In general, lower prices and increased ease of obtaining information were among those factors that agribusiness respondents indicated were most likely to influence adoption rates. Factors such as additional convenience, ease of product comparison, and expanded product choice each received, on average, a positive response, identifying them as potential contributors to speed of adoption, though respondents were more neutral in these cases. Figure 49 provides a summary of average respondent ratings on each of these influences.

Figure 49. Importance of Various Factors on e-commerce expansion (total sample)



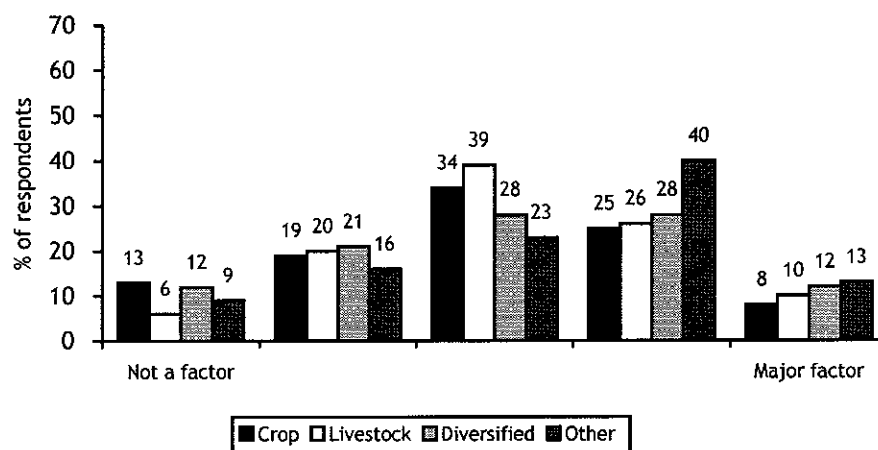
Respondents felt that the additional convenience the Internet would provide, relative to traditional channels, was not a major factor in farmer adoption of e-commerce or Internet purchasing. In responding to the statement, "Buying over the Internet is more convenient than traditional channels", 38 percent of respondents indicated they felt convenience was a factor, in contrast to 30 percent who indicated the opposite (Figure 50).

Figure 50. Buying over the Internet is more convenient than traditional channels.



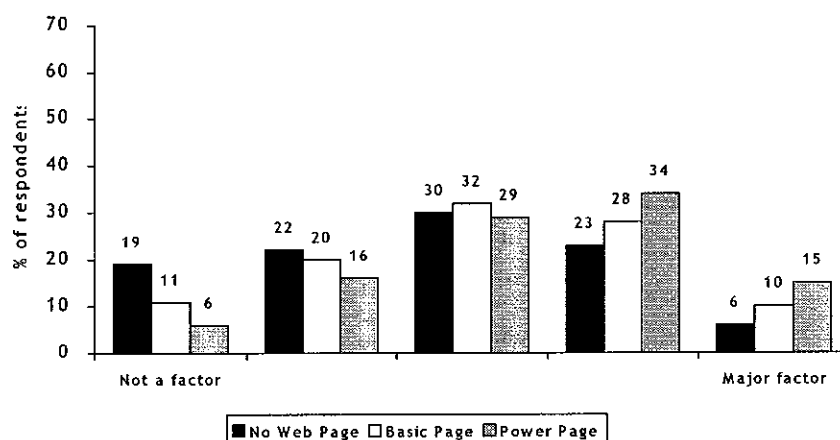
Convenience was considered a factor, however, when responses were segmented by product focus. Those classified as 'other' were more likely to identify convenience as a factor related to adoption (53 percent), relative to the overall average (38 percent) (Figure 51).

Figure 51. *Buying over the Internet is more convenient than traditional channels* (by product focus).



Likewise, there were differences in opinion on this issue across the three web strategy classes (Figure 52). Some 15 percent of respondents classified as power users identified convenience as a 'major factor' in adoption, with another 34 percent leaning towards that opinion, while non-users reported only 6 percent and 23 percent with this perspective, respectively.

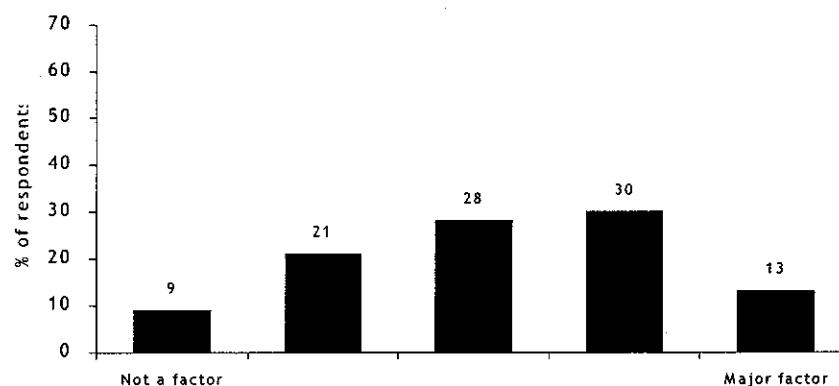
Figure 52. *Buying over the Internet is more convenient than traditional channels* (by web strategy).



When asked about the ability to make product comparisons over the Internet and its subsequent impact on adoption of the Internet by farmers, survey participants were fairly balanced in their responses (Figure 53). Reacting to the statement "It is easier to make product

comparisons over the Internet”, 43 percent of the respondents indicated that product comparisons on the Internet would influence farmer adoption, while 30 percent indicated they would not.

Figure 53. *It is easier to make product comparisons over the Internet.*



Survey respondents reported that expanded product choice over the Internet would influence e-commerce adoption and on-line purchases among farmers. Responding to the statement “More product choices will be available over the Internet”, Figure 54 shows that overall, 46 percent of respondents believed product choice was a factor, where only 27 percent did not. Moreover, segmentation by web strategy indicates that non-users considered expanded product choice a more significant influencer of adoption (52 percent) than did power users (42 percent) (Figure 55). Power users were more likely to believe that expanded product choice was ‘not a factor’ which influenced farmer adoption.

Figure 54. *More product choices will be available over the Internet.*

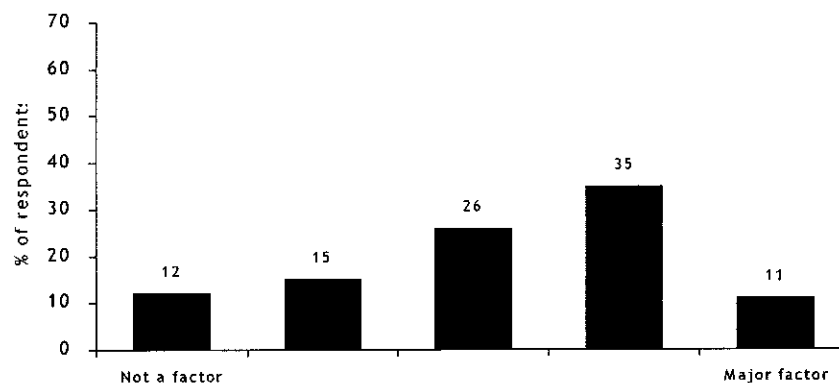
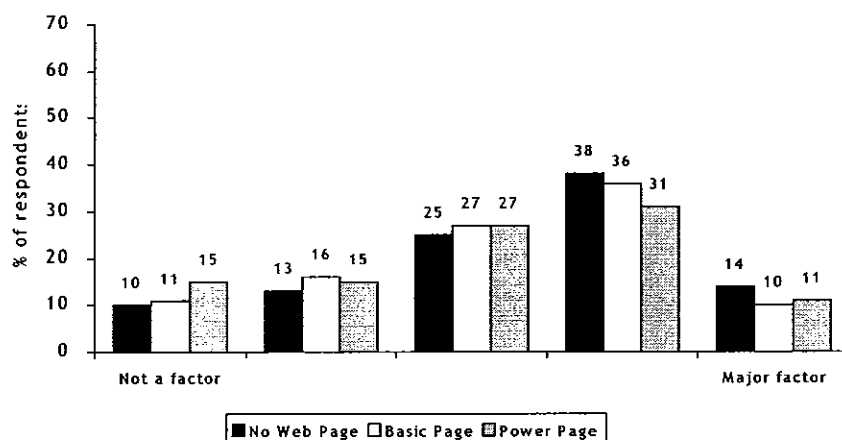
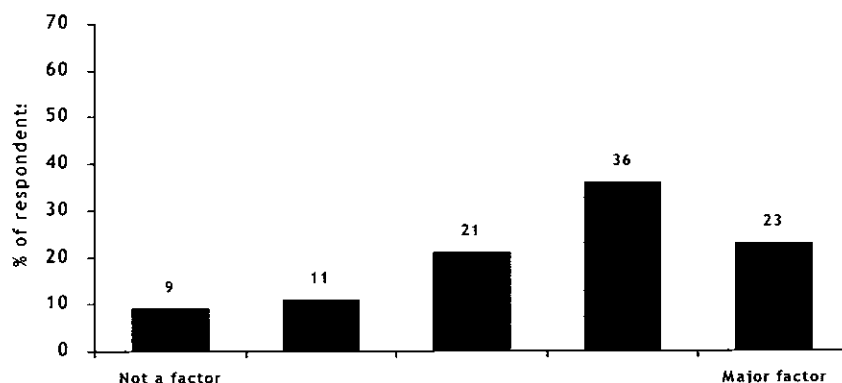


Figure 55. *More product choices will be available over the Internet (by web strategy).*



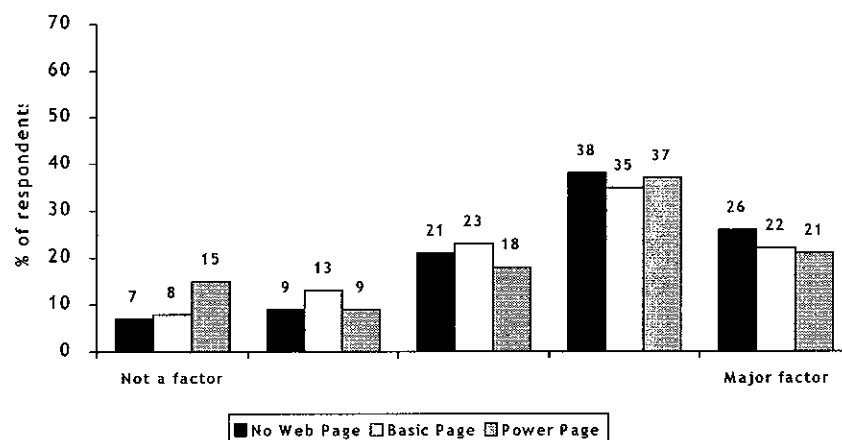
When asked to respond to the statement, “Prices for products will be lower if purchased over the Internet”, respondents were in general agreement overall. The ability to obtain lower prices on the Internet was seen as a major factor in the expansion of e-commerce by 23 percent of respondents, and an additional 36 percent leaned in this direction (Figure 56).

Figure 56. *Prices for products will be lower if purchased over the Internet.*



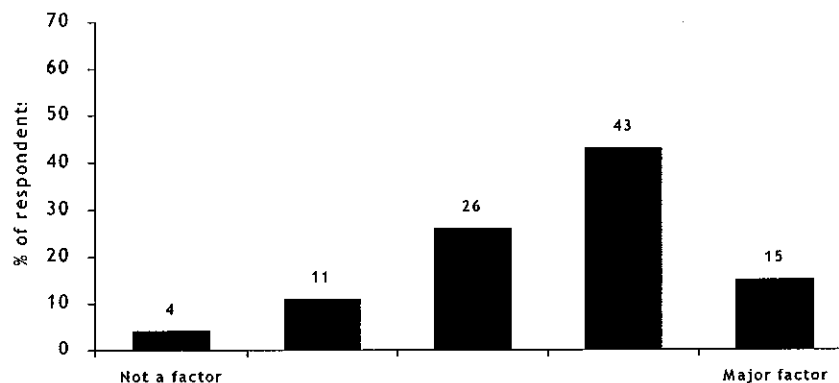
There were differences in opinion across the three web strategy classes. It is interesting to point out that respondents with more advanced web strategies reported slightly more skepticism about the influence of prices, in comparison to non-users and basic users. Power users were more likely to say that lower prices ‘were not a factor’ in influencing adoption (15 percent), compared with 7 and 8 percent for non-users and users, respectively (Figure 57).

Figure 57. Prices for products will be lower if purchased over the Internet (by web strategy).



The simplicity of obtaining information over the Internet, measured by participant reaction to the statement “Information can be obtained more easily over the Internet” was seen by 58 percent of the respondents as a significant factor influencing farmer adoption of Internet purchasing (Figure 58).

Figure 58. Information can be obtained more easily over the Internet.



When respondents were segmented by firm type and by web strategy, significant differences were observed across classes. Those respondents with an “other” firm type classification were most likely to consider ease of obtaining information an important factor influencing adoption (74 percent), compared with other firm types (Figure 59).

In addition, respondents classified as power users tended to weight ease of obtaining information more heavily (67 percent) than non-users (47 percent) and basic users (59 percent), as an influencer of farmer adoption and Internet purchasing. Non-users were most likely to carry a “neutral” opinion (Figure 60).

Figure 59. Information can be obtained more easily over the Internet (by product focus).

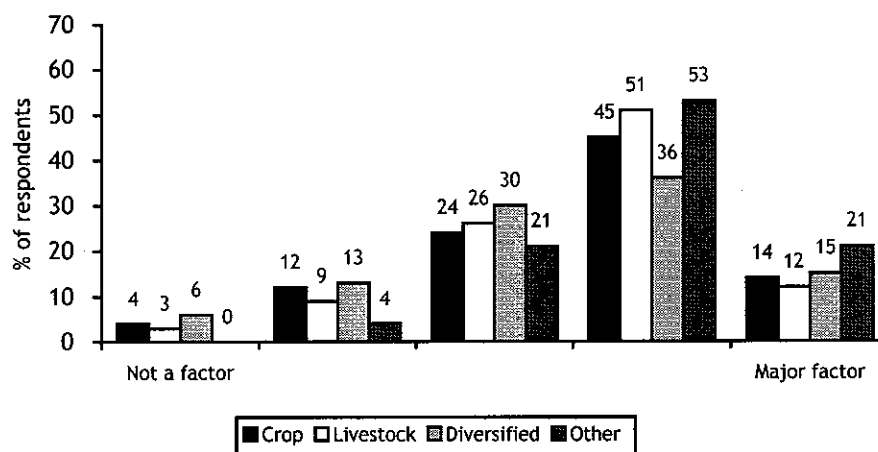
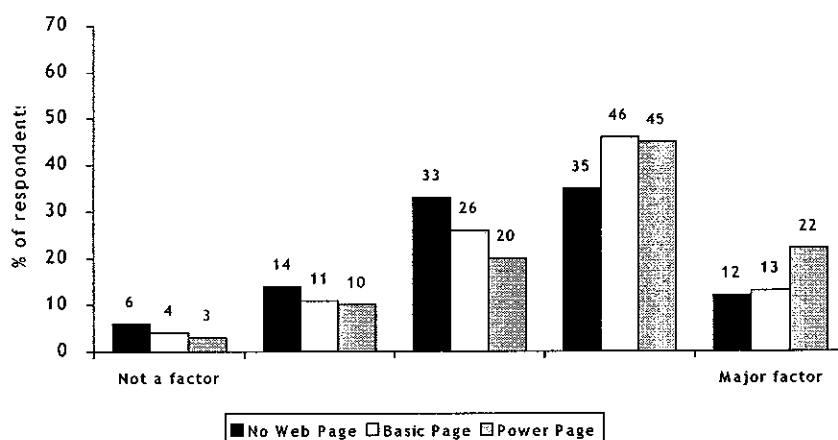


Figure 60. Information can be obtained more easily over the Internet (by web strategy).



Summary

At the time of this survey, e-commerce in agriculture is still in its infancy. This project has provided some insights into the current state of e-commerce adoption by agribusiness firms. In addition, the survey has provided some insights into manager attitudes toward barriers to e-commerce adoption, and catalysts that will encourage e-commerce adoption. In general, large firms have more fully developed e-commerce strategies. Likewise, those firms who are early and aggressive users of web pages are more bullish on the future of e-commerce in agriculture. Dealers hold the most reservations about farmer adoption of e-commerce. Much will be learned during the next few years as these strategies unfold and firms better understand where this information technology adds value and where it does not in the agribusiness industries.

Appendix: Questionnaire

<p>1999 Center for Agricultural Business Internet/E-Commerce Survey</p> <p>Help us better understand your company's use of the Internet and Electronic Commerce. When completed, please fax your responses to:</p> <p>Center for Agricultural Business Purdue University FAX: 765-494-4333</p> <p>All responses will be kept completely confidential.</p>
--

You and Your Company

1. What is your position/area of responsibility within your company? ☒ *appropriate response.*

- ☐ President/CEO/Owner
☐ Vice President/General Manager/ Division President
☐ CFO/Controller/Treasurer/Finance
☐ Marketing (Manager, Director, Product)
☐ Sales/Sales Management
☐ Production/Operations/Distribution/Logistics
☐ Human Resource Manager
☐ Research and Development
☐ Other: _____

2. What are your company's primary business interest(s)? ☒ *those your company is involved in and CIRCLE your operating unit's business interests.*

- | | |
|---|---|
| <input type="checkbox"/> Advertising | <input type="checkbox"/> General supply |
| <input type="checkbox"/> Animal health | <input type="checkbox"/> Government agency |
| <input type="checkbox"/> Association | <input type="checkbox"/> Grain merchandising/Processing |
| <input type="checkbox"/> Chemicals | <input type="checkbox"/> Lending |
| <input type="checkbox"/> Consulting | <input type="checkbox"/> Livestock equipment |
| <input type="checkbox"/> Crop equipment | <input type="checkbox"/> Seed |
| <input type="checkbox"/> Education | <input type="checkbox"/> Trade publications |
| <input type="checkbox"/> Farming/Ranching | <input type="checkbox"/> Other media |
| <input type="checkbox"/> Feed | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Fertilizer | |

3. Your company is best described as a: ☒ *all that apply.*

- ☐ Manufacturer ☐ Dealer
☐ Distributor ☐ Other: _____

4. Your company is: ☒ *appropriate response.*

- ☐ A Cooperative ☐ Publicly held
☐ Privately owned ☐ Other: _____

5. The scope of your operating unit's distribution of products/services is: ☒ *appropriate response.*

- ☐ Local ☐ National
☐ State-wide ☐ International
☐ Regional (multiple state)

6. What is the gross annual sales of your operating unit/total company? ☒ *only one in each column, based on 1998 sales figures.*

Operating Unit	Total Company
<input type="checkbox"/>	<input type="checkbox"/> Less than \$10 million
<input type="checkbox"/>	<input type="checkbox"/> \$10 million - \$49 million
<input type="checkbox"/>	<input type="checkbox"/> \$50 million - \$99 million
<input type="checkbox"/>	<input type="checkbox"/> \$100 million - \$499 million
<input type="checkbox"/>	<input type="checkbox"/> \$500 million - \$999 million
<input type="checkbox"/>	<input type="checkbox"/> \$1 billion or more

General Opinions

☒ Please give us your opinion on each of the following statements, rated on the scale from Strongly Agree to Strongly Disagree.

	Strongly Agree	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
E-commerce will fundamentally change the way we do business in our industry in the next three years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The emergence of e-commerce will greatly reduce the role for local dealers in our industry in the next three years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E-commerce will improve my company's ability to manage inventory in the next three years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Information about increasingly complex products is difficult to provide over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Farmers are unwilling to buy products on the Internet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Personal relationships with customers are difficult to be develop over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distribution (logistics) issues will limit sale of my industry's products over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Use of Internet and Electronic Commerce

7. What proportion of your end-user customers:
✓ appropriate responses.

	None	1-5%	6-15%	16-25%	26-100%
Communicate with your company by e-mail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Place orders for your products over the Internet (but still make payment by mail or traditional means)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Place orders and make payment for your products over the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. With what proportion of your suppliers, does your company:
✓ appropriate responses.

	None	1-5%	6-15%	16-25%	26-100%
Communicate with your suppliers by e-mail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Place orders for their products over the Internet (but still make payment by mail or traditional means)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Place orders and make payment for their products over the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Does your company have a web site? ☐ Yes ☐ No

If yes, ✓ all of the features found on your web site.

<input type="checkbox"/> Technical information about the products that you sell
<input type="checkbox"/> Pricing information for the products that you sell
<input type="checkbox"/> Background information about your company
<input type="checkbox"/> A dealer directory (information on where your products are sold)
<input type="checkbox"/> Links to industry trade associations
<input type="checkbox"/> Links to other data/information sources (e.g., USDA, universities)
<input type="checkbox"/> Online ordering (but traditional means of payment)
<input type="checkbox"/> Online ordering and payment
<input type="checkbox"/> Online communities (i.e., chat rooms, bulletin boards, message centers, virtual coffee shop, etc.)
<input type="checkbox"/> Areas with content customized to different audiences or individuals
<input type="checkbox"/> A password protected area, only accessible to registered customers or suppliers
<input type="checkbox"/> Other (please specify): _____

If no, does your company expect to develop a web site? ✓ appropriate response.

- ☐ NO
☐ YES, in 1999
☐ YES, in 2000
☐ YES, but not sure when

10. Several reasons have been suggested as possible barriers to farmer adoption of e-commerce. For each of the following potential barriers, rate the barrier on a scale from "Not a Barrier" to "Major Barrier".
✓ appropriate responses.

	Not a Barrier	Major Barrier
Farmers do not have Internet access.	<input type="checkbox"/>	<input type="checkbox"/>
Farmers lack the required funds to make Internet purchases.	<input type="checkbox"/>	<input type="checkbox"/>
The Internet offers limited ability to provide product recommendations to farmers	<input type="checkbox"/>	<input type="checkbox"/>
The Internet offers limited ability to provide after sale service to farmers.	<input type="checkbox"/>	<input type="checkbox"/>
Farmers are unable to find desired information conveniently on the Internet	<input type="checkbox"/>	<input type="checkbox"/>
Farmers question the security of e-commerce.	<input type="checkbox"/>	<input type="checkbox"/>
Farmers question the privacy of e-commerce	<input type="checkbox"/>	<input type="checkbox"/>

11. Several reasons have also been suggested that support rapid adoption of e-commerce and purchasing over the Internet by farmers. For each of the following reasons why farmers will buy products over the internet, rate the reason on a scale from "A Factor" to "Major factor".
✓ appropriate responses.

	Not a Factor	Major Factor
Prices for products will be lower if purchased over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>
Information can be obtained more easily over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>
More product choices will be available over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>
Buying over the Internet is more convenient than traditional channels.	<input type="checkbox"/>	<input type="checkbox"/>
It is easier to make product comparisons over the Internet.	<input type="checkbox"/>	<input type="checkbox"/>

12. What percent of your sales (in \$) are made via the Internet?

	Currently	3 years from now
Order placed on the Internet, but payment made by mail or traditional means	_____ %	_____ %
Order placed and payment made on the Internet	_____ %	_____ %

FORMANUFACTURERSONLY:

13. What percent of your sales (in \$) are distributed?

	Currently	3 years from now
From manufacturer to distributor to dealer to farmer	_____ %	_____ %
From manufacturer to dealer to farmer	_____ %	_____ %
From manufacturer to farmer	_____ %	_____ %
Total	100 %	100 %