Impacts of E-commerce and Information Technology on Global Agricultural Markets: Implications for Research Priorities, Policy Issues, and Data Needs

May 29–30

Day 1

I. Context: Susan Offutt, Economic Research Service, Administrator

For agricultural economists generally, there are many reasons to consider the evolution of e-commerce and the use of information technology in the food and agricultural system. But there are a few reasons that make the inquiry of particular interest to the Economic Research Service, and they have primarily to do with the intersection with Federal policy and programs.

One of the areas of interest is the impact of E-commerce on industry concentration through its effects on the methods firms use to coordinate production and distribution. Information technology should allow consumer preferences to be transmitted through the supply chain to farmers and thereby facilitate product differentiation. Is this what will happen? When food safety or product origin is at issue, will information technology make traceability easier or not? It certainly provides an infrastructure that might allow for this eventuality. How are cost savings and efficiencies associated with adoption of information technology related to vertical integration? To what extent does information technology facilitate concentration?

From another perspective, USDA has long had the role of leveling the playing field by providing information to a broad set of actors in agricultural markets. If information technology facilitates vertical integration, does it reduce transparency? What happens to transparency as the volume of products traded in traditional terminal and wholesale markets declines? Exchange is moving to bilateral channels where large retailers or food processors or food wholesalers acquire produce directly from growers or growers shippers. What happens to transparency and to price reporting in those circumstances?

A second relevant aspect for policy concerns differential effects across farms and agribusinesses of the adoption and use of this new technology. There are marked differences in cost structure and adoption of business practices across farms in the U.S. The smaller the farm, the more likely it is to sell into cash markets, as opposed to using some form of contract. Are there producers who are “left out” when information technology is used to facilitate contract sales? The Congressional direction for mandatory price reporting makes it clear that there are worries about people who may be left out of this changed information flow. Thus the distributional impacts of the adoption of
information technology are important. New technologies are often seen as being disadvantageous to small farms. Is this true for information technology? Or does this make access to knowledge easier and actually improve their wellbeing by reducing the costs of gathering and processing information?

II. Keynote Address – Old Economy, New Economy, Information Still Rules

Robert Kauffman, University of Minnesota:
Electronics and Electronic Commerce: Survey and Directions for Research

Economics has a number of different levels of analysis which are very effective for studying and examining some of the phenomena that go along with a change in technology such as within markets and the way that people interact. One can look at decision-makers, products, business processes, firms, and the interactions that they have in marketplaces, the structure of markets themselves and then aggregation into the economy that we see—the digital economy. The Internet allows for the rapid collection of data about phenomena in ways impossible to do a few years ago. Economics and econometrics provides us with the opportunity to be able to understand the mass of information we can now collect.

- Technology Level and Network Externalities
  - On the technology level we see things like software agent technology being available for use in e-commerce. Within the area of middleware between marketplaces and companies, we see the opportunity to look at developments from the point of view of network externalities and standards—lots of impetus for trying to understand what will be next and who will adopt it that way. There’s lots of opportunity to look at the way game theory can inform our understanding of how marketplaces develop in the presence of software agents. One of the things that people have talked quite a bit about in the past few years is the extent to which electronic agents will be trading on behalf of companies.
  - Economic theory would suggest some initial concern for the network size. Almost any decision about a given technical solution will be risky until it becomes clear that there is sufficient base for the solution to become cost-effective and value-effective as a network. As a result of that we see that in many instances within e-commerce that there have been standards competition among e-commerce solution providers. We see contested grounds in areas of, for example, of Internet-based business-to-business procurement markets. As well as among the companies that provide the technologies that power business infrastructure for e-commerce. Certain firms will win, not because one standard is better than the other, but rather that there were path dependencies in the marketplace-announcements that would be made by certain companies that would drive interest in one or the other of these standards. The reality of this
marketplace is that everybody is looking to see to the extent that they can how network externalities will play out. They’re all looking to see who’s going to get the first big boost in the marketplace so that there will be an obvious decision coming. Everybody will jump on the bandwagon. But it hasn’t happened in four years. Economic theory might predict that all one firm has to do is get one unit more in install base and then the market game is done. But there are too many other wrinkles that are going on in the marketplace. Timing however has been the big gamble in this particular marketplace. Who do you bet on?

- **Business Process Level**
  - Clearly information technology in a lot of business context today—a lot of industry context today—is all about mass customization. Mass customization provides the opportunity to create individual bundles—bundles that people are much more willing to pay a higher price for. So economics predicts that in this sort of competitive environment it’s most important for a competitor to know its consumers as opposed to worrying about the nature of combat and competition among other players that are doing this. If you know your customers well—if you’re able to really design and deliver to their specs, you’re going to have a place in that marketplace. The internet allows us to use technology to selectively commoditize products and to bring liquidity where there was none before.
  - On the business process level there are opportunities also to look at the economics of design—to try to understand whether or not a design is efficient and effective with respect to the kinds of business that’s being supported. There are many opportunities to examine IT value from the point of view of productivity and price recovery—whether more is produced more efficiently and whether companies can sell things at higher prices—because the value is uniquely expressed and people are willing to pay. Also, there are many opportunities also to look at competition between competing business processes for the same sort of thing.
  - The problem of adopting information technology in your business process is extremely important. Suppose one company decides to offer electronic trading and transactions while its competitor does not. At first, the non-adopter loses only a few marginal customers; however, these customers tend to be the most “savvy” and lower cost customers to service. Once these customers leave, the non-adopter has higher average costs of servicing their customers. The word then spreads to other clients that the internet mechanism is quite simple, so these clients also switch to the technology adopting company and so on until the non-adopting company is left only with high-cost customers.
  - When you add agents to the business process, it truly levels the playing field. Typically software agents are instructed to care about price and which allow for wholesale comparison for prices that buyers/sellers could not get
anywhere before.

- **Market Level and Intermediation**

  At the level of the market, once again we see tremendous opportunity with the application of auction theory to the operation of marketplaces on the World Wide Web. The research that was being done in the late 50s and into the 1960s, today is being reborn in this new technological context. How do we design a market to work well in e-commerce? Well you don’t build that set of ideas from scratch. You look to the people who figure out how to build financial markets. The designers of NASDAQ, the New York Stock Exchange, the London Stock Exchange, and so on. In addition there’s a whole set of theories that go along with intermediation and what’s optimal to do and who benefits and how the benefits are shared. Not every situation that we’ve seen in the last several years matches the predictions of the theory.

- What about electronic markets and e-intermediation? It’s as though today everybody has their own place that they can go to get digital data. If you’re a farmer, well perhaps, you’ll go to rooster.com. The reality however is that intermediaries, particularly electronic intermediaries on the Internet are all a matter of operation efficiency and market efficiency. There was a time when entrepreneurial players believed that it was possible to build a digital intermediary in just about any niche. Well, unfortunately many of these early niches were not sustainable because people could go to other marketplaces beyond the group buying marketplace where everybody went—the equivalence again of K-Mart and Wal-Mart on the Internet and get low, low prices all the time.

- Value chains very often tell the story. Value is added and selling prices increase along a chain involving a producer, wholesaler, retailer, and consumer where the selling price is dramatically higher for the consumer than it is for the value that the producer added. This is simply value that’s being added in packaging and delivery to the location where the consumer is. When you start to cut out those middlemen, you can find out that there will be quite a bit of money that there is to be saved there. This may motivate the movement of some electronic intermediaries to the market. When you move to an intermediary in the marketplace, the net market model, what you do is expect to connect through websites. Well, the net market phenomena is one that we’ve seen since about 1998 and for the most part these net markets have been public and open entities. But the reality is that we’re now moving into a world where greater value is seen accruing when networks are put together for these kinds of procurement transactions in coalition form—multiple companies going together. No individual player would be able to win by building its own solution. Also, potential intermediaries recognized that if all they’re in the business of doing is providing those basic market functions of aggregation matching and facilitation—bringing buyers and suppliers together—but not providing for
the management needs and not providing for the adaptation necessary to make technologies talk, you don’t have a solution. The intermediaries that will survive will be primarily determined by how well they are able to fulfill these other roles of providing for the management needs of market intelligence, managing business relationships, transforming business processes, and then helping with systems integration defining standards, and actually letting companies outsource all of this stuff so they don’t have to deal with it.

III. Session One: E-commerce and IT: Implications for International and U.S. Trade

Carolyn Freund, Federal Reserve Board:
Impacts of E-commerce on International Trade

The Internet stimulates trade. Using a gravity equation of trade among 56 countries, we find no evidence of an effect of the Internet on total trade flows in 1995 and only weak evidence of an effect in 1996. However, we find an increasing and significant impact from 1997 to 1999. Our results imply that a 10 percent increase in the relative number of web hosts in one country would have led to about 1 percent greater trade in 1998 and 1999. Surprisingly, we find that the effect of the Internet on trade has been stronger for poor countries than for rich countries, and that there is little evidence that the Internet has reduced the impact of distance on trade. The evidence is consistent with a model in which the Internet creates a global exchange for goods, thereby reducing market-specific sunk costs of exporting.

Tara Smith, Promar International:
Reaping the Cyber Harvest: E-commerce and Trade in Food and Agriculture.

The potential benefits of e-commerce are overwhelming. Seven percent of international trade is just paperwork. E-commerce also opens markets to new players. And it increases the competition. The hurdles are the following:

- **Trust** – making sure you don’t get cheated.
- **Technology** – not all regions or countries are created equal. Some important agricultural regions lack the basic technology to make E-commerce work.
- **Regulations** – protection is very high for food and agriculture.
- **Traits of the goods** – in the food and agricultural industry a lot has to be done in person. In a lot of food products there are no standards and standards are important to trade over the Internet. In developed countries, larger business and bulk commodities markets may already be as efficient as you can expect them to be. It is the specialty commodities, small businesses and small countries that may have more to gain.
Andrew Loder, Cargill International:
Capitalizing on Global E-Business Opportunities in Agriculture

The Internet and its presence in agriculture are not dead. It has infiltrated every aspect of modern life already. Even though much of it doesn't work particularly well at the moment, it’s still the biggest thing that has happened in our lifetimes. Amidst all the gloom and doom you’ve been hearing, you may not have noticed that on-line sales in the first quarter of this year totaled $7 billion dollars and is up 34 percent over last year. E-business is here to stay. We would all be wise to continue to seek ways to create value for our customers by using it.

The five lessons we have learned this past year will help us do this faster and better.

- First, if you build it they will not necessarily come. It has to meet a particular need.
- Second, even if they come you will not necessarily make money. It is easy to get information off some sites but actually do the buying elsewhere. Consider carefully ways to capture value for the service you provide.
- The third lesson is that speed to market, though important, is not as important as functionality. If your business plan isn’t sound, and if your technology is not user-friendly, it won’t matter that you were first to market in your sector.
- Lesson four is that everything will be more expensive and slower to implement than anticipated.
- Lesson five, is that it is not about technology, it is about creating value for the customer.

We see ourselves as using the Internet to put the farmer closer to the world market. One obstacle at this time is that connectivity is still a problem in the U.S.

IV. Luncheon discussion: Retailing

Jonathan Seltzer, Corporate Resource, Inc.
E-commerce’s Effect on Food Retailing and Supply Chains.

The impact of the Internet on processor, producers and policy markets will continue to accelerate. However trying to measure what is going on will be very challenging. The main points are the following:

1. All participants in the industry will be able to benefit and use the Internet but in different ways.
2. There will be profound changes in how services such as transportation and warehousing are used.
3. We will be operating with lower inventory levels.
4. Trading partners, suppliers and retailers are going to communicate much more effectively than they have in the past.
5. Promotions are going to change.
6. Terminal markets will be less reflective of the total volume of business. Similar to the "Dot.com industry" in general, the impact of the Internet on the retail food industry will continue to shift from being a "business" in itself, to a tool for innovation. Being on the Internet will not be the objective, rather the Internet will be one of many management tools.

There are two factors that will drive the impact of the Internet on the retail food industry:
1. Can someone, or company, develop a proprietary technology that makes a difference?
2. Are standards, product codes, established that enable information to be smoothly exchanged?

There are five factors affecting retail food, and by implication, the entire supply chain.
1. Diverse, and often competing, consumer preferences that add to the number of retail items and subsequent supply chain complexity. How often do you see someone go to McDonald’s and order a Big Mac super sized and a diet coke?
2. Labor expenses and availability.
4. Supply Chain inefficiencies as exemplified by Wal-Mart’s success. The growth of Wal-Mart and its use of technology are major research issues. It has encouraged the entire supermarket industry to look at their supply chain inefficiencies.
5. There is a problem with lack of standards.

Concentration at retail, five companies with a 40% retail grocery market share. This is not a result of the Internet. Concentration was started a long time ago. You are going to see with the Internet however an ability of a chain to better manage its different remote subsidiaries and divisions. You will see significant changes in relationships. When you have intermediaries that are not providing on-going value they are going to be continually challenged.

The stages of e-commerce at retail have run from 1998 to 2001. The first is procurement or just plain old-fashioned dotcoms. It had to be on the Internet and they were IPO driven. In 1999 we started to see some supply chain animals. Dell is one example as well as GM and Wal-Mart. In 2000 came the industry verticals such as Transora, Worldwide Retail Exchange and Global Net Exchange. They are collaborations of competitors. They can start moving into collaborative planning, forecasting and replenishment. This may encourage standards in the grocery business. They are requiring different producers to start utilizing these electronic exchanges. The fourth stage is what we are looking at now. Producers may be unwilling to pay the commissions of say Agribuys.com if they want to sell to Safeway. Worldwide Retail Exchange selected Agribuys.com as their produce
portal. Agribuys.com is an application service provider. They do things like match invoices and make sure bills are paid on time. There are also some transportation exchanges. The retail food industry will get more and more interested in transportation and warehousing exchanges. With companies like Webvan and Peapod, the important thing is not being on the Internet, it is the delivery. There is a certain niche for providing home delivery.

Products have to be right. The internet is the ultimate form of market research.

The main issue in e-commerce is standards. The development of standards will be absolutely critical. With companies like Transora and Worldwide Retailer Exchange what is the return on investment that they are going to demand? The supplier/customer relationships will continue to change. The role of the intermediaries will continue to be a topic of interest. And the all-time issue is brand. You need to be able to establish a brand.

V. Session Two: Use of Information Technology in the Food Systems of Selected Countries

United States: Paul Patterson, Arizona State University
E-commerce has proceeded through four stages of development: the advent of the dotcoms, subsequent brick and mortar investments in the Internet, the development of industry verticals or consortiums, and finally the recent rationalization or the decline of the dotcoms. This later stage has resulted in consolidations, the formation of alliances, firm closings and a focus by some of the dotcoms. There were 40 proposed trading sites for produce in 1999; by 2001 there were less than 10.

The B2B exchanges hold the promise to improve pricing efficiency and bring about reductions in marketing and productions costs. However, the competitive trading environment that would bring about this improvement in efficiency has not arrived. Many exchanges are organized to facilitate private transactions. They do little to offer more information to the market and hold open the possibility for imperfect competition.

Trade in produce presents some special challenges, given the lack of product standardization that is applied in actual commerce. Furthermore, the large number of products of varying quality only further complicates the matter.

United States: Albert Kagan, Arizona State University

Professor Kagan discussed the issue of Electronic Commerce (EC) as it pertains to the perishable sector. The emphasis of the presentation was upon the implementation issues of web sites and the Internet presence.
As firms begin to use the Internet as an extension of their established business model, certain issues need to be addressed. The aspect of standards as they relate to software development and the interface of business partners needs to be integrated across the channel. Security concerns regarding data transmission, storage, and retrieval have to be considered as part of the EC model. Cost containment and workflow efficiencies are the primary objective of the EC implementation with respect to organizational structure.

The use of Web site features has become an integral portion of the EC model for the produce sector. Firms are required to understand the various aspects of the Business to Business (B2B) interface in order to design the Web-site for maximum effectiveness. Many features such as help screens, inventory monitoring and tracking, EDI/EFT drivers, secured server capabilities and easy to use navigation aids are being placed on the Web presence. These features are beginning to resemble Business to Consumer (B2C) features.

**Latin America and Mexico: S. Kenneth Shwedel, Rabobank Mexico**

We differentiate between e-commerce and e-business. E-commerce is just the buying and selling electronically. E-business is the much larger activity. This is from the point of view of the firm. The firm will use E-business as a strategy. E-business creates economic advantage, concentration, and gives a company a significant advantage. It also creates barriers to entry.

- **Infrastructure** - Internet penetration in Mexico is low but it is not the whole story.
- **Capital markets** - in the U.S. there was a lot of capital available but not so in Mexico. The capital markets are still small and developing. A large amount of the capital comes from outside the region.
- **Regulatory environments** - contract law needs to be developed. Price controls, import and export controls are important. The institutional environment support is radically changing. The credit systems differ from country to country.
- **The market structure** - the wholesale market is important within the region and suppliers and middlemen are important sources of capital.

It is estimated that by 2005 there will be about 75 million Internet users and a population of about 500 million in Latin America. The size of the market tends to be small. But the users represent an important market segment. It is estimated that about 90,000 farmers out of over 200 million farms have access to the Internet. In Argentina about 10 percent of the wealthiest of farmers are using the Internet. Most of the large and mid-size agribusiness companies are connected to the Internet. Some multinational companies are also connected and
developed or are operating e-business strategies.

Latin America will play a small role overall in the market. The Internet has leveled the playing field between the U.S. and Mexico in terms of available information.

The revenue sources are not different. Most of the sources of revenue come from sales of other services, information, books, magazines and some advertising. This is more important than commissions on sales.

The Rabobank study looked at the number of Internet sites in Latin America. They identified 48 sites. Thirty-two are still alive. In Brazil there were 13 of which three are still around. In Mexico there were seven of which five are still around although one is up for sale now. Some have changed their business plans and others have gone into consulting business. In other words, what is taking place in other parts of the world is taking place in Latin America. The problem was that the businessmen failed to understand the market and the business conditions. Businesses are developing e-business models to coordinate supply chains as well as expand market opportunities. Some are concentrating on procurement and logistics.

**Japan: Rachel Howe, Cyberworks Japan**

There were overly high expectations about the impact of the Internet in Japan. There was the perception that Japanese businesses would be radically transformed and that U.S. business models could be transferred wholesale into the Japanese market.

1. Positive implications for foreign firms: Japanese firms and government have historically been reluctant to accept foreign investment, however FDI doubled in ’99 and was up markedly in 2000. This in part reflects a change in attitudes among bureaucrats and business leaders about the threat of foreign capital.

2. There are structural differences between the Internet in the U.S. and in Japan. The landline based, PC-based Internet never really took off in Japan. Japan lags far behind the U.S. and also behind a number of Asian nations with respect to Internet penetration through traditional telephone lines. This is true in terms of revenues as well. This gap is smaller in the B2B market however.

The Japanese are two years ahead of the U.S. in terms of mobile Internet access however. There were over 30 million users for mobile services as of the end of the first quarter 2001. If you want to reach the end consumer in Japan, you have to develop two e-commerce strategies, one for the traditional land-line-based Internet and one for the mobile-based Internet. This is due in part to the fact that the PC penetration rate in Japan is lower than in the U.S. However Japan’s use of the cell phone is much higher. Last quarter the number of subscribers to cellular
systems surpassed the physical landlines.

3. Some of the food and agriculture related sites in Japan. Last year there were over 27,000 cyber shops registered in Japan. Eight hundred fifty four of them were categorized as agriculture and fisheries related. Three thousand two hundred said they were primarily food and beverage related sites. Thirty of them said that they were malls where they had multiple tenants that were exclusively devoted to food, beverages or agriculture. Seven thousand six hundred other non-food exclusive shops said that they featured some sort of food or beverage on site.

There are some innovative, start-up type business models, including a site by a group of 25 university students who are selling organic food online. And there are online supermarkets with same day delivery. However, most of the sites are online initiatives of established players.

So, when we think about the impact of the Internet on a very traditional industry and a highly regulated industry, an industry where there are WTO sanctions on import quotas, etc. basically the rule of thumb is that you’re unlikely to see anything happening online that is not happening in the real world first. You are unlikely to see the Internet radically change established business practices unless there is some domestic constituency driving that change.

**Turkey: Barak Ar, Private businessman, Turkey**

Turkey has a population of about 66 million. The average age is 27. Turkey has been adopting an open market policy since 1980. The total number of companies is about 1 million. There are about 2 million internet users. There are nearly 30,000 dotcoms. There are 10,000 active e-commerce sites. Internet cafes are very common. There are about 6,000 at the moment. There are about 17 landlines in Turkey and about 17 million mobile phones. There has been a rapid growth in digital television. There are no taxes on European manufactured goods imported into Turkey. It is under discussion for agriculture. He is working on the establishment of a Turkish futures market.

There are about 102 exchanges around the country which act as places to resolve disputes if you trade in a commodity you bring the invoice to the exchange and register it. You pay a 2 percent tax.

**Egypt: Glenn Rogers, USAID, Egypt**

The Egyptian government has shown a commitment to information technology as has USAID. The Egyptian government has a newly established telecommunications regulatory authority to oversee the development and regulate the IT sector.

Egypt will have a large surge of entrants into the job market over the next couple of years. How do you link a disruptive technology to a short-term transition period?

AID will be providing assistance to implement and improve the legal and regulatory framework including draft telecommunications
e-business and other ICG related laws, regulations and procedures.

VI. Wrap-up Day 1: Research Priorities, Policy Issues and Data Needs

Sally Thompson – University of Illinois

What are the market performance implications of E-commerce?

E-commerce can go a long way towards lowering transactions costs and reducing barriers to entry. But, markets perform well for most of the major commodities in Illinois and there is little market failure that could be remedied by e-commerce. One of the reasons there has been much difficulty in successfully establishing e-commerce sites in agriculture is that there is not a great deal of slack, or inefficiency, in these markets. The markets for many commodities are fairly competitive, highly liquid and well functioning. However, in a few years agribusiness firms in Illinois and elsewhere will no longer be conducting paper transactions and all financial transactions will be electronic. Electronic transactions and management information systems may be the most promising value-added opportunities for e-commerce in agriculture.

Markets for specialty crops that are thin as well as developing countries can benefit from e-commerce right away through reductions in transactions costs and improved liquidity.

Some of the research questions involve access issues and the digital divide. How big do you have to be to play in these e-commerce systems? If they are going to be closed systems, what do you need to be in the club? Who or what is going to design the rules of the game? How much price discrimination will be possible through closed e-commerce systems?

Another question is how much does geography matter in agriculture? How will the Internet influence the importance of spatial monopolies?

Several researchers are now looking at e-commerce prices and comparing them to bricks-and-mortar prices. Open e-commerce systems can correct markets failures for a while, but huge arbitrage opportunities will not persist for long. XSAG.com helped identify arbitrage opportunities in agricultural inputs, but then input distributors met their prices, and overall market performance has improved as a result. Once the arbitrage opportunities are identified and eliminated, what is the role of these e-commerce sites?

Rolf Mueller, University of Kiel
Obtaining data. Conventional commerce in agribusiness is usually well covered by national statistics. Reliable data on agribusiness E-commerce are, in contrast, in short supply. Government statistics are, as yet, largely moot on the subject. To remedy the situation, researchers have to collect and process their own data by collecting primary data form people involved in E-commerce and from E-commerce websites.

Primary data collection is tedious and expensive. When performed by researchers by means of questionnaire surveys, responses are probably biased because of self-selection on behalf of the respondents. Furthermore, samples tend to be small and results may not always be readily available for use by others. Furthermore, in order to obtain access to E-commerce clients, researchers often require the assistance of E-commerce firms. The firms, intentionally or not, are likely to bias the focus of data collection towards issues that are of interest to the collaborating firms and that may have little public relevance.

Because of their reputation in the industry, public agencies are often in a better position to elicit the collaboration of survey respondents. Furthermore, if they have to collaborate with private E-commerce firms at all, public agencies are in a better position to deflect or ignore special interests of collaborators. Public agencies, finally, are also better positioned to make data available to bona fide researchers and to detect and prevent misuse of data.

One of the marvels of digital information technology is its capacity to avoid tedious and error-prone manual data capture and recording. Many E-commerce data of interest to economists, e.g. price and quantity data, reside in computers and should be captured at source for electronic transmission and processing elsewhere. Also, characteristics of E-commerce establishments can be harvested with suitable software tools, e.g. web crawlers that roam the web and automatically collect information on and from websites for reporting back to their home base.

Public research agencies could encourage the use of automated tools for E-commerce data capture by evaluating such tools, by providing a repository of non-proprietary tools and, if non-proprietary tools are unavailable and/or proprietary tools are prohibitively expensive, by encouraging the development of affordable tools.
Organizing data into information. To become information, data must be organized into some structure and be interpreted in the context of some theory. Our ability to turn data into information is, at present, constrained by a lack of a commonly accepted, standardized terminology for describing E-commerce activities by agribusiness firms. This lack renders communication among specialists unnecessarily complex and is likely to cause confusion and rejection of E-commerce by the uninitiated. ERS is probably in an excellent position to encourage the development of a commonly accepted terminology for agribusiness E-commerce.

We have as many theories as we have business models and theory doesn’t help us much to organize all the empirical evidence we have. Transaction costs is at this point not operational. We need empirical evidence. On the theory of exchange, there is not enough theory on physical products. Studies similar to the one that Goolsbee did on the insurance market are likely.

What will the external environment that is under the control of the government be. There is a question about infrastructure. What impact will various policies that were put in place for another purpose have on e-commerce? There are standardization issues: How do we settle disputes, how do we define products? Economists cannot in general contribute to designing systems however they can warn people.

Charles Moss, University of Florida

The issue is really one of institutional economics. He formerly had no faith in institutional economics but is now convinced that institutions matter. If they matter then there is path dependence. We are where we are as a result of a sequence of events that occurred in the past. As economists we want an optimum but there isn’t any. The transaction costs of moving to another arrangement are higher than the inefficiency. The Internet reduces the transaction costs. And the reduction in costs you have changed the optimal degree of vertical integration in the channel. But you have also decreased the economies of scope. What are the transaction costs, how significant are they and how stable is the channel? E-commerce is good at reducing search costs but if there is a transformation involved the issue is different.

On the supply side niche markets may be important. E-commerce may be more important for niche market than for non-niche markets states. Niche market commodities are more and more important. How much room is there for this type of niche market commodity?

Hamid Mohtadi, University of Minnesota

Identity preservation will be increasingly important. How do you design an information system that helps you do this? It also challenges existing subtechnologies such as logistics and
transportation. This seems to be particularly important in the food and agricultural industry.

The Internet helps collect and maintain all the additional information that is needed for trade such as country regulations, tariffs, quotas, and even country risk issues. Some firms provide trade management software that provides highly detailed data on commodities, tariffs, quotas and so on. One of these companies has begun integrating its technology with a supply chain management-based software company.

Why would firms want to share information? Why would they want to withhold information?

How does e-commerce contribute to growth and to productivity? The issue is not yet resolved?

E-commerce is likely to not be important for commodities where markets are efficient however it can be important where there are externalities.

S. Kenneth Shwedel, Rabobank, Mexico

It is important to understand why a firm will initiate an e-business venture. There are efficiencies to be gained through e-business initiatives, especially in areas of procurement and management. Yet we must also realize that e-business is a strategy which can create concentration and it is a strategy which can create barriers to entry.

It is important to approach the definition of policy issues and research priorities from this perspective, i.e. understand the economic motivation and strategies of the actors involved in- and excluded from the e-business environment. Failure to do so will lead to irrelevancy.

Research must be directed into understanding the environment in which e-businesses operate and the applicable business models. For the business models that focus specifically on food and agriculture there are areas that should be looked at: the unique risk environment, non-tariff barriers to trade, perishability, food safety, cross-border market differences and the need for specialized knowledge.

Another area for research is the impact of e-business on companies’ standard operating procedures. There are a number of areas that change. Among these are product development, sharing information and technology transfer.

Along these lines, one of the things that we question is whether e-business strategies will result in changing the optimum structure from vertical integration to vertical coordination to an e-business model?
There are serious policy issues related to the creation, management, and ownership of information arising in the e-business environment. Specifically, many e-business models facilitate information moving from a public good to a private good.

Regarding research, the concept of many transactions being carried-out over e-business sites has the potential to allow us to observe real-time transactions, providing the ability to model these transactions. From there it is an easy step to use the information to answer policy questions and/or develop new policy and business instruments, i.e. risk management tools.

As agribusiness companies change their operating procedures and adopt new business models, it will have an important impact on the way that farmers interact with the market. This opens up a number of research areas for policy determination. For example, where will price formation take place? Will this lead to more or less contracting?

One area that also needs to be looked at is the impact of e-business on rural communities. IT has the potential to strengthen rural communities, but it also has the power to destroy local institutions - be they good or bad. So how do you determine the “good” institutions and what policies should be put in place to protect them?

E-business also has the potential of impacting the rest of the food chain. For example, how important will brands be in the future? Does IT and e-business facilitate traceability? What about food company relationships with consumers: will they attempt to directly market and go around established retail channels?

From a policy point of view, there is the question what is the government's role? Will the government be an active player or a passive observer to this whole process? It is suggested that the government should take an active role in setting standards and trading rules.

DAY 2

I. Session Three: Impacts of E-commerce on Trade

Gordon Hunt, eFruit International:
Buying and Selling Juice on-line: A Case Study for International E-commerce

The objective of eFruit is to make it easier for people to buy and sell commodity lots of juice. The company started two years ago. eFruit is subscription based. eFruit supplies subscribers information it thinks its clients need. eFruit wanted something
people would use everyday. The industry itself is fairly archaic and very parochial. eFruit had to spend a lot of time teaching people what the Internet is. It started with being a spot marketplace for excess inventory. eFruit was told by its clients that it needed logistics, financing, insurance, quality control, advertising, etc. But what is the market? There are dozens and dozens of members of the community. eFruit is trying to bring as many as possible into the community. It wants to collect all the information necessary for processing the sales order into one document. If one is talking about an international sale, there can be up to 22 documents. eFruit want to put all the documents online.

Originally started with the spot market which is about 20 percent of the business. But that is not the way people do business. The current system allows subscribing firms to do both spot market and contract market transactions. On the spot market firms can decide whether to reveal themselves or remain anonymous right down to the final negotiation. In the contract trading, eFruit developed targeting features. Buyers send fees only to the approved authorized suppliers.

The technology is new and exciting. Efruit hasn’t even begun to make full use of it. Market places will be global and neutral. None of the market places that major corporate entities have set up have worked yet. This is probably because other major players do not want competitors to know what they are doing.

Andrew Schmitz, University of Florida:
Buying Inputs and Selling Outputs through E-commerce

It is important to know what the policy questions are regarding e-commerce. Why do you find vertical integration in some situations and not in others? What do Coase and the transaction costs theory have to contribute? There are no applications of the theory. A lot of the vertical integration cannot be explained by the theories that are out there.

Agricultural policy belongs to the field of public choice. It doesn’t belong to neoclassical economics. It’s about rentseeking behavior and the special interest groups and most of the rentseekers are not farmers. Then there is a link to E-commerce - if you get all your supply and demand positions for the retail demand curve and the farmer supply curve and all the margins in between. What is the impact of E-commerce and who are the losers and gainers? Not everyone is to gain from E-commerce. Unless you move out that demand curve, things happen to the margins in between. So if the farmers are going to get more of the margin from E-commerce, then someone else has to give up something. Why isn’t there a market in used farm equipment? Someone should take a look at land markets.

Sally Thompson’s point on the efficiency of the grain business is incorrect. The system is obsolete at the moment. The elevator
business is changing drastically. Why is there a need for the elevators if the farmer can produce and grade it professionally?

On the marketing of the specialty crops, we know how to produce but does anyone have a clue on how to market them? E-commerce may be able to help with that. Farmers in Canada are planting larger and larger quantities of specialty crops.

Farmers are in an overproduction trap; a prisoners’ dilemma and maybe E-commerce can solve the problem.

Hamid Mohtadi, University of Minnesota:
Information Technology Adoption in Supply Chains: Some Global Implications

What are the information sharing strategies that come up in the supply chain context? What are some of the potential global consequences of E-commerce? A large part of expected growth is B2B.

Why would a firm want to share information? The consumer is the product demander. As transaction costs go down there is less need for vertical integration. Vertical coordination may replace integration. There are several sharing models. Apple computers shares its data with Fritz suppliers to take care of its logistics and inventory. The 7-Eleven in Japan does a very good job in sharing data with the wholesalers. UPS is a leader in order tracking.

The large intermediaries are figuring out how to reinvent themselves.

Information is really about uncertainty. If you underestimate demand then you end up with a lot of inventory costs. Your loss is revenue forgone. There is also the uncertainty or the mismatch between orders and deliveries, and of course quality, quantity and timing. Will there be information sharing in the supply chain between supplier and retailer?

II. Session IV: Potential Impacts of E-commerce on Industry Structure and Behavior

David Zilberman, University of California, Berkeley:
Information Technology and the Evolution and Structure of Agriculture

- Economic agents value information, not only because it reduces uncertainty but also because it is expanding horizons. The Internet is providing information that is expanding opportunities. In our research we need to understand the role of new knowledge and its value in generating opportunities. This is also consistent with a
broader message. Producers do not perceive increased profitability statically. They don’t concentrate on squeezing cost out alone. Instead, they have a dynamic perspective of their environment and always seek and take advantage of new opportunities.

- We need empirical data about intermediaries (middlemen) in agriculture. These middlemen include contractors, packers, input suppliers, etc. But we need to know in more detail who they are, what are they doing, and how do they operate differently in various sectors of agriculture.

- We need to incorporate some of the knowledge and methodologies of business administration to economics. We have to recognize that numbers don’t capture all the information about economic behavior. Stories and descriptions are also important. Some of the information that we need is not numerical but narrative. We have to extract information from people’s minds and get the stories right so we’ll have a better handle on reality.

- Game theory has developed many conceptual frameworks to describe and analyze market behavior but we need to understand what’s going on institutionally to take advantage of this new machinery. Modern economics shouldn’t emphasize the simple profit-maximizing firm, but develop a more realistic representation that would introduce the nuts and bolts of business management.

- We need to think about, and understand entrepreneurship. This would require modifying and expanding our tools. We need a theory and then a quantitative measure of entrepreneurship and its impact.

- Our past data on prices has to be expanded to introduce quality characteristics. We need to recognize quality variation and record, both in consumption and production data, differences in quality.

- It is important to have better recording of technological change, and in particular, adoption of new technologies. We need to know when people switch to new technologies and some of the economic conditions associated with it.

- We need more data on contracting and vertical integration. The old farm samples, which assume competitive farming, become less relevant. When we obtain data about producers we need to know whether they were engaged in contractual relationships.

- We will not be able to do meaningful statistical work on agriculture without understanding agribusiness. Changes in
structure may require developing new statistical sampling procedure and databases.

- We also need to consider the web as a data source. We need to develop technologies that take advantage of web databases and the information that they convey about farmer production activities, marketing effort, and economic situation.

- The web became an incredibly important global asset that really keeps us as a community. We need to develop mechanisms for expanding the use of the web for data collection and information dissemination. With the Web it will be possible to establish interactive exercises that will obtain data that provide education. The Government should finance some websites that support the common good such as websites for industries, states, and tourism.

- Everyone needs to be able to access the Internet. There is an incredible challenge to modernize extension.

Rolf Mueller, University of Kiel: Digital Information Technology and Entrepreneurship in the Agro-food Industry

E-commerce can be usefully discussed in terms of the concepts of entrepreneurship suggested by T.W. Schultz, I.M. Kirzner, and S. Rosen. The Internet challenges farmers to adjust their allocation decisions to the new circumstances and it provides farmers with information required in decision making. The Internet also opens new opportunities for alert entrepreneurs to profit from as yet unexploited arbitrage opportunities in agricultural product and input markets. Finally, a new breed of E-commerce market organizers uses the new information technology tools to forge new market arrangements. Eventually, entrepreneurs are also likely to employ digital information technology to (i) modify conventional agricultural products by enriching them with innovative information components and (ii) to devise new coordination mechanism between farmers and their clients. Recognition of entrepreneurship in E-commerce also implies that policy makers must accept the unpredictability of the specific development path E-commerce will follow in agriculture as in other industries. Most likely, there also will be some agricultural lobbyists who will focus their entrepreneurial creativity on obtaining regulations that generate rents for them to capture.

Jeffrey Dorfman, University of Georgia: E-markets in Agribusiness: How Will They Work and Who Will Win?

A variety of Internet sites exist today, some designed for farmers and some business-to-business (B2B) sites. Most of the sites that are either business-to-farmer (B2F) or farmer-to-business (F2B) are only partially developed and these
e-markets are still extremely thin. Similarly most of the B2B sites are still in development and few agri-products are actually being traded through e-markets. Even given the slow development of these e-markets over the last two to three years, few doubt that these markets will soon complete their development and many agricultural products (raw and processed) will begin to trade electronically in substantial volume. Market structure can guide us in determining the type of e-markets that will develop. In a market with weak sellers and strong buyers, we predict reverse auctions are likely. In a market with strong sellers and weak buyers, auctions are predicted. When sellers and buyers are both strong, negotiation is predicted; when both are weak, Dutch auctions. In agribusiness, this suggests reverse auctions might appear in markets for livestock, and many major commodities; regular auctions might appear in markets for tree nuts, dairy products, and specialty produce items. Still gains from efficiency or new market types are most likely to accrue to buyers/processor, not farmers in most areas of agribusiness. Gains to farmers are most probable through cost savings on input purchases or for growers of the most differentiated products.

III. Wrap-up Day 2: Research Priorities, Policy Issues and Data Needs

Glenn Rogers

The big question is rent-seeking and how we can put U.S. taxpayer money into local economies in ways that open up broad-based access to economic players and not just create first round winners.

E-business rather than e-commerce is what is important. We may not be casting the net widely enough in understanding the benefits and costs from the private sector perspective of adopting these technologies.

Three items are important: insuring data availability for markets, policy determination, and decision-making on risk. We need a source of consistent time series data. We need to have a farm and county typologies. The second item is increasing the productivity of information management and generation. Another productivity is accelerating the development of workforce skills. The third issue is the quality of regulation of information output.

Is geographic concentration good or bad? It is going to deliver benefits to the consumer.

How do we insure that agricultural information transfer to developing countries is accelerated?

What are the minimum market size and minimum number of players to have websites? How do you fit the IT component into the existing social patterns of the trust relationships to reduce transactions
costs? We need better empirical information on how and where people want to get information.

How do we measure the impacts of IT support? How should be use public dollars?

Troy Schmitz

I teach a course of computer applications for agribusiness at Arizona State University. In the last three years there has been a great change in the ability of students to use the computer. There are not a lot of programmers out there so there are not a lot of people who can create.

They did a survey to find out what attributes students wanted on a website. By the time they developed the website, the students’ preferences changed. Search time did not seem to matter. There was a high variability in prices.

E-bay has served an important function – to get rid of excess inventory.

On research priorities—there is a dearth of literature on the economics of vertical market change. There is no published research that uses vertical market models that include relevant policy parameters. However it is not clear what the relevant policy parameters are. It is hard to do the analysis without the data. You cannot build the perfect model and expect to find the data. You have to combine welfare analysis with economics and industrial structure-type business models. With e-commerce you are basically eliminating the middleman. However it may be that a different type of intermediary may take over.

You may want to have simple generic backoffice software with tutorials that a producer who recently went online can start to use.

You should look more into auction theory. What are the differences between live auctions, video auctions and Internet auctions? What about monitoring and enforcing sales contracts? What are the differences between IT issues, e-commerce issues and I-commerce issues? IT issues are the actual functioning of the computer. I-commerce issues are the ones where you’re buying and selling over the Internet. E-commerce issues are buying and selling and the Internet portion of it.

USDA may want to implement some type of quantity reporting system for agricultural products sold via the Internet. Perhaps USDA should hire somebody to create and implement a website drilling for price and quantity information.

This type of conference is needed every year or at least next year to see how far everyone has gotten with his or her work.
Jeffrey Dorfman, University of Georgia

1. USDA did a survey that will be available in two months that looks at the use of the Internet by farmers. 2. Look where arbitrage can occur. 3. We need a lot more common sense. If you just do some back of the envelope calculations you will see that some projections are silly.

Why don’t we have any successful processor-to-farmers or farmer-to-processor systems? We have a lot of B-to-B systems or processor to processor systems. Why? Is it because the market’s already efficient or is it because the market doesn’t favor processors or is there another reason?

What about outsourcing? E-commerce allows more outsourcing thus less vertical integration to weigh against the trend towards customization as opposed to commoditization of agricultural products. This should lead to more forward contracting and more vertical integration. So there are two trends going in opposite directions. One is going to swamp the other but I don’t know which one.

There is an interesting question related to the question of private data gathering and rapid learning by firms. This is a game theory area. Amazon got caught experimenting with prices trying to determine a demand curve. That would have been hard to do a few years ago.

Farmers may get on the Internet because they can do it when they don’t have to be in the fields. Travel websites may not be easy to use but you can buy a ticket at midnight when you cannot get hold of your travel again.