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TRACEABILITY IN RED MEAT: 
MARKET OPPORTUNITY OR THREAT?

Sterling Liddell and DeeVon Bailey

ABSTRACT

Traceability poses market opportunities and threats for U.S. red meat producers for at least two reasons. First, consumers are becoming more concerned about the inputs and practices used to produce food and the ability to trace red meat to its source is an essential step in providing information to consumers about inputs and practices. Second, our principal competitors and customers in international red meat trade have been developing traceability systems. If our competitors are successful in differentiating their red meat products based on traceability, it could have a potentially devastating effect on U.S. red meat trade. This paper discusses these potential opportunities and threats and discusses the genesis of traceability, transparency, and assurance (TTA) in red meat markets.
RISING CONSUMER CONCERNS CAN MEAN LOSS OF MARKET SHARE

The appearance of "mad cow" disease (bovine spongiform encephalopathy, or BSE) in Europe and widely publicized outbreaks of *e. coli* and other bacterial scares in the fast-food industry have sparked a rising public concern in this country for food safety—especially in meat. There is some evidence that U.S. red meat producers have not taken this concern seriously enough. Recent research completed at Utah State University (Liddell) suggests the U.S. red meat industry has been slow to adopt the traceability, transparency, and assurance (TTA) standards that its major competitors and trading partners have been developing since the mid 1990s. In fact, the U.S. pork system ranks last when compared against the United Kingdom, Denmark, Canada, Japan, and Australia/New Zealand in terms of TTA. If this disparity in adopting more rigorous TTA standards persists, it could result in losses of red meat market share and an erosion of consumer confidence. Either would seriously impact the total U.S. farm economy since the U.S. beef and pork industries, with 1997 farm-level sales of $36.1 billion and $13.2 billion, respectively (U.S. Department of Agriculture), represent over 24% of the annual gross income received by U.S. farmers and ranchers. These two commodities are produced in virtually every state and are an integral part of most states' agricultural economies.

**Just What is TTA?**

TTA is a complex system of accountability encompassing both process and end product. The "traceability" component is sometimes called "identity preservation," and Liddell defines it as the ability to track a red meat product from its point of retail sale back through its various
stages of production. "Transparency" means providing information to the consumer about the processes used during each phase of an individual red meat product's creation; "assurance" covers all the product testing and process auditing procedures used to monitor the food chain.

Significantly, what the United States does not currently have in place is TTA prior to processing. Instead, most U.S. red meat is traceable from the retailer back to the processor, but not back to the individual farm or animal. This differs from practices in a number of European Union (EU) countries that have developed complex and comprehensive TTA systems. As identified by Liddell, "traceability" in such EU systems begins with complete traceability (genetic lines, feed inputs, etc.) and goes on to include producer, processor, distributor, and national origin traceability. "Transparency" encompasses producer, processor, distributor, and national information sources, and "assurance" covers processes and procedures at the farm, processor, transportation, and retail levels. Similarly complex tracing and record-keeping systems would be required here if such systems were adopted in the United States.

For example, completely traceable (animal-level) TTA requires a system capable of tracking where and when the animal was born, who its progeny were, when the animal was sold, the types of medications it was administered, its feeding and handling regimes, the location of its slaughter, grading information, shipment dates, the location of the retail outlet where the final meat product was sold, and any other information handlers or consumers might desire. Producer traceable (farm-level) TTA would require similar information for groups of animals but not for an individual animal.

Capturing and cataloguing such information for a TTA program in the United States would best be handled by electronic systems, and such systems are currently being developed. It is conceivable that in the near future any consumer questions about the origin, management, or
processing procedures of a red meat product could be tracked backward through the system to the farm or ranch where the animal was born (Coe). However, these systems would also require third-party certification to be credible (Bailey and Hayes).

**Genesis and Evolution of Traceability Programs**

Efforts to establish traceability have their roots in the 1996 BSE scare in the United Kingdom. BSE is a disease found in cattle that may be linked to a possible variant of a potentially fatal human disease called Creutzfeld Jacobs Disease. Two additional EU food crises occurred almost simultaneously with BSE. One of those outbreaks involved salmonella contamination in Danish pork; the other was an e. coli outbreak traced to Scotland that resulted in twenty-one deaths (Liddell). These food scares, coupled with a lack of confidence by EU consumers regarding government inspections and assurances about food safety, led to the establishment of trace-back systems in Europe. Furthermore, Europeans are, in general, more concerned about animal welfare than U.S. consumers, and quality assurance programs evolved simultaneously with food safety issues as incentives for TTA development in Europe. Thus, EU marketing emphasizes food safety and quality assurance characteristics to differentiate food products as being safe, environmentally friendly, and animal friendly.

Denmark recently switched to full traceability in certain hog production processes (Meat International), Germany successfully implemented traceability in at least part of its beef chain (EAN, 9/2000), many smaller plants in the United Kingdom have begun to offer full traceability to consumers, and retail consumers in Sweden can surf the web for pictures of actual pork farmers and farm sites (Swedish Farm Assured). In an aggressive initiative, the Australians (
EAN, 6/2000) are establishing a track-forward/trace-back chain for beef that emphasizes both management and food safety and encompasses breeding to consumption (Bailey and Hayes).

*Why TTA Development Has Been Slower Here*

By contrast, the U.S. has been late in implementing TTA programs for red meat, largely because different incentives have been at work here. While TTA programs in Europe materialized partially in reaction to food scares, concern about animal welfare also provided an incentive for the evolution of TTA in the EU. In general, U.S. consumers have had greater confidence in government inspection programs than their European counterparts, which meant that traceability was generally established back to the processor only, not to the farm level. As a result, little third-party private certification has been done in U.S. red meat markets. U.S. pork producers have established ISO 9000-based programs covering such issues as production, harvest, genetic controls, product labelling, and advertising, but most of the their initial efforts have been aimed exclusively at food safety concerns and have not been as comprehensive as TTA systems in the EU. U.S. beef markets, too, have done relatively little to facilitate TTA compared to EU countries. The U.S. beef industry’s current strategy appears targeted at improving the consistency of eating experiences for domestic consumers and at increasing exports. While this strategy is making headway in improving domestic beef markets, it does not address the potential concerns domestic and foreign consumers have about a lack of TTA in U.S. beef.

*A Lagging TTA System Poses Some Serious Potential Threats*

There are two reasons U.S. red meat producers and processors should be concerned that
TTA development in this country lags behind that of other countries. One is that consumers worldwide have become increasingly concerned about the processes (inputs and methods) used to produce food. TTA can address many of these emerging consumer concerns by providing increased consumer confidence in food safety, animal welfare, and environmental preservation. TTA can also verify the many different claims made about what inputs or absence of inputs exist in food products. For example, a product may claim to be free of genetically modified organisms (GMOs), or produced with sensitivity for animal welfare, or produced using environmentally “friendly” processes. The potential for fraud exists if no credible system is in place to support these claims, and TTA—because it traces food and food inputs to their sources—can establish or affirm the reputations of producers and suppliers by providing that credible evidence.

The second reason is that if competitors are able to use TTA to differentiate their red meat products as being superior to U.S. red meat products, the U.S. may lose market share in its red meat export markets. For example, the recent heightened concerns about food safety in Japan, the United State’s principal export market for red meat, could eventually lead to a loss of U.S. market share if competitors such as Canada, Australia/New Zealand, and Denmark are successful in convincing Japanese buyers that their products are “safer” than U.S. products because their systems provide more TTA.

The World Red Meat Markets

Not only are world red meat export markets characterized by being well integrated and highly competitive, they are highly concentrated on both the export and import sides. Figures 1a and 1b show what countries are major pork and beef exporters. There are also relatively few countries that are major importers of red meat. Figures 2a and 2b show the importance of Japan as an importer of red meats. Because U.S. red meat exporters rely heavily on the Japanese
market for export purchases, they should not take it for granted, especially since it is very sensitive to food safety issues, evidenced by its recent reaction to issues relating to food biotechnology (Partch). If the United State’s competitors can successfully differentiate their red meat products on the basis of TTA in a country like Japan, this could be potentially devastating to U.S. red meat exports. The recent Taiwanese experience proves how quickly a country can lose its market share to competitors. Following an outbreak of foot-and-mouth disease (FMD), Taiwan went from being a major pork exporter to being a zero exporter in a very short period of time. While FMD is a more apparent threat to export markets than TTA, this demonstrates the sensitivity of these markets to concerns like food safety.

**Needed: More Research**

Implementing TTA systems in the U.S. red meat industry appears inevitable, but to date, very little economic research has been conducted to explain how consumers would like to see TTA systems develop or evolve or what their costs and benefits would be. Finding out what level of TTA red meat consumers (both foreign and domestic) want and are willing to pay for (WTP), and determining the benefits and costs associated with implementing them is crucial, especially if attitudes among U.S., Japanese, European, and Canadian consumers regarding their WTP for TTA are sufficiently different so that these markets could be TTA-differentiated.

More research is also needed to determine if a market opportunity exists for adding value to U.S. red meat products by providing more TTA. One piece of evidence suggesting TTA products might have a significant niche in the United States is the rapid growth of the organic foods market (Calafut), which indicates many U.S. consumers appear willing to pay a premium for products with certain certifiable characteristics beyond just basic USDA inspections, such as specific genetic strains, fewer calories, or environmentally friendly handling.
U.S.-developed TTA systems might or might not contain all the TTA features incorporated in EU systems, but they should be developed based on the type of information and certification consumers want and are willing to pay for. Again, more research is needed to assess and evaluate the issues affecting how well U.S. producers and processors—and their foreign competitors—compete in domestic and international markets. TTA lies at the heart of competitiveness, and U.S. red meat producers need to understand that it could have enormous consequences, especially in the areas of food safety and product differentiation.

References


Figure 1a. Market Shares for World's Pork Exporters

- EU: 45%
- US: 20%
- Canada: 20%
- Other: 15%

Figure 1b. Market Shares of the World's Beef Exporters

- Argentina/Brazil: 40%
- Australia: 20%
- Canada: 10%
- US: 19%
- Others: 11%
Figure 2a. Japan's Share of World Pork Imports

Japan 31%
Other 69%

Figure 2b. Japan's Share of World Beef Imports

Japan 20%
Other 80%