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# POTENTIAL IMPACTS OF MODULARIZATION UPON THE U.S. FOOD DISTRIBUTION SYSTEM

by

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When Wes Kriebel asked me to speak at this session today, we discussed and later I pondered what I would best present to you. As many of you know, Battelle Memorial Institute, where I have worked the past 5-1/2 years, recently completed a multiclient study titled "Food Retailing and Distribution Systems in the 1980s and 1990s". As part of the study, for which I was project manager, Battelle analyzed important new or evolving technologies and assessed their impact on the food distribution system into the 21st century. These technologies included materials handling equipment, packaging, food preservation systems, aquaculture, and controlled environment agriculture.

We also looked at food retailing formats and other topics such as vertical integration and cash and carry wholesalers. Incidentally, Wes and I first met during the course of Battelle's research for this program. Wes provided us with important insights into food transportation. I am happy now, in return, to be able to participate with Wes in this conference.

Today, I want to draw from the font of knowledge which I have developed during the course of this study and other studies at Battelle and share with you the ways in which I think modular containers might affect the U.S. Food Distribution System in the future. Specifically, I would like to touch upon four primary areas of change in food distribution. These are:

- materials handling systems including robotics
- transportation
- cash and carry wholesalers
- electronic shopping

Before I go any further, however, I know some of you in the audience are not familiar with Battelle Memorial Institute. Let me digress for a few moments and tell you a little bit about Battelle. I think you may be surprised to learn of the depth and scope of our research activities.

## Battelle Memorial Institute

Battelle Memorial Institute is the world's largest independent, not for profit, contract research organization with offices and research facilities throughout the world. Battelle was founded in 1929 in accordance with and through monies provided by the will of Gordon Battelle, a wealthy Ohio industrialist. Gordon Battelle was one of the first businessmen to recognize the need for contract research and the benefits that research can provide by identifying or developing solutions to technical and business problems.

I come to you from Battelle's Columbus Division, which is the original research center of Battelle Memorial Institute. Approximately 3,000 people work at Battelle's Columbus complex. Worldwide, Battelle employs 7,000 staff. Other major Battelle facilities are located in Richland, Washington; Frankfurt, Germany; and Geneva, Switzerland.

Now that you know more about Battelle, I will draw upon some of the non-proprietary results of research conducted at Battelle and relate a variety of trends in food distribution to the use of modular containers.

### Materials Handling Systems

As part of the food distribution program, Battelle evaluated past, present, and future uses for a variety of materials handling equipment.

- With regard to conveying systems, relatively inexpensive and flexible lift trucks are being supplemented by the use of conveyors and automatic guided vehicles.
- Storage systems referred to as automatic storage and retrieval systems (AS/RS) have been installed in situations where the high capital requirements are justifiable.
- The efficiency of order picking systems is improving as mechanized and automated systems are developed to supplement or replace manual systems.
- Robots, although currently used only in limited applications, will increasingly be utilized for moving individual as well as palletized containers of food products.

The world's entry into the electronic/information age makes many of these improvements possible. Many of these changes could not take place without the availability of computers and programmable controllers and the acceptance of bar coding which allows rapid identification, routing, and tracking of products.

The development of standards for modular containers and rapid adoption by the industry could aid in making materials handling equipment more productive. Equipment could be de-

signed and built to closer specifications and operating requirements, allowing more accurate and timely product handling. Automatic storage and retrieval systems could operate with fewer adjustments and reduced down time. Primitive and relatively inexpensive robots could be used for many food handling tasks if standardized containers, modules, and pallets are used and the robots programmed to recognize them and work within standardized parameters.

Already, the Japanese are experimenting in Yokohama with the use of robots for loading and unloading food packages from trucks and moving these packages by robot within the supermarket. In the U.S., Keebler Company is using robots in three of its distribution centers to handle food products. Such applications are certain to increase in number and would be aided by the use of standardized and modularized packaging.

### Transportation

Transportation is another area in which the use of modular containers could be beneficial. The trailer, railcar, or container in which the packages are transported should be considered as just another module into which smaller containers or pallets fit. For dry groceries, there is no good reason except for perhaps **weight** or structural limitations that **unused** space should be wasted either along the sides or above the produce being shipped.

With transportation deregulation and increased competition, transport companies continually are looking for new ways to make their operations more efficient. Indicative of change within the trucking industry are the increased number of mergers, loss of market share to non-union truckers, and the expanding use of backhaul. Similarly, rail companies are merging, upgrading rail lines, designing new rail cars, and promoting the use of trailers on flatcars, containers, and intermodal equipment.

Design of new trailers, rail cars, or containers as part of a modularized standardized system makes a great deal of sense since this can result in more efficient use of limited transportation and energy resources. First, however, these standards need to be promulgated and accepted by industry.

#### Cash & Carry Wholesalers

Cash and carry wholesalers operate large warehouses open to members only where a variety of food and non-food items are made available. One-stop shopping is offered to merchants who operate small restaurants or small food stores and to other members. Prices may be lower or competitive with other wholesalers but an important attraction is the convenience of one-stop shopping and expanded shopping hours.

Large cash and carry warehouses range up to 200,000 square feet in size. The first warehouses opened in the U.S. in the late 1970s and are owned by foreign firms. Expanding cash and carry operations include Makro, Metro, Jetro, and the Price Company. Wal-Mart also has opened their own version called Sam's Wholesale Club.

Such warehouses typically display their dry grocery produce on 40"x48" pallets with cases cut open. Additional inventory is stored above on pallets placed on metal racks. Because much of the grocery section resembles a typical grocery warehouse in design, the cash and carry operations would benefit from the use of modularized containers in basic ways--that is, through use of more efficient materials handling systems and transportation.

Additionally, the cash and carry operator would benefit in another important way. Since customers typically buy in less than case lots, the universal use of modularized packaging would be beneficial to the warehouse operator. Currently, many of the grocery products

are shrink wrapped in less than case units by the operator. The availability of modularized packaging from more food processors could reduce the cash and carry operator's labor costs significantly. Many cash and carry operators typically carry only the most popular items in each product category. The availability of convenient modular packaging could encourage operators to expand product categories or to try new items or substitute slightly less popular products.

If recent history is any indication the cash and carry wholesalers are here to stay. The Price Company is growing very rapidly and sales figures are impressive (\$14 M in 1977 vs. \$370 M in 1982). Wal-Mart's Sam's experimental 100,000 square foot unit reportedly is exceeding original sales expectations. The increasing growth of this food distribution format is likely to encourage the expanding use of modular containers as a promotional tool for manufacturers and a cost-savings innovation for cash and carry operators.

#### Electronic Shopping

A food retailing format with growing potential is teleshopping or electronic shopping. In one scenario, a consumer would use a computer or telephone in his home or other location to order food. The order would be entered into a computer at the company warehouse either directly or by a telephone operator. The order could be picked directly from the warehouse and either made available for pick-up by the consumer or for delivery to the home or a convenient depot.

As you know, food retailing is a competitive and low margin business. Many retailers argue that such an electronic shopping service cannot be provided economically. With the use of available materials handling and computer technology, substantial economies of operation perhaps can be realized. Use of modular containers can aid in reducing handling costs in ways noted earlier.

The economics and consumer acceptance of electronic shopping still are not known. The continuing operation of the Grocery Express phone-in/delivery service in San Francisco suggests such a format may be feasible and profitable. Also, a phone-in/drive-through supermarket opened in Los Angeles this year. Battelle expects to begin a program in the near future which we call "Teleshopping Economics" which will determine the feasibility of electronic shopping for food and a variety of non-food items. The costs and benefits for extensive use of materials handling equipment, robotics, and potential benefits of use of modular containers will be evaluated as part of this study.

Electronic shopping for food will not cause the disappearance of super-

markets as we know them today. However, teleshopping will evolve to form a profitable niche among a variety of other food retailing formats. The increasing use of and standardization of modular containers will help each of these formats to be more efficient and profitable and fulfill consumer needs. This step forward benefits the total food distribution system.

It has been a pleasure preparing for and participating in this conference. I will be happy to answer questions during this session or to meet with any of you later to discuss Battelle's research in the food area.