EFFICIENCY CONCEPTS IN THE FOOD DISTRIBUTION RESEARCH INDUSTRY

by

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"It is not enough to be busy--
we must know what we are busy
about."
--Anonymous

Background

If one were to ask each member of the Food Distribution Research Society regarding the individual and collective superordinate goals of the members, the response would probably be along the lines of:

making the food distribution system more efficient--that is, providing greater selections of food at lower prices to consumers.

On the surface, this response seems quite clear. However, this statement implies that:

1. The current and future states of efficiency are measurable;

2. Actions and interactions of food industry operators, researchers, and government can positively influence efficiency;

3. Consumers are the ultimate beneficiaries of greater efficiency in food distribution.

While these implications appear to be self-evident, the concept of "efficiency," as currently used by researchers, does not adequately cover these points, particularly with regard to consumers.

Focus

This paper focuses on "efficiency" in the food distribution system and covers:

1. Historical concepts of efficiency;

2. Efficiency from the consumer's perspective;

3. Strategic implications for research arising from a consumer perspective.

Additional Authors Involved With "Efficiency"

In addition to the authors shown in Table 1, the food distribution area has had some authors who needed to define "efficiency" as part of their research and had a thorough review of the agricultural economics literature. These include:

1. Araji[2] --production efficiency of beef cattle operations;

2. Muller[3] -- sources of technical efficiency--impact of information;

3. Seitz[4] --measurement of efficiency relative to a further production function.

These authors also cited some key conceptual thinkers in the definition and measurement of efficiency:

Table 1. Summary of Key Frameworks for Efficiency Concepts

Author	Efficiency Concepts	Subcomponents	Variables
Douglas[5]	Technical efficiency	Output	-Sales volume, gross margin, value added, number of transactions.
		Input	-Labor, capital, management.
		Ratios	-Output per man hour, transaction size, service per transaction.
	Managerial efficiency	Decision areas	-Use of decision models for location and movement of merchandise; managerial policies.
	Social efficiency	Pareto optimality	-Redistribution of income, governmental regulations.
		Indirect benefits and costs	-Effects of advertising on consumers; pollution.
		Welfare criteria and time	-Resource mobility, rate of innovation, prices and price responsiveness, market structure.
Warrack[6]	Marketing efficiency	Operational	-Marketing organization, logistics, and cost-reducing technologies.
		Exchange	-Competition, market structure, and pricing.
Farmer[7]	Total system efficiency	Problems	-Measurement, knowledge, uncertainty, goals, subsystem optimization, resource mobility.
		Total country	-Real per capita GNP, rate of growth or real per capita GNP, rate of utilization of inputs, usability of outputs, degree of competition, planning efficiency. (Measurement is difficult, so rank order by country).
	Firm efficiency	Calculate for each firm	-Profitability, exports, usable output per man, plant utilization, prices relative to foreign firms, long-run innovation effectiveness.
	Intrafirm efficiency	Compare firms	-Output/person, output sold/total production, change in sales volume/change in investment, total production costs/total output, spoilage/total output, total distribution costs/total output sold, total output sold/total fixed capital, number of people leaving/total personnel, working capital/fixed capital, working capital/total output, working capital/total output.

4. Farrell and Fieldhouse[8] --linear programming technique for measuring production efficiency;

5. Timmer[9] --measurement of technical efficiency;

6. Hopper[10] --allocative efficiency in Indian agriculture;

7. Yotopoulos[11] --allocative efficiency in economic development.

It should be noted that this review of authors concerned with efficiency, particularly in an agricultural/food context, is not exhaustive. The final report for the Canadian government will be much more complete than this paper allows.

Historical Concepts of Efficiency

It appears that the term "efficiency" was transposed from engineering into a business context. However, in reviewing the key frameworks for efficiency concepts presents in Table 1, it appears that "efficiency" and "productivity" are used somewhat interchangeably. Beckman and Davidson[12] distinguish between these two terms:

> First, productivity is a ratio of output, or the results of production, to the corresponding input of economic resources, both during a given period of time. ....Economic efficiency is closely related to productivity, but it is a more far-reaching concept. Efficiency implies some definite economic goal such as accomplishing the greatest amount of work in the best possible manner with the least expenditure of time and resources. In fact, there is no such thing as efficiency in general inefficiency per se. What may be judged as efficient by one measuring rod may be quite inefficient when measured by a different standard. (Bechman and Davidson go on to distinguish between physical, financial, and social efficiency.)

Some conclusions appear to be quite clear in reviewing the key framework for efficiency concepts in Table 1:

1. There is no clear evidence of goal orientation explicit in the efficiency measurements.

2. The orientation is clearly production-oriented, rather than consumer-oriented.

Efficiency From the Consumer's Perspective

Marketing scholars and practitioners have taken the view since the mid 1960's that a product is the set of satisfactions received by the consumer and is not necessarily related to the physical attributes manufactured into the item. In short, rather than following a product from "seed to consumer," contemporary marketers follow the demand information passed from consumers to producers and then the physical product from producer to consumer.

Considering the marketing orientation, the consideration that historical efficiency concepts do not explicitly have a goal, and that most food distribution companies are operating on a low gross margin percentage, it is clear that a consumer perspective on efficiency is required.

Following this consumer approach, it is logical to ask: "Why do people buy food?" When this question is answered, then the next area of concern would seem to lie in the technical and economic efficiencies of getting food to the consumer in the lowest cost manner.

Although no consumer behavior literature is cited here, it appears that consumers buy food for the following motivations:

1. Survival
2. Nutrition
3. Social (eating with other people)
4. Entertainment

Where can people obtain these satisfactions? Depending on how each customer values money, time, taste, variety, and motivations, the following marketing systems provide food to consumers in developed countries:

1. Large retail supermarkets
2. Convenience food stores
3. Specialty food stores
4. Fast food outlets
5. Restaurants
6. Food departments of department stores
7. Farmers' markets
8. Home grown and produced groceries
9. Vending machines
10. Direct delivery (milk, bread)
11. Mail order
12. Consumer cooperatives
13. Institutions (schools, hospitals, airlines, social services)

It is interesting to note that most of the academic research and governmental legislative effort has looked at market structure of producers and distributors to large retail supermarkets. Of prime concern have been operational productivity, prices, profits, number of firms, and--at the producer level--tariffs, subsidies, and quotas. While these efforts are laudable, one wonders how much cost savings to consumers is possible with a supermarket system that has had 40 years' worth of tinkering.

To state the situation another way, the next step in real cost savings in food distribution must come from the consumer. That is, in the short-run it is highly unlikely that cost savings of more than one percent to two percent can be realized by consumers through tinkering with the system. In short, consumer efficiency would state: "Given that my income is fixed, how can I spend less on food?"

Advantages of a Consumer Efficiency Perspective

Investigation of the efficiency of the consumer has the following advantages:

1. Real (more than two percent) cost savings to consumers are possible in the short run. Consumer inefficiencies are probably far more than production and distribution inefficiencies.

2. The "head" of higher consumer food price indices is focused back on the consumer rather than on producers or legislators.

3. Consumers can be made more aware of the economic consequences of their choices.

4. Conceptually, the market structure will follow consumers' choices much in the same way as when Cullen started the supermarket in the 30's.

5. Food and agricultural policy can focus on consumer goals rather than production or structure goals.

6. Consumers can be made more aware of the nutritional aspects related to food.

Strategic Implications

Adoption of a consumer efficiency perspective raises the following strategic areas for research:

1. Do consumers realize how inefficient they are--or at least the tradeoffs between money, time, nutrition, and entertainment?

2. Possible cost savings through use of consumer cooperatives buying direct from wholesalers in case lot sizes. Coops could be formed in work, church, club, or geographical areas.

3. Changing communication technology and Cable TV have consequences regarding comparative price shopping.

4. To what extent can localized production facilities lower prices? In particular, consideration should be given to hydroponics, vegetarian diets, greenhouses powered by excess energy currently emitted to the environment, and personal vegetable gardens.

5. To what extent are consumers willing to change diets and cultural tastes in order to lower food costs for themselves and increase nutrition?

In summary, unless these strategic implications of a consumer efficiency perspective are answered, we may find in the year 2,000 that we spent too much of our efforts doing things right rather than doing the right things.

FOOTNOTES

[1]This paper follows from a grant received by the author from the Policy and Coordination Branch, Department of Consumer and Corporate Affairs of the canadian Federal Government.

[2]Ahmed A. Araji, "The Effect of Vertical Integration in the Production Efficiency of Beef Cattle Operations," American Journal of Agricultural Economics, Vol. 56 (February, 1976), pp. 101-104.

[3]Jurgen Muller, "On Sources of Measured Technical Efficiency: The Impact of Information," American Journal of Agricultural Economics, Vol. 56 (November, 1974), pp. 73-738.

[4]Wesley D. Seitz, "The Measurement of Efficiency Relative to a Frontier Production Function," American Journal of Agricultural Economics, Vol. 52 (November, 1970), pp. 505-511.

[5] Edna Douglas, Economics of Marketing. (New York: Harper and Row, 1975), pp. 674-692.

[6] Allan A. Warrack, "A Conceptual Framework for Analysis of Market Efficiency," Canadian Journal of Agricultural Economics, Vol. 20 (November, 1972), pp. 9-22.

[7] Richard N. Farmer and Barry M. Richman, Comparative Management and Economic Progress. (Homewood, Illinois: Richard D. Irwin, Inc., 1965), pp. 39-73, 414-429.

[8] M. J. Farrell and M. Fieldhouse, "Estimating Efficient Production Functions Under Increasing Returns to Scale," Journal of the Royal Statistics Society, Series A, Part 2, Vol. 125 (1962), pp. 252-267.

[9] C. Peter Timmer, "On Measuring Technical Efficiency," Food Research Institute Studies, Vol. 9 (1970), pp. 99-171.

[10] W. D. Hopper, "Allocative Efficiency in a Traditional Indian Agriculture," Journal of Farm Economics, Vol. 47, (August, 1965), pp. 611-624.

[11] P. A. Yotopoulos, Allocative Efficiency in Economic Development: A Cross Section Analysis of Epirus Farming. (Athens: Center of Planning and Economic Research, 1961).

[12] Theodore N. Beckman and William R. Davidson, Marketing. (New York: Ronald Press, 1968), pp. 788-797.

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