

TOTAL SYSTEMS PRODUCTIVITY IN THE FOOD INDUSTRY: AN IDEA COMING INTO ITS OWN

by

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The total system approach is needed to address some of the larger productivity issues that are too costly for single segments of the system to solve.

United States Food Industry System

The total United States food production, processing, distribution and consumption system, which needs to have its productivity (1) identified, (2) measured, and (3) improved, is an immensely complex system. It is a curious admixture of 200 plus year old institutions and space age technology, finely honed over many generations; and walking the precarious balance between the market place which gave it life and the many bureaucracies that would shape its destiny.

The United States food industry system is made up of at least five major parts:

1. The basic firms which produce, process, distribute and provide for consumption of food products and services.
2. The so-called "service industries" e.g., farm machinery, farm supply, packaging, advertising and financial services and many others.
3. An information system - part public, part private.
4. Government regulatory system.

INTRODUCTION

What we must do is "improve productivity!!" How many times, these days, one has those two words presented as a simplistic solution to a broad range of economic, technological and even social problems? As a starting point for discussion of what is rapidly becoming one of modern man's most perplexing problems, let's examine this little phrase more closely.

To improve, we must move from one specified level of proficiency to another (higher). This implies some sort of objective, a means of progressing toward the objective, benchmarks to measure progress, and a knowledge of the relationships involved in accomplishing a particular task. Productivity implies some sort of input-output relationship. But what are the inputs and outputs? How are they measured? What is the relationship of the various inputs to outputs? What outputs should we seek in the first place?

5. University system providing education, research, service.

As with the total system, each of these parts have inputs and produce various types of outputs, and, at least theoretically, have measurable productivity. Factors of production (land, labor, capital and management), functions, institutions, and technologies are combined in an almost infinite number of variations throughout the system. Eventually a wide variety of food products and/or services are presented for ultimate consumption. Indeed, a detailed description of the total system and its subparts in a meaningful manner for use in productivity analysis would be a "Herculean task" at best, and at its worst would end up as a hopeless muddle of "semantic bickering."

Total Systems Productivity

What we are looking at is an aggregation of inputs moving through a complex and changing system which produces **and** delivers an aggregation of outputs (goods, services, perceptions). When an adequate measure(s) of aggregate productivity has been agreed upon, our general food industry goal will be:

To provide adequate supplies of safe, nutritious food and food products with desired service levels at prices that reflect true value to the United States consumer, at a minimum total resource cost.¹

Problems

An economist might look at an input-output relationship as factors of production (inputs):

1. Labor
2. Capital and land
3. Management and entrepreneurship
4. Systems (combinations of the above)

compared to a series of goods and services (outputs).

The problem becomes one of definition of both inputs and outputs and measurement of their relationship. In an elementary situation, one or more factors of production (inputs) are applied in an operation to yield a specified amount of goods and/or services (outputs). To improve productivity, we try to get more goods and/or services from the same amount of the factors of production; or to get the same amount of goods and/or services from a lesser amount of the factors of production. There is at least a theoretical point of "optimization" where one can get the most output for the least input in a given situation.²

First, we are dealing with a total production, processing, distribution and consumption food industry system for the entire country and not a single enterprise. Second, we are combining varying quantities and qualities of factors of production, functions, institutions, and technologies in an almost infinite series of combinations that are constantly changing over time. Third, in many cases, we have sketchy or nonexistent information on how these elements relate to each other; let alone useable criteria for measuring the input/output relationship. Fourth, even if we had specific measures of productivity for all possible combinations of elements; there is the problem of aggregation of unlike measures to get an overall estimate of total food industry systems productivity for comparison with other industries, or food industries in other countries, or to use as a base point for possible improvement. How does one equate the physical, financial and personnel measurements into a meaningful relationship?

Why People Were Not Interested In Total Systems Productivity In The Past

There may be any number of reasons why the concept of total systems

productivity has not become a household word. However, they can be summarized:

1. It would be such a monumental task as to overwhelm most folks.
2. In an age of specialization, we tend to be interested in our own narrow area and not in someone else's.
3. Our view has been short range and our goals of an immediate nature.

It simply hasn't paid for most of us to be interested in the "big picture."

What Has Changed Or Will Be Changing So That "Total Systems Productivity" Becomes Important To People?

There are five basic areas of change that will focus more upon the total operation of the food system and the interdependence of its many parts. These are:

- A. Computer technology
- B. Energy technology
- C. "Unifying forces," both organizational and technological
- D. Institutions themselves
- E. Linkages between institutions

Computer Technology

With UPC and scanners at retail, as well as common computer language for each institutional segment of the system, a total system-wide information network cannot be far behind.

Energy Technology

The current United States food industry system was developed in an era of cheap petroleum based energy, giving it the attributes of speed of delivery, flexibility and above all mobility.³ As the cost of conventional non-

renewable energy increases, new energy technologies are introduced, there will be both individual and system-wide impacts. Emphasis on more local production for certain items and moving further processing closer to points of consumption will be two of the major reactions to changes in energy technology over the remainder of the century.

Unifying Forces

The forces that will tend to draw the food industry system closer together and make it more cognizant of its interdependent parts can be classified as (1) organizational and (2) technological.

Organizational forces are exemplified by:

1. Mergers and consolidations--vertical, horizontal and conglomerate integration⁴
2. Physical Distribution Management--combines transport, storage and inventory control
3. Big labor
4. More "all-pervasive" government⁴
5. Re-awakened consumerism⁴

Examples of technological forces are:

1. Modularization
2. Intermodal transport
3. Central processing of perishables
4. Consolidated delivery
5. Back-hauls
6. Retortable pouch

The reader can most probably add to either of these lists. They are not intended to be exhaustive. The point of this portion of the paper was to show that there are numerous forces at work which tend to draw the food industry system closer together into a more "manageable" unit. A unit whose productivity is important can be measured, improved and compared with other systems.

Institutions Themselves

One of the biggest potential stumbling blocks in moving toward the concepts of total systems productivity rests within the myriad of institutions that make up the current food industry system. A number of pertinent thoughts are outlined below:

1. Changes in technology move very rapidly, institutions change very slowly. Many of our institutions with roots in the 19th century need major revisions to catch up with the 20th century, let alone to get ready for the 21st century.⁵
2. Size, Complexity, Rigidity. As institutions grow, productivity suffers because a higher proportion of total resources are used for internal maintenance of the institution, leaving less to produce goods, services and perceptions for the outside world.⁶
3. Concentration of Power--Power to make positive changes; power to perpetuate the "Status Quo!!"
4. Leadership--void.
5. Special Interest vs. General Interest.

As the renowned philosopher and social critic, "Pogo" said, "We have seen the enemy, and he is us." Within the elements of the fabric of a food industry system are the seeds of the new and the ghosts of old. The trick is to get the best of both to use as building blocks for the 21st century system.

Linkages Between Institutions

The particular pattern by which individual institutions are linked together to form the marketing chain or channel, if you will, has a significant

impact upon individual institutional productivity and the overall productivity of the channel systems. For example, trains are more energy efficient than trucks in moving food products from the producing areas of the West and South to the consuming areas of the East and North. Because of the demise of a more energy efficient long haul link (trains), wholesalers and retailers must utilize less energy efficient transport mode (trucks). Many of the forces that will impact upon institutions discussed earlier will also impact upon the linkages.

Another example in the area of linkages between institutions in the area of Direct Store Delivery. Attempts to consolidate deliveries and minimize the cost of performing these activities to suppliers, transporters, retailers and consumers can have a positive impact upon the productivity of the total food industry system, as well as several of its parts.

How Productive Is The Total United States Food Industry System?

E. F. Schumacher writes:⁷

The most striking thing about modern industry is that it requires so much to accomplish so little. Modern industry seems to be inefficient to a degree that surpasses one's ordinary powers of imagination. Its inefficiency therefore remains unnoticed.

Have you ever thought about the resources employed in your particular segment of the system and wondered if Mr. Schumacher was talking about you? The author has wondered a great deal about his own segment of the system and the total system with all its parts as well.

How many times have you heard, "We (the United States) have the most

productive food industry in the world"? What probably is meant here is we have the most prolific food industry in the world in terms of total output of goods and services. Although the author is not sure whether even that is true. The point is that we have no basis, in fact, to compare total food industry system productivity in the United States with any other country or countries. We don't even know our own total food industry system's productivity.

Current Food Industry Efforts To "Improve Productivity"

With all this talk about total systems productivity, and the problems involved in measuring and improving same; please, dear reader, don't get the impression that the author is "down on" current food industry efforts to "improve productivity." Nothing could be further from the truth!! A lot of excellent work has been done over the years, and those responsible are to be sincerely congratulated and otherwise rewarded.

IMPLICATIONS

Another dimension needs to be added to the productivity scene--a total systems look!! Will this eliminate the need for productivity work at the (1) activity, (2) firm, (3) industry, or (4) between institutional levels? The answer is a resounding, NO!!

The aggregate (total system) look needs to be added to provide the total picture for the system, and to address some of the larger productivity issues that it would be difficult and costly for single segments of the system to solve by themselves. The total systems approach may call for some redirection in productivity thinking for certain more detailed situations. This is where we may run "a-foul" of existing

institutions and occasionally get tangled up, unintentionally, in a "turf-war."

Self-interest has been the major motivation for most improvements in productivity. What the author has been trying to say in this paper is that self interest must now be divided into two dimensions: (1) the classic-direct action for direct personal gain; and (2) the new-indirect action (work on total systems improvement) for indirect gain (a more productive system) from which you benefit as a consumer and contribute to the overall food system efficiency, thus strengthening the nation's economy and helping yourself at the same time.

CHALLENGES

1. Definition of productivity in all segments of the total United States Food Industry System--current and future.
2. Development of appropriate standards or benchmarks for productivity measurement.
3. Collection of data so that we can know where we are.
4. Meaningful aggregation of data to get a total system perspective.
5. Identification of areas where productivity can be improved.
6. Action to correct deficiencies.
7. Continuous monitoring of the situation-management by exception.

FOOTNOTES

¹"National Goals and Food Industry Productivity: Toward 2000 A.D.," Journal of Food Distribution Research, Volume 12, No. 3, September, 1981.

²"Food Distribution Research Priorities for Improvement in Total System

Productivity to 1985," Journal of Food Distribution Research, Volume VI, No. 2, July 1975.

³"Energy Technology as a Constraint to Future Food Industry Productivity," Journal of Food Distribution Research, Volume VI, No. 1, February, 1975.

⁴"Food Industry, Government, Labor and the American Consumer in Tomorrow's Market Place," Journal of Food Distribution Research, Volume XI, No. 1, February, 1980.

⁵"Institutional Productivity in the Food Industry: 1978-2000 A.D.," Journal of Food Distribution Research, Volume X, No. 2, May 1979.

⁶"Organization of a Total Food Industry System to Maximize Human Productivity - The United States Case," Journal of Food Distribution Research, Volume XI, No. 3, September, 1980.

⁷"Small Is Beautiful," E. F. Schumacher, Perennial Library, 1974.