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FOOD INDUSTRY IN THE YEAR 2000

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PREFACE

This paper was presented at the workshop "Size and Productive Efficiency: The Wider Implications" held at IIASA in June 1979. Because of its relevance to study of problems of scale in organizations it is being published as a collaborative paper in order to give it a wider circulation.

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Food Industry in the Year 2000

Gillis Een

The following study was carried out in Alfa-Laval in Sweden and was intended primarily for internal use. The purpose was to provide some guidance for our technical and marketing development activities.

BACKGROUND INFORMATION

Alfa-Laval is a supplier of capital goods to the food industry. We do not operate any food plants, but the food industry is our most important market, and we have every reason to follow very closely developments in this industry.

In the near past and especially after the Second World War we have seen a pronounced centralization of production capacity in many food industries. Potato starch, beer brewing and milk processing can serve as examples. It is obvious, however, that a simple trend extrapolation leads to forecasts which are improbable or even absurd, for example, a single milk processing plant for all of Europe.

There are also problems in further scaling-up of certain types of equipment which we produce in house. In some cases we have reached the size limit of technologies which have served us well so far. Furthermore the trend towards a smaller number of larger units is causing a diseconomy of scale in our own development and production.

This study has been carried out without any sophisticated methodology. I have simply collected facts and view points in a computerized system for storage and retrieval of information.

The material is not only from the traditional fields of technology and economy, but also from fields outside my professional training. Without any formalized procedure the material was used to form a simple scenario which I shall present here followed by a number of factors which defend this scenario.

THE SCENARIO

I believe in general that the food industry will be organized into a small number of national or multinational corporations with centralized resources for among other things R & D. In many countries the food industry is in a defensive situation regarding the food and health authorities. The industry has to spend the larger part of its R & D budget complying with regulations and proving that its products are nutritious and harmless. Small organizations cannot afford this type of work.

On the other hand I believe that the production units of the food industry will become more decentralized than at the present time. These satellite production units will be standardized however, thus achieving a certain economy of scale in design, building and maintenance. It is also possible that the production units will be more flexible in the sense that certain unit operations can be reprogrammed for changes in raw materials and end-products, thus avoiding the worst effect of short season crops.

I have based my scenario on the following factors.

Higher Transport Costs

It is probable that transport costs will continue to rise especially for perishable nonliquid foods. This will effect both the supply of raw material and the distribution of finished products.

Decentralized Sources of Energy

Nonconventional sources of energy such as direct solar energy or biomass favor decentralized production and use. Direct solar energy can e.g. produce warm water for cleaning and sanitation with equal or better economy on a small scale.

Diminishing World Trade

Most countries try to improve their balance of trade by reducing imports. The resulting protectionism favors the use of domestic raw materials.

The present pattern of international trade in basic food products is partly the result of political systems which have

now disappeared. Many incentives for buying for instance tropical fat from former colonies have vanished, but we still have a concentration of certain food processing industries at harbors with overseas trade, the industry for upgrading of the above-mentioned tropical fats for example. A switch over to domestic raw materials will remove the reason for this localization and concentration.

A Higher Degree of National or Regional Self-Reliance

This is not only a problem for developing countries, as is often assumed, but there is an increasing trend generally to plan and act in such a way that the effects of political events beyond a country or block's own control can be reduced to a minimum. Also this factor favors the use of domestic raw materials.

Complete Utilization of Agricultural Primary Products

In the past one raw material gave one finished product plus waste or perhaps an animal feed by-product. The new trend is towards production units which will fractionate the agriculture raw materials to:

- Food products
- Animal feed
- Energy
- Feed stock for chemical process industries
- Nitrogen, phosphorus, potassium, water and energy

back to the original agriculture.

Two of these items, i.e., animal feed and NPK, will drive development in the direction of decentralization. If these materials can be returned to agriculture without preservation or concentration, much energy will be saved. This can certainly be achieved much more easily in small production units with an uncomplicated, flexible and direct contact with the surrounding agriculture.

Stronger Legislation Regarding Environmental Protection

Large food processing industries produce corresponding amounts of water pollution and can easily overload recipients unless very special and costly precautions are taken. In a decentralized situation this is easier to avoid, or can be done for lower costs.

In some food industries much of the polluted water from small plants can even be absorbed by the surrounding agriculture in the form of irrigation and fertilization.

Better and Cheaper Process Automation

In the past, process automation was so costly that only large plants could afford it. Today this is one of the very few areas where costs are going down. Thus automation can be justified also in small or medium sized units.

Automation which can be reprogrammed is a prerequisite for the type of flexibility which is a part of my scenario.

Better and Cheaper Tele-Communication

Today people can communicate over long distances without travelling. Thus it is no longer necessary to have frequent person to person contacts between all the functions of an enterprise and a large part of administration, accounting, etc. can be physically separated from production.

Better and Cheaper Information Storage and Processing

This is related to the previous point. "Libraries" can be centrally situated in the corporation, and information can be retrieved and transferred to the satellites without time delay or loss of efficiency.

Increasing Demands for Reduced Vulnerability

This is related to the previous point about self reliance, and can be applied both on the national and the individual level.

When the Soviet Union had poor harvests and had to buy wheat in USA there was talk about agri-power in the States. A similar situation has occurred with soya-products. These events will certainly drive nations towards self-reliance and will result in reduced world trade.

On the level of the individual household the situation today is very different from before. We have food in the larder for one or two weeks and not more. This makes the whole society extremely vulnerable to intentional or accidental disturbances. A prolonged power cut e.g. will have a tremendous effect.

Strikes in the past were conflicts between employers and employees where the two parties fought each other without, if possible, hurting the third party. This picture has changed, Today a strike seems to be more effective the more it injures the third party, because in this situation news-media become interested and the government will be asked to interfere. There is a great danger that the food industry and food distribution system will become a favored target for such actions. Counter-actions on the individual level will be easier with a decentralized food production system where the nearest supply is not too remote.

Increasing Demands for Job Satisfaction

It seems to be a fact that small working places with, for instance, less than 100 employees have less disturbances in the form of sick leave, strikes, etc. and consequently a higher productivity. This can be related to less specialization, better personal contacts, better understanding of the complete operation, and fewer hierarchical levels. The end effect in economical terms is a higher efficiency per employee.

CONCLUDING REMARKS

This study indicates that in the middle range future, several factors will change in such a direction that ultimately the optimal size of the production units in the food industry will be smaller than it has been or is. This change of trend from centralization to decentralization will be gradual and vary from branch to branch within the food industry.