



JOCS

ABSTRACTS

ISF-JOCS WORLD CONGRESS 1988

The 19th World Congress of
The International Society for
Fat Research (ISF) and
The 27th Annual Meeting of
The Japan Oil Chemists' Society (JOCS)

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WORLD CONGRESS 1988

ABSTRACTS

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Plenary Lectures

RESEARCH AND DEVELOPMENT - A KEY FOR BUSINESS STRATEGY

PL Yoshio Maruta
Kao Corporation, Tokyo 103
Japan

1. Changes in the environment surrounding industry

There is a major evolution taking place on a global scale in the industry. For example, there are issues of technological innovation, highly advanced information society, and globalization, all the elements of which are multiplexed and intertwined, to generate another phase of evolution.

The advancement of the Japanese technologies, in particular, has produced a trade friction, which has now spread to the contention that Japan is getting a free ride on technology, and furthermore, to the contention to impose sanction on Japan, causing investment friction. It should be clearly noted that Japanese industries have become integral part of the total global environment. It is of utmost urgency, therefore, that Japan should create its unique and original technologies, in order to both make contributions to the international society, and promote international exchanges and cooperation.

When the society is undergoing structural changes on a global scale, the industry cannot expect to survive in the same traditional manner as before.

2. Innovation in companies

The introduction of innovative approaches should be pursued in accordance with the characteristics or the individual uniqueness of each one of the companies, and therefore, it is hard to generalize. In this section, the case of Kao Corporation is presented as an example.

First of all, it is important that the organizational power is utilized to the utmost, in order for a group to function collectively. To set forth a unified direction for the whole of the company to pursue, there must be a management philosophy to cope with the changing trends of the times. Kao Corporation has the following

management philosophy, which is being penetrated throughout the whole organization and all the employees:

- the spirit of service to the consumers
- absolute equality of human beings
- the view of the realization of universal Truth and collective wisdom

Secondly, there must be innovation in research and development work, marketing and production, which are the fundamental activities of the management of a company.

Marketing activities from our viewpoint does not mean the simple pursuit of market needs, but the exploration of potential market needs. For this purpose, it is necessary to sow the field of research with "seeds", in order that the research side is always prepared to cope with any emerging new "needs". The marketing activities and R & D are like two sides of one coin.

As for production, Kao Corporation has outgrown from the level of devising methods for rationalization, such as the conventional efforts of energy conservation and labor saving. The company is now attempting to drastically reduce fixed costs, through the introduction of automation, high speed equipment, and tankless system, and the incorporation of innovative computer network.

Thirdly, in an advanced information society of today, computers and communications technologies must be utilized to the fullest. Therefore, we have constructed a total system, centering around computers and communications technologies. Here, R & D, production and marketing and sales have shifted from the conventional form of separate and individual work to an integrated whole. Information exchange is taking place at a rapid pace, while a network has been established, enabling each division of the company to quickly respond to the requirements from other divisions. The aim here is to establish a network in such a way that it can function as if it were one human being.

In addition to the above, we are undertaking project activities, under the name of "TCR", through which we thoroughly review the current business to immediately make any necessary revisions. "TCR" stands for "Total Creative Revolution", or "Total Cost Reduction", meaning that the spirit of people as well as the scope of the businesses must undergo a period of revolution. The final goal of the TCR project is to drastically reduce total cost, while at the same time, extricating human beings from menial work that computers

or machines can handle, in order that people can engage themselves in work areas, that can only be done by people, and where people can find meaning in their working life.

The TCR activities are nothing to be done only on a temporally basis, but rather, they will have to be pursued on a medium- and long-term basis, as the activities themselves breed new tasks to be addressed by collective human wisdom.

3. Present significance of R & D and its innovation

The central role of corporate innovation is assumed by the R & D activities. Based on the concept that R & D is the source of power for Kao to survive and thrive, we have positioned the activities in the core of management. R & D strategy, therefore, must go in line with management strategy. Furthermore, an innovation is strongly called for, which should not be on the extension of traditional line of activities. That is, a high level R & D work is a requisite exploiting high-tech means and tools of today, to discover new and unique principles, and develop substances, materials, systems and technologies that have completely new features. This inevitably has enhanced the importance of basic research. At this time of rapid technological innovation, it is difficult for corporations to respond to the true needs of the users or to identify and create new needs, unless they are engaged in very basic R & D work. Needless to say that such fundamental research work is a prerequisite in surviving the era of internationalization.

In the high technology arena of electronics, new materials, biotechnology, and new energy, which are rapidly progressing, investigatory efforts go back to the basics to the levels of molecules, atoms, and further, electrons and elementary particles.

The technological innovation of the future will heavily depend on the creation of new technology, through the fusion of chemistry and other sciences. Chemical industry will go beyond the border of conventional chemical industry, and is expected to become the driving force of a frontier industry, in the form of "new chemistry".

In fact, the research work on the interface of chemistry, biology and physics are revealing the nature of the unknown, creating new technologies.

As stated above, the quality of basic research has been extremely upgraded, while at the same time, the trend for

interdisciplinary work, or the "fusion of various disciplines" is increasingly enhanced, in a natural course of events.

Therefore, we are placing even more emphasis on basic and fundamental research, as the basic orientation of our R & D activities. Our policy is to delve into the level of molecules and atoms, or the level of cells, in our research work. This inevitably includes interdisciplinary work. We are positively promoting joint research programs with universities in and out of the country and further, sending our people abroad to learn the knowledge and technologies of different disciplinary areas.

The in-depth basic research and relevant interdisciplinary studies unavoidably lead to the pursuit of vertical integration.

The chemical industry of the future will require the departure from its traditional operations, so that it would have a total grasp of the whole process, from materials, through assembly and systematization, to the final products. In our opinion, that there is no other alternatives than vertical integration to precisely combine and fuse the needs and seeds.

Such will be the way new markets and new demands may be created, new values born in the true sense of the word. The major aspect of technological innovation that is required of in the chemical industry of today is the development of new products through such vertical integration. We believe it is the only direction we should tread to ensure our survival into the 21st century.

Based on the direction, as mentioned above, our organization for R & D has gone through a period of innovation. As for basic research, Kao Institute for Fundamental Research was established. In addition, Fundamental Research Center have been set up, crossing over various regionally located laboratories. Each of the centers specializes in a specific fields of science, such as surface science, physico-organo chemistry and biological science.

The organization of our company is a flat yet flexible structure. The route of information transmission is made short so that quick responses can be made. Our system is such that the internal organizational change and transfer of researchers can easily be done, in accordance with the circumstances or to improve efficiency.

Among our laboratories, there is Knowledge and Intelligence Science Institute, which studies computer software and information communications, fully utilizing computer hardware. Not only

supporting our R & D activities, the Institute is carrying out studies for effective utilization of computer technologies as a means of management, in various areas of marketing and physical distribution (in other word, material flow). More recently, emphasis is placed on mathematics, as a basic science for deepening our understanding of the Truth. We have established the Mathematical Science Institute, which has just started its initial activities.

Among the R & D Division, the upstream materials development group assumes the role of creating seeds, while the downstream product development group is responsible for exploring and identifying needs. On the other hand, the Production Technology Development Division, or the Engineering Division, introduces technological innovation for completely rationalized production processes, in addition to developing commercial production technology of newly developed products.

Such efforts have traditionally been undertaken through a linear flow within the organization, handed over the functions from one section to the other. As the first change, we have interlocked and fused the functions of materials development group and product development group, connecting the seeds and needs within the R & D activities, with an objective of providing an atmosphere enabling development of key chemicals and key technologies.

Today, both of the two divisions of research and technology development, are required to unite force to efficiently and rapidly bring about their result in the form of new products. Therefore, we have recently integrated the two divisions, creating one research and technology development division. The integration of the series of activities from creation of new substances, physical evaluation, product development by application technology and to development of production technologies, has contributed to the establishment of a dynamic system for our research and technology development work.

What is important in conducting the tasks of research and development through such an organization is sharing and exchange of information. This is spelled out as one of the management philosophy of our company. The policy is meant to penetrate through the organization from the top management to individual researchers. We believe that information should not be monopolized by a limited number of executives or specialists, but rather should be commonly used, in order to allow fair discussions and sharing of wisdom, based on the same information. Only then could we approach the Truth and

conceive of good ideas. Our company offers frequent occasions for information exchange. At the same time, we have adopted an open space system, so that information exchange can take place in a natural, free and daily atmosphere.

This has increasingly motivated the researchers, strengthening the organic ties that exist among various laboratories and various research groups.

4. Research based on the renaissance of humanism

What is even more important is the attitude for research, based on humanism. The basic research or interdisciplinary research means, in one sense, renaissance of humanism in research activities. Nature is originally one integrated entity. In the field of academic studies, the separation of humanities from natural science is, in itself, a deviation from the true essence of nature.

Therefore, integration in research functions means that researchers can continue their traditional in-depth pursuit of facts in a narrowly defined area, while they can also feel, think and contemplate various events from a broader point of view. In order for them to do so, it would be only natural to return to the starting point of humanity, pondering over the fundamental thinking. Such a naive, yet integrated and fundamental attitude will bring us even closer to Truth. The Truth is "Law", one of the "three sacred treasures of life", as preached by Prince Shotoku 1,380 years ago.

The chemical industry of the future is tantamount to a group of "Sangha", who are working towards the direction of "Buddha", or needs, through "Law", or a humble attempt of approach to the Truth from a broader viewpoint based on humanism.

THE SAFETY OF OILS AND FATS

J. Nieuwenhuis, Unilever Research Vlaardingen

P.O. Box 114,

3130 AC Vlaardingen

The Netherlands

PL

Oils and fats form, together with protein and carbohydrates, the three main nutrients and oils and fats supply an estimated 22% of all energy intake by the world's population.

About 60% of that fat consumption on a world wide basis is in the form of "invisible fats" such as animal fats in meat and dairy products, vegetable fats in nuts and grain, etc. The remaining 40% is consumed as "visible" oils and fats. The total production of these oils and fats, such as Soyabean oil, Palm oil, Sunflower oil but also Fish oil has increased enormously in the last decade and now exceeds 50 million metric tonnes. This forms the basis of a world wide industry consisting of a variety of activities ranging from plantations, oil mills, oil processing industries to industries for producing and marketing consumer goods.

Oils and fats consumed as such, but also as incorporated into many consumer products, are one of the biggest single products in our food intake. As a result the safety of these oils and fats and the resulting products is an important issue, especially as in the world at large Product Assurance is growing in importance year by year. The very low incidence of food poisoning accidents involving oils and fats is very reassuring for all of us but this does not mean that there are no safety risks. Moreover contaminants which, due to their presence at trace levels in the product, scientifically do not represent a health hazard can still be perceived by the public as unsafe. This can have negative effects on the image and market position of such products. In view of the above, quality assurance should have a high priority for all company boards in our industry.

Potential hazards on the long and complicated path from the field to the user will be identified and discussed. These hazards can be associated to amongst others, processing methods, production equipment, factory environment, storage and transport and the microbiological stability of fat products. A systematic approach is essential to indentify weak spots and coupled with appropriate and timely action the safety of products has been

and still can be improved.

Oils and fats have proved to be very safe food products, opportunities still exist to further improve the safety and reduce any remaining risks. This, in combination with the growing demand of the public regarding the safety of their food, implies that the oils and fats industry has to work hard to maintain their present good position.

All companies working in the industry have a major responsibility to achieve this aim. A Company Safety Policy, promoting as it does a systematic approach to quality assurance, can be an excellent tool to enable Company Boards to manage the quality of their products and so contributes in a significant way to improved safety.

DIETARY CULTURE AND FOOD INDUSTRIES IN JAPAN

Katsuhiro Utada

Ajinomoto Co., Inc., Japan

PL

I. Japanese Dietary Tradition

A. The Natural Environment and Dietary Culture

The natural environment has a great influence on the diet of any nation, which varies according to local conditions. Dietary culture is also the product of people's attitudes toward nature.

B. The Advantages of the Rice Paddies

C. History of Japanese Dietary Culture

1. The Nara Period (7th-8th cent.)

2. Before and during the Edo Period (16th-19th cent.)

3. The Meiji Period (19th-20th cent.)

4. The Showa Period (with focus on postwar period)

II. Features of Japanese Dietary Culture

A. Nature in Traditional Japanese Thought

The desire to adapt to and live in harmony with nature as an integral part of traditional Japanese culture versus the desire to change and control nature as characteristic of European culture.

B. Fresh Over Processed Foods

C. Active Adoption of New Things and Ideas from Overseas

D. The Concept of Coexistence

III. Dietary Culture and the Food Industry

A. Development of the Food Industry in Tandem with Dietary Trends

1. Before the Edo Period

2. The Meiji Period: Increase in Meat Consumption

3. The Strong Influence of European and American Diets

B. Soybean and Soy-related Industries

1. Soybeans

2. Oilseed Industry

C. The Fermentation Industry: The Ingenuity of East Asia

IV. Food Industries Today

A. Changing Consumer Dietary Preferences

B. Innovations in Distribution

C. Innovations by Food Manufacturers

THE EDIBLE OILSEED PROTEIN SITUATION

W. J. Wolf

Northern Regional Research Center, 1815 North University Street,
Peoria, IL USA

PL

In the 1960's and 1970's much attention focused on oilseeds as sources of edible proteins to help meet the needs of a growing world population. Extensive research and development were conducted on a number of oilseeds and enthusiastic predictions were made about the extent of use of these proteins in the future. The future has arrived and we find that these predictions have missed their marks by wide margins. Among the oilseeds that were considered were soybeans, peanuts (groundnuts), cottonseed, sunflower and rapeseed. All require some form of processing to make them edible and palatable. The present status of these oilseeds for production of edible proteins is reviewed here.

Soybeans. Today soybeans are the predominant oilseed source for edible proteins in the forms of flours and grits, concentrates and isolates. These proteins have been available in the United States for over 30 years and are no longer considered new or novel (1).

In the past four years, the United States soybean processing industry has undergone significant consolidation to fewer and larger companies. The protein processing segment of the industry likewise has changed significantly since 1975 when there were sixteen major producers of soybean protein products. Included were several large food companies who did not process soybeans but who purchased defatted flakes or flours as their starting materials (2). Since then most of the non-soybean processing companies have withdrawn from the business leaving only twelve companies in 1988. Today only six companies produce defatted flours and grits, two concerns are in the concentrate business, three manufacture isolates and eight texturize flours, concentrates and isolates. United States production of these products has increased over the years as shown in the estimates for 1967 and 1985:

	1967	1985
	1000 MT	
Defatted flours and grits	48-50	150
Concentrates	8-14	50
Isolates	10-16	70
Textured flours and concentrates	-	75