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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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THE APPLICATION OF SCIENCE IN POLISH INDUSTRY[1/]

by

Dr. Ryszard Maj*

* Sea Fisheries Institute, Gdynia, Poland

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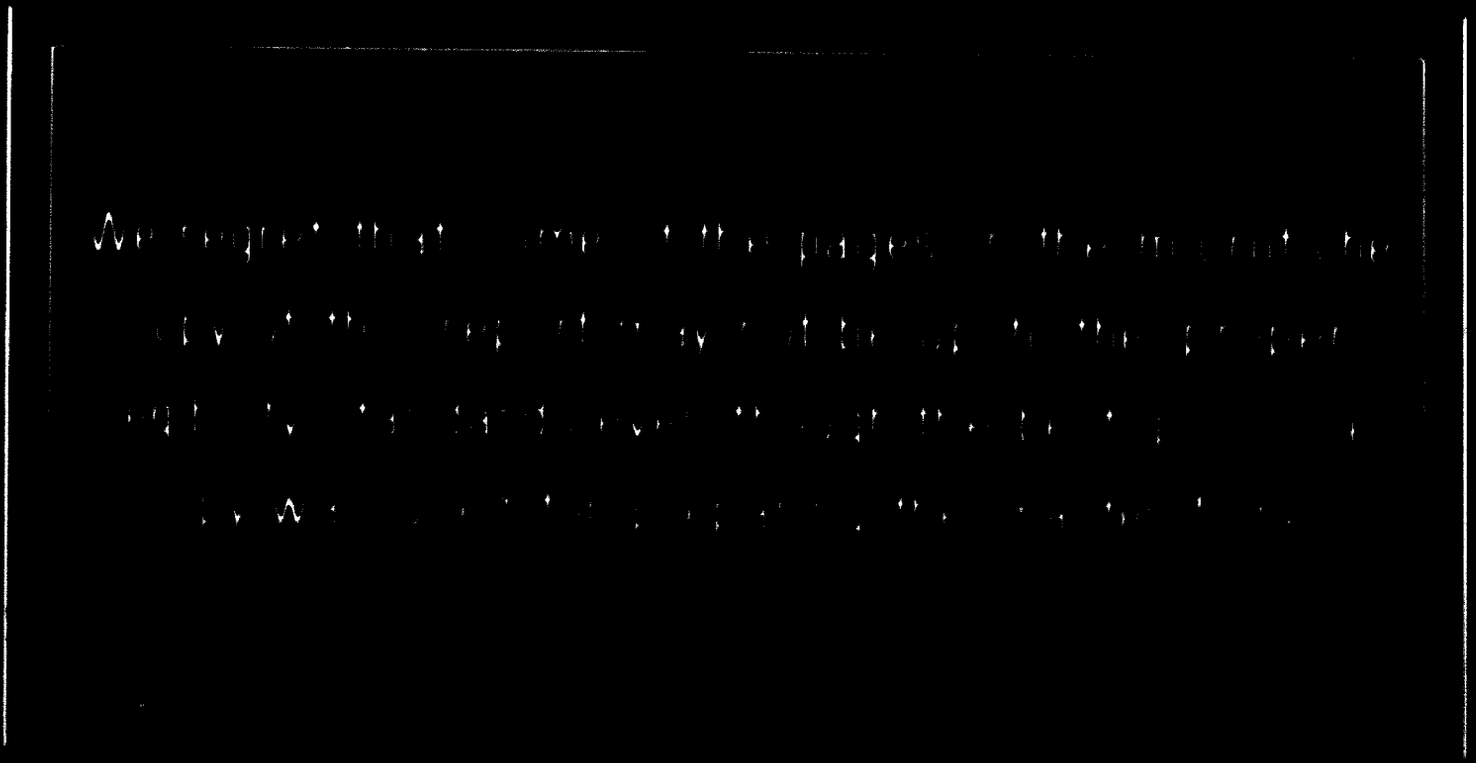

Introduction

1. There are two kinds of research in science. One seeks to develop theories during the study of various phenomena. The other is of an applied character and seeks to develop these theories for man's overall benefit.

The dynamic development of the world economy requires continuous scientific research. On the one hand, this research must keep ahead of the manufacturing stage so as to pave the way for further technical and organizational progress. On the other hand, it creates a scientific basis for current economic actions.

2. In our economy it is the rule that theory is closely linked with practice, and that the efforts of workers in both the scientific and economic fields are combined in order to attain the best results in the realization of production targets.

Such co-operation is found right the way through the whole economic process. The process of co-operation aims to achieve feasible planning targets, which are based on a reliable analysis of economic potentials and on the possibilities of including the fruits of scientific progress in their realization. Scientific aid concerns the formulation of both short-term and development plans, and also the coordination and equalisation of macro- and microeconomic programmes at the level of the state, branch of industry and company.

The tasks of science are to choose optimal methods of action, to analyse the course of a given process, and to study its effects. One can thus put it very simply: in a socialist economy, both research scientists and those who put their theories into practice are destined to work together such co-operation is advantageous to both sides.

Using the example of the fishing industry one can safely say that the greater the difficulties met by the industry, the more urgent does the need for research become.

3. In Poland scientific research is carried out by four basic groups of scientific institutions:

1. The Polish Academy of Sciences.
2. College Institutes / Polytechnics, Universities/.
3. Institutes and research centres of central government institutions, especially those of ministries.
4. Industrial institutes and research centres.

4. Typically, it is the scientific centres mentioned in groups three and four which in particular work for the benefit of industry. However, they frequently work together with all the other research groups.

In addition, the scientific institutes of the Polish Academy of Sciences, the College Institutes and the central institutions all carry out some industrial projects. In Poland a new form of organization has even evolved: combined college and industrial institutes.

5. I will talk about the organization of research carried out directly in industry using the example of the fishery economy. This is illustrated by the enclosed diagram No. 1.

6. The Sea Fisheries Institute in Gdynia /SFI/ plays a leading part among the scientific research institutions connected with the fisheries. It is controlled directly by the Central Fisheries Board in Szczecin, and indirectly by the Ministry of Foreign Trade and Shipping in Warsaw. This Board, as a so-called Great Economic Organization and having the character of a large company, unites all undertakings connected with the fishing industry, and from the cybernetic point of view forms a comprehensive and closed entity.

The remaining research centres of the industry include:

- The Central Laboratories of the Fishing Industry in Gdynia
- The High Trade Scientific and Research Centre
- Company research centres in the larger undertakings of the industry.

7. An essential condition for well-run research activities is an efficient organizational structure, enabling a logical layout of duties and responsibilities to be made, and making it possible to arrange subordinate sections so that the execution of set tasks is expedited. Organization is therefore the basis of group activity, and combines individual efforts in that group activity.

An analysis of research projects which have produced positive results has shown that an improvement on average results is rarely achieved by one single outstandingly talented person.

It is necessary therefore to create such an organizational structure which makes it possible to divide specific tasks among a number of groups, and which coordinates their activities, and assesses their results.

8. Diagram No. 2 shows how research activities at the Institute are administered.

9. The Sea Fisheries Institute has already been active for 55 years. It employs 700 people, 300 of whom are scientists. 40 of these possess distinguished scientific titles. The SFI has four research ships at its disposal, including the r/v "Professor Siedlecki", one of the most modern research ships in the world. The spectrum of research is very wide, ranging from oceanography to technology and economics. It is an institute of great diversification, there being 14 separate scientific departments.

10. The head of the institute and those of his deputies who direct the research are placed fairly high up in the organizational structure, because in principle they are responsible for setting out the aims of the Institute.

On the middle level are the heads of the separate scientific departments of the Institute and should possess more scientific knowledge than administrative experience, since there are specialised groups dealing with such activities as providing equipment, creating research posts, conditions of research etc.

Aims of Research

11. The aims of the research activities carried out by an industrial institute must correlate with the general aims of the industry as a whole. The economic aims and those of research are mutually cause and effect.

When deciding the aims of research activities, one ought to take into consideration a number of factors which make for efficient research. Such factors include:

a/ the form of research organization
b/ the main direction of research activities
c/ the proportions of, for example, biological and technical research
d/ the importance of the research in that branch of industry
e/ the necessary qualifications of the scientific staff
f/ the quality and range of technical equipment
g/ the extent of coordination with other scientific institutes
h/ the extent to which original achievements are introduced.

Research aims are brought up to date every four or five years / 5-year plans/, or on the basis of changes in world politics, e.g. the introduction of 200-mile coastal zones.

12. The aim of current research is to work out technological methods and means whereby the basic targets of both industry as a whole and of individual undertakings can be realised. This aim also concerns:

- current tasks, including the solution of immediate problems
- prospective tasks, enabling the trends of development to be outlined.

Research problems solved by the Institute are introduced by the industry as a form of technical and organizational progress. Within this framework the following additional tasks are carried out:

- the adaptation of world and national achievements,
- the results of a large number of specialists at the Institute are used to make work there more efficient,
- an advisory service providing scientific and technical information, patent details and statistical analyses,
- training of specialists.

13. The Sea Fisheries Institute has defined its chief research target as follows: to enable the Polish sea-fishery industry to exploit areas and fishing grounds as yet unknown to it. This aims to make the catches of live resources as large as possible. The principles of rational and economic activity will be adhered to, when, for Poland new catch, storage and processing methods are applied.

Forms of co-operation between research institutes and industry in Poland.

14. In Poland, scientific research is financed by grants for particular research purposes, or by a technical progress fund set up by individual enterprises.

Any research idea put forward by an enterprise, industry or ministry is analysed in the institute and is either accepted, rejected or passed on to another institute. If the subject is accepted, it is introduced into the plan, the time for completion of the project is estimated, and then, depending on its importance and the number of research staff available, work is started on it.

15. At this point, the Institute signs contracts with the body from whom it has received the research proposal in order to:

- produce a written summary and an estimate of costs for the project in question,
- carry out and introduce the requested research solutions / e.g. new production technology, new technical construction or organisational, financial or information systems etc./,
- elect a group consisting of workers from both sides to solve particular problems.

Additionally, enterprises may ask institutes to carry out particular studies and immediate research services such as:

- writing monographs / e.g. the production by the SRI of an analysis of the profits to be had from ocean catches based on a given foreign port/,
- expertise opinions and attestations,
- advisory services / e.g. the selection of the best of a group of processing machines for a given enterprise,
- routine studies / e.g. laboratory/.

16. An institute may also offer its projects and solutions to industry in order to make them more widely known or to sell them under licence. This particularly concerns that work which the institute itself has initiated.

17. A special form of co-operation with branches of industry are long-term projects, usually in the form of composite formulations such as the establishment of investments, development programmes for the industry as a whole or for separate enterprises, modernisation / e.g. of the fleet/ etc. Such co-operation may be initiated both by industry itself or by central government institutions.

Industrial research centres, and joint research groups and teams.

18. The large economic organizations such as the Central Fisheries Board generally have their own research institutes. In addition, large undertakings / e.g. large fish processing factories/ have set up scientific and technical centres on their own premises. Their purpose is primarily to introduce into a particular enterprise technological analyses and solutions which have been carried out in specialist research institutes. They also work out smaller problems specific to a given enterprise, especially in the field of technical and organisational progress.

19. The larger enterprises have their own scientific and technical information centres. These work with similar centres representing other branches of industry, and together form a nation-wide information system. They also have analytical and research laboratories at their disposal where they can work out their own production technology.

The branches of the Board may additionally appoint industrial centres to calculate work norms. Groups dealing with standardisation may also be set up.

20. Research undertaken by development groups, made up of both scientists and industrial specialists, has proved to be particularly effective. At the SRI such combined groups have solved such complex problems as:

- working out a new technology for the production of net fabrics by the textile industry. This group was made up of scientists, experts from net factories net-making specialists from the large fishery companies, and captains of fishing vessels,
- working out a new technology for fish products /e.g. minced fish/,
- working out new mechanical equipment.

Such research successes are due not only to the integration of theoretical and practical knowledge, but also to common interests and ambitions and the overall desire for a friendly atmosphere based on personal contacts and informal relations between scientific and practical experts.

Advisory services and training in the field of research carried out by research institutes for the benefit of industry.

21. The co-operation mentioned in the title results from the substantial needs of industry. In particular, enterprises request various forms of advice. So, for example, in the fishing industry, our Institute answers questions like: where, when and what kinds of fish can be caught, how best to space out a fleet in given fishing grounds. As for the technical field, the questions are often about necessary machines, navigational, locational and processing equipment, and apparatus for dealing with aspects of the science or materials. Information bulletins and the so-called "Express Information" are very popular. As far as training is concerned, scientists are particularly keen to participate when the discussions are about the introduction of some new technical equipment or technology, or about organizational, financial and information systems. Lectures on problems relevant to the industry, scientific symposia and conferences are also well attended.

22. Bilateral contacts between scientists in enterprises and experts from industry in the institute enable regular exchange of ideas and acquaintance with one another's problems. Annual and extraordinary meetings of the institute's management with the directors of the enterprises ensure that co-operation is going in the right direction, and make possible analyses of its results, and an improvement in its forms and methods. Because of this, the scientists are well versed in the problems of industry, while the work force in the various enterprises appreciates the practical help given by the scientists in solving its problems.

The Sea Fisheries Institute keeps in close touch with world developments and keeps the industry informed of them. It also takes part in international symposia, exhibitions, conferences and training schemes.

23. Almost every research institute co-operates with a certain number of similar institutes at home and abroad. I will present this problem again using the example of the SFI. Co-operation between the Institute and many similar foreign institutes takes on three basic forms:

- the regular exchange of publications. In this respect, the SFI maintains contacts with over 200 such institutes throughout the world,
- special scientific contracts, as with the Whitefish Authority during the construction of the research cutter on the r/v "Professor Siedlecki",
- regular co-operation covered by contracts and plans.

24. For nearly 15 years the SFI has been co-operating closely on a contract basis in coordinated research work within the framework of the so-called "Five-party fishery agreement". This provides for scientific and technical co-operation regarding the fishery industry with the Bulgarian People's Republic, the German Democratic Republic, the Rumanian People's Republic and the Union of Soviet Socialist Republics.

25. Within the terms of a contract with the American institute in Woods Hole, the SFI is conducting investigations on stock abundance in the Atlantic fishing grounds. The specially set up Plankton and Taxonomic Centre in Szczecin is also carrying out work for this institute. Polish scientists from the SFI together with their colleagues from the USA and West Germany, under the code name "Helgoland", took part in joint investigations of fish spawning grounds. The SFI has also carried out a number of studies for the benefit of the industries of other countries, especially those of the developing countries. For example, under the auspices of the Food and Agriculture Organization / FAO/, the research vessel "Professor Siedlecki" investigated the Patagonian shelf, and survey of the Peruvian fishing grounds. The Institute carries out other maritime studies within the framework of those fisheries conventions to which Poland is a signatory. Similar projects are completed by the SFI for international fishing partnerships and for the FAO.

The need for scientific studies on behalf of our foreign partners is increasing in the face of the ever greater part played by the Polish fishing industry in international co-operation. The Institute is therefore prepared to extend its research services in the form of international consultations.

Does it pay industry to co-operate with research institutes?

26. Industry feels the need to co-operate with research centres. Evidence of this are the numerous contracts and requests for help in solving difficult problems. Such close co-operation is usually favourably assessed. However, it is difficult to estimate its profitability, or the extent of its concrete calculable effects. There are, of course, those results which can be expressed in figures. For example, the SFI constructed a machine for the mechanical processing of

fish. This gave a direct saving in the domestic price per machine of 595 thousand zlotys over the cost of an imported machine incorporating similar features.

27. Another very emphatic example from the SFI. The SFI's research vessels discovered rich fishing grounds and their exploitation by the Polish fishing fleet enabled the entire cost of research at the Institute to be covered for several years.

28. The profitability of industrial co-operation with science is not a deciding factor in this problem. Stress is laid on how to direct research on to the most important problems of industry, so that it produces the most advantageous results while at the same time using the research funds in the most economical way possible. Important also is how much money can be set aside for research.

<u>The role of UNIDO in supporting and establishing co-operation between research institutes and developing countries.</u>

29. The economic development of every country and its industry may either take place in an unrestrained fashion, or it may be suitably controlled. Practice teaches one to make full use of experience and acquired knowledge - here one may cite the example of the Polish fisheries which had to learn sea-fishing from scratch - and this sets one well on the way to success, eliminating great risks at the same time.

30. The role of UNIDO should be to inform countries without experience and tradition in this respect about the advantages of scientific investigations and also to create an economically useful demand for such research in these countries.

31. The second task is to give help in recognising these needs and in ways of satisfying them: how much can be achieved by training one's own specialists, and what is worth taking over from specialised research centres as part of international co-operation.

32. The third task could be to find out which centres in the developed countries could and would be prepared to help and advise eventual foreign partners, and to facilitate such contacts.

33. The proposals I have put before you are neither original nor do they exhaust the subject. This problem has been presented and worked out by UNIDO itself.

In the light of the growing demands in this regard, it is therefore not so much the programme which is important, but the range and forms of its realisation. These requirements have originated especially in the fishery industries of developing countries because of the new legal and political situation in which the world's fisheries find themselves. In striving for a rapid expansion of their own fisheries, it is more and more common to find these states introducing so-called economic zones. They therefore need quick and effective help in realising their plans. Poland has always been ready to come to their aid. This readiness was once again expressed recently, when Poland, together with the FAO, carried out some oceanographic research on their behalf.

The SFI, as I have already mentioned, has a wealth of experience in every aspect of fishery industry, from catching, processing, trade and services, to the design of fishing vessels, ports and fishery enterprises.

The SFI has at its disposal a worthy staff of specialists, funds and wide-reaching contacts and partnership in the spheres of research, training and industry. I can

thus offer a full list of services starting with monographs and finishing with complex investment, developmental and organisational projects. We can also offer our services as regards training under contract conditions, that is, both through the delegation of specialists and the sale of licences and complete projects, and also on other principles of co-operation / e.g. economic co-operation/.

Our establishing of co-operation with UNIDO may mark a new step on the right way towards the realisation of these plans.

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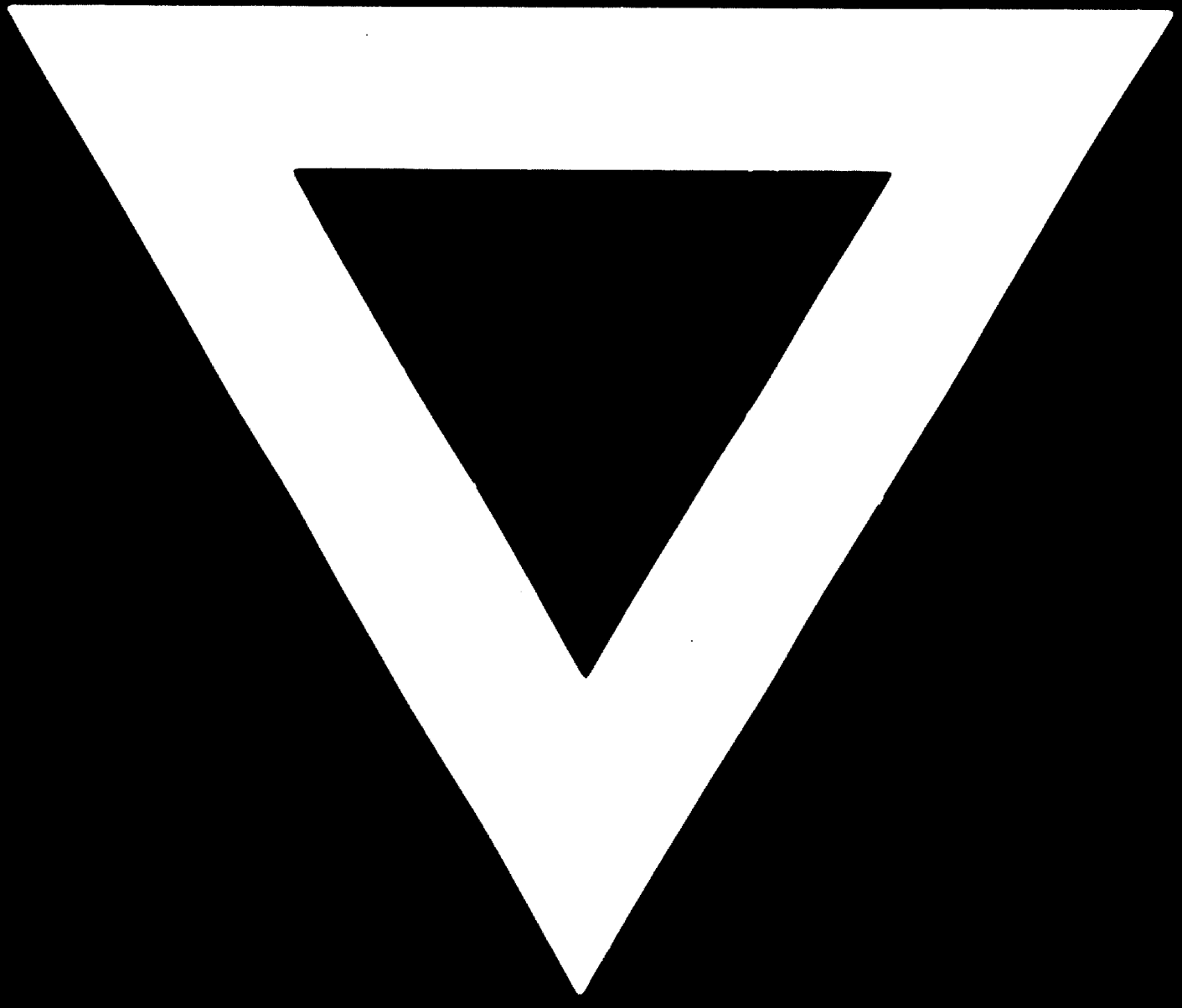

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