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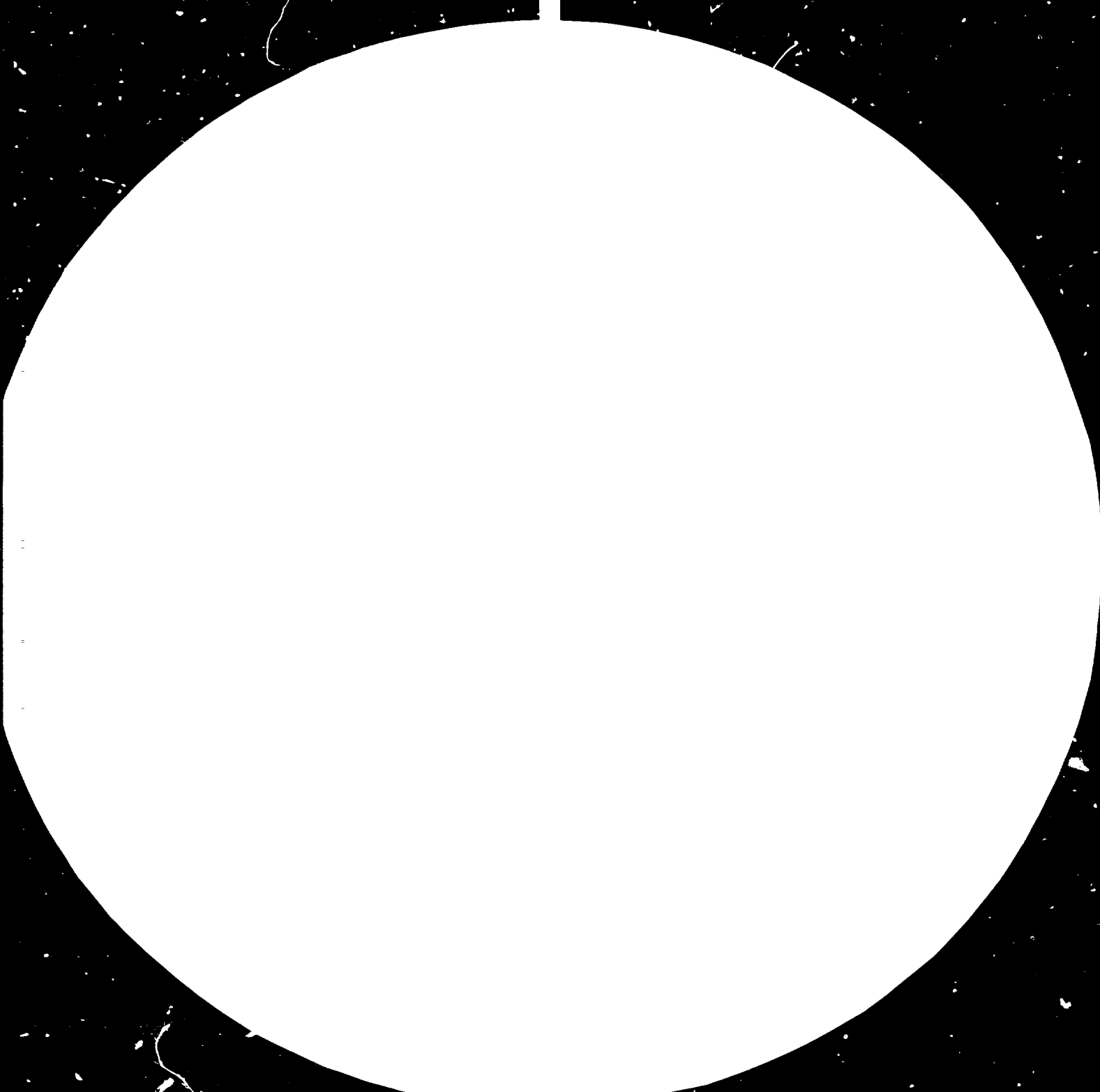
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United Nations Industrial Development Organization

Meeting on Industry-Research Institute Linkage
with Special Reference to Instrument Design

Sofia, Bulgaria, 20-24 April 1981

REPORT .

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INTRODUCTION

It is a recognized fact that industrial research and service institutes (IRSIs) often have an unsatisfactory relationship with industry and obtain most of their budget from the Government rather than as a project fee from industry. The Bulgarian Institute for Instrument Design (IID), however, develops projects under contract with the industry concerned, thus providing direct contacts with the industry.

In order to make the Bulgarian experience known, the Joint Committee for Co-operation between UNIDO and the Bulgarian Government decided to arrange a meeting at Sofia on industry-research institute linkage, with special reference to instrument design. In appreciation of the assistance given to IID by UNIDO, and desiring to help developing countries, the Institute invited participants to share the Bulgarian experience. The linkage of IRSIs (by twinning and other such arrangements) in the rapidly growing and essential field of instrument design is a topic of great interest both to UNIDO and to the developing countries. Furthermore, IID is ready to draw up contracts with developing countries for various types of assistance, such as training, direct transfer of technology and twinning arrangements.

UNIDO welcomed the opportunity thus offered for several reasons, one being that the meeting could be considered to be a follow-up to the recent evaluation study of industrial research and service institutes undertaken by UNIDO and UNDP; moreover, such arrangements were a normal part of UNIDO activities. Last but not least, UNIDO had difficulty in placing fellows from less developed countries and finding qualified twinning partners for industrial research and service institutes, requesting that type of technical assistance.

I. ORGANIZATION OF THE MEETING AND DOCUMENTATION

The meeting took place at Sofia from 20 to 24 April 1981. UNIDO provided air transportation for the participants and a daily subsistence allowance in local currency. IID provided local transportation for the participants, conference facilities, hospitality and secretarial services. In addition to the Bulgarian participants, there were 17 guests from 12 developing countries, three UNIDO staff members and one UNIDO consultant. The meeting was opened by Mr. A. Angelov, Corresponding Member of the Bulgarian Academy of Science and First Vice-President of the State Committee of Science and Technical Progress. An opening statement was also made by the Officer-in-Charge of the Institutional Infrastructure Branch of UNIDO. The programme of the meeting included the discussion of papers, plant visits, round-table discussions and some bilateral meetings. After each of the papers had been presented, there was ample time to ask questions and discuss the topics dealt with. The substantive programme is given in annex I below.

Four papers were presented at the meeting.

The first paper, by I. Petrov, Director of IID and UNIDO Project Manager, was entitled "Research institute-industry linkage with special reference to instrument design". It described the Institute for Instrument Design, its structure and scope, the type of projects involved, their organization, financing and relations with industry and the Government etc.

The second paper, by A. Pissarev, Deputy Minister, Ministry of Education, was entitled "Experience and problems in the integration of education in Bulgarian higher education institutes with research and production". It described the educational system in Bulgaria and the highly successful results of the industrialization of Bulgaria under the socialist Government since the last war, drawing attention to the closely integrated system of education and research.

Two papers were submitted by Richard H. Westergaard, UNIDO consultant and Research Project Manager at the Central Institute for Industrial Research in Oslo. The first paper, entitled "Co-operation between industrial research and service institutes", analysed the advantages and disadvantages

of various types of co-operation among industrial research and service institutes, such as twinning arrangements. The second paper, entitled "Industry-industrial research and service institutes co-operation", described the problem of linkages between industrial research and service institutes and industry, emphasizing that research and development (R and D) should not be undertaken in isolation but jointly with industry.

The four papers were subsequently issued by UNIDO as documents ID/WG.344/1-4.

II. CHARACTERISTICS OF THE INSTITUTE FOR INSTRUMENT DESIGN

As one of the main objects of the meeting was to show the potential of IID to assist industrial research and service institutes in developing countries, it is essential to understand exactly what kind of institution it is, as well as the political-economical framework within which it works.

A. Nature of the Institute

IID is basically the product development division for a State-owned company consisting of 20 factories with some 20,000 employees; it employs about 700 people. Practically all its activities are devoted to well-defined product development projects, contracted from 20 factories. This is also the source of financing of IID. Most of the products are conventional in technology, design and production, rather than being based on sophisticated innovative research. Applied research is an important element and there is a continuous ongoing effort to improve the products and introduce new products or improve design and production.

B. Products developed

IID mainly develops industrial measuring and process-control equipment, including such instruments as step motors, servo-valves and similar devices of small and intermediate size, electrical watt-hour meters, voltmeters and temperature control devices. The development of numerical control systems for machine tools is a very important part of its activities. IID is a modern and advanced institution and is actively introducing computer technology and microprocessors in product development. Quality control and reliability evaluation are very important aspects of its work.

C. Market situation

IID and the company to which it belongs are managed strictly according to such economic criteria as profitability and efficiency. Although their

original objective was to meet the demands of the home market, today export is the main outlet for most of their products. Thanks to industrial co-operation amongst the socialist countries, a certain degree of market-sharing secures the outlets for the products as long as they are competitive in price and quality. There is also some export to other countries, both developing and developed, in Africa, Asia, Europe and the Middle East.

D. Incentives

In many developing countries, professional staff members receive payment according to a government scale and can only earn a fraction of what they could earn in industry. If there is also a shortage of qualified academics, this system makes it impossible to attract and keep a high-calibre staff and thus to make the industrial research and service institute a centre of excellence.

IID is offering salaries that are high enough to attract and keep highly qualified people, with the added incentives of equal opportunities and promotions.

III. WHAT CAN THE INSTITUTE FOR INSTRUMENT DESIGN OFFER TO DEVELOPING COUNTRIES?

As has already been noted in the introduction, IID keeps in close contact with UNIDO and is prepared to become more involved in assisting developing countries. This is certainly welcomed by UNIDO because of the difficulties UNIDO has in placing specialists from developing countries for training and in recruiting competent consultants and experts.

A. Advantages offered by the Institute

One great advantage of IID is that the services it offers cost considerably less than the rates prevailing in most industrialized countries, where similar institutions charge \$50 an hour or more for R and D professionals. The services of IID, or any equipment supplied through UNIDO/UNDP projects for the developing countries, could be paid entirely or in part with the Bulgarian currency accumulated in UNDP funds.

The Institute has interpreters available, so that it is possible to receive trainees or send experts speaking the following languages: English, French, German, Russian, Spanish.

IID provides the following types of assistance:

- (a) Long-term or short-term training of fellows in general or specific problems and techniques;
- (b) Commissioning of consultants and experts;
- (c) Transfer of technology by granting a licence or teaching some of the techniques known to IID;
- (d) Twinning, which is the term used for close co-operation or of adoption of the IRSI needing assistance by IID over a period of several years;
- (e) Provision of support services.

B. The value of the Institute as a model for other industrial research and service institutes

In addition to its various technical skills, the most important feature of IID is that it has gained experience in product development in co-operation with industry. R and D people from less developed countries could learn a lot from IID, where all steps in the process of product development can be followed: market study, planning and execution of R and D, prototype development, production and quality control systems and standards.

C. The differences between the Institute and a "normal" industrial research and service institute

Normal industrial research and service institutes, even of the mono-branch type, are separate and independent from industry and have a problem selling their services and integrating the R and D with the sponsoring industry. An IRSI seldom does the whole job of developing more or less conventional products. It will more often be asked to handle only a part of the development work, such as designing a microcomputer and the interface equipment, solving a materials problem, developing a special transducer etc. The rest is done by industry.

Bulgaria already has a considerable industry, including the manufacture of capital goods, a well-functioning educational system, and a large number of specialized R and D institutes and other institutional infrastructure, which are more or less lacking in the developing countries.

D. Application of the Bulgarian model

Under the Bulgarian model for R and D, factories producing related products are organized as a company and each company has its own R and D institute where all product development work is done. Each company has 10-30 factories and 20,000-30,000 employees, and the institutes employ 500-2,000 people. All R and D institutes are mono-branch institutes serving their own companies. This model appears to solve the problem of linkage between industry and the institutes in a very satisfactory way. The model can work not only in a country with a centrally planned economy but also:

- (a) Within large corporations, irrespective of ownership;
- (b) Within countries which have a mixed economy, where State-owned companies can establish co-operation with private companies with a joint R and D institute;
- (c) Within a group of privately-owned companies working in the same field (same type of technology), which can decide to share the market and have a common R and D institute.

One important condition for the success of the Bulgarian model is the co-operation and market-sharing that take place among the socialist countries. Countries that do not have this advantage must instead seek regional co-operation, common markets and similar arrangements; if they are to embark on sophisticated production based on their own R and D, such regional co-operation is essential, particularly when each of the countries is small.

E. Conclusions

It will thus be seen that Bulgaria can help developing countries in two ways: (a) by strengthening the capability of existing IRSIs or creating new ones; and (b) by transferring the technology required to set up production in the developing countries of products developed in Bulgaria.

IV. IMMEDIATE OUTCOME OF THE MEETING

During the meeting, bilateral consultations were held, which led to concrete agreements for co-operation between IID and the relevant industrial research and service institutes and companies in the developing countries.

At the request of the participants, the procedure for the establishment of twinning arrangements and an example of a twinning agreement were drawn up at the meeting, in co-operation with UNIDO representatives (see annex II below).

Also at the request of the participants, other institutes belonging to companies of the Ministry of Electronics and Electrical Technology are listed in annex III below.

A suggestion that an interregional centre for training on conventional and microprocessor devices might be set up at IID, with a view to meeting the needs of developing countries in the training of specialists, was supported by all the participants.

Annex I

PROGRAMME OF THE MEETING

- 20 April Opening statements
 Visit to the instrument exhibit
 Visit to the Institute's laboratories
 Presentation by I. Petrov of the paper entitled
 "Research institute-industry linkage, with
 special reference to instrument design"
 Discussion of the paper
- 21 April Presentation by A. Pissarev of the paper
 entitled "Experience and problems in the
 integration of education in Bulgaria's
 higher educational institutes with research
 and production"
 Discussion of the paper
 Visit to the Electra plant
- 22 April Visit to the storage device plant at Plovdiv
- 23 April Presentation by R. H. Westergaard of papers
 entitled "Co-operation between industrial
 research and service institutes" and
 "Industry - industrial research and service
 institutes co-operation"
 Discussion of the papers
- 24 April Visit to the Institute for Computing Techniques,
 Sofia
 Visit to the Institute of Industrial Cybernetics and
 Robotics, Sofia
 Round-table discussion of the problems of
 efficient organization of the national human
 resources for the development of R and D and
 industrial activity, directed by I. Petrov
 Closure of the meeting

Annex II

PROCEDURE FOR THE ESTABLISHMENT OF TWINNING ARRANGEMENTS
AND SAMPLE AGREEMENT

A. Procedure

The procedure for the conclusion of twinning arrangements should consist of two phases, as follows:

Phase I: The negotiation and conclusion of a twinning agreement between two (or more) parties under the auspices of UNIDO

A format for a twinning agreement is set out in the appendix below; this sample twinning agreement will represent the formal basis for the implementation of the projects mentioned under phase II.

The approval by UNIDO of this twinning agreement will not be binding as to the commitment of financial resources.

Phase II: The identification and formulation of project documents for projects covering specific activities, leading to measurable outputs and results which can be evaluated

The project document should be drawn up on the basis of the standard UNDP/UNIDO format.

B. Sample twinning agreement

Between
and the Institute for Instrument Design (NIPKIP), Sofia, Bulgaria, under
the auspices of the United Nations Industrial Development Organization
(UNIDO), Vienna, Austria

Number: (To be completed by UNIDO)
Duration:years
Date of submission:
Starting date:

On behalf of the
.....
.....
Date:.....

On behalf of the
Institute for Instrument Design,
Sofia, Bulgaria
Date:.....

On behalf of the
United Nations Industrial
Development Organization (UNIDO)
Vienna, Austria
Date:.....

PREAMBLE

In accordance with the recommendations made by industrial co-operation on the basis of the sharing of experience in industrialization and technology by those who have already acquired this know-how, the United Nations Industrial Development Organization at its Second General Conference in the Lima Declaration and Plan of Action on Industrial Development and Co-operation (para 60(K)), and the Kuwait Declaration on Technical Co-operation among Developing Countries, to the effect that the demand for technical co-operation between developing countries has to be actively organized and stimulated (para. 6(f)), the present Twinning Agreement is signed between the
.....
and the Institute for Instrument Design, Sofia, Bulgaria under the auspices of the United Nations Industrial Development Organization.

I. INSTITUTIONAL FRAMEWORK

The Institute for Instrument Design belongs to the State Economic Enterprise "Instrumentation and Automation", which reports to the Ministry of Electronics and Electrical Technology. It is headed by a scientific council, whose Chairman is the Director of the Institute. Representatives of Industry, Technical High Schools, Universities and the Ministry of Electronics and Electrical Technology are members of this Council..The main fields of activity of the Institute are: research, design, development and production of electronic, electrical, electromechanical and pneumatic devices and systems for automation.

The
.....
.....
.....its main fields of activity are:

.....
.....

Both the Institute for Instrument Design and the
.....
have been assisted by the United Nations Development Programme/IID since 1969 and by
.....since

A Board of Directors shall be established to monitor and supervise the Twinning Agreement. The members of the Board will be as follows:

- Director of the Institute for Instrument Design
- General Manager of.....
- Representative of the United Nations Development Programme
- Representative of the United Nations Industrial Development Organization

II. SCOPE OF THE TWINNING AGREEMENT

The Twinning Agreement includes the following fields of activity:

- Industrial electronics
- Electronic measuring instruments
- Electronic components
- Test evaluation of electronic components and devices

III. MEANS OF IMPLEMENTATION

The activities listed in section III above will be implemented through:

- The provision of technical expertise, and of senior adviser expertise for a general survey;
- The exchange of technical information;
- The provision of fellowship training and on-the-job learning facilities;
- The conclusion of licensing agreements;
- The supply of specialized equipment, tools or devices etc.

IV. DURATION

The present Agreement comes into force after approval from the authorities concerned in both countries and the United Nations Industrial Development Organization. The Agreement is concluded for a period of years, extended automatically for a period of anotheryears, unless one of the parties does not express a written wish to complete the Agreement.

V. PROJECTS

Project documents covering well-defined activities will be prepared by both parties and the United Nations Industrial Development Organization from time to time and as required. Meetings will take place in turn at Sofia,..... and Vienna at least once a year in order to identify, prepare, review and evaluate the project.

VI. FINANCING

All activities concerning the Agreement will be financed by both partners and the United Nations Industrial Development Organization in accordance with the project documents mentioned above.

Annex III

LIST OF OTHER INSTITUTES BELONGING TO COMPANIES OF
THE MINISTRY OF ELECTRONICS AND ELECTRICAL TECHNOLOGY

Institute for the Electrical Industry
Blvd. G. Traikov No. 127
Sofia, Bulgaria
Tel. 62431

Institute for Radio-electronics
Comp. Zaharna Fabrika
Sofia, Bulgaria
Tel. 21271

Institute for the Communications Industry
Compl. Zaharna Fabrika
Sofia, Bulgaria
Tel. 21341

Institute for Computing Technics
Blvd. Lenin, 7th km
Sofia, Bulgaria
Tel. 71251



