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**SOME HIGHLIGHTS ON THE RESULTS OF THE JOINT UNDP/UNIDO
EVALUATION STAFF REPORT ON INDUSTRIAL RESEARCH
AND SERVICE INSTITUTES ***

Paper prepared for delivery to
Seminar on University-Industry Cooperation,
at Bursa, Turkey, 18-20 May 1979

by

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Address for Seminar on University-Industry Co-operation

Bursa, Turkey 18-20 May 1979

I am honoured and pleased to be invited to address this distinguished group, meeting in this beautiful and productive area, to discuss the critical question of improving university-industry co-operation as a means of accelerating industrial development. The invitation was tendered by Mr. Lalkaka because I have been a participant in a recently-completed joint UNDP/UNIDO evaluation study of industrial research and service institutions (IRSIs) which have received UN assistance. The assumption is that selected results of the evaluation exercise will be of interest to this group and that some of the conclusions and suggestions regarding IRSI-industry cooperation could have relevance to the topic being discussed in your seminar. My remarks will be as brief as possible, touching only on the highlights most interesting to the group as a whole, but I will be delighted to discuss other specific findings, conclusions and suggested guidelines in subsequent meetings or with individuals around a cup of Turkish coffee.

To begin with, the evaluation focused on the efficiency and effectiveness of UNDP-financed and UNIDO-executed assistance to IRSIs, i.e., multi-purpose institutions in which R+D is a significant function. It was felt, however, that an assessment of effectiveness could not be undertaken without looking at the impact of the IRSIs themselves on the industrial development process in their countries or, at least, on their intended clients. It is this latter focus which should be of most interest here and I will not deal with UNIDO/UNDP technical cooperation with these institutions per se. However, it must be noted that the evaluation sample was necessarily limited, with two exceptions, to those institutions who had received, or were receiving, UN assistance and no claim is made that the exercise was truly scientific, fully objec-

tive or necessarily representative of most IRSIs in developing countries. Nevertheless, this was a comprehensive and systematic exercise, taking over a year and a half to complete and involving over 20 consultants UNDP and UNIDO officials from developed and developing countries, and is the first known attempt to assess a group of IRSIs based on their actual performance and the conditions prevalent in their own milieu. The evaluation participants believe that the findings, conclusions and suggestions included in the staff report in general reflect real and critical problems which face most developing-country IRSIs. For those of you particularly interested, I have a few copies of the staff report study with me which not only gives the results of the exercise but explains the methodology employed, includes specific recommendations, and annexes the results of a high-level group review of some of the principle issues posed by the evaluation study. I hasten to note, however, that while the staff report is being submitted to the respective governing bodies of UNDP and UNIDO, specific conclusions and recommendations have not as yet been endorsed either by the Administrator of the UNDP or the Executive Director of UNIDO.

Let me now paraphrase some selected portions of the report on the relevance, performance, and impact of the IRSIs included in the evaluation sample. Our analysis showed that a clearly-stated mission or purpose and set of policy objectives, (e.g., improvement of existing industries, utilisation of indigenous materials) related to specific technological or industrial development national policies was lacking in most of the IRSIs. Empirically at least, it must be presumed that the degree of relevance of those IRSIs which are without meaningful guidance in the sense of specific linkages to government development and industrial

policies or, I hasten to add, to industry itself, is suspect at best and probably marginal in many instances. The same general conclusion could be reached regarding their work programmes, i.e. functional activities, (e.g., R+D, trouble-shooting, training) and their probable impact. Functional coverage, for example, is often so broad that, given the limitations on staff size and skill composition, institutional capacity is often and obviously spread too thin, further reducing the effectiveness of many IRSIs in the developing countries.

The evaluation indicated that the more successful of the IRSIs in the sample studies are those that have a clear perception of the needs of industry. These institutions direct their attention to the larger and more sophisticated enterprises and have effective mechanisms to recruit and retain the staff competence necessary to provide needed services. They usually perform extension and supporting service work which is most likely to lead to R+D contracts. They have both competence and facilities to move R+D results to the commercialization stage. While receiving appropriate financial support from government, they nonetheless enjoy sufficient autonomy and administrative flexibility to exercise independence, with concurrent responsibility, for development of programmes and projects in the conduct of R+D. They exist in an environment for industrialization and development which has been clearly established through government policy. The less successful of the IRSIs tend to be those which exhibit the reverse characteristics as those just described beginning, particularly, with the absence of the clear understanding of the needs of industry.

Providing services to industry, which should be a primary objective of most IRSIs, was not found to be particularly effective except for

certain basic or routine services such as testing and analysis. This could be traced, in part, to a low level of industry sophistication and awareness. Moreover, industry tends to suspect the close IRSI-government relationship which is presumed to exist and is hesitant to expose information about its operations for fear of possible government intervention or competitors. The lack of adequate industry participation in the IRSI Governing Board and committees for programme design and execution was clearly evident. In the absence of incentives which encourage industry to use IRSI services and demonstrated IRSI competence, it is improbable that industry will increase utilization of IRSI services to any appreciable extent.

IRSI performance appears to be particularly weak in educational and training programmes for industry workers and in exchange on-the-job training between IRSI and industry staff. Such programmes could do much to improve the dialogue between IRSI and industry, increase the opportunities for gaining a better understanding of industry problems, and demonstrate the IRSI's capability to solve such problems. The lesson here for universities is, I think, obvious. Effective programmes for communicating with potential clients vis-a-vis extension services, industrial seminars and workshops and other promotional activities appear to be lacking. While the maturity of industries varies greatly in the developing countries, all too often IRSI staffs are not, by themselves or by their institute policies, motivated to develop, continue and expand industrial relationships. Such motivation is much more obvious when the IRSI is required to obtain at least a significant portion of its operational expenditures from contracted services to clients.

With few exceptions, IRSI linkages with other groups also needs strengthening, particularly with universities and other industrial instit-

utions. Relations with universities have special significance. They are usually the main source of theoretical knowledge in a country and a certain amount of fundamental research is being carried out in university laboratories by professors and graduate students. Universities are a good source of academically trained researchers and engineers which can be easily converted to technical research. Several institutes included in the evaluation sample were established and developed with the help and under the auspices of universities, for instance CAPIRI in Trinidad-Tobago and the Materials Research Division of the MAPMAPA Institute here in Turkey.

The over-all assessment suggests, first, careful consideration of whether a multi-branch and/or multi-purpose institute involving research and development is the correct answer in a specific situation, vis-a-vis other institutional or technology alternatives, and second, if it is, the necessity to plan carefully those complementary and supporting actions that are necessary for a successful IPSI. It is necessary to recall that an IPSI is only one element of the necessary infrastructural system required for industrial growth. The other elements--government, public and private sectors, development banks and universities, among others--also have a significant and sometimes critical role to play.

Given these conclusions, the evaluation report goes into considerable depth regarding possible ways to improve the future performance and impact of IPSIs. Following are some abbreviated examples of the guidelines suggested which may also have some relevance to the subject under consideration at this seminar.

In any case, but particularly where government priorities have not as yet been articulated in terms that provide guidance to IPSI management, it is necessary to identify clearly the intended beneficiaries of the IPSI services, that is, the targeted government and industry clients. This may involve a survey of industry demands and potential needs and

the design of mechanisms and processes for continuing surveys of their requirements. There is a greater potential demand for such surveys than is usually realized. They can be equally important to industries, particularly if the results are analyzed by the IPSIs in terms of applicable knowledge of technology and presented with recommendations regarding specific steps which can be taken by the IRSI to help meet the needs so identified. While the primary or initial intent of such surveys is to identify the needs of clients, the very surveys themselves can become a service to both the IRSIs, who establish working relationships with industry, and industry itself since they will contain aggregate information not normally available to individual enterprises. This is particularly true when the category of information collected and analysed includes such as availability of infrastructure facilities, identification of commercial opportunities, impact of new legislation on process and product control, alternative energy sources, industrial forecasting, productivity ratios, etc. The potential for university involvement in these type of surveys would appear high with mutual benefits accruing to both parties.

An IPSI, and certainly not a university, cannot be expected to play all the many roles needed to establish new industry. While they can provide some critical building blocks, industry must normally carry the bulk of the load such as engineering, management, financing, etc. In the opinion of our consultants, it is unrealistic to expect an IRSI to deliver turn-key projects or even produce products prototypes ready for production--an admonition you may wish to keep in mind.

The proper balance of research is a critical decision for an IRSI, or a university which is considering commercial R+D. Strategic research

involves building up institutional capacity to service needs projected for the future while tactical research caters to immediate needs. Related to this question is the balance between in-house vs. directed or contracted research. In any event, the same conditions of practicability and applicability of tactical or sponsored research should apply. Conduct of R&D in the developing countries with little or no relevance to demonstrated industrial need is a luxury that few countries can afford. The report also notes the high cost and high risk of pilot plants and the need to involve industry at the earliest stages if the eventual R&D results are to be "commercialized".

The staff study pinpoints some of the barriers that need to be overcome in providing effective service to industry. It is suggested that two eminently practical and proven mechanisms are available to assist in ameliorating the barriers, constraints and operational problems over which IPSIs have some control. These are linkages-from advanced to developing and/or developing to developing IPSIs-and networks, focused on specific problems and involving either regional institutes (including universities), area institutions, or other mixes. Linkages and networks have considerable potential for providing broad-scale and appropriate technical and management assistance. These linkages may take the form of twinning arrangements where the focus is on institution-building and staff development or may involve cooperative research on priority problems. Mr. Keyalar's office is very interested in identifying and facilitating such arrangements.

In conclusion, the study also considered the alternatives to IPSIs available to developing countries, particularly those in the earlier stages of industrialization. In the four major groupings of functional activities, i.e., support services, technical extension services, training, and

research and development, universities can play a role either as a substitute, an interim measure, or a complement to an IRSI. Universities are often reluctant to engage in applied or even directed basic research although there are notable exceptions, particularly with "technical" universities. At the same time, there usually exists within a university one or more faculty members who have a strong sense of responsibility towards development and who can serve as the nucleus of an applied R+D centre. There is a considerable amount of information available which details ways in which universities do become involved in research relevant to national needs. Usually, the incentives are based on contracted services to the university for research on a specific topic, with additional payment to the faculty member who undertakes the research. This is a common practice in a number of industrial countries such as Japan, Korea, Turkey, Great Britain and the United States where universities are involved to an appreciable extent in development-oriented R+D.

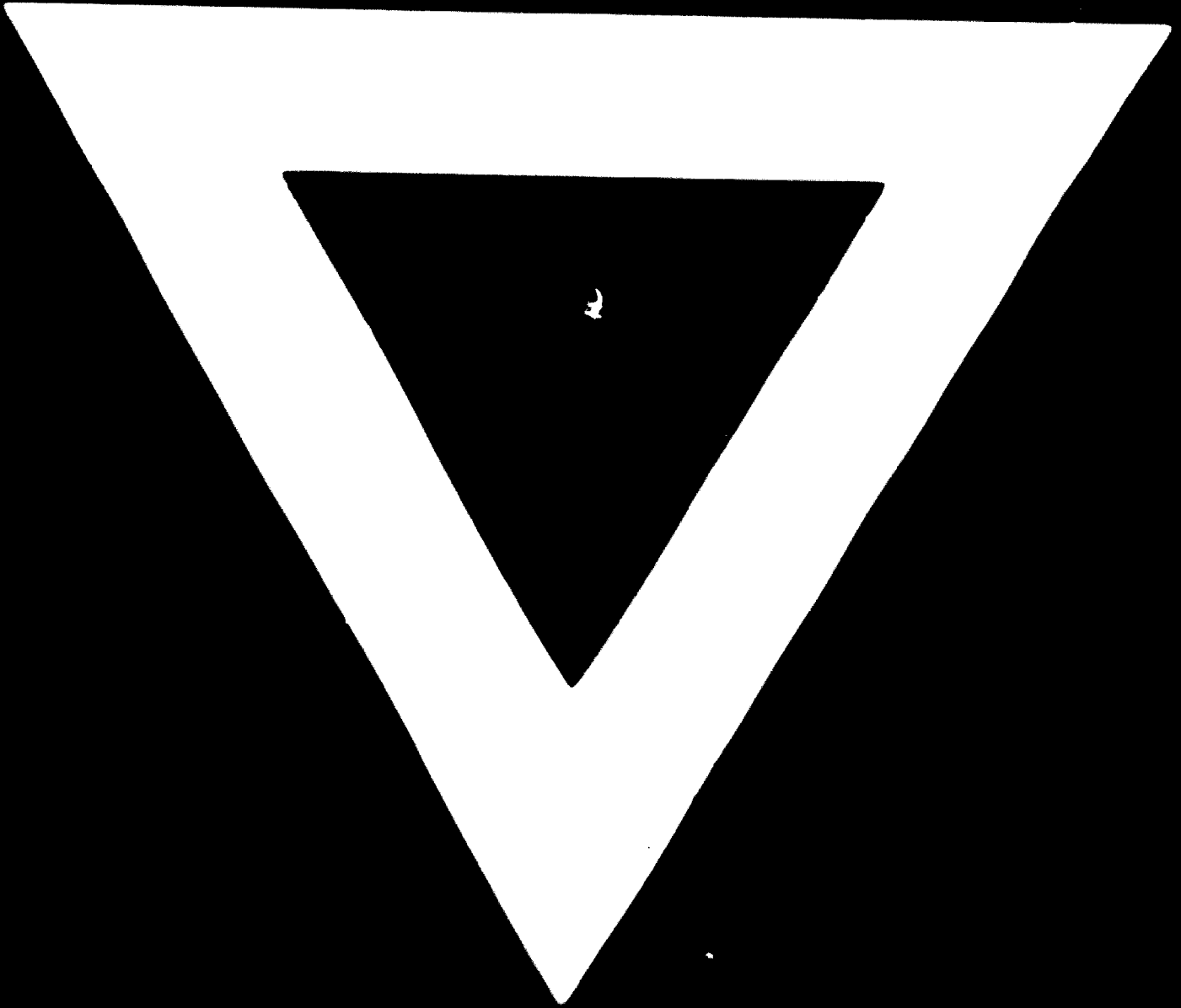
While university faculties may not often have "hands on" industrial experience, they nonetheless do possess strong technological capabilities which are not usually utilized effectively by developing country governments. Instead of attempting to create anew such skills by establishing an IRSI, it is sometimes more realistic to use these existing skills, at least in the interim, until people who will eventually staff an IRSI can be trained appropriately. One of the arguments sometimes posited by faculty members is that they do not have time for research nor do they have the equipment. Yet in so many instances, university professors "moonlight" on one and sometimes more extra jobs and are often given as much as 75% of their academic time to perform R+D or other activities. Additional payments for directed

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or purpose-oriented research could take the place of secondary employment. Research equipment that would be needed could be supplied at no greater and perhaps at even less expense than that required to equip an IPSI. Whether the university is contracted to provide research relevant to national need, the university subsidy is increased, or other mechanisms are used, the important point is that the university become an integral part of the industrial development infrastructure. There are few developing countries who can afford the luxury of underutilizing skilled human resources and at the same time attempt to develop yet another body of skilled scientists and engineers. The benefits of university-industry cooperation will be developed, I am sure, during the course of this seminar. The crucial result will be, or should be, an identification and overlap of mutual objectives and interest on the part of Bursa University and the industries to be served, including an agreed-upon identification of priority areas of need, both of a strategic and tactical nature. This need must be more than "felt", it must be demonstrated and fully understood with both parties achieving a measure of benefit from the desired relationship. Without such a base, mere rhetoric or cosmetically designed committees are not apt to be helpful in achieving the objectives set out by this seminar. I wish you success in your deliberations which are aimed at moving you towards this consensus and concrete follow-up actions. UNIDO hopes this synthesis of experience with IPSIS will be useful. Thank you for the opportunity to address you and be with you here today.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche

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