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Ad-Hoc Expert Group Meeting on Co-operation
among Universities, Industrial Research
Organizations and Industries and the Role
of UNIDO in this Co-operation

Vienna, Austria, 29 November to 3 December 1976

CO-OPERATIVE EFFORTS FOR INDUSTRIAL DEVELOPMENT,
APPLICABLE ASPECTS OF THE STANFORD RESEARCH INSTITUTE EXPERIENCE^{1/}

by

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Stanford Research Institute -- or SRI as it is widely known around the world -- was among the first independent research organisations to establish a broad competence in industrial research and consulting on an international scale. Some of its experience is related and should be of interest to this UNIDO meeting on institutional collaboration as an aid to industrialisation.

But what, one may ask, is the purpose of SRI and what does it do? Our business is solving problems for industry and government on a contract basis. This includes developing new products, processes and techniques, studying the feasibility of new business strategies, improving information systems, finding new investment possibilities, exploring industrial development potentials, assisting in the transfer and application of modern technology, seeking answers to social and economic problems, and aiding in the growth of national economics.

Thirty years ago, SRI was created by the trustees of Stanford University. This action was taken as a result of the efforts of a few far-seeing California industrialists who envisaged a need for objective research and consulting services, a linkage between a strong university and California industry, an organisation staffed by well-qualified specialists with experience in industrial research or management. So it was that SRI was founded on the basis of university-industry joint interests and in connection with a well known university.

Although formal ties were severed between Stanford University and SRI in 1970, close professional co-operation on an individual and informal basis continues and, in fact, works exceptionally well from the points of view of both institutions. Neither would wish for closer ties which might lead to problems because of differing aims. Both desire and promote individual arrangements for Institute staff members to conduct research or occasional courses at the University and for faculty members to participate in Institute client-sponsored research projects.

Generally, in the United States, the significant difference between academic and independent research institutions is in the kind of research performed -- academic research to enhance knowledge and understanding, which is often

related to the educational process, in contrast to problem-solving research for a variety of clients, which is almost always confidential in nature. Universities tend towards publishable, basic work and avoid client-confidential studies. In this context, the completely separated operations of the two organisations -- Stanford University and SRI -- together with considerable informal collaboration, appears to be most appropriate.

One of SRI's strengths as an applied research organisation designed to assist industry and government, lies in size and diversity. There are 3,000 staff members, about two thirds in professional and technical categories. Annual revenue is more than \$100 million. As many as 1,000 new research projects are initiated each year for several hundred company and government clients in some 130 research fields in over 60 countries around the world. Projects range across the physical and life sciences, the engineering sciences, urban and social systems, industrial and development economics, and management systems. Each project requires the application of knowledge contained within one or more of the scores of disciplines represented on the staff. A single specialist or, more often, an interdisciplinary team, may be assigned to a project, depending on its size and degree of complexity.

Another strength is derived from a common characteristic shared by our projects; they involve efforts to solve client-oriented, tangible problems and thus the outcome of work on each one is important to both the research organisation and the client concerned. We term this work 'contract research' because it is undertaken on an institutional contract basis for clients to assist in the solution of specific practical problems which lend themselves to objective analysis. The cost of such research is borne by the client, either public or private, under a contract. The project purposes, scope, methodology, cost and time limitations must all be approved by the client and are usually developed in consultation. As a result, both the research institution and the client are stakeholders in the project and both co-operate to attain mutually desired ends.

Over the years, SRI has participated in the establishment of a number of industrial research organisations -- in Japan, Singapore, India, Lebanon, Brazil and Peru, and in the United States. An interesting illustration is our consulting assistance in establishing, and then developing over more than a decade, the Nomura Research Institute of Technology and Economics in Tokyo for the Nomura Securities Company. Consulting services have concerned organisation,

management, physical plant and research program planning, as well as co-operative relations between a research institute, such as NRI, and academic, industrial and governmental organisations. One report is on the advantages of a management training institution in Japan, its affiliation to NRI, its use by Japanese industry, and its role vis-a-vis Japanese universities. In addition, we accept NRI staff members as trainees for up to a year at our main offices and laboratories in Menlo Park, California.

At times we conduct joint studies with organisations located where most of the field work is to be done. This has been a particularly beneficial arrangement for projects which are designed to train local organisation personnel, or which demand a considerable amount of on-site investigation best carried out by individuals familiar with local conditions.

A good example was an enquiry into comparative costs of supplying the physical and social infrastructure required by industry in urban centres of different sizes in developing countries. The research was centered on the industrial growth requirements of selected cities in northern India. It was undertaken jointly by a three-way partnership composed of SRI, the School of Planning and Architecture, New Delhi, with a central purpose of training city planners, and the Small Industry Extension Training Institute, Hyderabad, engaged in analyses of problems of small and medium sized manufacturing plants.

A well integrated approach by the institutions and professional understanding and teamwork by the specialists in this three-party union led to valuable conclusions. These conclusions, published over eight years ago, remain relevant today for urban industrial development and city planning. In fact, the final paragraph of the summary of the report is on target for this UNIDO meeting :

'The present report therefore points to two pervasive needs in promoting industrial growth and better urban development: more adequate funding of interprofessional collaboration in both operating and research programs; and more deliberate, broad-based exchanges between public agencies and industrial investors whose combined resources will shape the cities of tomorrow.'

At present we have non-exclusive co-operative agreements on a project-by-project basis with two private consultancy groups -- one in Iran and the other headquartered in Kuwait covering the Arab world. In both cases, we are jointly engaged in several specific economic and management improvement studies. This combination of professional experience in the technologically advanced Western world and intimate knowledge of the local environment and practices is found to be very advantageous in meeting the needs of industry and government in developing countries.

SRI has been a member of the World Association of Industrial and Technological Research Organisations since its inception in October 1970, the founding SRI member serving as the United States member of the Executive Committee and also its Chairman. We have taken an active part in furthering the work of the association, collaborating with the Secretary-General on such matters as organisation of conferences, solicitation of support, recruitment of members, and structuring of a program designed to provide applied training for personnel of WAITRO members in developing countries. As we see it, this 85 member organisation has made valuable contributions to developing country institutions, but benefits to its European and North American members are less easily observed.

It now appears that WAITRO is about to be more active and move further towards its main objective: the exchange of experience in industrial research and research management. Working groups are to be established to study common, specific problems, such as information exchange systems, information retrieval and dissemination, training in industrial research, and sources of funding. As these activities progress, WAITRO should become strengthened and be a greater force for co-operation among its members.

SRI has participated over an extensive period in the industrialisation of developing countries. In general, this has been through two principal channels -- first, by development planning, institution building and other technical assistance to third world public agencies in many countries -- Columbia and Peru, India and Pakistan, Iran and Saudi Arabia, for example -- and second, through technical and economic research and management advisory services for private sector corporations, often multinational in nature, with interests in the third world. From this experience using both channels, several concepts have emerged in our approach to industrialisation :

- Industrial advancement is a very broad-based process that encompasses the modernisation of agricultural, transportation, communications, energy, urban and social systems, as well as the implantation of manufacturing industry.
- The technology to be used should be appropriate to the physical, human and capital resources available and to the economic, social and political parameters determining their optimum employment.
- Progress with industrialisation of the developing countries has taken them to the stage where they have no choice but to adopt technology compatible with that of the industrialised countries, to enable the former to compete effectively in an interdependent world.
- Developing countries need to greatly increase indigenous capabilities for analysing socio-economic implications of the technological and other changes they seek. These countries need help in sharpening their skills in systems analysis, decision analysis, intelligence evaluation, forecasting and long-range planning.

These concepts call for an approach to industrial growth and to the transfer of technology that emphasises modernisation rather than industrialisation, economically and socially efficient technology rather than advanced technology, technology compatible with that of the industrialised countries, a multi-disciplinary approach to problem solving and more joint collaboration between organisations in the Western and third worlds. Some of the activities of SRI consistent with such an approach are :

- International meetings in various countries that bring together business and government leaders from industrialised and developing countries to discuss topics of current interest.
- Multiclient sponsored, world-wide programs on such topics as industrial chemicals, energy, minerals availability, health industries and financial institutions. Included also is our Business Intelligence Program, an on-going, international study of the business world.

- Industrial development advisory services encompassing national economic and social planning, urban and regional development, and manpower planning.
- Industrial research and consultancy services encompassing market and feasibility analysis, choice of technology, management policy and practise, manpower training and many other subjects.
- Technical support for applied research institutes or consulting groups established to undertake technical, economic and social research, or for development planning agencies working on a national or sectorial basis. The possibility exists for either a specific project agreement, or a long-term continuing relationship where one or more of our staff members take up residence in the country in an advisory capacity.
- Acceptance of international fellows from client firms or co-operating research groups. Selected staff members of such firms or groups spend from two months to one year in a Western setting for research internships and to learn relevant techniques through actual participation.

A look into the future, although speculative and hazardous, may help bring perspective to the present. Dr. Weldon B. Gibson, our Executive Vice President and President of SRI International, recently published his thinking for international corporations on socio-economic evolutionary trends around the world in the 21st Century. Highlights applicable to this UNIDO meeting are :

- The urge to industrialise in developing lands will accelerate as populations rise and become more urbanised.
- More and more of the world's production will shift to areas of resource and population concentrations.
- The highly developed nations will gradually become 'post-industrialised societies' with greater and greater emphasis on the services.

- The flow of world resources will increasingly be governed by multinational agreements.
- A major effort will be made to increase agricultural production and productivity, especially in food-deficient regions.
- International trade will continue to rise as barriers are reduced and economic decision-making is broadened.
- More and more powers in business will shift to governments, while more and more international agencies and agreements will deal with pressing business problems.
- World corporations will be much more a collection of partners - including governments - rather than national instruments.
- Business will be increasingly challenged to assume more and more national and international social and public responsibilities.

In this paper for UNIDO, we have shared our experiences in international industrial collaboration. In sum, we are an international resource with a mission to serve both industry and government and we hope that, in so doing, we are helping improve living standards and assisting in desired growth and change in developing countries.



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