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UNITED NATIONS INDUSTRIAL
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DETERMINING INDUSTRY NEEDS*

Issue paper

prepared for the

Joint UNDP/UNIDO Evaluation Study
of Industrial Research and Service Institutes

by
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* The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.

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The impact, and therefore the success, of an Industrial Research and Service Institute (IRSI) can be related in large measure to the services that it renders to the industrial sector to foster and promote industrial growth and development. The IRSI services must relate both to Government priorities and industry capabilities and potential. However, there are several means by which assistance can be provided to industry and each IRSI must find that optimum balance of programmes which enables it to have the maximum impact and effectiveness. This balance will depend on combinations of factors which will be considered in this paper. This subject will be considered from the following standpoints:

- sectoral surveys of current and future needs
- role of industry associations
- distinctions between small-scale and large-scale industries
- industry needs as related to Government development priorities
- technology transfer and adaptation

Much has been written elsewhere on the capabilities needed within an IRSI structure to perform for industry the usual extension and support services. In this paper, we will consider additional services which can be performed for

industry and which can assist the IRSI in developing a worthy reputation for effectiveness and accordingly increase its contacts and performance level.

Sectoral Surveys of Current and Future Needs

In addition to its normal extension services and supporting and analytical activities, an IRSI has many opportunities to serve industry by acting as an information clearing house. In this work, the IRSI will perform the types of activities often carried out in developed countries by private consulting firms; but since these usually do not exist in developing countries, the IRSI should fill this important need.

Information detailing industrial opportunities, or needs, is generally available from a number of sources and can be gathered through several means. In some cases, information can readily be obtained from Government or industry associations while in other cases industry is the only possible source. The best method in each instance will depend on the exact type of information being sought. This may vary as exemplified by the following examples:

- availability, price and/or quality of raw materials used;
- projected infrastructure capabilities or capacities;
- commercial viability of a new product or process;
- industry ability to adjust to changes in manufacturing criteria such as new Government regulations, increased energy costs, etc.;
- forecasting of business trends as with use of the Delphi technique;

- process and product modification and refining;
- feasibility studies for new business opportunities.

Often, industry staff itself is not qualified to undertake this work, or independent counsel is sought. This is especially true, of course, in the case of the small-scale industry sector.

As an IRSI accumulates and maintains current data banks of information in areas such as the above, its qualifications and ability for serving industry, and Government, will increase and both will find increasing occasions to turn to the IRSI for guidance. Furthermore, the ability of the IRSI to select and monitor its own in-house R & D activities will be sharply improved.

Statistical Information

Government ministries normally compile and keep up-dated information on many subjects related to national business activities, including annual production figures of agricultural commodities, basic raw materials, energy costs and availability, etc. Often these data are simply compiled statistics, with no attempt to analyze the impact or significance of trends on industrial performance and needs. An IRSI should avail itself of all pertinent information and further analyze and interpret it as it fits the exact needs of the industries they represent. A considerable service can thus be rendered to industry, and the IRSI further is able to project needs and opportunities where innovation is required.

Infrastructure Capacities

A new or expanding industry often has need for knowledge about availability of infrastructure facilities, e.g., water, electricity, manpower (skilled and manual), tax structure and incentives, etc. These data are generally available from Government sources and IRSI should not only have them readily available for industry but should have a working knowledge of the data for their own internal use in planning.

In other cases, the industry itself is the only source of information needed by the IRSI to plan its own activities and provide specific services requested. A strong word of caution is needed at this point. The quickest way for an IRSI or for a consulting firm for that matter to alienate industry personnel is to make contact with a company on a DEFENSIVE basis---"here I am, what can I do for you today". Almost never will anything materialise, including even a second chance to ask the question! Service organisations should approach industry ONLY WITH AN OFFENSIVE APPROACH AND WHEN THEY HAVE SOMETHING TO OFFER. Even then their future chances are limited unless SOMETHING useful turns up more often than not.

New Process or Product Viability

On the more positive side, however, if an IRSI identifies a commercial opportunity, either from in-house R & D, from the literature, or from adaption of technology from another sector, it must get all the facts straight and then turn to

industry for help in finding the best viable means for reducing this to commercial practice. Government is in no position to help. Usually, companies which might potentially benefit from the new technology will not only be willing, but eager, to provide information describing their capabilities as well as their interest in entering this new or modified product market. They are anxious to talk about any new concept having the potential for early commercial success. Questionnaires sent to industry on these bases can often provide an IRSI with basic information not readily available from other sources, such as national capacity for specific unit processes, willingness and ability of industry to expand or introduce new capacity, availability of secondary raw materials and supplies, etc. Later on, these data can be of great assistance in planning in-house R & D work at the IRSI.

Changing Manufacturing Criteria

An increasing role of IRSI's and consulting firms in developed countries has been directed toward assistance to industry in answering the (sometimes staggering) demands of new legislation aimed at process and product control. In developing countries, these measures are generally only in their infancy, if present at all. However, an IRSI should be informed of activities in developed countries and consider means whereby future potential problems for their industry can be avoided, primarily through technology selection and product design; in this way, the experience and pitfalls of

developed countries can best be avoided and maximum benefit can be gained from their experience. Industry personnel could be expected to cautiously engage in dialogues on these subjects.

As alternative energy sources are being sought world-wide, another opportunity presents itself for an IRSI. Each unit operation in every industry sector can potentially benefit from alternative energy sources and energy conservation measures. Since individual companies do not usually have the resources to consider the alternatives, the IRSI should acquire the capacity to undertake detailed technical and cost analyses for their industry members.

Industrial Forecasting

A technique frequently used in developed countries for forecasting business opportunities is the Delphi approach. Industry representatives will almost always agree to participate in Delphi studies, especially if they are provided the results of the study following its completion. This provides another important form of contact between IRSI staff and key industrial personnel. Industry itself cannot usually undertake Delphi-type studies independently because competing firms which must also participate would not cooperate because of probable conflicts of interest.

Feasibility Studies

Guidelines provided by studies of the Delphi type indicated above often lead to the need for follow-up feasibility studies. An IRSI should have the expertise to carry these out, as often this ability is lacking in industry.

Process/Product Modifications

The final area where the IRSI must look to industry for guidance is in technology improvement and adaptation. In order to have any meaningful judgements at all in this area, the IRSI staff must already possess first-hand and detailed knowledge of present industry practice. There always exists an enormous breadth of opportunities in technology adaptation and modification, from simple process modifications to reduce manufacturing costs or improve product quality, to the introduction of new processes and products which might in fact replace, more profitably, products already being manufactured. This line of work should form a part of the normal extension services offered by the IRSI. In order to be effective in this area, it is essential that the IRSI staff be comprised of at least some members with earlier industrial experience. In those cases where this poses a problem, as with Government funded IRSI's tied to civil service salary scales and benefit plans, the IRSI should at least increase its contacts with industry by forming Advisory Boards comprised of industry representatives. Industry is usually most willing to participate in such capacities.

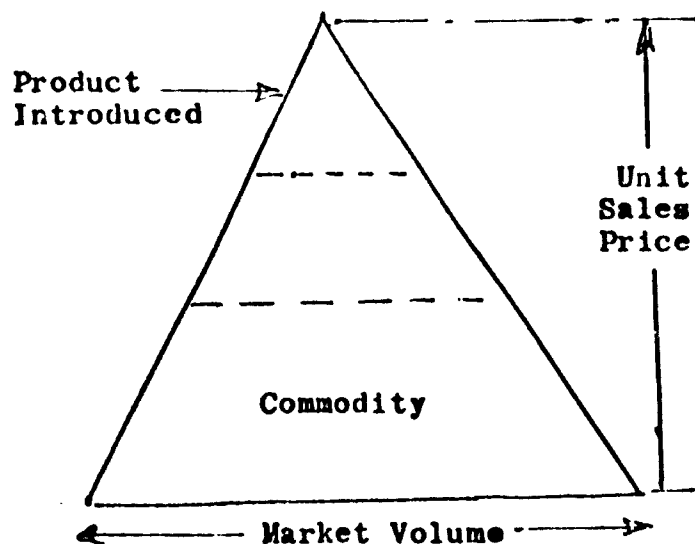
Role of Industry Association

The functions of industry associations do not usually overlap with the activities outlined in the foregoing section. Associations generally compile statistics for dissemination to their members, publish technical and trade literature, and engage in setting of quality control test methods and standards specifications. To the extent that these activities are not being carried out, the IRSI should fill the prevailing voids. Sometimes the association also engages in lobbying activities, but these would not generally form part of the function of the IRSI.

Generally, the IRSI and the industry associations compliment each other in their activities and services to industry. As such, there is little direct competition but at the same time there is very little that either can offer the other in way of direct services.

Distinction Between Small-scale and Large-scale Industries

Small-scale industry normally will not be innovative but will produce commodity products which earlier had been introduced by a larger company. A large company remains profitable in one of two ways---by producing commodity products in high volume giving rise to lower unit cost than is available to the smaller producer or by avoiding volume commodity items and continuously introducing at premium market prices new products which derive from substantial investments in R & D, marketing and promotional activities. At the same time, these companies know that their products can be "knocked off" by small-scale competition who simply copy their products and undersell them with comparable quality in light of their smaller investment to recoup. This is the basis of the common marketing "volume versus sales price triangle" whereby a new product (be it a new style golf shirt, an improved deodorant, or a new fortified cereal) is introduced at the premium price range and finds its way to commodity status after a period of time. This is depicted as follows:



Larger companies generally introduce new products in the upper range (small volume, high price) of the triangle and may continue production even after sales price drops to the middle portion. During this period they must recoup all their investments. Often they discontinue production once the product reaches the commodity status (high volume, low unit profitability). With the aid of technical forecasts, an IRSI can help both small and large companies to decide when to enter as well as when to abandon production of a given line, depending on the sales volume/profitability relationships that prevail and the status of the competition.

Small-scale industry, usually undercapitalised, can suffer disadvantage from lack of investment in sophisticated engineering schemes which minimise labour intensity in manufacturing. Therefore, they can often use help from an IRSI or from consultants in designing special labour-saving devices. This subject sometimes becomes complicated in certain developing countries, however, where Government policies provide tax incentives and other means to stimulate industry to utilise labour-intensive practices to increase employment. Each IRSI must decide for itself the extent to which the companies it represents might benefit from labour-savings engineering schemes.

The biggest role of an IRSI in helping the small-scale industry sector can be in trouble-shooting, assuming the IRSI staff is qualified to undertake this extension service. The companies generally cannot afford to retain staff to solve

all its technical problems but is willing to pay for such services if necessary. The IRSI must have competence to provide on-the-spot answers in most cases if it is going to gain credibility. In any regard, time is always of the essence to solve problems before serious production interruptions occur which can be very costly. Large companies generally retain their own internal staff to fill troubleshooting needs.

A major problem that often exists for an IRSI to gain entry into manufacturing facilities lies in the fear of industry that their own proprietary information will leak out through the experience and find its way into competitors' hands. This is especially true when the IRSI is Government funded and contract services are usually not offered. IRSI staff may be looked on as "industrial spies", a stigma against which the IRSI must constantly safeguard. It is not an uncommon occurrence in developed countries where even the staff from an R & D branch of a large corporation are barred admission to the companies manufacturing units for fear that proprietary information will leak out.

Small-scale industry is almost never horizontally integrated and depends therefore on a large number of suppliers for components needed in manufacture. The technical service needs are generally made available readily by these suppliers of materials used (chemicals, equipment, etc.) and the IRSI should not attempt to compete with them since the latter have a vested interest in providing this technical back-up service

at no cost to the company. However, there may be certain types of peripheral product and quality control testing that may not be available from the suppliers and this provides an opportunity for the IRSI.

The small-scale industry is almost never able to utilise the results of research and development which might be provided by the IRSI. High financial investments and risk factors preclude this. Instead, the IRSI should expect to assist this industry segment in emulating process technology already accomplished and marketed by medium and large-scale industry. In so doing, of course, they run the risk of alienating the larger company being copied unless it has abandoned the particular business line.

The small-scale industry sector will generally be prepared to pay an IRSI for technical service work, especially if it has a demonstrable impact on the bottom line of the monthly balance sheet; however, they are reluctant to fund long-range or "blue-sky" research projects where a remote chance exists for a breakthrough down-the-line. On the other hand, the large company is much more able and willing to support long-range research projects, which can supplement its own research activities. Each IRSI must establish its own optimum balance of technical service work, for the small-scale sector, and R & D effort aimed primarily at the large-scale sector, to suit the best overall needs of the industry overall.

A problem common to many IRSI's in both developed and developing countries lies in the sharp contrast between the

staff qualifications and qualities and those of the industry or Government personnel they are expected to serve. Most IRSI key staff members have advanced degrees, often received in a foreign country. They have acquired personal and cultural habits and tastes which differ sharply from those of native personnel in industry who often have never even ventured abroad. This is particularly true in the case of the small-scale industry sector. Communication is thus a problem and individuals who need to interact in close working relationships do not even understand the same language. Social interaction between the parties is also minimal if any exists at all. Some of the most effective interactions between an IRSI and industry or Government bodies have occurred where these limitations have not been present, or have been minimal, and close personal ties have developed between parties concerned.

Industry Needs as Related to Government Development Priorities

Government development priorities take many forms and affect industry in so many direct and indirect ways that it is only possible to touch on some major points here. Development priorities vary considerable from country to country and even among regions within a country, depending on the nature of the problems being addressed and the strategy which has been developed to overcome them. For many developing countries, however, Government will set policies for industrial development so as to have varying degrees of impact in the following areas:

- increase employment
- reduce foreign trade deficits
- increase national output
- raise living standards
- provide for import substitution
- increase education and training levels

Because of critical shortages in capital for investment, and a reluctance to speed industrial growth by allowing foreign investment, most developing countries are experiencing acute industrial growth problems in many areas and have traditionally fallen far short of the projected goals and targets which have been set in most problem areas listed above.

Increase Employment

In order to increase employment, especially among the unskilled masses, Governments sometimes provide tax credits

and investment incentives to industry to install manufacturing technology (or lack of it) which maximises labour utilisation. In some cases, even though this can actually result in higher costs of production, industry usually takes advantage of these benefits. Accordingly, serious limitations arise in the ability of an IRSI to assist these industries through modernisation and cost-savings technology. The IRSI is limited to providing technical assistance adapted to manually operated, discontinuous, batch-designed production equipment where even quality control and producing to standards can pose serious problems.

Only at such time as employment in developing countries approaches saturation can it be expected that Government attitudes will change or will the opportunity arise to introduce labour-savings stream-lined production technology.

Reducing Foreign Trade Deficits

Many developing countries experience substantial trade deficits as the value of imports of essential commodities cannot be offset due to their lack of capacity to manufacture for export. Foreign trade deficits can be reduced by curbing imports and/or by increasing exports, preferably both. Import substitution schemes are generally given high priorities by Governments. In addition, Governments often provide incentives for manufacture for export, including duty rebates on imported raw materials and customs duty draw back. Liberal import of foreign technology and equipment specifically

designated for production of exports is also often encouraged. This provides considerable scope for an IRSI to assist industry in setting up export-oriented companies where know-how may not be available regionally.

It would appear that perhaps the greatest opportunities for an IRSI to impact on national development is in the area of import substitution. R & D are needed to convert indigenous raw materials to saleable products traditionally imported. Industry is generally ill-equipped to carry out this research.

Probably the greatest deterrent to manufacture for export in developing countries lies in a total lack of expertise in marketing of products in foreign countries. Even if they recognise this as a major obstacle, Governments have often not found ways to answer the needs. Too much is left to chance with random purchase by foreign buyers who more often than not only capitalise during a brief transaction. There is no means for the manufacturer to plan his future production since he has no idea what or how big the markets in the future will be. Often he optimistically continues to overproduce only to be left with warehouses full of surplus goods or canceled orders.

There exists a serious need for Government and/or industry in developing countries to establish more effective means of marketing their products in foreign countries. Clearly, they can learn many important lessons from the Japanese. International trading companies which have become so successful in Japan are virtually non-existent in most developing countries.

Increasing National Output

All other problems facing a developing country are fundamentally tied to its national output. There are many indications that Governments cannot always have sufficient flexibility and coherency in their administrative machinery to operate with the best continuing balance of incentives and regulatory practices to provide the optimum impact, en balance, for increasing national output at satisfactory rates.

An IRSI should have readily available all statistics from Government and from trade associations which can provide guidance for opportunities to increase national output, benefit the maximum number of people and strengthen the national position vis-à-vis trade balance, etc.

Raising Living Standards

A major problem in many developing countries is that a rapid rate of industrialisation during the past few decades has had the net effect of providing benefit to only a very small percentage of the population. In some cases the overwhelming majority are in fact experiencing no gain, or are even worse off today from the standpoint of earned purchasing power than they were a decade ago. Population increases, sporadic droughts and other factors influence these statistics, but by-and-large industrialisation, while going on under strict Government guidance and control, has not benefited the majority of people.

Most Government priorities are continually being reassessed to assure that the maximum benefit is provided

to the maximum number of people. An IRSI must give full recognition to these priorities and strive to provide the greatest impact on all parties concerned. In so doing, it can work more effectively with industry as well as with Government personnel.

Import Substitution

In view of the foregoing discussions, there are obviously many instances where import substitution can work to the advantage of a developing country from numerous standpoints---especially balance of trade, increasing employment and raising living standards. Technology developed to duplicate or replace agricultural or industrial products formerly imported can further have the added advantage that they can become important export items.

Increasing Training and Educational Levels

In many developing countries the level of training and education has difficulty in keeping astride the demands arising from industrial growth and critical shortages of trained personnel exist. Whereas Government must assume the major responsibility for education and training, an IRSI can easily institute training programmes in areas concerned with its own specialities and thereby gain secondary benefits for itself as well. Training provides an ideal opportunity for an IRSI to interact with industry, to use industrial personnel both in the learning and the teaching processes,

to increase the qualifications of its own staff and at the same time to provide a valuable service to industry.

The above comments suggest that an IRSI must continuously evaluate and weigh Government priorities as they affect industrial growth, with its associated problems and opportunities. If this is not done, the IRSI will be "working in a vacuum" and will be able to provide neither industry nor the Government with useful services. An IRSI should have a competent segment of its staff assigned only to deal with problems associated with Government/industry interrelationships as they relate to national developments. This Section can often serve as the interface liaison with industry and Government personnel, thereby freeing the Director to perform important in-house activities. At the same time, the expertise the Section will acquire can be invaluable in guiding in-house operations.

Technology Transfer and Adaptation

Technology transfer and adaptation of known technologies to new use applications can potentially form one of the major activities of an IRSI in its role in accelerating innovation to expedite national growth. Because industry in developing countries is generally far behind those technological levels already achieved in developed countries, future advances can be made by adapting technology already used elsewhere. Costs involved in adapting technology are infinitesimal when compared to the cost of developing new technology through R & D.

It is difficult to see how a Government or an IRSI can justify any more than a minor portion of its budget in carrying out R & D when so many opportunities exist to adapt known technology to the needs of its member companies. The philosophy of technology transfer has, in fact, been adapted during the past decade by many major corporations in all developed countries.

Yet, it seems that the experience of several developing countries in adapting foreign technology has been unsatisfactory and priorities are being shifted to technological independence¹. This course of action can only result in grievous costly, probably futile, and unnecessary expense.

Industry in developing countries are often not in a position to acquire outside expertise, especially from foreign countries. An IRSI can provide invaluable service in disseminating required information, preferably with a critical assessment of its applicability.

Biritz¹ attributes a major role for IRSI's in the transfer process which includes the following:

- providing information on desired technology
- identifying alternative technological possibilities
- feasibility studies
- technology selection
- identifying alternative technology sources
- personnel training
- providing technical services
- performing back-up R & D

Only excluded for the IRSI's are the areas of legal definition of technological rights, financing considerations, and establishment of physical facilities. In isolated cases, it is clear that the IRSI might provide service even in these areas.

Technology adaptation will usually require a multidisciplinary activity and often requires major contributions from engineering services. The multidisciplinary task force approach can be used most effectively for reducing technology to new uses.

Reduction to practice of known technology by an IRSI will generally be of greater importance to medium and small-scale industry than to larger established firms which are more apt to be self sufficient in the required skills.

1 Report: Analysis of Selected Documents Relating to the Joint UNDP/UNIDO Evaluation Study of Industrial Research and Service Institutes, James F. Blackledge, 7 February 1978.

Relating IRSI Policies to Government Priorities

The fundamental policies of an IRSI must relate directly to Government priorities or the results of its work will probably not be useful. It cannot be expected, based on experience to date, that Government will have the desire or capability to base its national growth objectives around the results and activities of the IRSI. (In any regard, this should not be the procedure in most cases). Unfortunately, Governments generally do not retain staff with capabilities even to evaluate potential impact of IRSI activities, and no attempt is made to do so. Therefore, it must remain the responsibility of the IRSI to plan its operations around Government priorities and to develop working relationships with industry to assist them in relating to those same priorities. It cannot be expected that this situation will change in the near future.

For the arguments developed in this Section, it is assumed that the IRSI derives most of its funding from Government, as opposed to industry, as this is the situation that prevails in most developing countries. Different arguments would apply with IRSI's deriving half or more of their support from industry.

An IRSI must take into account the influence of each of its programmes on all the priorities set by Government. The direct implications of certain programme objectives will

be obvious while others will of necessity be difficult to assess or may even be undefinable.

There is generally a serious gulf in the critical interrelationships between Government planners, industry, and IRSI staff. It is usually not possible for staff members of the various IRSI's in a developing country, even the Directors, to establish working relationships with Government counterparts, including even those who approve their annual budgets. The serious communication gap thus exists. On the other hand, principal staff of international organisations, including UNIDO/UNDP, usually have established and continuing contacts with personnel in high Government positions, often Ministers themselves. These international bodies thus have an important opportunity, often apparently not utilised or even recognised, to close the linkage in communications and influence policy direction on both ends, serving as an invaluable interface between Government, IRSI, and industry personnel. In this way, it would be possible for the IRSI to formulate its programmes with greater consideration for Government priorities.

Relationship of IRSI Functions and Policy Objectives
to National Development Goals

As industrial development proceeds in developing countries, the experience gained makes it possible for Governments to redefine national development goals in a more rational manner. As the development goals are better defined and understood, it then becomes more meaningful to relate the policy objectives and functions of an IRSI to those development priorities.

Development goals are often interrelated, e.g., providing for import substitution can automatically reduce foreign trade deficits. However, these two objectives must be distinguished because they can be dealt with in different ways, i.e., foreign trade deficits may also be reduced by increasing exports. Another important direct interrelationship occurs with raising overall living standards and broadening income distribution. The means for Government to best set guidelines for industrial expansion must take into account these and numerous other factors.

The following assessment scheme relates the probable impact of the functions and policy objectives of a typical IRSI to those important national development goals which are common to most developing countries.

Potential Impact of Typical IRSI Functions and Policy Objectives on National Development Goals

key: 2 - important direct potential impact
 1 - possible indirect impact
 0 - no probable impact

<u>National Development Goals</u>	<u>IRSI Policy Objectives</u>				<u>IRSI Functions</u>				Sub-total	Total (Possible score - 16)	
	Utilisation of Indigenous Materials	Technology Transfer and Adaptation	Development of New Technology	Improving Existing Industries	Education and Training	Applied R & D	Extension Services	Supporting Services			
Provide Import Substitution	2	2	2	1	7	1	2	2	2	7	14
Increase National Output	2	2	1	1	6	1	1	2	1	5	11
Reduce Foreign Trade Deficit	2	2	1	1	6	1	1	2	1	5	11
Raise Living Standards	2	2	1	1	6	1	1	0	0	2	8
Broaden Income Distribution	2	2	1	1	6	2	0	0	0	2	8
Increase Employment	2	1	1	0	4	2	1	0	0	3	7
Raise Education/Training Levels	0	1	1	1	3	2	1	0	0	3	6
Total (Possible score - 14)	13	11	8	6	(38)	10	7	6	4	(27)	56

IRSI Policy Objectives

Considering first the IRSI policy objectives in the above example, it would appear that the greatest direct impact would derive from efforts to utilise indigenous materials. These efforts can have an important impact on all development goals listed, especially if they lead to creation of new industry, with the possible exception of having only an indirect impact on education and training. Technology transfer and adaptation can be nearly as important, only having questionable impact on employment levels (in some cases it can actually reduce employment) and no probable impact on education and training. The critical feature that these two objectives have in common which elevates their importance is the potential for expanding the employment base to the agricultural, commercial, retail and other sectors of the economy to spread economic impact. The remaining objectives, improving existing industries and developing new technology, would seem to have less direct potential impact on development goals. Either of these objectives usually will replace an obsolete technology and thereby increasing profitability of existing industry but may have questionable or no impact on several of the most important national development goals.

IRSI Functions

Considering now the IRSI functions, the greatest impact on national development goals would seem to lie in the area of education and training, this having other important potential in increasing employment and broadening income distribution. Regrettably, most IRSI's are scarcely involved at all in education and training activities. Applied R & D usually has a direct impact only on possible import substitution, but has possible implications on several other development goals. Supporting and extension services suffer the same limitations which were noted above under the IRSI policy objectives, i.e., developing new technology and improving existing industries, in that assistance to existing industries does not have a direct impact, or can sometimes have a negative effect, on several of the most important national development goals.

In the above example, it may be noted that the IRSI policy objectives have a combined score of 38 out of a possible 56, while the IRSI functions reached a score of only 27, or only half the possible 56. Thus, the functions noted do not seem to be matched to the policy objectives and addition of new functions, such as dissemination of information, probably should be considered.

National Development Goals

The same criteria shown in Table 1 above can be used to assess the overall potential impact of IRSI policy objectives and functions on total national development goals (horizontal summing of scores). This reveals that provision for import substitution can have the greatest overall potential impact (score 14 out of possible 16). The IRSI should also be able to have substantial impact on development goals from its efforts to increase national output and to reduce foreign trade deficits, which can go hand in hand in any regard (score 11 each). This is best accomplished by utilising indigenous materials through technology transfer with the use of extension services. As they are presently set up and operated, it should be expected that IRSI's will make minimal contributions to the important government goals of increasing national employment, raising the living standards and broadening income distribution, or to improving education and training levels. Governments perhaps must look to alternative schemes to provide for growth in these areas.

Establishing an IRSI

When an IRSI is to be established, industry opportunities which best relate to industrial growth capabilities and as these in turn reflect national development plans by Government must be carefully assessed. A rating technique such as the one used above might be employed to advantage. Both Government and industry thus develop an understanding of the magnitude of the role that industrial development can have in meeting national development objectives. When that is accomplished, it becomes possible to determine the most effective means for an IRSI to contribute to the joint Government/industry growth plans. Again, a rating system such as the one employed above should be most helpful in identifying strong and weak potential impact points from the IRSI. The relationship between IRSI policy objectives and functions to national development goals can be clearly revealed. In turn, the size, quality and balance of professional components, including staff, which will best comprise the IRSI can then be judged.

Assessing IRSI Performance

Any IRSI should be able to evaluate its own performance and capabilities as these relate to national development objectives and industrial needs. Its functions and policy objectives should be rated, such as with the technique used above, to reflect the potential impact that each can have on national development goals. Often a sharp contrast can be discovered between ratings for IRSI's policy objectives and its functions (e.g., policy objectives having a high score

while functions have a very low score). This should prompt the IRSI to further consider the nature of its functions which might bring them better in line with their stated policy objectives. Usually an IRSI should make these assessments as they reflect their own impact on the specific industry segments that they are trying to serve, namely transnational companies, medium and large scale national industries, or cottage industries, where scores might develop very differently. Experience with rating different IRSI's will quickly show that their greatest potential impact is most likely to be on national companies with the least impact from assistance to transnational companies as the influence on national development priorities is assessed.

In addition to the above, the IRSI can also assess in the same manner its policy objectives and functions as they relate directly to known Government development priorities which in turn reflect national objectives for overall industrial growth. This can sometimes reveal sharp deviations between the assistance the IRSI can expect to provide to industry overall and those being anticipated by Government.

International organisations such as UNIDO/UNDP can provide invaluable assistance to IRSI's, Government, and to industry in helping to make these evaluations and sharing these experiences with other countries concerned with similar development objectives and problems.



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