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ISSUES AND PROBLEMS IN MANPOWER DEVELOPMENT FOR INDUSTRIALIZATION

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Presented by the United Nations Industrial Development Organization and the International Labour Organisation

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ISSUES AND PROBLEMS IN MANPOWER DEVELOPMENT FOR INDUSTRIALIZATION

I. THE ROLE OF SKILLS IN THE PROCESS OF INDUSTRIALIZATION

1. Recently, the subject of development of skills, or a major aspect of the development of human resources, has been the focus of attention in the developing countries. Economists, in analysing the relative values of inputs in manufacturing and related activities to total increases of output, have now been emphasizing the so-called "residual factor". The significant proportion of increase in output - up to about 30 per cent - has been ascribed to the residual factor, i.e. of the growth not accounted for in increased inputs of capital, land and labour. The residual is generally explained by increased productivity brought about in part directly or indirectly by higher levels of education and availability of better skills.

2. While much work is being done to quantify the "residual factor", it is clear that the acceleration of the process of industrialization involves not only considera ion of investment problems, but also of skills.[2/] The role of skills, however, becomes crucial since it takes a relatively longer time to transform a bright, young boy into an engineer than to negotiate a loan to build a factory. Technology can be imported and industries can be erected, but skills to maintain and to use such facilities cannot be imported, at least in the required numbers necessary to sustain industry. Apart from the length of time to prepare the technician or the engineer, developing countries very often lack the adequate education and training infra-structure to equip young persons with skills. This makes the task of producing adequate skills rather difficult and puts a serious constraint on the pace of industrialization.

3. The latest technology and the resulting modern industry which developing countries aspire to possess and sustain as a part of their drive for industrialization brings with it a certain number of challenges and problems. The advances in engineering and technology (and these are changing rapidly every decade) have made factory production possible on a larger scale. The size of a

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2/ See Policy Conference on Economic Growth and Investment and Education, OECD, Paris, 1962.

plant to produce steel, fertilizers, cement, etc. has grown considerably. The result is that not only a large deployment of capital is necessary, but also a large deployment of specialized skills to handle specialized operations. Furthermore, a large, intricate organization which is necessary to manage the use of such large resources also brings out the need for organizational and planning skills.3/

4. Thus, the developing countries are increasingly concerned with generating skills to sustain imported technology and industry, and secondly, to meet the challenge posed by rapidly changing technology incorporated into industrial design and production which, in turn, require increasingly specialized and advanced skills, both technical and organizational. In the case of several industries, the latter is just as important as the first, since industry is becoming highly competitive and the search for export markets very often means establishing plants in the developing countries with a high technological content. In other words, the basic problem in the developing countries is mainly one of deploying existing skills effectively and of producing new and specialized skills as soon as possible and at a minimum cost.

5. The tasks involved in producing or generating adequate skills for industry are rather staggering.4/ The time factor involved in this is serious enough in the developing countries. There is also a lack of proper understanding of the entire process involved in the generation of skills. Is it possible to estimate the number of skills or numbers required for such skills with a fair degree of accuracy? Can the skills be doubled by doubling the schools and universities under the educational system in the country? Can the skill-gap be filled by increasing the number of specialized training institutions? Would industry accept readily the personnel coming out of such parts of the skill-generating system? Is there an organization or branch of the government which can look at it in a comprehensive way? Are there

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3/ The New Industrial State, John K. Galbraith, Lecture No. 1, Reith Lectures for the British Broadcasting Corporation, The Listener, 17 November 1966.

4/ In a recent report prepared by the Secretary-General, it is estimated that some 400,000 engineers and scientists and 1 million technicians need to be trained by 1975 to meet the needs of industrialization programmes in Asia, Africa and Latin America. See United Nations document, Training of National Technical Personnel for Accelerated Industrialization of Developing Countries, E/3901/Rev.1, Add.1, 1964.

sufficient financial resources and teaching cadres to undertake this task? These are some of the questions that need to be answered. Efforts will be made in this paper to raise some basic questions related to the development of skills. Particular attention will be given to organizational questions which are, to some extent, a pre-condition for undertaking any serious steps by the developing countries.

II. DEVELOPMENT OF SKILLS FOR INDUSTRY

6. The use of the term "skills" in this paper is to some extent deliberate. It denotes something analogous to the tool which a person possesses and uses in his productive activities. It also indicates the proximity to employment. Therefore, there is a certain extent of consumer orientation involved in this approach; namely that of industry. In order to operate industry and its supporting institutions, certain types of skills are needed. The problem then is whether such skills can be enumerated in quality and quantity and whether they can be produced within a reasonable time.

7. Education is the first step in the generation of skills. Furthermore, it is an instrument of social transformation and modernization. It has been often stated that the modern industrial system is a highly complex organism and not merely a collection of machines and the skills to operate them. To industrialize successfully in an environment where economic-social-political features of traditional society are still strong, educational programmes must do much more than create a technically qualified labour force. They should assist in liberating minds, broadening people's outlook, etc. Nevertheless, machines are part of industrial life and skills are needed to use them.

8. The problem of production or development of skills for industrialization would have been less complicated if the output of the educational system - schools, colleges, universities, research and scientific organizations, etc. - were to correspond to the requirements of industrialization. The employing organizations, particularly the manufacturing industries, have often indicated that the output of the colleges and universities is not suited to their

requirements.5/ Very often, they have to train personnel for jobs in industry. Such training has been undertaken quite extensively and the number of training institutions, both in the plants and elsewhere, has reached sizable proportions.

9. In fact, this feature has existed in the industrialized countries for some time and the number of institutions is growing at a rapid pace. The rapid growth of ad hoc training is influenced by the efforts to keep pace with the rate of technological change. It is also due to the changing concept of education and skills, namely acceptance of an idea on continuing education spread over working life rather than the terminal concept of several years ago. Furthermore, the volume of technical information is estimated to be doubling every seven years and a person of responsibility must make efforts to keep pace with chaning information. In effect, the specialized training and accompanying production of software (books, journals and audio-visual methods) have now become large undertakings comparable to manufacturing industries.

10. In the developing countries, the number of specialized training institutions has also grown rapidly in the post-war years. The process of industrialization has created urgent demands for a variety of specialized skills at all levels. These could not be supplied and at the rate they were required by the existing educational system. Consequently, a large variety of training establishments were established to cater to these demands. These were industry or government initiated and financed. It would be most interesting to make a survey of the growth of such institutions in the developing countries covering all skills (skilled labour, managerial, planning and administrative, etc.). It is apparent, however, that they are not co-ordinated in their activities or in the orientation of their training methods. There is also overlapping in their activities. It is clear, however, that this multitude of training institutions has come to stay.

5/ A Report on the Education and Training of Professional Engineers in the United States: Engineers' Council for Professional Development, New York, 1962, page 80; Yap Kie Han, In-Plant Training of Graduate Engineers in the Developing Countries, United Nations, Industrialization and Productivity Bulletin No. 4, New York, 1961; C. Borjal, Education and Training Requirements for Technicians, UNESCO Seminar on Technical Education in Asia, Bombay, 1966, documents in series A.

11. This system of training institutions has numerous advantages in developing skills for industrialization. It has the great advantage of flexibility as compared to the traditional educational system. The curricula method of instruction, etc. of such institutions could be changed and adapted more rapidly to suit the prevailing needs. These training programmes for different kinds and levels of skill are also amenable to importing of skills from abroad for training local personnel and hence constitute an area of fruitful international co-operation. Therefore, any planning efforts in the developing countries need to clearly distinguish between the traditional educational system which provides "trainables" and the training institutions' sector which provides the actual requirement of skills to the manufacturing sector. Such a basic distinction will facilitate skill-planning, since different planning techniques and systems of administration for implementation are distinct for each and can be integrated in the over-all plan.

12. If the availability of the right type of skills and the time required is the object of planning of skills for industrialization, it is necessary to know the following: (a) the nature of skills and the number of personnel required for successive stages of industrialization; (b) the components of that skill or group of skills to be developed in the educational system and the training system; (c) organizational support required to ensure that skills are available to industry as well as the adequacy of finance for this purpose.

III. THE NATURE OF SKILL STRUCTURE FOR INDUSTRIALIZATION

13. It would be inappropriate to equate the needs of skills for industrialization by looking exclusively to the needs of skills for manufacturing industry. Manufacturing contributes effectively to a country's economic and social advancement when it is part of a functioning industrial system. Industrialization is the process of creating such a system. Manufacturing plays a central role in the industrial system, analogous to the role of the assembly line in a modern factory. But just as the assembly line requires support from the rest of the factory organization - including shops that make components and sub-assemblies, purchasing services, maintenance services, financial planning, sales, etc., - so the development of manufacturing on a truly viable basis requires the parallel development of a great many ancillary and supporting activities. Among these are activities that supply necessary materials, get the final products to

consumers, supply and install machinery and spare parts, engage in market research and product design, and provide loans and other financial services. Industrializing countries can obtain some of these auxiliary and supporting services from abroad and may find it economical to do so, but many of the elements of the industrial system have to be developed close at hand. Below is a broad list of groups of activities that are important for the achievement of a well-functioning industrial system: (i) manufacturing, (ii) production of raw materials and intermediate products, (iii) power, transport and communications' services, (iv) construction, (v) financial services, (vi) supply services for equipment, parts and materials, (vii) distribution (marketing) services, (viii) installation, maintenance and repair services, (ix) industrial research and consulting services, (x) educational and training services, (xi) activities that shape the industrial milieu - policy-makers and administrators in government, leaders of employers' associations and labour unions.

15. What types of qualified personnel are needed to man these essential activities in a developing industrial system? The purpose in posing this question, of course, is to seek a sound classification for the design of the training programmes. The following is an indication of the range involved in this work: (i) innovative organizers - entrepreneurs in the public and private sectors, (ii) managers - top- and middle-level managers in large organizations and managers of independent small enterprises, (iii) sub-managers - supervisors and foremen, (iv) professionals - engineers and technologists - social science based, research scientists - natural science based, research scientists - social science based, instructional personnel, (v) sub-professionals - technicians, natural science and social science based, (vi) broadly skilled workers, craftsmen, in production and maintenance work and in office and commercial work, (vii) specific skilled workers, operatives in production and maintenance work and in office and commercial work, (viii) unskilled workers, but not entirely unqualified.

16. There is available an international classification of occupations and it is being revised to reflect the changing nature of skills.[6/] However, it was not

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6/ ILO, International Classification of Occupations: Geneva, 1958.

designed for use in the analysis of skill requirements to correspond to the chain of activities involved in the development of skills. Some manpower forecasting methods use classifications by very broad occupational and skill categories covering all production and service activities to sustain development activities. Such classifications are useful for long-term planning, for instance, of education. But for medium- and short-term planning more detailed classifications are needed. For the short-term (e.g. in connexion with the establishment of specific factories) it is necessary to provide staffing lists for training purposes. Some work of this nature has been done but it is still in the early stages and covers only a few industry sectors.7/ It needs to be expanded horizontally to cover all industries and combine them into meaningful skill patterns. More work needs to be done, however, to ascertain whether the methodology for such studies is appropriate and also to examine whether common skill patterns emerge.

17. The above discussion serves to indicate the magnitude of work involved in the classification of skills and to link it with training programmes. In the estimation of skill requirements of industry, it is not enough to consider short-term requirements but also long-term requirements. The latter will depend on the efficiency of forecasting methods on the one hand and the reasonable approximation of skill classification on the other. Since these take a long time and much research effort, attention to immediate and feasible action in determining common skill catalogues with an agreed classification of skill structures is essential. In the short run, the deliberations of a few expert group meetings could be convened to draw up skill requirements for branches of industry and to recommend ways and means of training for the supply of such skills.

IV. PROBLEMS AND ISSUES INVOLVED IN THE DEVELOPMENT OF SKILLS

Some general issues

18. It has been mentioned earlier that general education is not only the first step, but often the most vital step, in the process of development of industrial skills. The tasks of the educational system in providing "trainables" for

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7/ UNIDO, Estimation of Managerial and Technical Personnel Requirements in Selected Industry Branches, New York (to be published).

industrialization are heavy. It has to give greater weight than in the past to the scientific and technological content of education and foster a scientific and technological approach to economic, social and political problems. The background of children growing up in the developing countries is often alien to the attitudes valued in a technological and industrial society. Children in the industrialized countries, on the other hand, grow up with a considerable background of technical information which contributes to the acquiring of skills later in life. The educational system in the developing countries will have to devise ways and means of instilling into the thinking process some of the traits required for the industrial society. But this is more easily said than done. Nevertheless, serious thought and action is called for in providing education which precedes occupation or employment with emphasis on technical versatility.

19. The tasks of the regular school system, as described above, are to provide general education, wide application of techniques, personality formation and some occupational counselling and guidance information. The task of the industrial training system should be to take these trainable people and to develop in them the specific skills and personality traits needed for good performance in the exact jobs that have to be done. In this task, the continued co-operation of the educational system is needed. For some kinds of training, part-time use of school facilities and laboratories may add to the efficiency of instruction or may save costs. Also further education should normally be associated with training programmes and this is a function the education system is usually best qualified to perform.

Training near the point of employment

20. Training for skills, generally undertaken before or near employment or after employment, and if undertaken by the employing organizations and plants, has a number of advantages. First, the numbers so trained are likely to correspond fairly closely to the effective demand. There is an immediate feedback from the evolving needs of industry to current training programmes. Correspondingly, there is less waste of resources and less frustration for individuals from misdirected training for non-existent jobs. Secondly, such training tends to produce more realistic training programmes. They are almost certain to be consistent with the needs of industry and working methods in practice. Training during employment, in intimate association with industry, has a salutory effect

of putting "certificates" in perspective and in supporting the efforts of those who are striving to reform inappropriate examinations. Thirdly, training programmes organized by, or in close co-operation with employing organizations serving persons whom they already employ or expect to employ, would usually have access to regular production and equipment - at least to the extent of observation and demonstration, and in many cases for actual operation by trainees under guidance. Since industrially experienced instructors are in short supply, the training in the plant at least will not have that disadvantage, or at least the shortage is minimized. Where an employing organization is running its training programme, it can call on its own experienced personnel to participate from time to time; also it has ready access to their advice in planning the content of training programmes.

Continuing system of training, education and re-training

21. In view of the comples occupational tasks of an industrial system and the changes continually brought about by technological and economic factors, it is no longer useful to assume that at some fixed point formal education terminates and "life" and "work" take over, accompanied only by informal, unplanned learning. Would it not be better, in the newly industrializing countries, to plan educational and training systems so that formal learning opportunities recur from time to time throughout a person's working career? In terms of occupational education and training this would mean, in the initial years of a person's regular employment, specific job training intermixed with further education. But education and training would not terminate even at the end of the initial employment stage. Repeatedly, there would be opportunities for further training and for further education to upgrade the person's level of competence, to renew his knowledge and skills to keep him abreast of changes in his field, and to assist in transfer to other fields when that proves desirable.

Education and training of working adults

22. One of the problems in the planning of education and training programmes in nearly all countries is under-investment in education and training for adults.

It has been said that education for children is fine, but its potential contribution to output over ten years is small compared to the potential contribution of efforts devoted to improving adult skills.[8] A weighty argument for high priority to education and training for working adults is the immediacy of the return. This is a very important advantage in countries where the problem is to get economic growth started and thus to generate the added production and income which will make it possible to achieve other educational goals. Adult education is needed to remedy the weaknesses of past and present school systems. The flexibility of informal adult education in contrast to the ridigity of most school systems offers greater potential for a break with cramping traditions, and for large-scale experiments. Training of adults deserves more attention, not only because of the skills and knowledge it can impart, but perhaps even more crucial for industrialization and development generally, because of the considerable potential it has (at least in some circumstances) to influence attitudes, values, motivations, and habits of thought and work. In a way, it can be said that this type of training is another side of the training near or in the employment mentioned above.

The role of employing organizations

23. An objective of a training policy should be to make almost every employing organization a training organization. Large employers can and should mount their own training programmes, assisted in instructor-training and preparation of instructional materials by the central organization to be proposed later, and in associated further education by schools, technical colleges, universities, and other units of the regular educational system. Smaller employers should co-operate in group training centres, or hire the services of training institutions. It is important to emphasize that "employing organizations" emphatically should include public enterprises and the ministries and other agencies of government. In newly developing countries, the Government is often the largest employer of qualified personnel. It may not be feasible to organize training programmes in all government

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8/ W. Arthur Lewis, Priorities for Educational Expansion, Social and Economic Studies, vol. 10, No. 2, June 1961; cf. V.K.R.V. Rao, Education and Economic Development, Pannikar Memorial Lectures, National Council of Educational Research and Training, 1964, pages 8-9.

agencies within the first few years, but this should be the long-range aim. Meanwhile, there probably are some government organizations that already have their own training programmes and a gradual improvement and expansion can be planned.

24. Will employers be willing to devote to training programmes the time, energy, personnel, and money that good programmes require? More particularly, in view of the recommendation that specific job training take place, so far as is feasible, after rather than before employment, will employers be willing to take untrained (but trainable) youths and train them? The answer is that the more progressive and better-managed employing organizations do these things now. Modern managements consider training to be one of their most important management tools, and therefore a continuing part of the regular process of running their organizations. Well-planned and well-executed training programmes are a means of giving leadership without coercion, often times, more effectively than can be done by issuing orders.

Training of various categories of skills

25. These approaches to education and training can be further examined in the light of specific skill levels. The first grouping consists of manual and skilled workers including lower-level clerical skills. The second group consists of foremen, supervisors, instructors and technicians, and the third group covers the remainder, namely, engineers, administrators and managerial personnel at top and middle levels.

Training of lower-level skill categories including skilled workers

26. This category is by far the largest component of the total number employed in any industrial establishment. Preparation of workers for specific jobs has been undertaken in the past under the apprentice-type programmes. Under this system, training for the most part is given on the job. In general, it involved providing the worker with a range of skills composing a recognized trade and the provision of a specified amount of instruction. It is organized in accordance with a contract specifying the obligations of the contracting parties and at the end of his training, the apprentice is recognized as fully qualified in his trade or occupation. This system is now being replaced in the industrialized countries by carefully planned training, and with a flexible approach using specialized materials and instructors in combination with informal learning on the job. This comprises short-term

industrial training in specific job skills and repeated opportunities for further training throughout the working career. In contrast, the apprenticeship system, under which the young entrant learns a collection of skills over a long-fixed period early in his working career and qualifies him in a certain trade for a lifetime, tends to introduce rigidity in the process of acquiring skills.

27. Many developing countries still adopt the apprenticeship system and very often without adaptation to their needs. Consequently, serious bottle-necks have arisen, mostly in matching skills with the specific jobs at the plant level. Recently, some efforts have been made to "modernize" this system. These efforts include ensuring the length of training in the light of specific needs, establishing a list of apprenticeable trades, phased apprenticeship, etc. This, in effect, is an approach nearer to the new concept and some re-examination of the relative merits of the system is considered necessary. This examination would tend to meet some opposition, since an enormous administrative superstructure at the national level has been built up and any change would involve a re-examination of the supporting structure as well.

28. Another problem complicates the training of workers for skills in industry. There are presently three types of institutes preparing workers for industry, namely, vocational and trade schools, vocational training centres, and industrial establishments themselves providing training to secondary school level persons. There exists a certain amount of controversy over the usefulness of vocational schools as opposed to vocational training institutions and training in undertakings. The vocational school concept is, to some extent, the extension of the established school university system in the field of training. The available evidence suggests that vocational schools are not only an expensive operation but also their output has no bearing on the actual needs of industry.9/ The "trainable" of the vocational school system may be better than those provided by the general school system but not much better. Here again, a search for an appropriate system in the developing countries is considered necessary.

9/ See document ID/CONF.1/33 presented to the Symposium and Education and Training Policy for Industrialization and Education and Economic Development; Ed. Arnold Anderson and Jean Bowman, Chicago, 1965, pages 142-166.

Training of intermediate category of industrial personnel

29. This category consists of supervisors, technicians and teaching staff. In modern industry, this group of skills, broadly conceived and defined, is proving to be the crucial part of the operation of plants. With diversification and specialization of operations, the main support in the form of first-line supervisory personnel is an essential and significant part of the manufacturing activity at the plant level. Technician training given in the technical streams of general secondary education and in technical institutes of secondary or junior college level is subject to much the same criticism all over the world. It is stated that the persons trained do not reach the required level. In consequence, the undertakings are obliged to resort to the traditional sources of technician recruitment; that is, to use either highly skilled workers (who do not, however, have the necessary theoretical knowledge and general education), or engineers. Most of the industrialists attending a Colombo Plan Conference held in 1966 stated that few technical education graduates could be employed.[10/]

30. Various arrangements have been made, in an effort to overcome these defects and to provide manpower already in employment with part-time training in schools - for instance, by means of evening, correspondence or sandwich courses, but these are not yet satisfactory and they also involve a number of difficulties. Full benefit is often not gained from the theoretical instruction given because the post a trainee actually occupies in industry does not give him the corresponding practical experience, the theoretical instruction itself varies considerably in quality, and arrangements of the type mentioned are not practicable in a rapidly expanding industry which does not have sufficient work posts.

Training of high-level personnel and professional category

31. Occupations and skills classified as professional and higher-level personnel, such as those of engineers, technologists, managers and higher-level personnel at all levels, have the common characteristic that they require relatively broad knowledge, mastery of a complex subject matter, and ability to manipulate and apply

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10/ C. Berjal, Ibid.

rather abstract ideas and principles. Therefore, this group of personnel requires a good general education, well into or through the university level, followed by pre-occupational education which gives them a thorough familiarity with the basic theoretical structures and operational skills related to the field in which they plan to specialize.

(i) Engineers and technologists

32. Much of what has been said earlier in regard to different levels of skills applies to availability of engineering and technological skills required by industry. It has been generally agreed that there is a gap between the knowledge and techniques acquired by engineers at the universities and the specific orientation and skills required by industry.[11/] The gap is much wider in the developing countries. First, much of the curricula of the engineering and technical colleges in the developing countries is fashioned on the Western model. Secondly, these educational institutions compare unfavourably with the laboratory and other facilities required to gear basic skills to practice. Lastly, the technological and industrial environments which play a significant part in shaping attitudes and part-time work experience, are lacking. These problems are further complicated by some sociological factors which put a heavier premium on work inside offices rather than on the use of the hands. To remedy such a situation, there is a need for engineers to undergo additional practical training in industry. UNIDO, after considerable research and experimentation, has evolved a system of in-plant training of engineers and technicians for periods of from five to eight months. These programmes are organized in specific branches of industry, such as textiles, iron and steel, cement, etc. These have proved to be quite valuable in sharpening skills and there appears to be a need to organize such programmes on an extensive scale, and as a part of the industrial training system in the developing countries. These are necessarily initial training programmes, but attention needs to be given to providing, at successive levels of responsibility, further training programmes.

11/ Yap Kie Han, In-plant Training of Graduate Engineers in the Developing Countries, United Nations, Industrialization and Productivity, Bulletin No. 4, New York, 1961.

(ii) Higher administrative and managerial personnel

33. The training of the higher administrative and managerial personnel to deal with problems of industrialization needs to be approached at two levels: at the level of formulation and implementation of natural policies and at the level of management of individual enterprises. The latter category is easily identifiable and recently its role in the efficient administration of the industrial enterprises has received considerable attention. The role of the State, on the other hand, is very important in the developing countries. It provides a horizon in terms of development goals and creates an atmosphere in which industries can be established and operated. The role of the government, therefore, becomes more meaningful in aiding the process of industrial development.

(a) Economic administration

34. The economic administrators in the developing countries are already playing a vital role, not only in initiating various industrial development projects, but also in controlling the pace of development through systems of allocations of foreign exchange, raw materials and licensing. The economic functions of these administrators in the governments of developing countries have been increasing and any improvement in the services they provide to aid the industrialization process would be desirable.

35. The training of economic administrators, who deal with problems of formulation and implementation of industrial development programmes in the developing countries, has been so far closely connected with training in economic planning. It is being increasingly realized, however, that the knowledge and skills required in this area require training which, in a way, attempts to provide technical background to economists and economic background to engineers and technical personnel working in government and semi-government institutions. In a recent survey carried out by the United Nations, certain gaps in training provided by the economic development institutes were ascertained. The consensus of opinion of those involved in the training of economic administrators was that courses in formulation, evaluation and implementation of industrial development projects should be provided in the existing economic development training institutions sponsored by the governments and the international organizations. This should be followed by evolving new specialized

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training programmes in industrial development for the economic administrators.[12] Such training programmes could be introduced in the Planning and Development Institutes sponsored by the regional economic commissions of the United Nations and assisted by the Special Fund. The experience gained there could be made available for further use in similar training programmes organized on a sub-regional or local basis.

(b) Senior management and administrative staff of industrial undertakings

36. These are the persons responsible for policy-framing, planning, organization and management in undertakings. In a factory employing several hundred people where four hierarchical levels can be distinguished - workers, supervisory staff, departmental heads and top management - the staff in question will come under the latter two headings; they will include highly qualified persons such as market research specialists, and industrial engineering specialists. In a small undertaking, the only persons falling within this category will be the owner-manager and his immediate assistants. As in the case of the other categories of staff, a distinction needs to be made between management education, training programmes and management development programmes.

37. Many countries have made considerable efforts to improve this situation by establishing training centres, but a great deal still remains to be done. For one thing, many industrialists are not fully convinced of the utility of the programmes introduced, partly because in some cases they have been developed for use in very different cultural environments. It has already been pointed out that one reason for the shortcomings apparent in training programmes for all manpower levels is the inadequacy of co-operation between educational and training institutions and industry. A variety of arrangements have been made for all manpower levels, with a view to establishing or developing such co-operation. An example is the establishment of advisory committees which include representatives of the occupation concerned and of employers, and which have the task of providing the authorities responsible for establishing training curricula with information on the content of the occupation and the qualifications it requires, and of advising on courses and

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12/ UNIDO, Training of Economic Administrators in Industrial Development, Training for Industrialization Series No. 1, 1967.

methods of instructions. Problems arise, however, in connexion with such committees; their membership is not always representative of the real needs of the industry concerned (for example, when membership is too high level), and their advice may be based on current or individual situations without sufficient account being taken for the future or for the situation as a whole.[13/]

V. CO-ORDINATION AND DEVELOPMENT OF NATIONAL INDUSTRIAL TRAINING SYSTEMS - ESTABLISHMENT OF ITO

38. The foregoing description of issues and analysis of problems make it clear that the time has come to take more effective action at both the national and international level. It is not entirely satisfactory to suggest a few solutions at random points. The problem is serious enough to require immediate attention and concerted effort on a national scale. It is in this spirit that the following policy and organizational suggestions are offered for consideration and discussions by the Governments attending the International Symposium on Industrialization.

A four-phase approach to generation of industrial skills in the developing countries

39. Much of the foregoing discussion in this paper has indicated the need to consider the basic components involved in the skill generation system; namely the educational system and the training system. It would be useful here to establish the route and link between the two systems and to examine the framework for implementing their programmes. It is proposed that plans for industrial education and training recognize four phases or stages which merge into each other and, to some extent, overlap:

(i) general education;
(ii) pre-occupational education;
(iii) initial job training, with further education;
(iv) up-grading, renewal and transfer training, with further education.

13/ Hugh King, The Contribution of Technical Education, Pan-Indian Ocean Conference on Technical Education and Training, Perth, August 1966, Background Paper No. 2.

The first two phases are primarily concerned with education, the third and fourth with training, combined with further education. The distinction between education and training is mainly one of degree of specificity. Education is concerned with knowledge, techniques and personality factors broadly relevant for a great many purposes and life situations; training is concerned with the skills, knowledge and personality factors relevant to good performance of a specific task or a set of tasks making up a job or skill required for it.

General education

40. General education, besides enlarging the individual's horizons and preparing him for life in society and for citizenship, also is a nearly indispensable foundation for all modern industrial occupations. It should provide at least elementary skills in communication (reading and writing) and mathematics, some knowledge of the physical, biological, and social world and of the human heritage, and should contribute to formation of desirable attitudes, motivations and values. Ideally, each person should have the opportunity to absorb as much general education as his aptitudes and interests suggest; in practice, the rule may have to be as much as he and the country can afford.

Pre-occupational education

41. The period of general education should conclude with two or three years in which the general content is combined with occupationally oriented content and career counselling. The curriculum should provide for "streams" of students tending towards different occupational careers, with some specialized subject-matter for each stream and some common subject-matter for all or nearly all students. The occupationally oriented content should still be quite broad, offering appropriate background for large groups of occupations rather than for very specific occupations or jobs. It should aim to produce trainable rather than fully trained people, to provide fundamentals that make for versatility and ability to learn and re-learn on the job. This phase might best be within comprehensive (multi-channel) schools, rather than in separated schools which isolate students preparing for a higher academic level from vocational preparatory students.

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Initial job training, with further education

42. When the individual first enters employment, or is about to enter it, his specific job training should begin. This is the desirable general principle - not very specific training prior to and un-connected with employment in the hope of finding employment, but training on the job. However, the principle should be applied flexibly and with exceptions. For example, training for jobs as typists or book-keepers and for various recognized skills used in many industries or practised independently in small shops, may usefully be quite specific in an institutional setting prior to employment, with only a little extra orientation after entering a particular job. The same may be true for skills known to be in strong demand in a particular locality, for example, where there are many local firms wanting textile workers or electronics technicians. Even in such cases, though, there are likely to be advantages in combining institutional with on-the-job training in some part-time arrangement.

43. The specific job training should, wherever feasible, be conducted by, or in close co-operation with the employing organization. In fact, the concept should be that every employing organization (governmental and private) ought also to function as a training organization, or should join with others in arranging for, and paying for a training programme. The training should usually be a combination of (a) practical experience in a production situation, under guidance, with (b) formal instruction in classroom, laboratory, or teaching workshop. The formal instruction might be provided on the premises of the employer (if the employer is a fairly large organization) or in a co-operating educational institution or a training centre serving a group of employers. Along with the specific job training, there should always be (c) further education, to remedy deficiencies and build further on the individual's existing educational background.

Up-grading renewal and transfer training, with further education

44. Opportunities should be systematically provided for additional training and further education throughout each individual working career. The direct purposes would be three: (a) upgrading the individual's qualifications to do his particular job better or to advance to the next higher job, as when an electronics technician, by study and experience, moves up to be an electronics engineer; (b) renewal of

qualifications in a trade or occupation to keep abreast of technological or other changes, as when a plumber skilled in handling steel pipe learns to handle plastic pipe, or an accountant to make use of computerized record systems; (c) transfer to a different job or occupation, as when a coal miner whose job is eliminated by mechanization retrains to be a radio repairman, or a shop worker wants to become a salesman, or an engineer finds himself becoming a manager or an independent entrepreneur and, therefore, needs to learn techniques of administration, marketing and finance.

Administrative and financial responsibility for education and training

45. In designing an industrial education and training system or improvements in an existing one, no country starts with a clean slate. There are existing institutions, traditions, practices, and point of view not easily changed, not to speak of constraints imposed by available resources. Since no two situations are exactly alike, it is impossible to propose specific solutions to problems of organization, financing, etc., that will be realistic and generally applicable. Each country must work out solutions appropriate to its own situation. What we shall attempt to do here is to offer some ideas and principles that are capable of being adapted in a variety of different ways to fit specific situations.

46. First, it is proposed that responsibility (both administrative and financial) for the four phases of education and training be shared by the public education system on the one hand, and the industrial production system on the other, as follows:

(a) Phases 1 and 2 - that is general education and pre-occupational education - should be the responsibility of the regular school authorities (the Ministry of Education, or whatever the agency or agencies may be called).

(b) Phases 3 and 4 in their training aspects - that is initial job training and upgrading, renewal, and transfer training - should be the responsibility of the industrial production system. This responsibility should be organized through a mechanism representing employers, labour, educators and government, which we shall call an Industrial Training Organization (ITO). The ITO might take a variety of different forms in different countries. The ITO and its training programmes should be supported, at least partly, by a compulsory levy

on employers (whether in the private or public sector). In order to encourage employing organizations themselves to undertake training programmes, the ITO should offer rebates on the levy to those that do, provided the programmes meet minimum standards verified by inspection.

(c) Phases 3 and 4 in their further education aspects should be the responsibility of the school authorities, but in close co-operation with the training programmes of industry. This co-operation would be organized and facilitated by the ITO, on which both systems would be represented. The co-operation should also extend to the occupational counselling and guidance aspects of phase 2.

An Industrial Training Organization (ITO)

47. Structure

As already stated, the proposed ITO could take any of several different forms, depending on institutions and preferred methods of work in the country concerned. Probably most generally recommendable, if in line with a country's institutional and legal framework, is some form of public or quasi-public corporation with a governing body representing:

(i) Industry

Employers - private sector and public sector

Workers - labour unions

(ii) Government

Industry Ministry

Labour Ministry

Education Ministry

(iii) Educational and training institutions

Representatives of selected schools or training centres of productivity centres actively engaged in work related to the ITO functions.

Depending on the size of the country and the amount and diversity of its industry, it might be desirable for the ITO to have a sub-structure consisting of regional boards or boards for particular industries (textiles, metallurgy, construction, metalworking, etc.). In all cases the ITO will need a strong staff headed by a

full-time administrator of high competence who must have sufficient prestige to inspire confidence and co-operation in the worlds of industry and commerce, labour, government and education.

Functions

48. In general, it is proposed that the ITO should be charged with the following functions:

(i) To formulate short, medium and long-term industrial training targets at the national and sectoral levels, including targets for industrial enterprise training schemes;

(ii) To give organizational form to the training responsibilities of the industrial enterprises;

(iii) To provide a mechanism for linkage and co-operation between the industrial enterprises and the educational and training institutions in all phases of industrial education and training.

In this connexion, the ITO should give a very high priority to the following activities:

(i) Analysis of current and future needs for industrial education and training;

(ii) Education and training of instructors;

(iii) Preparation of training materials and experimentation with new materials and methods;

(iv) Setting of standards for, and inspection of aided training programmes; and

(v) Preparation and administration of examinations for testing attainment of a certain level of proficiency in specified types of industrial education and training.

Financing and methods of work

49. The costs of training (as distinguished from education) should largely be borne by industry. As already mentioned, it is recommended that as far as possible, a training levy be imposed on all employers (private firms and public-sector enterprises). For administrative reasons, it is probably desirable to exempt very

small employers - say those with less than fifteen employees - at least at first. The levy should be partly or wholly rebated to employing organizations which establish and run adequate training programmes of their own, as attested by ITO inspection and approval. Experience in several countries suggests that a levy equivalent to 1 or 2 per cent of payrolls (gross wages and salaries) will provide adequate funds for a least a good start on a programme of industrial training.[14/] In countries at very early stages of industrialization, it may be necessary or advisable to start the training programme by covering some of the costs from the government's general funds or those earmarked for development. This is a field in which international aid might also be made available, for such purposes as instructor training. In the long run, however, the major share of the costs of training should be borne by the employing organizations.

50. A very important reason for recommending a compulsory training levy on employing organizations is that the offer to rebate part or all of it provides a powerful lever with which to induce the employing organizations to mount their own training programmes. Such programmes are likely to be both more realistic and less costly for equivalent results than training programmes in a vocational school or other institution not directly tied to industry. Furthermore, the very fact that an employing organization is induced to establish and run a systematic training programme will most probably improve the morale as well as the competence of its work force and raise the efficiency of its operations. Progressive employers realize this, and many of them, where the organization is large enough, already engage in training.

14/ In some respects, a payroll tax is not a good tax. It tends to increase the cost of labour in relation to capital and might, therefore, have an adverse effect on employment by encouraging employers to replace labour by machinery. But the effect of a 1 per cent or 2 per cent tax is hardly likely to be significant in this respect, and the manifest equity of a training tax based on gross wages and salaries, plus the ease of administration (as compared with, say, a tax on capital or income or output), turns the balance in its favour. Furthermore, if the proceeds of the tax are well used and, as a result of training programmes, the average efficiency of labour goes up by 5 per cent or even more, this will more than offset the 1 per cent or 2 per cent tax and produce a net encouraging effect on employment of labour.

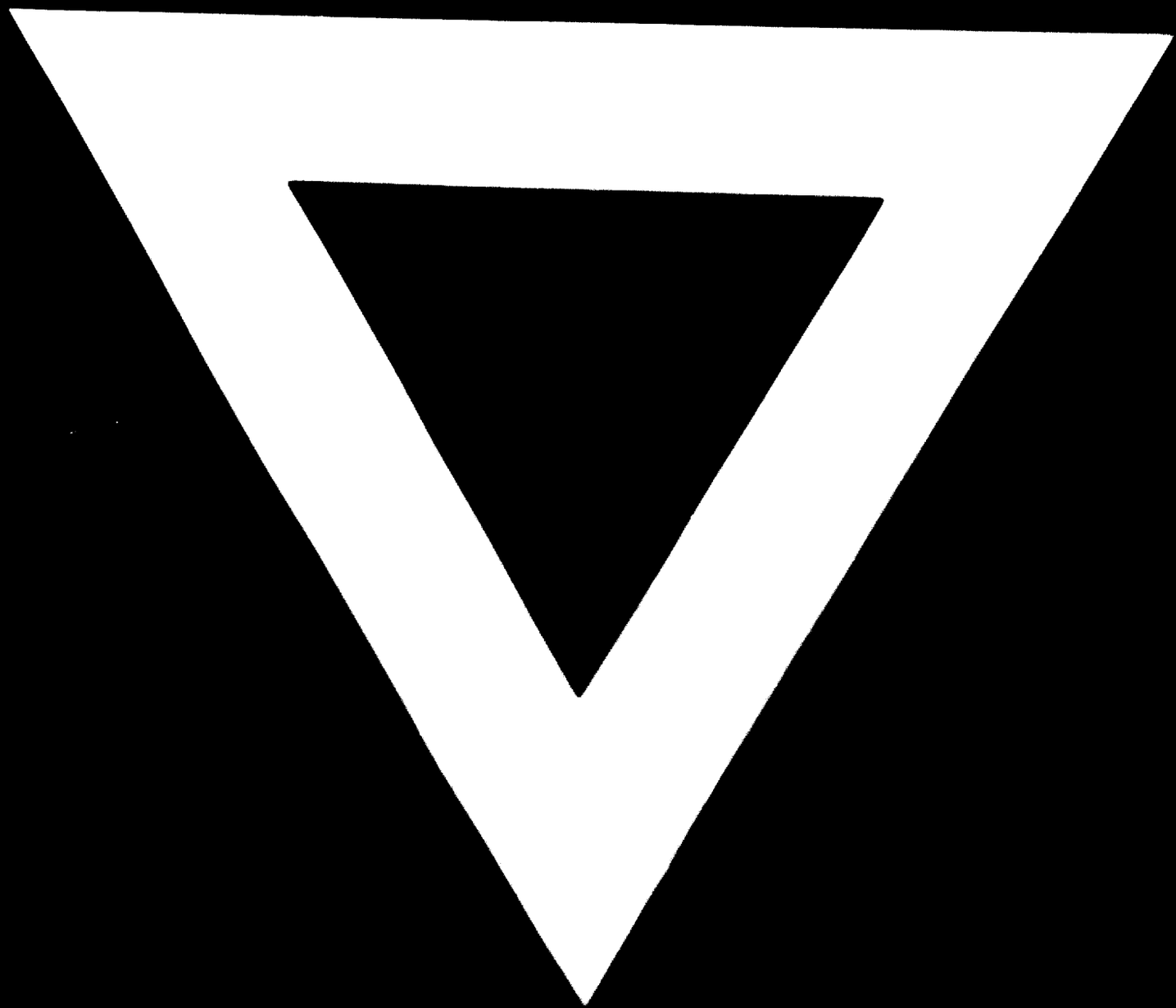
51. But in the absence of the kind of system recommended here, any employer who invests in a training programme has to reckon with a more or less sizable percentage of cases in which he receives little or no return on the investment, because some employees leave soon after training - perhaps hired away by another employer who thus gets trained personnel without paying the costs of training. This "leakage" of the benefits of training substantially reduces the incentive for any given employer to undertake training, unless he is very large or without competitors in the skills for which he trains. The proposed ITO system, by contrast, says to each employer, "If you cannot or do not wish to do your share of training, you must pay the training provided elsewhere. On the other hand, if you are able and willing to do a good job of training, the ITO will reimburse at least part and perhaps all or more than all of your training costs."

52. The ITO should follow the policy of persuading and subsidizing other organizations - employing organizations, schools, and training centres - to undertake a large share of the actual training work. It should also work closely with productivity centres, small industry service institutes, management associations, labour unions, and other agencies that are able to run good training programmes. Where necessary, it should subsidize their training programmes, besides assisting in the training of instructors, preparation of materials, and in other concrete ways. Only where others cannot do the job that needs to be done, even with the help from the ITO, should the ITO itself directly undertake a training task. In practice, it may have to do a substantial amount of such work in a newly industrializing country, because facilities and staffs are otherwise not available. For this reason, and also to discharge some of its other functions, the ITO may need to establish special schools or training centres of its own. Nevertheless, the general policy should be to hold this within reasonable limits in order to encourage a more decentralized and pluralistic approach and especially to make maximum use of the facilities (equipment and personnel) of the employing organizations themselves.

53. Countries could request UNIDO, ILO and UNESCO to send joint missions to assist in setting up ITO. Such missions would provide advice on the organization's scope and objectives, its structure as well as on its means of action and financial resources. International technical and financial assistance could also be provided in connexion with the organization's operational activities once it is established.

Current practices and precedents

54. The above-mentioned organizational framework is, to some extent, based on current practices and precedents. In Latin America, a distinctive group of organizations for skill training exists. The first of these was established in 1942 and others have been in existence since 1957. These organizations include SENAI (for National Industrial Apprenticeship) in Brazil; SENA (for National Industrial Apprenticeship) in Colombia; INCE (for National Institute for Educational Co-operation) in Venezuela; SENATI (for National Service for Training Industrial Workers) in Peru, etc. The British Industrial Training Act of 1964 has also introduced important innovations which are having a profound effect on the development of skills. It is rather early to assess the experience of this Act, but it is clear that unless the governments take up this matter and provide a legislative framework, the progress can be visualized only in terms of aspiration, academic generalizations, hit-and-miss efforts at random points. It would be desirable to raise the status of work dealing with training of skills into an active national programme and evolve an appropriate legal framework and administrative organization like ITO in the developing countries.



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