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High Level Expert Group Meeting in
Preparation of the Second Consultation
on the Training of Industrial Manpower

Paris, France, 13-16 January 1986

CONTEXT, OBJECTIVES AND PREPARATORY WORK FOR THE
SECOND CONSULTATION ON THE TRAINING OF
INDUSTRIAL MANPOWER *

Prepared by the UNIDO Secretariat

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Introduction

The Second Consultation on the Training of Industrial Manpower will be held during the 1986-1987 biennium, towards mid-1987, in line with a decision of the UNIDO Industrial Development Board at its nineteenth session held in Vienna in May 1985.

This will be a significant event among the activities of the System of Consultations. The fact is that industrial training represents the only global issue to which a Consultation is to be devoted during the next biennium under a system based on an industrial sector approach. Moreover, the subject of the development and training of human resources is today rightly regarded as a fundamental factor in technological and industrial development in both the developed and the developing countries. It is an area in which there are major opportunities for developing international co-operative relationships to take better account of the principle of mutual advantage.

UNIDO in general, and the System of Consultations in particular, can play a useful role in this field. The conversion of UNIDO into a specialized and independent agency on 1 January 1986 will mean for the Organization greater opportunities and the need for an effective and innovative approach to the key issues central to the future of world industry and to the ways and means of promoting industrialization in the developing countries.

The Paris meeting in preparation for the Second Consultation provides an opportunity for the formulation and implementation of an approach and programme of activities that will satisfy the expectations of the Member countries and make possible effective co-operation between the different international organizations heavily engaged in this area, particularly within the United Nations system.

The convening of this meeting in Paris also represents an initial expression of confidence on the part of a number of Member States vis-à-vis the System of Consultations in general and the process which UNIDO has adopted for the Consultation on the Training of Industrial Manpower in particular. The French Government has made a generous financial contribution and provided logistic support to permit the holding of this meeting in which numerous experts from the developing countries are expected to participate.

The purpose of the present document is to provide each participant with the information necessary for an understanding of the political, administrative and technical context surrounding the Second Consultation and the Paris meeting. It is believed that this common body of knowledge will be useful in making possible the formation of a more homogeneous group better prepared for effective discussions of the complex questions at issue within the limited time available (four days).

I. THE CONTEXT OF THE SECOND CONSULTATION ON THE TRAINING OF INDUSTRIAL MANPOWER

The Second Consultation needs to be examined in two different contexts: the specific UNIDO context and the world-wide context.

1. The specific UNIDO context

This Consultation is one of a series of several events of importance to UNIDO.

(a) The First Consultation

The First Consultation took place at Stuttgart, Federal Republic of Germany, from 22 to 26 November 1982. 1/ As a result of the experience gained at this first meeting, a body of ideas was developed that will be used to guide the work of the Second Consultation. A large number of studies and analyses were prepared for this first meeting and it was possible to conduct a comprehensive and coherent review of all aspects of industrial training in a world-wide context. This was a necessary stage for the first of the Consultations. Still, this major effort did perhaps result in too many recommendations and it proved possible to discuss only a few studies at the meeting. For the Second Consultation it has been decided at the outset to impose a reasonable limit on the scope of the discussions and studies with a view to greater effectiveness. An effort will be made to strike a proper balance between the objectives sought, the priorities of the work, and the resources (particularly of a financial nature) available. This approach is in full accord with the recommendations adopted by the UNIDO Industrial Development Board with respect to the overall philosophy of the System of Consultations (see document ID/B/349).

(b) The Fourth General Conference of UNIDO (Vienna, August 1984)

Preceded by a meeting of high-level experts at Yaoundé, Cameroon, in May 1984, which was especially devoted to the subject of the "accelerated development of human resources for industrialization" (see report ID/WG.394/8), the Fourth General Conference of UNIDO 2/ assigned particular priority to this subject, regarding which there was a genuine consensus among the Member countries. Moreover, the Conference recognized that "UNIDO's programmes in respect of human resources development need to be strengthened and made more effective in order to assist in meeting the requirements of developing countries in the field of industrial development".

(c) The conversion of UNIDO into a specialized agency on 1 January 1986

This conversion will increase UNIDO's capabilities and responsibilities in terms of more effective action for the promotion of the industrialization of the developing countries and towards the establishment of a new international economic order. It also represents a challenge to the Organization - a challenge to improve the effectiveness of its programmes and structures, to enter into direct dialogue with the Member countries (contributors and recipients) so as better to respond to their expectations and priority requirements, and to develop its expertise in

1/ See the Report of the First Consultation (ID/294) distributed to the participants.

2/ See document ID/CONF.5/C.2/L.9 giving resolution 1 on the subject of the accelerated development of human resources for industrial development.

specific areas. It is against this background that UNIDO's new Director-General has on several occasions 3/ stressed a number of points that have been reflected in the approach selected for the Second Consultation: a priority-based and integrated country-by-country approach, programmes of a more action-oriented nature, the accordence of priority to the development of human resources and industrial training, and a higher degree of integration and complementarity between UNIDO's various activities and structures, particularly between the provision of technical assistance and the Organization's other activities.

(d) The co-operation necessary within the United Nations system

With a view to responding to a concern often expressed by the Member States, and at a time when the organizations of the United Nations system are being called upon to give better evidence of the proper use of limited development resources, co-operation within the system represents a political and technical imperative.

The areas of human resource development for industry, on the one hand, and of technology, on the other, fall naturally within the range of activities of a large number of organizations, but at different levels of competence. These organizations face a common need to evaluate, streamline and develop their training activities. 4/

As a consequence, co-operation and co-ordination are even more necessary in order to avoid a duplication of effort, exchange experience and ensure the principle of complementarity in the work undertaken in this complex and changing field, where the needs are immense and out of all proportion to the resources available. The preparatory phase for the Second Consultation provides an opportunity to contribute to this consolidation of inter-agency co-operation, respecting the mandates of the individual organizations and complying with UNIDO's specific responsibilities in the industrial area. 5/

The Paris meeting has already provided an opportunity for useful and close contacts and for exchanges of information regarding complementary activities with the International Labour Office (ILO) and UNESCO. The meeting itself will permit a sharing of views that should ultimately be translated into greater coherence and co-ordination between the complementary activities and programmes of these organizations, with a view in particular to the UNIDO Consultation. 6/ This desire for a constructive dialogue extends also to other regional or intergovernmental organizations whose participation in the Paris meeting UNIDO welcomes.

3/ See, for example, the Director-General's statement of 6 November 1985 to the UNIDO Industrial Development Board.

4/ See, for example, Industrial Training Evaluation Study No. 11, prepared jointly by the International Labour Office and UNDP (June 1984), as well as the UNESCO report regarding the expert group meeting on training policies for the development of human resources (November 1984, CPX/FEL/RES.HUM/4).

5/ Preamble of the UNIDO Constitution: "UNIDO shall play the central role in and be responsible for reviewing and promoting the co-ordination of all activities of the United Nations system in the field of industrial development".

6/ Obviously, each organization is responsible for its own selections. Moreover, the financial resources available for the period 1986-1987 have already been allocated to activities and programmes. There are, however, possibilities for adaptation and greater co-ordination that have not been totally exploited.

2. The world-wide context

The world-wide context, particularly since the First Consultation, which met in November 1982, has been marked by a dramatic quickening of technological and industrial change and ever-increasing differences in the positions of enterprises and countries in the face of economic crisis and evolving technologies. This economic and financial crisis, along with policies of structural adjustment favouring short-term "technical" results, are negatively affecting the situation of the labour force, including such factors as unemployment, income, training budgets and the human dimension of development. ^{7/} The mobilization of the personnel in each enterprise and in each industrial sector represents an imperative condition for the improvement of productivity and enterprise performance and for the achievement of better aggregate economic results in each country. There is growing evidence of a critical need to identify what exactly is at stake for the present and the future and to improve the training and mobilization of the workforce. This is a crucial requirement for managers and industrial decision makers in the developing countries, confronted as they are with a theoretical surfeit of technological and industrial alternatives coupled with a dearth of personnel and resources and a constricting web of constraints.

Consideration of this world-wide context and of the specific mandates and events marking UNIDO's recent evolution prompts the proposal of a particular approach to the Second Consultation on the Training of Industrial Manpower.

^{7/} See the report of the round table jointly organized by UNDP and the North-South Round Table in Istanbul, Turkey, in September 1985.

II. GUIDELINES FOR THE SECOND CONSULTATION AND FRAMEWORK FOR THE PREPARATORY WORK

1. The role of UNIDO and of the System of Consultations

This role may be thought of as a catalytic and organizational factor in a joint effort with other organizations and Member countries, designed to generate alternatives or the necessary adaptations consistent with the priority needs of the developing countries and to promote international co-operation taking into account the mutual interests of the North and South. UNIDO expects to play this role as part of its original function, namely, by articulating most particularly the point of view of industry with regard to its needs and objectives and by living up to its co-ordinating responsibility, within the United Nations system, in the field of industrial development. This also implies an understanding of development and personnel training for industry and their promotion in the face of the constraints on individual enterprises and industrial sectors and in line with their objectives.

The System of Consultations is an ongoing process. The focal point of this process is obviously the Consultation meeting itself, but the activities both preceding it (the preparations) and following it (the follow-up) are also essential and of practical interest. The general brochure (attached to this document) on the System of Consultations describes clearly the overall objectives and activities of this System.

In general terms, the System of Consultations can perform two major functions:

- The function of generating and heightening an international awareness of the major problems and needs of common interest (teaching function);
- The function of taking action at different levels: the preparation of structured information and studies, the development of action-oriented thinking and methodological tools, the formulation of alternative strategies, the proposal of plans of action (at the national and subregional levels), the elaboration of concepts and programmes of technical assistance, the design of guidelines for investment promotion, the enhancement of the effectiveness of multilateral assistance, and the establishment of direct contacts between industrial protagonists during the Consultation.

The preparatory work and the Second Consultation on the Training of Industrial Manpower will form an organic set of interrelated activities with one priority objective: the submission, for approval, to the Consultation, regarded as a political (and technically representative) embodiment of the international community, of draft resolutions dealing with a limited number of priority issues/subjects. These resolutions will represent the elements of a shared approach and international consensus for the future, and will provide specific action-oriented guidelines for multilateral co-operation and, in particular, for the provision of technical assistance by UNIDO.

2. Subject area proposed for the Second Consultation

The general subject area of the Second Consultation may be defined as follows: The development of human resources for the acquisition of industrial and technological competence in the developing countries.

Two specific subjects are proposed:

Subject A: The development of human resources for industrial maintenance;

Subject B: The development of human resources for the mastery of technological changes.

It is an indisputable fact that the developing countries are aspiring to and wish to achieve this kind of mastery, which thus becomes a major factor in problems related to international industrial co-operation and technology transfers. Since human resources and industrial training constitute an essential factor of this mastery, they must naturally take their rightful place, and this requires the kind of substantive changes that the Consultation can help to analyse better and to promote.

The desire for industrial mastery, with particular stress on the technological dimension, is both a mobilizing and an organizing factor. It calls for comprehensive consideration of the objectives, parameters, constraints and means involved in this mastery, particularly key functions and occupations, so as to provide a framework of analysis for the problem of priority needs (see part III, 3, of this document). The role of the human factor, essential but not exclusive, may be placed in proper perspective vis-à-vis the other factors influencing either technological dependence or, alternatively, fully mastered technological and industrial development.

There remained to be added a supplementary dimension permitting the Consultation to achieve a genuine degree of effectiveness and practical utility. This is the purpose of the two specific subjects that have been chosen, which involve a critical parameter in the achievement of mastery, something that by its very nature requires a prolonged effort, i.e., the time factor. Mastery in this sense means a mastery of both the present and the future, known priorities and a less certain but equally decisive future.

In the short term, industrial mastery implies the satisfactory management of what one has, in particular one's productive assets, within the framework of existing constraints, technologies and means. The means of production are not some sort of inert stock; they can only be productive if they are constantly and correctly maintained, repaired and improved. This involves the broad notion of industrial maintenance, which is of such great importance for many developing countries that sometimes have sub-standard or uncompetitive industrial plant. This maintenance function is directly linked to the decisions, attitudes and skills of the industrial work-force taken as a whole.

Today's future brings with it uncertainty, change and the need for innovation. The principal factors at work in changing and even restructuring the world industrial establishment are represented by changes in technology, the use of computers, the automation of activities, the emergence of intelligent machines using a rediscovered and incorporated technical know-how, the primacy of the power of information and intelligence over physical force and manual dexterity, changes in materials and the development of biotechnology. The industrial future of all countries (developing countries in particular) lies in their capacity to perceive, select and master these technological innovations 8/ using competent personnel trained to an appropriate level.

In this way, the two subjects of maintenance and technological change represent two "angles", two "lines of attack" of practical and decisive importance to the acquisition of technological and industrial mastery by the labour forces of

8/ These innovations cover a very wide range extending from simple modifications/adaptations of products, production processes and machines to the use of the advanced technologies previously mentioned.

the developing countries. Further, these are two fields in which the North and South can usefully exchange their experience and in which there are major areas of mutual interest. They are also two factors with the ability to activate international industrial co-operation and improve the effectiveness and quality of technology transfers. Finally, these two areas represent priority objectives common to a great number of international organizations for which concerted thinking can only prove beneficial.

These two subjects are not new. A sizeable body of publications, studies, experience and successful projects already exists, although it has perhaps not been fully consolidated and exploited. This preliminary consolidation is essential for the validity and efficacy of future actions.

3. Work planned for the Consultation

It may be useful to summarize the framework of objectives and work proposed for the Second Consultation. In this connection, it is possible to distinguish three interdependent work modules or blocks.

First of all, there is an initial global module G, of thinking and action, with the following objectives:

- To promote the role of human resources as a decisive factor in the acquisition of industrial and technological mastery;
- To formalize in a concrete manner the relationship between human resources/training and industrial and technological mastery, sectorally and globally, by developing practical methodological approaches and devising operational methods for analysing ascertained requirements in the various countries, ultimately leading to programmes of technical co-operation in the field of training;
- To prepare a forecast ^{9/} of the future evolution of the technical system and the structure of world industry, along with the related consequences for human beings and their training, especially in the developing countries, and for industrial co-operation;
- To pursue the implementation of the global recommendations, in particular those of the First Consultation and the Fourth General Conference of UNIDO, which are of common interest to all countries and industrial sectors (for example, the establishment of a check-list of training clauses that might be included in contracts).

This involves, above all, two modules/ensembles relating to the two specific subjects proposed, viz.:

- A. The development of human resources for industrial maintenance;
- B. The development of human resources for the mastery of technological change.

In order to guarantee the success of the work and its practical results, each subject will be dealt with by stressing two parameters:

^{9/} See part III, 4, of this document.

- The need and concern for action at the national level, i.e., from the point of view of the developing country. Specifically, it would seem necessary to distinguish between three major categories:

- The least developed countries;
- The new industrial countries;
- The category of intermediate countries.

- The sectoral level. This level is, in fact, of the greatest importance to technological strategy and training. It is here that there are quite often deficiencies of a kind that rule out the possibility of effective individual and decentralized training initiatives. Thus, thought might be given to analysing each of the two subjects on the basis of a certain number of industrial sectors representative of the priorities of developing countries in terms of the varied nature of the industrial fabric within the country and the social usefulness of these priorities (in particular with regard to employment). It is essential that an industrial infrastructure sector be considered.

The sectors considered might be:

- An agro-industrial sector;
- The textile/clothing sector;
- The capital goods industries (engineering and electrical industries);
- A heavy industry sector (e.g., iron and steel);
- The construction/building materials sector;
- One or two industrial infrastructure and service sectors, such as transport (e.g., railways), the production and distribution of energy (e.g., electricity) or water.

These are only suggestions and the sectors considered might differ according to the subject, the experience acquired or the needs perceived.

Obviously, the global and intersectoral aspect of the Consultation is necessary and justified. Comparative analyses and an analysis of interrelationships between sectors will be necessary, taking account of the national aspect of the industrial and educational problem and, above all, the often trans-sectoral nature of the new technologies (use of microelectronics and further developments in the machine-tools sector 10/).

The global outline and the nature of the principal preparatory activities are described in annex 1. The objective is to propose to the Consultation a select set of recommendations and specific programmes for the two subjects A and B. In addition, each of these subjects will be discussed at a specialized expert group meeting to be held in Africa (subject A) and, most probably, in Asia (subject B).

10/ See UNIDO document ID/312 "Technological Perspectives in the Machine-Tool Industry and their Implications for Developing Countries". Development and Transfer of Technology Series, No. 19, 1985.

Considering the critical importance of industrial maintenance in Africa, and out of a desire to impart a practical thrust to the work, a principle more easily achieved when the work focuses on a given region, the expert group meeting planned for June 1986 in Nairobi, Kenya, should deal specifically with industrial maintenance in Africa. Nevertheless, it is clear that maintenance will be considered by the Second Consultation as a global subject of interest to all the world's regions, and preparatory activities will be carried out in 1986 in other regions. As far as the expert group meeting planned for subject B is concerned, this meeting will not be limited to any given region, but will be an interregional event.

4. Work undertaken for the Paris meeting

The Paris meeting represents the genuine point of departure for the preparatory work for the Consultation, and the presence there of numerous invited experts and representatives of organizations attests to the importance ascribed by UNIDO to this forum for joint reflection and the elaboration of proposals.

This meeting will make it possible:

- To formulate priority objectives and approaches for the Second Consultation by forging links between areas of central interest in participating countries, institutions and other organizations;
- To define and elaborate in greater depth the two technical subjects A and B and the relevant priority "angles of attack";
- To identify the priority activities for the 1986-1987 biennium relating to the subjects and priority "angles of attack" selected, in particular for the two expert group meetings that are envisaged;
- To consider the contributions that might be made by the other institutions or countries present.

As a first step, the preparations for the Paris meeting required the execution of a "state-of-the-art" study of the two proposed subjects. For subject A, this study has been undertaken by UNIDO and a consultant. The latter has prepared a global document on the subject of industrial maintenance. ^{11/} This document describes the principal aspects of the maintenance problem and their implications in terms of human resources and training. In addition to providing a detailed account of the past and present work of various institutions and countries, it proposes specific "angles of attack" designed to satisfy the priority needs of developing countries. A second document has been prepared by the UNIDO Training Branch entitled "UNIDO Training Programmes in the Area of Industrial Maintenance". These two documents will serve as a basis for discussion of subject A by the expert group meeting in Paris.

Subject B regarding technological change is by its very nature more complex and general as regards philosophy and applications. An initial collection of studies and information has been assembled, specifically by the International Labour Office (ILO), UNESCO, the European Economic Community (EEC), the

^{11/} See UNIDO document ID/WG.460/1 "The Role of Human Resources Development for Industrial Maintenance" by Mr. Mel Crofton of the TETOC Group, British Council, London.

Organization of Economic Co-operation and Development (OECD) and, naturally, UNIDO, 12/ and from a variety of national sources. A specific contribution has been prepared by a consultant and will be submitted for discussion. 13/ This latter study adds to the two principal aspects of technical change and human resources the technology transfer/industrial co-operation aspect. The fact is that it is principally through this particularly favoured vehicle that technological change is transmitted to the developing countries and it is in this connection that personnel training becomes a decisive factor.

We shall not in this introductory document describe in any detail the content or the characteristics proposed for the analysis and development of the two specific subjects A and B, since these elements are contained in the two consultants' contributions and will be discussed at the meeting.

12/ We might recall that this subject represents an important objective of UNIDO's activities, in particular its technology programme, through the promotion of national policies aimed at acquiring a mastery of technological change and at developing technological capacities in the countries concerned.

13/ Study entitled "Changements technologiques, Transferts et Ressources Humaines dans les Pays en Développement" (ID/WG.460/2) by Professors P. Hugon and C.-A. Michalet of the Université de Paris X - Nanterre.

III. METHODOLOGICAL APPROACH: HIGHLIGHTING THE REAL PROBLEMS

This final part explains the reasoning and thought processes behind the definition of the strategy for the Consultation and the proposed subjects. It is a form of methodological complement to the first two parts.

1. The importance of the human factor in the development process

The role of the human factor still seems to be often misunderstood in the realities and theories of development. For all that it is declared to be the fundamental goal and means of development, men, women, young and old are sometimes painfully confronted with the effects of economic and technological change, and patterns of growth whose social consequences are poorly controlled. ^{14/} The field of industrialization is no exception; the human factor is often considered to be of little importance. The majority of studies and financial resources are devoted to the identification, acquisition and replacement of industrial plant and equipment while the attention given to people and their training is fragmentary, tardy, exposed to financial hazards and cuts, and placed within an unsuitable legal and financial framework. ^{15/} In general, it is the nature and practice of feasibility studies to pay greater attention to people as consumers (through market research) than to people as the principal resource and a critical factor in the success of the enterprise to be set up. This undervaluation of the human factor is often a result of the fact that countries do not pay enough attention to the development of human resources and the persons assigned to work in this field are not sufficiently motivated, competent or trained (despite the fact that sums spent on education are often very large). This is particularly true as far as the role and status of trainers is concerned, although they are the cornerstone of any national training system. ^{16/}

As a reaction to this, alternative models or new concepts have been developed, such as the concept of basic needs or appropriate technologies, but these have experienced great difficulties in finding acceptance for their value in objective terms. The world economic crisis has had a marked effect on the social aspect of development, particularly in developing countries, and has weighed heavily on education budgets and vocational training expenditure which have been considered too costly. At the same time, the third technological revolution was making its appearance in the industrialized countries. Faced with the needs of modernization and restructuring and with this new technological challenge, industrial enterprises and countries were rediscovering the vital role of people and technology in the

^{14/} Extract from the report on the Round Table organized by UNDP in Istanbul in September 1985 in co-operation with the North-South Round Table: "It is essential that there should be much clearer recognition of the human aspect as the fundamental objective of economic development and a decisive factor in all economic activity. This requires consideration of the human aspect to be a principal element in the evaluation of economic performance."

^{15/} See the works of M. Salem, Professor at the CNRS, on behalf of UNIDO: study entitled "Les prestations de formation industrielle - Problèmes juridiques et recherche de solutions" (1982) and "Legal aspects of industrial training" (1985).

^{16/} Everybody knows and accepts the role of capital goods, and in particular machine tools, i.e. machines for the production of machines - the core of the process of accumulating and generating capital. There is far less concern for the role of trainers in vocational education, industrial training and industry, i.e. people for the production of productive people.

enterprise, 17/ identifying the notions of "the culture and the goal of the enterprise", and the need for new labour relations breaking the Taylorian model. The rapid emergence of Japan among the leading industrial countries and the novel concept of "quality circles" were playing a significant role in this new consciousness.

In its special issue on the "Etat de la Technique" (Status of Technology), 18/ the periodical "Sciences et Techniques" published an interview with Mr. Konosuke Matsushita, Chairman of Matsushita Electrical Industrial Co. Ltd. We quote this article in annex 2 since it is a good summary of the Japanese attitude to people and training. If one takes the opening sentence "we are going to win and the industrialized West is going to lose ... you carry the seeds of your defeat within yourselves", one is inevitably moved to reflect with some concern on the situation and possible fate of the majority of developing countries in the face of this new world cultural and technological challenge. One thing is certain: the mobilization of their human resources and productive and creative capabilities, and their training and adaptation to technological change are for each of them a vital challenge which is still poorly perceived and addressed in respect both of the policy, structures and means countries have brought into play and of acquisitions and transfers of technology from supplier countries.

In its final conclusions, the Istanbul meeting organized by UNDP and the North-South Round Table mentioned above strongly supported the ILO proposal to convene a tripartite international conference in 1986 19/ to investigate the effects of the structural adjustment process on employment and other aspects of social development, and also the UNDP initiative to convene a world conference on the "State of the Human Condition".

In the programme of UNIDO, the Second Consultation on the Training of Industrial Manpower is the only international conference that offers the opportunity and is responsible for dealing with the subject of the role of people in industrialization. It is important to tackle this subject in a way which correctly reflects what is really at stake and, if necessary, to help change approaches, mentalities and mechanisms. 20/

17/ Witness the success of T. Peters and R. Waterman's book "In Search of Excellence".

18/ Undertaken by CPE (Centre de Prospective et d'Evaluation) and the Société des Ingénieurs et Scientifiques de France, on behalf of the Ministry of Industry.

19/ In addition, ILO is also planning to convene a global conference on training in 1988/1989. A first preparatory meeting on this subject is planned for April 1986 at Geneva.

20/ See the article by George Kanawaty, Chief of the Training Department, ILO, entitled "Training for a changing world: some general reflections", in ILO's revue Internationale du Travail, Vol. 124, No. 4, 1985 (Quotation: "The rapid and accelerating pace of change in the economic and social setting will compel a radical shift in approaches to human resources". ...)

For example:

- It is important that training should not be considered as a social cost, to be borne by enterprises or the State, but as a priority investment in the human resource, which constitutes their wealth and their real capital.
- It is necessary to recognize the prime role of the enterprise and of industry in mobilizing and training the industrial labour force and to encourage this, while realizing that it is also vital to find the means of effective and flexible co-operation with other components of the training system, namely the general educational system and vocational training.
- It is necessary to assign a more prominent place to training and software in relation to hardware.

After identifying the main changes necessary, it might then be useful to draw attention to the practical and innovative approaches which in some countries have succeeded in bringing about those changes.

2. The use of the concept of human resources development

Training is important but represents only one way of improving the performance and the skill of people working in industry. Methods of managing, motivating and developing human resources are a much broader area which must be considered as a whole. For practical reasons, the approach chosen for the Consultation will mainly consider the development (or exploitation) of human resources in relation to industrial and technological development, without studying in depth the other critical social aspects of this development, such as income, employment and unemployment, security, hygiene and health, and culture, aspects which are analysed in detail by ILO and UNESCO in particular, and by some UNIDO programmes. 21/

The subject of training will certainly play a central role, including the training of women and young people whose importance and unique characteristics are not always sufficiently recognized. Taking into account the complex and changing character of the training concept, in particular with regard to the language used, annex 3 provides some simple definitions in order to afford the participants in the Paris meeting a common basis for discussion.

It should also be pointed out that training can be considered as a means of reducing the gap between a desired level of performance, knowledge and skill in a given work situation, and an initial level in a particular environment. All too often, unfortunately, there is no awareness of this or it is poorly assessed, and this is a frequent source of training failures, additional costs and serious misunderstandings, in particular involving suppliers of technology and training.

3. The key question of training requirements for industry

The preparation of the Second Consultation takes its inspiration directly from consideration of the mandates and recommendations addressed to UNIDO. The development of human resources for industrialization and of the technological potential of developing countries is of central importance in the priority mandates

21/ Social aspects of industrialization, integration of women in industrial development.

of UNIDO and other organs of the United Nations system, 22/ as the first two resolutions of the Fourth General Conference of UNIDO clearly show. 23/ Within this field, the question of priority requirements for personnel and training is a recurring leit-motiv (see annex 4). This shows both that the question is critical and that there has been little success in solving it. At the detailed level, the recommendations refer to a considerable number of priority fields or groups and thus lose their practical value: (key professions such as managers, engineers, technicians, trainers, groups such as women and young people, types of enterprise such as small- and medium-scale enterprises or the informal sector, fields such as maintenance, energy, new technologies, sectors such as agro-food industries, industries processing local raw materials, etc.

It is therefore necessary for UNIDO to develop its thinking, contribute its analytical tools and active assistance to developing countries, in accordance with its industrial mandate and outlook, in co-operation with the other organizations in the United Nations system which are directly involved. 24/

This problem is not an easy one. Two contradictory (and equally justified) approaches may be followed. On the one hand, it can be said that the priority requirements are well known, as are the means of satisfying them, but that the failures are explained by inadequacy of resources or political and technical mistakes; there is no need to set up national plans, whose methods lack precision and are in any case of little operational value; managers know perfectly well what their requirements are, but are not sufficiently involved in collective macro-economic planning measures. On the other hand, it is equally valid to say that this pragmatic and short-term approach is structurally unsuited to a situation of considerable technical change and that it is necessary to have a prospective analysis of future requirements, new jobs and the structure of the newly evolving work environment.

Moreover, the estimation of requirements is unfortunately often predetermined by the existing supply of training. A third approach consists of reliance on the labour market and incentive measures to permit adjustments and flexibility between supply and demand for training.

In the majority of the developing countries, requirements are very extensive in quantity and quality and are increasingly varied, due to rapid changes in technologies, the market and international competition. The action objective requires the selection and ranking of urgent requirements, consideration of the time factor, coherent co-ordination of individual actions so as to build, patiently and with determination, a national collective capacity (the idea of STNP - Scientific and Technical National Potential, used in the document produced by professors Hugon and Michalet quoted in 13/ with generative and multiplier effects

22/ United Nations Conference on Science and Technology for Development, Vienna 1979.

23/ 1. Accelerated development of human resources for industrial development; 2. Strengthening of scientific and technological capacities for industrial development in developing countries.

24/ Seminar organized by ILO at Turin (Italy) in September 1983 on the subject of analysis of methods of evaluation of training needs and placing emphasis on the sectoral analysis of needs (see the article quoted in 20/).

within the enterprise, industrial branch or the industrial system as a whole. It is thus a methodological problem that countries are facing, and it is they themselves which are responsible for analysing their needs and establishing their priorities.

It is the aim and concern of the concept of industrial and technological mastery to explain and rationalize the complexity of the problem of the needs of industry, in order to identify as a matter of necessity priorities and interrelated functions and jobs within a sector and between industrial sectors.

4. The essential complementarity between thought and action

The preceding subject demonstrates the complexity of the problem faced by both developing and developed countries in managing and training people to respond to the industrial and technological challenge. Such a complexity renders inadequate both the experimental approach and the simple transfer of recipes. Indeed, "training is not a product that can be sold, exchanged or exported. One is always compelled to start from a given human resource problem which has to be solved in a given time and find viable solutions within the given constraints". 25/ Action, using limited resources, should be able to concentrate on points whose application is paramount; the identification of such points can only result from a coherent and in-depth analysis 26/ and the use of appropriate methods and concepts (such as the concept of systematic training) allowing a correct conception of the training context and activities in order to avoid the repetition of mistakes, to limit risks, and to apply acquired experience. The conception and promotion of such methods are part of the area of responsibility of UNIDO, as member States reaffirmed at the First General Conference of the new UNIDO, in December 1985. 27/

In the industrial and technological field, there seems to be a need for prospective and long-term analyses. In a recent book, 28/ an expert presents in a precise and colourful way the complementary factors that make prospective analysis necessary:

- "The acceleration of technical, economic and social change, with the consequence that "the faster you drive, the further ahead your headlights must light up the road";
- The factors of inertia related to structures and behaviour patterns demand one to sow today in order to reap tomorrow, for the longer a tree takes to grow, the less you should delay in planting it;
- The increase in uncertainties of a technical, political, economic and social nature: when a ship is in a fog and a storm at the same time, the keys to survival are a course, a compass and a lookout."

25/ Study by F. Viallet, Quaternaire Education, France, entitled "Rôle des institutions de formation industrielle à vocation internationale pour réduire la dépendance technologique des pays en développement".

26/ CIMI (Centre International de la Maintenance Industrielle) Blois, France, quotes the maxim of Henri Bergson: "Agir en homme de pensée et penser en homme d'action" (act like a thinker and think like a man of action).

27/ In accordance with Article 2c of the Constitution of UNIDO.

28/ Michel Godet. Prospective et planification stratégique, Economica, Paris, 1985.

The field of human resource planning and training is particularly vulnerable to the three factors mentioned above (technical change, cultural and educational rigidity, uncertainties of every kind). This is all the more so since there is a significant difference between the short time-scale required for technical change, technological decisions and industrial installations and the long time-scale and difficulties involved in educating and training groups of workers in the knowledge, skills and attitudes required, in an environment where there is little incentive and the initial level of technological or general knowledge is often inadequate.

A narrow, short term, passive view results in the subsequent need to negotiate "the damages of progress" and spend a great deal of money in a non-productive manner (e.g., assistance to the unemployed). It is better to think and negotiate a considered and desired future ex ante. In the field of training, it is particularly essential to consider the immediate future of technologies, the features of the evolving world industrial system, on the basis of already perceptible trends. It is also necessary to consider the effects of technical change on qualifications, the appearance of new types of job, the need for new training curricula and methods which themselves use the new technologies. 29/ It is necessary to analyse the alternatives available to developing countries, and the probability and conditions of transfer and adaptation of these changes to their productive system, in relation to the countries and sectors concerned. 30/ Finally it is essential to promote new types of relations between industry and the national education and training system so that the latter can adjust better and more flexibly to the changing needs of industry.

5. Industrialization - with or without technological mastery?

The concepts and models of industrialization and technology are also worthy of in-depth analysis, since they constitute the core of the training question. Alongside successful examples in a number of developing countries, some models of industrialization have favoured the establishment of juxtaposed industrial capacities, representing two contrasting situations: on the one hand, small units mainly dealing with assembly operations, on the other, large and sophisticated units requiring a more or less constant and costly resort to technical assistance. In both cases, the accumulation of technology, the progressive mastery of more efficient techniques, the creation of an interactive industrial fabric (with small and medium-scale industry, infrastructures and sub-contracting) and the training and mobilization of people failed to occur as a result of this "exploded" concept of industrialization, which is sometimes encouraged by the practice of certain international firms or even international technical assistance (the project approach rather than the sectoral or integrated approach).

Reflecting the concept of the "Japanese technological tree" (see annex 2) industrial enterprises today emphasize the importance of the "technological resource" of the enterprise. The human resource is naturally decisive, since technology is expressed in the capacity to develop and implement a technique, in the nature of operational methods, in the individual and collective skill of the workforce and in the forms of labour organization. 31/

29/ See discussion paper No. 10, "The skill and training implications of new technologies: some issues", by Torkel Alfthan, ILO, Geneva.

30/ See the document prepared by P. Hugon and C.-A. Michalet for this meeting: "Changements technologiques, Transferts et Ressources Humaines dans les Pays en Développement" (ID/WG.460/2).

31/ See Jacques Perrin, "Les Transferts de Technologie", Editions la Découverte, Paris, 1984.

Within the framework of the Second Consultation, we consider that the first problem to be solved in connection with the development and training of manpower concerns the knowledge and mastery of technologies which are or will be selected in the industrialization process. Moreover, there is a relationship of a dialectical nature between these two elements: the training and capabilities of the workforce should be adaptable to the industrial and technological choices, 32/ but at the same time the latter should depend on the human and structural potential available for mastering them adequately and without undue difficulty, as well as the social and cultural environment and social values.

The First Consultation on the Training of Industrial Manpower already emphasized that to master the industrialization process was a priority objective of developing countries wishing to become industrialized (see report ID/294). In a study undertaken in preparation for that Consultation, a detailed analysis was made of the process of access to industrial mastery through the use of projects, twenty-four specific steps being distinguished. 33/

During 1984-1985, two UNIDO programmes connected with the System of Consultations effectively carried out research and sought applications concerned with the concepts of industrial mastery and technological complexity in the iron and steel 34/ and capital goods sectors. The ATC (Analysis of Technological Complexity) method 35/ relating to the latter sector was successfully applied in Tunisia, in particular, and has opened the way to the conception of a national operational training plan for personnel in the country's metal-engineering and electronics industries.

Conclusion

It is hoped that this document will have provided participants with a better knowledge and understanding of the context of this meeting and the major orientations UNIDO wishes to give to the Second Consultation on the Training of Industrial Manpower. The ideas and suggestions that will be put forward by the experts and representatives of organizations in their personal capacity will enable the validity of these orientations to be tested and, above all, to be thoroughly examined and finalized, so that an effective and co-operative effort may be made in the preparatory work during 1986-1987 in order to ensure the success of the Second Consultation on the Training of Industrial Manpower.

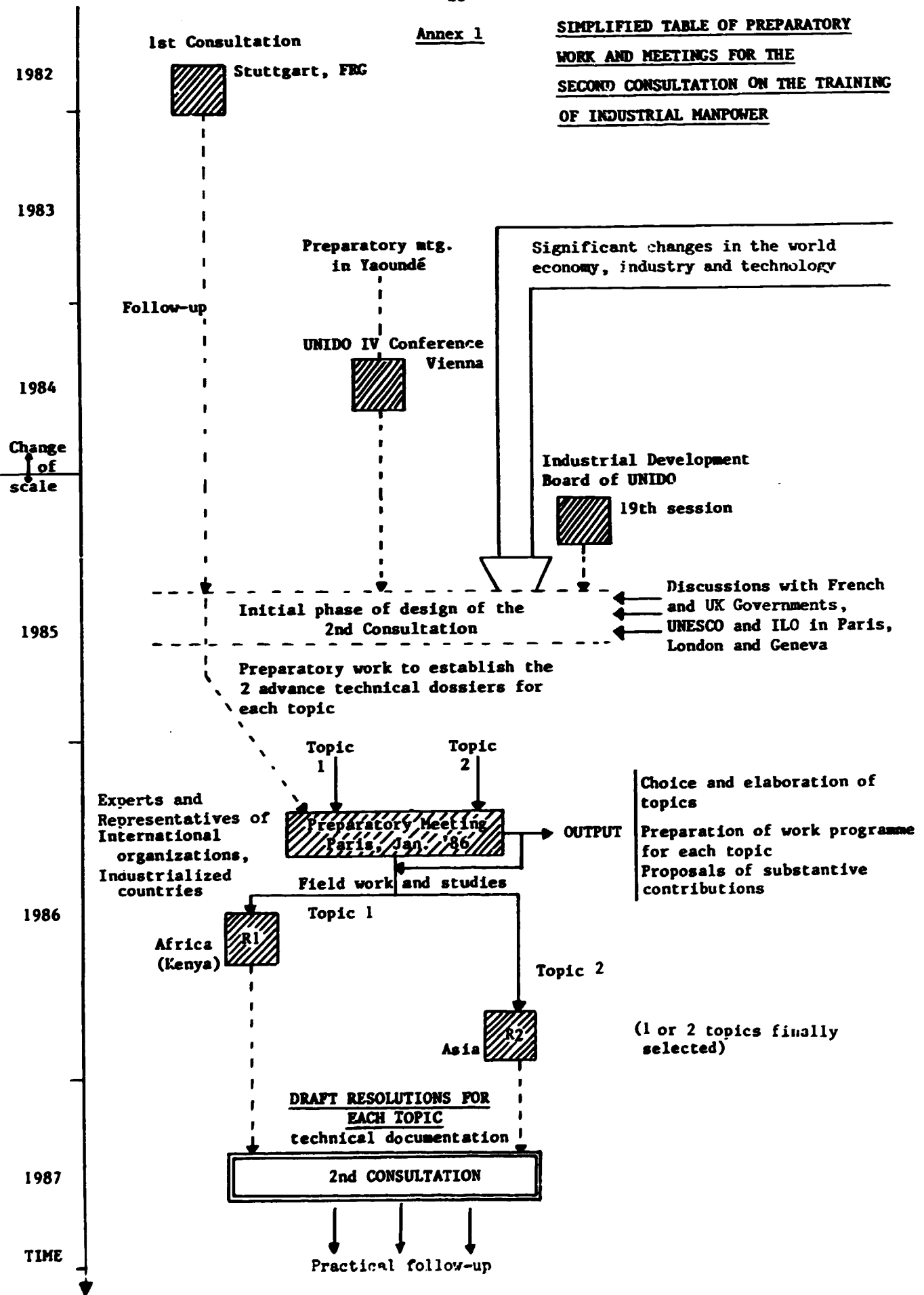
32/ Without however believing in technological determinism or in dogmas such as economies of scale, which are partly contradicted by the rapid development and competitiveness of mini-plants in certain industrial sectors.

33/ "The Training of Industrial Manpower: its Problems, Practice and Place in the Process of Access to Industrial Mastery", EUREQUIP, Vaucresson, France.

34/ Study entitled "Normative guidelines for the mastering of technology in iron and steel through training", undertaken by COFRANSID, Groupement Française pour la Construction d'Installations Sidérurgiques, Paris, France, 1985, and intended to be discussed at the Fourth Consultation on the Iron and Steel Industry, Vienna, Austria, June 1986 (ID/WG.458/1).

35/ This method has been undergoing development in the context of close co-operation between Mr. F. Vidossich, Brazilian consultant and UNIDO since 1979.

SIMPLIFIED TABLE OF PREPARATORY
WORK AND MEETINGS FOR THE
SECOND CONSULTATION ON THE TRAINING
OF INDUSTRIAL MANPOWER



Annex 2

Aspects of the Japanese approach to labour, industrial training and technology

1. Extract from the periodical "Sciences et Techniques", special issue "Rapport sur l'Etat de la Technique. La révolution de l'intelligence", March 1985

The view of Chairman Konosuke Matsushita *

We are going to win and the industrialized West is going to lose: there is not a great deal you can do about it, because you carry the seeds of your defeat within yourselves.

Your organizations are Taylorian; but the worst of all is that your heads are Taylorian too. You are totally convinced that you can operate your enterprises efficiently by separating the bosses on the one hand and the workers on the other; those who do the thinking on one side, those who do the job on the other.

As far as you are concerned, management is the art of transferring the ideas of the bosses to the hands of the workers in a suitable manner.

We, on the other hand, are post-Taylorian: we know that business has become so complicated, so difficult and the survival of a firm so hedged with problems in an increasingly dangerous, unpredictable and competitive environment that a company must mobilize the intelligence of everyone every day if it is to have any chance of pulling through.

For us, management is quite simply the art of mobilizing and involving all that intelligence to serve the aims of the enterprise. Because we have assessed, better than you have, the new technological and economic challenges, we know that the intelligence of a few technocrats, no matter how brilliant they are, will be quite insufficient to meet those challenges in the future.

Only the intelligence of its members as a whole will enable an enterprise to face up to the turbulences and demands of its new environment.

That is why our large companies give three to four times more training to all their personnel than yours do; that is why they carry on such an intense internal dialogue and communication, why they continually ask for suggestions from everyone and above all why, upstream, they ask the national education system to provide them with ever more graduates, enlightened and cultivated people with a broad general knowledge, an essential basis for an industry which must take its nourishment from a constantly available source of intelligence.

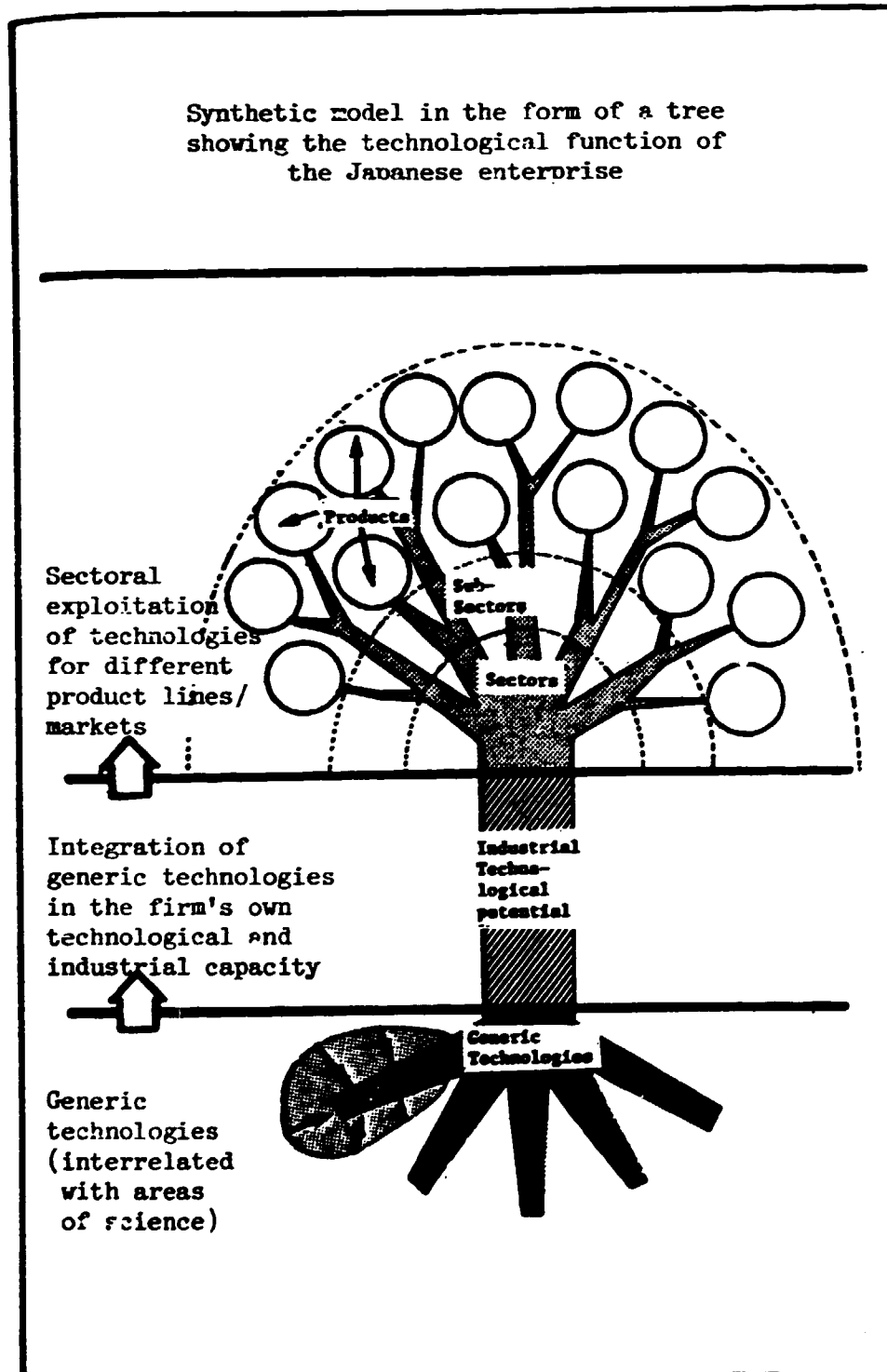
Your social leaders, who are often well meaning people, believe that it is necessary to defend man within the enterprise. We, as realists, think that on the contrary men must be used to defend the enterprise which will return to them a hundredfold what they have put in. In this way, we end up by being more "social" than you.

* Konosuke Matsushita is the Executive Councillor of Matsushita Electrical Industrial Company Ltd.

2. Extract from the periodical "Finance and Development", World Bank, September 1985. Article entitled "Industrial Manpower Development in Japan", by S. M. Asher and K. Inoue

"... The Japanese approach should, however, be understood within the context of its culture and society since they play an important part in the Japanese training and employment systems. The Japanese experience may not be transferable easily to a country without a similar, supporting cultural and social structure. Lessons for developing countries that emerge from the Japanese experience are the stress placed on well-funded and disciplined formal education to supply useful "raw materials" to industry - a common characteristic of advanced countries; the active role of industry in its personnel development; and integration of personnel training and management by industry ..."

3. The Japanese technological tree (Source: CPE, Centre de Prospective et d'Evaluation, 1984)



Annex 3

Some simple definitions relating to training*

1. General education

This involves educational activities taken as a whole permitting the attainment of levels of knowledge and the acquisition of mastery over mental operations employed in intellectual work.

1.1 General education comprises the first basic education, also called primary education, and also general secondary education and general higher education.

1.2 The various levels of acquisition are recognized by diplomas certifying an intellectual level. One should rather speak in these cases of degrees. As one progresses through general education, the diplomas, or degrees, for each level become diversified, in secondary education, throughout the main branches of learning (letters, economics, sciences) and then in higher education, within branches, by disciplines (psychology, geology, data processing ...).

1.3 Depending on the direction chosen, general education can comprise scientific disciplines (for example, electricity), and also technical disciplines (electrotechnology, for example) and technological education (turning machines, for example).

2. Vocational education (or vocational training)

This consists of educational activities which, taking as a starting point a "degree" already acquired in general education, prepare individuals for the exercise of a particular job and, more frequently, a group of jobs.

2.1 The reference in general education is the discipline; the reference in vocational training is the job.

2.2 The completion of vocational training is normally recognized by a diploma certifying a capacity to enter professional life and hold responsibility within it.

2.3 Frequently, vocational training based on the most elementary degrees of general education lead to a small number of different jobs (diplomas for skilled workers and technicians). On the other hand higher vocational training (higher grade technicians, engineers) provide access to a wider range of jobs.

2.4 Progression from a vocational education diploma to a higher diploma most often requires a further period of general education.

3. Industrial training

This involves educational activities aimed at providing individuals with the precise knowledge of equipment and procedures which they will have to master in their employment and initiate them into the behaviour required in the work unit to which they belong or are to be assigned.

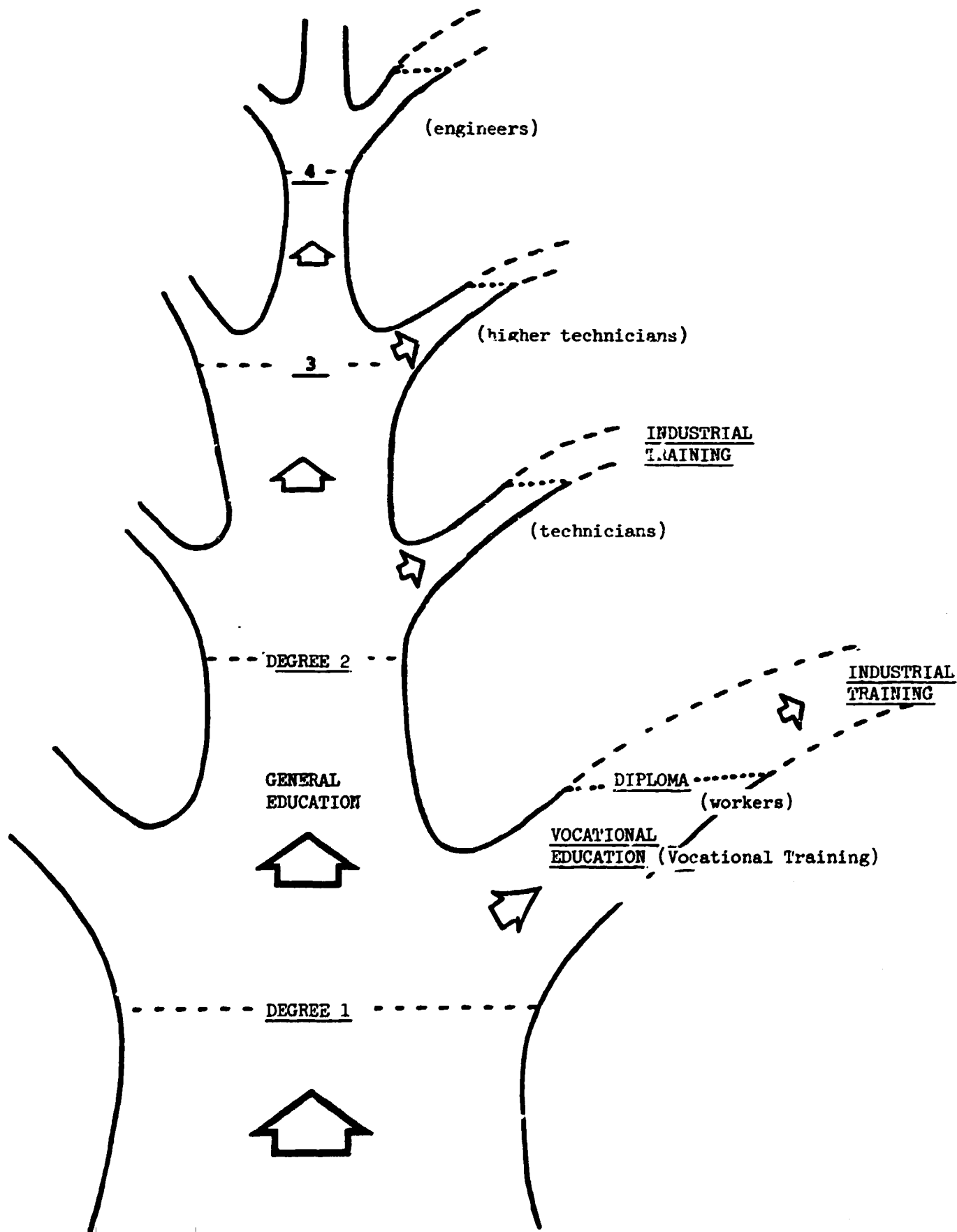
* Extracts from the report by Mr. F. Viallet, Quatenaire Education, Paris, prepared for the First Consultation and entitled: "Rôle des institutions de formation industrielle à la vocation internationale pour réduire la dépendance technologique des pays en développement".

3.1 Normally, industrial training arises immediately after vocational training, or at a later stage.

3.2 Most frequently, its results are monitored by the employers, while vocational training is usually under the control of the national educational system or under the joint control of this system and a professional branch (more rarely an employer).

The link between these different types of education and training is a close one, since a general education cannot avoid reference to specific practices; vocational education (or vocational training) complements the general education and provides a preparation for entrance to specific professional life; industrial training, with which we are concerned here, mobilizes prior general and vocational knowledge and provides, where necessary, such knowledge as is essential for the mastery of a particular job (the normal case with industrial training offered to candidates coming directly from general education).

GENERAL EDUCATION VOCATIONAL TRAINING INDUSTRIAL TRAINING



Annex 4

The subject of analysis of priority training needs in the recommendations *
addressed to UNIDO in the field of human resources development

1. Third General Conference, New Delhi, January 1980 (report ID/CONF.4/22) - paragraph 270 (first recommendation): "improve identification as an ongoing process of priority topics and sectors for industrial training on the basis of the needs of the developing countries, and structure its training programmes accordingly."
2. First Consultation on the Training of Industrial Manpower, Stuttgart, November 1982 (report ID/294) - paragraph 12b: UNIDO should "continue to develop methodologies to contribute to the determination of industrial manpower and training needs in relation to different levels of technological complexity;"
3. Fourth General Conference, Vienna, August 1984 (ID/CONF.5/46) - paragraph 10 (first recommendation): "recommends that UNIDO should assist developing countries to determine their requirements for accelerated human resources development in the field of industry and to work out appropriate plans of action to meet those requirements. UNIDO should be provided with adequate resources for that purpose and efforts should be made to mobilize resources for their implementation, ..."
4. Furthermore, by way of illustration, the new convention (Lomé III), signed on 8 December 1984 between the European Economic Community and the 65 ACP States (Africa - Caribbean - Pacific), in its first two substantive articles dealing with industrial development, clearly emphasizes industrial training and maintenance.

TITLE III. INDUSTRIAL DEVELOPMENT

Article 64

On the basis of a request from an ACP State, the Community shall provide the assistance required in the field of industrial training at all levels, bearing notably on the evaluation of industrial training needs and the establishment of corresponding programmes, the setting-up and operation of national or regional ACP industrial training establishments, training for ACP nationals in appropriate establishments, on-the-job training both in the Community and in the ACP States and also co-operation between industrial training establishments in the Community and the ACP States, and between the latter and those of other developing countries.

Article 65

The Community shall assist in the establishment and expansion of all types of viable enterprise which have been identified by the ACP States as important in terms of their development objectives.

The Community and the ACP States shall place special emphasis on the restoration, upgrading, reorganization or restructuring of existing industrial capacities which are viable but temporarily out of action or performing badly and also on the maintenance of plant and equipment and of enterprises and, for this purpose, industrial co-operation shall be focused on assistance for the start-up or rehabilitation of such enterprises and on the relevant forms of training at all levels.

* Non-exhaustive selection thereof.

Particular attention shall be paid to

- Industries for the domestic processing of ACP raw materials;
- Agro-industries;
- Integral industries capable of creating links between the different sectors of the economy;
- Industries which have a favourable effect on employment, the trade balance and regional integration.