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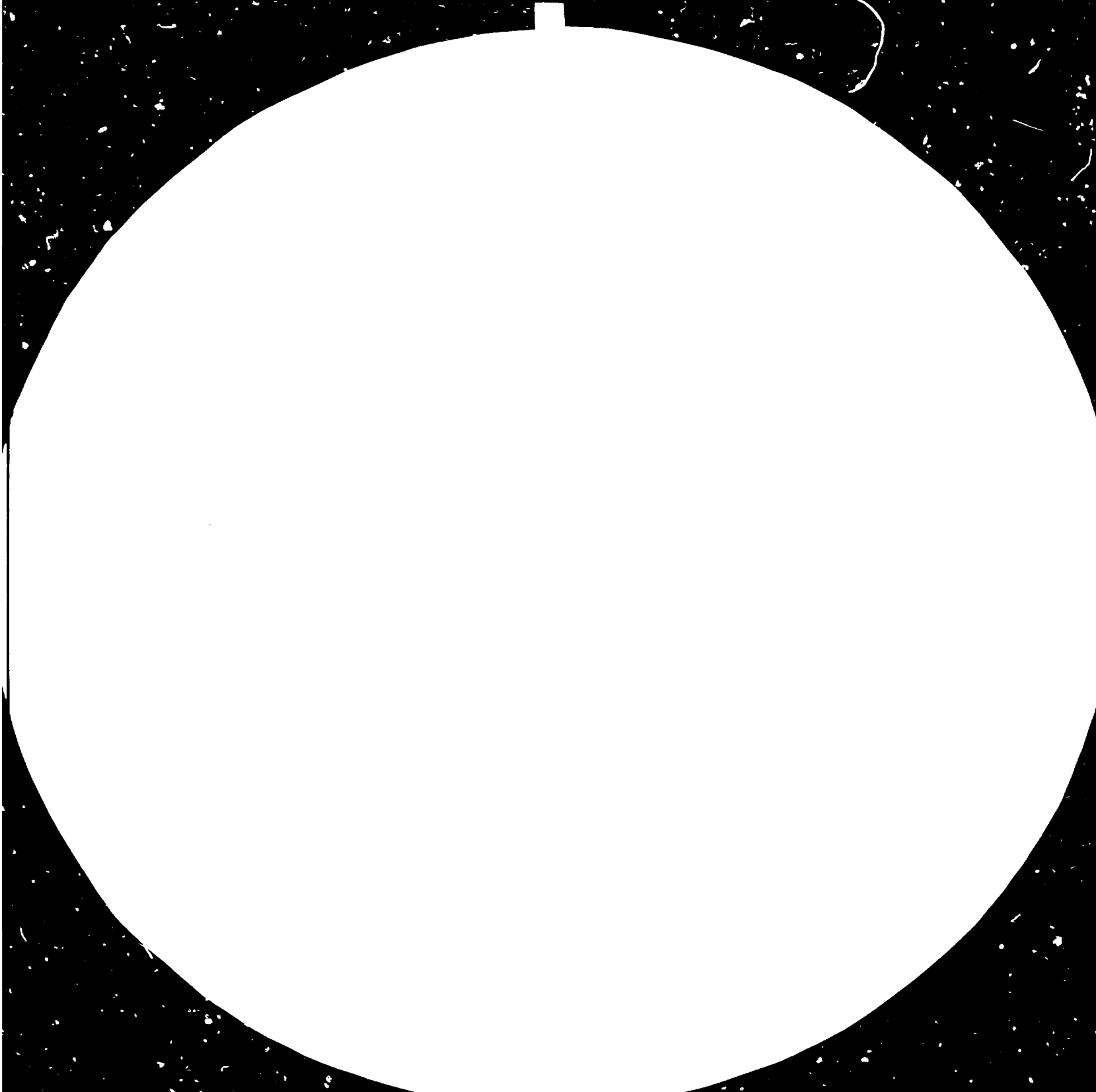
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Discussion Meeting on Information
Technology for Development
Vienna, Austria, 21 - 23 March 1984

REPORT* (meeting on Information
Technology for Development).

2345

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INTRODUCTION

1. Representatives of 11 organizations, experts from selected developing countries as well as electronics experts met in a meeting convened by UNIDO at Vienna on 21-23 March 1984 to exchange information on their respective goals and activities in the area of information technology* for development, identify gaps, complementarities and common ground and consider establishing an operative mechanism for future co-operation. Other items on the agenda were the creation of an international roster of scientists and technologists and the setting up of a silicon foundry to service developing countries' needs. The list of participants is attached as Annex I and the list of documents including background papers is in Annex II. The meeting elected Prof. R. Narasimhan (India) as its chairman.

2. In opening the meeting, Mr. G.S. Gouri, Director, Division for Industrial Studies, UNIDO emphasized that the "Information Society" was here already and that UNIDO's attention was focused on promoting access to and use of information technology by developing countries. Aside from industrial applications, industry would have to manufacture the products and systems involved in applications in agriculture, health, transport and electricity. He explained that for this meeting, which would be followed by similar gatherings in the future, certain organizations known to UNIDO as being engaged in this field had been invited. He hoped that participation would be extended to others and that the group could meet more often, exchange experience and carry out joint programmes. He also drew attention to the note prepared by the Secretariat for the meeting.**

3. Mr. K. Venkataraman, Special Technical Adviser, UNIDO Technology Programme, described the work of the Technology Programme starting with the meeting of experts on implications of microelectronics for developing countries in June 1981. He said that developing countries had the option of remaining observers or adopting the new technology as early as possible in a manner suited to their own conditions. The Tbilisi Forum had

* As defined, for this purpose, as a broad term to cover developments in computing, systems analysis, telecommunications and microelectronics.

** Microelectronics Applications for Developing Countries: Preliminary Issues for Concerted Action (ID/WG.419/1).

signalled the route to bring the potential within the reach of countries. The concept of "technologies for humanity" had surfaced at the Forum to develop by international co-operation a number of technologies jointly with public funding to meet human needs of a critical and urgent nature. This concept which had been discussed by selected scientists earlier in the week could be related to proposed joint efforts of the organizations present, one good case could be selected and the movement launched. Following the Forum, a proposal for UNIDO to build up a select international roster of scientists and technologists in some fields of technological advances, including microelectronics, had been developed. He also pointed out that future meetings of the group should be action-oriented.

CONCLUSIONS AND RECOMMENDATIONS

4. It was quite clear from the presentations of the participants of ongoing action-related programmes and policy studies, and from the views expressed in the ensuing discussions, that there was a general recognition of the great potentials inherent in information technology to promote development in general and industrial development in particular in the developing countries. It was a general conclusion of the discussions that assistance to the developing countries should have as its central objective the building up of indigenous technological and managerial capabilities as well as necessary skills for development. The participants recognized the value of co-operative and concerted action and expressed a keen desire to explore the possibilities of such action. It was also stressed that action-programmes pursued by various organizations in this field should include assessments of their socio-economic impact to avoid uncritical and indiscriminate applications which may have adverse side-effects.

5. It was observed that ongoing programmes brought out for discussion at the meeting had all originated from individual and group initiatives independently taken. It was agreed that to ensure the longer-term impact of such independent efforts, and to enlarge their scope and spheres of influence, it would be useful to provide a more global discussion framework in the form of a Consultative Group on Information Technology

(COGIT). The Consultative Group to be convened by UNIDO, should be comprised of representatives of interested United Nations organizations as well as of groups such as those who participated in the present Discussion Meeting. The Consultative Group would remain open-ended so that additions to it could be made as and when new groups/individuals with similar interests were identified. The Consultative Group would meet periodically to exchange experience, discuss ongoing programmes, and explore possibilities of consultations, co-operation and co-ordination in the planning of new programmes, particularly related to industrial development.

6. In an immediate effort to realize the benefits of consultations, it was agreed that some of the ongoing programmes presented, and discussed at the meeting, could serve as starting points for such co-operative action between groups and individuals immediately interested in exploring the potentials inherent in these programmes for promoting development in general and industrial development in particular in a larger context. This purpose would be better served if comparable programmes were carried out on a regional basis in different parts of the developing world. In particular, the Discussion Meeting recommended the exploration of possibilities of consultations, co-operation and joint action in the cases listed below, keeping in mind the larger objectives as indicated:

- (a) Consider the possibility of deploying information technology for integrated health-care in rural communities. The Centre Mondial field experiment being carried out in Chad would be studied from this viewpoint and could possibly be repeated in other geographical regions. The UNIDO secretariat would explore possibilities of co-operation with the Centre in this respect. International Medical Informatics Association (IMIA)/International Federation for Information Processing (IFIP) and Intergovernmental Bureau for Informatics (IBI) may also be interested in participating in this programme;
- (b) Study the potentials of information technology, on the basis of experience, to support primary, secondary and vocational school education. The Centre Mondial experiment in Senegal would be studied from this viewpoint. Apart from the Centre, The U.K. Council for Computing Development (UKCCD),

International Development Research Centre (IDRC), IFIP, UNIDO, United Nations Educational, Scientific and Cultural Organization (UNESCO), International Labour Organisation (ILO) etc. may be interested;

- (c) Study the possibility of providing low-cost communication infrastructure for a variety of applications to geographically dispersed groups/individuals through the use of low-altitude earth satellites. The PACKSAT project of Volunteers in Technical Assistance (VITA), which was endorsed by the meeting as a useful experiment and an opportunity for participation by different organizations, would be studied from this viewpoint and action programmes developed. Interested groups would include VITA, IFIP, IBI, UNIDO and possible funding agencies;
- (d) Study on the use of information technology to provide better access to techno-economic intelligence relating to technologies of relevance to developing countries, and to assist in information dissemination in general. VITA, IDRC, Research Policy Institute (RPI), at the University of Lund, International Center for Law in Development, Council on International and Public Affairs (CIPA), UNIDO etc. would explore this feasibility taking as an example the work done in the design and development of wood stoves;
- (e) UNIDO should explore the possibility of creating a dynamic directory of groups and organizations working in the area of information technology for development. The directory would remain open-ended to include new groups and it would also include the completed and ongoing programmes of each group;
- (f) UNIDO should explore the feasibility of creating an inventory/library of software packages applicable specifically to meet developing country needs. The inventory should include all relevant particulars about each package such as description, ownership, availability, cost etc.

7. It was agreed that there was a need for evolving guidelines for licensing and procurement negotiations in relation to information technology products and services supplied to the developing countries. The work done by UKCCD and UNIDO in this respect was noted.

8. It was noted that microcomputer and data communication access was being provided to youths as part of the Young Unispace/World Simulation 2001 project in connection with the International Youth Year 1985. It was agreed that possibilities would be explored by interested organizations for co-operation with the Unispace project in relation to the International Youth Year programmes; possibilities for effective utilization of systems developed for the Unispace project beyond 1985 might be explored.

9. The Discussion Meeting endorsed the need for developing countries to analyze and evaluate possible options available to them in deploying information technology for their internal use. Some illustrative examples considered were:

- (a) Establishing relevant production capabilities through licensing of designs and purchase of related production facilities no longer in commercial use from developed countries (e.g. Texas Instruments home computers);
- (b) Software industry development for purposes of export as well as for specialized indigenous applications.

In carrying out such activities co-ordinated assistance could be usefully provided by professional societies from developed countries interested in such problem areas.

10. The Discussion Meeting appreciated the efforts being undertaken by UNIDO to promote the concept of "Technologies for Humanity" and agreed that information technology was one of the central technologies falling into this category. It was also agreed that, through the further activities of the Consultative Group and through other collective and individual efforts, specific projects in information technology would be identified for implementation to advance the objectives of the Technologies for Humanity programme.

11. The Discussion Meeting endorsed the usefulness of creating an International Roster of Scientists and Technologists working at the leading edge of information technology. Such a roster, initiated by UNIDO, would help in the systematic mobilization of the interests and assistance of such persons in the planning, formulation and implementation of projects such as those referred to above. UNIDO could draw upon the experience of organizations such as VITA, the Council on Science and Technology in Developing Countries (COSTED) and possibly ILO to initiate preliminary efforts.

12. The Discussion Meeting appreciated the desire of the developing countries to build up indigenous design and engineering capabilities rather than be merely satisfied with the "black box" approach to solving development-related problems through external purchases of equipment, services etc. In this context, the proposal relating to the establishment of a silicon foundry to service the developing countries' needs and the designs originating from these countries was extensively discussed. It was agreed that setting up such a facility, preferably on a regional basis, would prove to be very useful, particularly in building up design competence in developing countries to meet their specific needs. It was stressed, however, that in the detailed formulation of such a project, the viability of the facility in terms of cost, economies of scale, level of technology, operational efficiency etc. should be carefully scrutinized.

13. A proposal for the publication of an International Journal of Information Technology for Development was discussed and endorsed. It was agreed that such a journal, if available, could also serve as a vehicle, among other things, to disseminate information about the kinds of programmes and policy studies referred to and discussed in this meeting. It was noted that the publication of the journal in more than one language would enhance its usefulness.

14. The meeting recommended that UNIDO take further initiatives to pursue and promote the various actions recommended above and to bring within the sphere of this activity all interested organizations in developing and developed countries. It was recommended that a similar meeting of interested groups could be convened in a year's time.

PRESENTATIONS BY ORGANIZATIONS

15. Those who attended the Discussion Meeting comprised representatives from professional societies in the information technology area with an interest in the use of this technology to promote development in the developing countries; policy institutes actively engaged in studying the social, economic and technological issues relating to information technology applied to development in developing countries; voluntary groups dedicated to implementing action-oriented programmes at the field-level in developing countries utilizing information technology to promote development; development and funding agencies interested in information technology as an important tool for development; and individual experts from developing and developed countries interested in the use of information technology for development.

16. Each organization had prepared a paper for the meeting giving brief details on its activities in the area of information technology for development which were made available to the meeting. Based on these papers, oral presentations were made by the representatives present. The individual papers are contained in UNIDO documents ID/WG.419/5 to ID/WG.419/12.

17. The secretariat presented its work in the field of microelectronics as contained in document UNIDO/IS.445. That work was initiated by a meeting of experts in June 1981 which had inter alia emphasized selective applications for developing countries. Actions were being pursued at international, regional and national levels. The concept of promoting software as an industry through national actions in developing countries was being elaborated. UNIDO was trying to build up an "application software bank" and provide specific packages such as management software, software for preparation of feasibility studies etc. The recent ECWA/UNIDO* meeting on microelectronics was mentioned where on the software side the problems of arabization had been looked into and also the idea of setting up a silicon foundry in the region had been

* Expert Group Meeting on Microelectronics and Informatics for the Arab Countries, Kuwait, 4-7 March 1984.

presented. Reference was also made to the forthcoming Congress of African Scientists* where the implications of microelectronics development might also be discussed. The INTIB programme of UNIDO was briefly described.

18. The case of Argentina in regard to its microelectronics needs and policies was also presented. In the information technology field the policy followed by the different Argentinian governments in the last few years was an open-door policy. The dissemination of the technology was realized through the commercial efforts of private enterprises, many of them transnationals. In 1982 there were more than 10,000 computers installed. 350 numerical control machine tools, 10 CAD/CAM systems and several stored programme public telephone exchanges. No official effort was made to co-ordinate the introduction of new technologies or even to evaluate if they were adapted to the local conditions. The applications programmes, mainly in the business area were made locally. The special applications, like CAD/CAM systems, airline reservations systems, were bought as turn-key systems. In some areas, mainly office machines, in which the market was estimated to be so large as to sustain a local factory, a policy of substitution of experts was applied, mainly through, transnational investments.

19. In spite of that policy, a substantial governmental effort was made in the research and development area. In 1983 more than 1,000 people were working in the universities and other official laboratories in electronics research and development, including that of microelectronics components. This effort was not very successful because there was no industrial counterpart requiring results and it became something like an academic objective. One of the first actions of the new government was to constitute an inter-ministerial commission whose purpose is to define a national policy on information technology. At official level that meant computer products and software because these are the most visible

* Expert Group Meeting on the Implications of New Technologies for the Implementation of the Lagos Plan of Action to be held at Mbabane, Swaziland, 22-26 October 1984.

and largest markets. The commission was expected to propose to the decision-making level alternative policies regarding the use of these technologies in the public sector of the economy, in industrial activity and the national development of technology.

20. The expert from Argentina suggested that the following were the traditional steps that a developing country must go through in order to achieve the mastery of a new technology. The first step would be the utilization of the products and the acquired capacity for operation and maintenance; in the second step the country would add mounting, assembling and quality control of the products, thus beginning the industrial production; in the third step local integration of parts and components acquiring the capacity of product engineering and adaptation development would start. Finally, in the fourth step, independent research and development would begin, thus acquiring the capacity of technology generation. He considered that Argentina was on the third step for microcomputers and some microprocessor applications, and could arrive at that level in a rather short time for 16 bit microcomputers. However, Argentina was still on the first level for mainframes.

SOME CONSIDERATIONS ARISING FROM THE DISCUSSIONS

21. It was apparent from the discussions that while commendable efforts were being made by a number of organizations and professional groups, there was in most cases a fragmented ad hoc approach and a lack of a critical mass. Individual efforts were modelled from the points of view of the persons involved. Modalities for co-operation had to be devised and implemented. There was general agreement that it was essential to be action-oriented and designed to build up indigenous capabilities. The socio-economic impact was an important aspect but had to be assessed by the developing countries themselves. It was also important to monitor the trends and policies of industrialized countries with regard to their implications for developing countries. UNIDO might provide a mechanism for making known to developing countries the output of the work of the individual organizations using existing networks as well as its

Microelectronics Monitor. In this connection it was felt that it would be useful to publish a directory of institutions engaged in the field of information technology describing their work and explaining how they could be approached.

22. The meeting felt that the sensitization process should be aimed both at the level of the policy-makers and the scientists and the level of the people in the developing countries. There had to be real involvement in and acceptance of the new technology. It was suggested that one or two pilot cases involving e.g. UNIDO and a funding agency should be carried out in a specific region, such as the diagnostic kit programme of the Centre Mondial or the PACKSAT project of VITA so as to demonstrate what can be practically and beneficially done with the new technology.

23. The meeting considered that to rectify the present lack of cohesion in the activities of the organizations concerned and in order to impart momentum to those activities necessary steps should be taken such as mutual exchange of information on programmes; including other groups in the network of activities (professional societies, R+D institutions working in all fields, industrial enterprises, university-level interaction, networks of specialized teams); and setting up of a consultative group on information technology (COGIT). This group could help promote concerted action which is so necessary in this field. It could also, inter alia, promote the setting up of a roster of scientists and technologists, the establishment of a silicon foundry in a region in combination with a design centre, and interact with the movement on "Technologies for Humanity" to secure international co-operation.

ANNEX I

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ANNEX II

LIST OF DOCUMENTS

Aide-Memoire

Provisional Agenda (ID/WG.419/3)

Provisional List of Participants (ID/WG.419/4)

Microelectronics Applications for Developing Countries: Preliminary
Issues for Considered Action (ID/WG.419/1)
prepared by the UNIDO secretariat

Commonwealth Secretariat - Commonwealth Science Council: Aims and
Activities (ID/WG.419/5)
by Peter Hutchinson

Activities of the British Computer Society's Specialist Group for
Developing Countries (ID/WG.419/6)
by J. Sherif

Some Activities Related to Microelectronics in Developing Countries
(ID/WG.419/7)
by Ward Morehouse

Microcomputer Processes at VITA: An Overview (ID/WG.419/8)
by Gary Garriott

Information Technology in Argentina, National Policies and Needs
(ID/WG.419/9)
by Edgardo Cohen, Andres Dmitruk and Alberto Godel

Centre Mondial informatique et Ressource humain: International Actions
(ID/WG.419/10)
by J. Todd Simonds

Some Thoughts on Sharing Information for Information Management
(ID/WG.419/12)
by Judy Biace

Microprocessor Applications in Developing Countries (UNIDO/IS.351)
by James M. Oliphant

Guidelines for Software Development in Developing Countries (UNIDO/IS.439)
by R. Narasimhan

Guidelines for Software Production in Developing Countries (UNIDO/IS.440)
by Hermann Kopetz

A Silicon Foundry to Service Developing Countries' Needs: A Preliminary
Approach (UNIDO/IS.444)
prepared by the UNIDO secretariat

The UNIDO Programme of Technological Advances: Microelectronics
(UNIDO/IS.445)
prepared by the UNIDO Technology Programme

Software Engineering: A Survey (UNIDO/IS.446)
by Wladyslaw M. Turski

A Programme of Action for Establishment of a Silicon Foundry in a
Developing Country in West Asian Region (draft)
by Stephen L. Gilbert

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