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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Meeting of the Consultative Group on
Informatics Technology for Development

Buenos Aires, Argentina, 11-13 December 1989

REPORT*

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*   This document has not been edited.

TABLE OF CONTENTS

EXPLANATORY NOTES

ASIC   Application-specific integrated circuits

CAD   Computer aided design

IC   Integrated circuits

LSI   Large-scale integration

VLSI   Very large-scale integration

I. INTRODUCTION

1.   In 1984 a meeting of professionals and representatives of non-governmental organizations active in the field of applied informatics technology for development proposed establishment of a Consultative Group on Information Technology (COGIT) which could advise UNIDO on an action-oriented approach to help build up indigenous microelectronics and informatics capabilities in developing countries.

2.   Since then the COGIT Group reconvened in 1987 to review the status of activities in the field of informatics technology and work out means of international co-operation to speed up applications. The main objective of the meeting held in Vienna on 14-16 December 1987, was to review practical experience in the applications of informatics technology for development and to identify concrete measures of co-operation at international level, including co-operation among developing countries, so as to promote such applications in a manner consistent with the requirements of developing countries.

3.   Following the recommendation of the Meeting, UNIDO assistance to strengthen capabilities in informatics and microelectronics were enhanced mostly on regional and national levels.

4.   Regional co-operation in Latin America and Caribbean countries co-ordinated by the Conferencia de Autoridades Latinoamericana de Informática (CALAI) and financed from UNDP funds led to initiation of co-operation in those countries in the field of informatics and microelectronics.

5.   The formal framework for this co-operation has been established in the form of the Regional Network for Microelectronics in the ECLAC Region (REMLAC). In 1989 CALAI expressed interest in assimilating REMLAC as one of its important activities. A list of countries participating in REMLAC and government-nominated focal points in those countries are listed in Annex 4.

6.   Moreover, during the initial phase of REMLAC co-operation other countries in the region (Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Nicaragua, Panama, Uruguay, and Paraguay) indicated their interest in regional co-operation and have been considering their affiliation to REMLAC.

7.   With that development, it was felt that the Third Meeting of the Consultative Group on Informatics Technology for Development should be oriented more specifically to Latin American regional co-operation, besides its constitutional role of providing UNIDO with other recommendations concerning its activities in the field.

8.   Therefore, the Meeting was held in Buenos Aires on 11-13 December 1989 and organized in co-operation with the Instituto Nacional de Tecnológia Industrial (INTI).

9.   The formal objectives of the Meeting were:

(a)   To review practical experience in the application of informatics technology for development and to identify concrete measures of co-operation among developing countries at the regional level, as well as international co-operation so as to promote informatics applications in a manner consistent with the requirements of the developing countries;

(b)   To provide a forum to exchange views on advice and assistance which the international and regional organizations could render to accelerate development of informatics and microelectronics in the region;

(c)   To review UNIDO's past and planned activities in this field with recommendation to action on regional and subregional levels, especially activities aimed at strengthening acquisition of hardware and production of software.

10.   The participants from the REMLAC focal points and regional
organizations, and experts from developed countries are listed in Annex 1.
The documents prepared for the Meeting are listed in Annex 3.

11.   The Meeting was opened with an address by Mr. Carlos Giudici, President
of INTI, welcoming the participants in his name and that of the Subsecretariat
of informatics and Development (SECYT) which was represented by Mr. Sassalis.

      Opening comments were also made by Mr. Andrés Dmitruk, Director of the
Centro de Investigaciónes Tecnológia Electrónica e Informatica (CITEI) and the
Chief of the Informatics Unit of the Industrial Technology Development
Division of UNIDO.

12.   Following these opening comments, the Meeting's formal work begun with
the election of officers. Mr Andrés Dmitruk of CITEI-INTI was elected as
Chairman. Mr. Atul Wad of the Northwestern University and
Mr. Vinicio Baquero Ordonez of Escuela Politécnica Nacional from Ecuador were
elected as rapporteurs.

13.   The proposed agenda for the Meeting (attached as Annex 2) was adopted by
the Group.

14.   Presentations were then made by UNIDO consultants and several members of
the REMLAC network on their projects and experiences. They described the
dimensions of their projects, the current status and the planned future
activities. A summary of participants' presentations constitutes the third
section of this report.

15.   Following these presentations, the Group met to discuss specific
conclusions and recommendations for UNIDO and governments as summarized in the
next section of this document.

16. Having adopted the recommendations and report, the Group expressed its strong appreciation for the excellent organization of the Meeting by CITEI-INTI, the efficient chairmanship of Mr. Dmitruk and the support by UNIDO for the Meeting.

II. CONCLUSIONS AND RECOMMENDATIONS

17. The participants at the Meeting discussed and reviewed various current and emerging issues and trends that had implications for informatics technology (understood in this context as computer hardware and software, telecommunications, and microelectronics and its applications) development in Latin America. The Group recognized the importance of regional and sub-regional efforts to promote technology development, as well as their limitations, given the different levels of development of the countries in the region. The Group adopted a number of conclusions and recommendations for consideration by UNIDO and individual governments with respect to the proper strategic development of informatics technology in the region.

The Present Status of Informatics Technology

18. The Group agreed that it is important in the development and implementation of policies and the design of policy instruments to recognize that informatics is no longer a new and emerging technology, but one where a dominant paradigm seems to be emerging. The technology, though not fully mature, is already displaying many characteristics of a mature technology: a consolidation of industrial concentration, with acknowledged leaders and followers and fairly wide dissemination of the technology and its applications. As such, there are strong barriers to entry which require more innovative approaches to participate in the technology.

However, the Group noted that this did not imply that the technology was stagnant. Rather, informatics technology continues to change at a rapid rate. Furthermore, the possibilities of related technological advances, i.e., trajectories, should not be ignored. Governments should take this into consideration when planning and programming informatics activities.

Approach to Informatics Development

19. The Group recommended that the overall approach to informatics
technology by developing countries should be driven by two basic
considerations:

   a) To learn to use the technology more efficiently and effectively for
       the achievement of their industrial development goals and strategic
       plans, and to diffuse it in the proper manner;

   b) Based upon international and domestic market considerations, to
       selectively develop production capabilities in the appropriate areas
       of informatics technology, that is, computer hardware and software,
       telecommunications and microelectronics and its applications.

20. Specifically, the Group emphasized the need to recognize the different
motivations of countries vis a vis informatics technology, in terms of whether
they are strategic (and not necessarily based on an economic rationale) or
market driven.

     It was recommended that UNIDO: a) take steps to establish demonstration
projects in various countries to promote the diffusion and application of
informatics technology; b) organize workshops and conduct case studies on the
diffusion of informatics technology in various countries, with a focus on
identifying methods of diffusion that would be most effective in different
situations; and c) provide guidelines and advice on the proper utilization of
informatics technology.

21. The Group agreed that one of the central problems facing developing
countries is with regard to access to informatics technology. The proper
identification, assessment and sourcing of specific technologies on fair and
reasonable terms is essential for the positive participation of Latin American
countries in the global informatics technology market and for their own
development. However, the Group noted two countervailing trends in this
regard. On the one hand, access to technology, and particularly to 'core'

technology is becoming increasingly restricted due to increased capital requirements. For strategic and economic reasons, and as a result of firm-level or policy level decisions, access to technology by developing countries is difficult or costly.

On the other hand, the Group noted that the range of potential sources of information on informatics technology had increased significantly and that methodologies, approaches and the knowledge base for more efficient identification and sourcing of technology on a global scale were now better understood and available.

As such, the Group emphasized the importance of developing technology intelligence capabilities in informatics at the national and regional levels and recommended that UNIDO and the governments take measures to encourage operational mechanisms for the monitoring, assessment and acquisition of informatics technology for countries in the region.

Assistance on the Firm Level

22. The Group focussed on the need for concrete support mechanisms at the firm level to foster technology development and commercialization. It was agreed that while broad macro-policier were necessary for such development, practical mechanisms were also necessary for tangible results.

23. Specifically, the potential value of technology incubators was highlighted. A variety of models of incubators exist in different developed and developing countries. Some are supported by the public sector, some are private and operate as commercial profit-making enterprises. Some are limited to universities, industrial estates or research parks. In general, they all have common attributes - shared office services, low cost office space, access to technical and managerial expertise, access to sources of finance, etc. The fundamental purpose of an incubator is to provide a supportive environment for start-up firms, usually hi-tech, and reduce the risks associated with this start-up phase. Through proper filters and screening mechanisms and on-going managerial and technical support, incubators greatly enhance small business development and technology commercialization. It is recommended that UNIDO

draw upon the available practical experience of technology incubators around the world and synthesize experiences in the design, development, financing, promotion, operation and evaluation of technology incubators for informatics.

24. Furthermore, the Group also emphasized the importance for business support systems designed: a) to facilitate the participation of small and medium sized firms from Latin America in the international market-place; and b) to encourage small and medium enterprises (SME's) from developed countries, and other developing countries, to explore and accomplish business co-operation with local firms. The support of this bi-directional business activity is important in several respects: a) To enable local firms to optimize their business and technological potential by becoming active participants in the global market; b) to promote technology transfer through joint ventures and other forms of business collaboration; c) to assist SME's to build networks and long-term alliances with firms and sources of technology in other countries; and d) to reduce the cost and time normally associated with international business, specifically for SME's, which generally do not have the resources and confidence to explore such avenues on their own.

In this respect, it is recommended that UNIDO prepare information on existing business support systems in various countries and synthesize experiences and approaches for governments of the appropriate forms of such support systems for their own needs and priorities.

Development of Regional Co-operation

25. The project on informatics DP/RLA/86/003 - Regional Project for Strengthening Microelectronics Infrastructure and Capabilities in REMLAC Member Countries - was presented and described to the group in detail by the co-ordinator. The various elements of the project were discussed and comments were received on its conceptual framework and implementation. There was a general consensus on the scope and contents of the project and the direction in which it was headed.

In view of the significance of the project to Latin America, the Meeting encouraged the project co-ordinator and UNIDO to prepare a full scale continuation project in 1990 to be presented to UNDP for financing. This continuation project could relate to a variety of specific issues raised during the Meeting, including technology and acquisition, informatics policy, software production, integrated circuit (IC) design and legal aspects of informatics. The group discussed these issues in the context of the regional project in Latin America and recommended that UNIDO should focus its attention on such questions in its regional efforts.

26.   Several REMLAC member focal points presented their specific project experiences and achievements.

The Meeting recognized these efforts of the REMLAC network and urged their continued support through the proposed project by UNIDO and other organizations so as to continue to strengthen the collective and individual efforts of REMLAC.

27.   The Indian experience in the area of CAD of LSI/VLSI was presented. The structure consists of a three-level framework consisting of Level 1 – Centre for VLSI Design, Level 2 – Centres at the major academic institutions and R & D laboratories, and Level 3 – CAD awareness activities at engineering colleges as well as 10 VLSI design centres to cater for the ASIC requirements of the industry.

The Group took note of the Indian experience and recommended that UNIDO should develop appropriate mechanisms to facilitate interaction and exchanges of experiences between India and the Latin American region.

28.   The concept of "silicon-brokers" was proposed at the Meeting as having substantial merits. The Group agreed that there was a need for two types of mechanisms. One is a network based vehicle for organizations involved in IC design (universities, research, laboratories, etc.) to pool their resources for production at silicon foundries. The models of the MOS Information Service in the United States (MOSIS) and the Canadian Microelectronics Corporation (CMC) were mentioned. In these cases, IC designers submitted their designs to a central organization which in turn pooled together a number of such designs into a shipment to a foundry, thus enabling volume economies to be achieved.

29. The second mechanism required is one which acts as an intermediary or 'broker' between producers of specific IC designs and potential users. The Group agreed that there were a number of different IC designs that had been developed in universities and laboratories in the region, and a 'market integration' vehicle was necessary to assist them in identifying potential users in the region and around the world. In turn, there were many demands for specific IC design needs that could be addressed by institutes within the region if the information were available. It was recommended that UNIDO encourage and support access by REMLAC members to such mechanisms.

30. Apart from the regional project, several satellite projects should be considered, especially in software application and indigenous software production. Country representatives indicated a willingness to approach UNIDO with such requests, and it was recommended that UNIDO would encourage these efforts within the context of its regional activities.

31. The question of inter-relationship between hardware, broadly defined to include computer hardware as well as industrial equipment and machinery, and software (including applications, control systems, etc.) was discussed in depth. It was agreed that this was a complex but vitally important issue in te-ms of the competitiveness and productivity of indigenous industries. The issues involved relate to questions of industrial strategy, approaches to production and design and the goal of maximizing the value added component of local manufacture. It was recommended that UNIDO undertake a study of specific potential sources of added value in the region and its implications for industrial policy and competitiveness, with a focus on informatics and digital based equipment.

32. The need for an integrated approach to the design, development and manufacture of industrial design in this respect, as well as to the issues of vertical integration and contract manufacturing as discussed in the context of evolving patterns of international industrial relations and structures was discussed. It was recommended that UNIDO undertake case studies of these issues in different countries in order to draw inferences for the informatics industry in Latin American countries.

33. At a general level, the Group stressed the importance of compatibility between different informatics systems and noted that there were as yet no clear cut procedures for ensuring compatibility when making decisions about new equipment. The Group cautioned that this was a major problem and that users of informatics should be aware of this and be fully informed about the characteristics of different systems before making acquisition decisions.

III. SUMMARY OF PRESENTATIONS BY PARTICIPANTS

34. Each of the invited participants presented a short account of ongoing or planned programmes of his country, outlining their priority needs in the area of microelectronics and information technology. The experts presented papers on current trends in their special fields. The UNIDO Secretariat presented the Organization's approach to informatics development and made available experts' reports, state-of-the-art studies in selected developing countries and reports of expert group meetings (see Annex 3 for complete documentation list).

35. Mr. Vinicio Baquero Ordonez from the Escuela Politécnica Nacional of Ecuador gave a general description of the situation of informatics in his country. He analysed the legal and organizational development of the state entity in charge of the informatics area in his country.

He emphasized the importance that Ecuador attaches to definitions of their policy on informatics.

He described the situation of the Escuela Politécnica Nacional in the educational field and stressed the wish to establish a postgraduate programme for informatics professionals in the industrial production of software. He also emphasized the development in the bank automation area.

36.   Mr. Jorge Cossi Casas from the Instituto de Investigación Tecnológia
Industrial y de Normas Técnicas (ITINTEC) of Peru described the actual state
of informatics in Peru.

He explained that the Government of Peru had a permanent interest in
modernizing and consolidating the Government informatics system.

He described in general terms the situation of each of the institutions
involved in informatics, especially that of ITINTEC, the Consejo de Ciencia y
Tecnológia (CONCYTEC) and the General Secretariat of Informatics.

37.   Mr. Jaime Santana Pere from the Instituto Nacional de Sistemas
Automatizados y Técnicas de Computación (INSAC), Cuba, explained principally
the organization of the informatics and electronic industry in his country and
stressed the existence of INSAC as the principal organization responsible for
this field in Cuba.

He gave general information on the basic idea of informatics policy and
industrial automation. This was followed by an account of the structure and
organization of INSAC and its support for the electronics and informatics
industry based in a network conforming productive and services support.

The holding of the international conference 'Informatica 90' in Havana
was announced.

38.   The representative of the Permanent Secretariat of the Sistema Económico
Latinoamericano (SELA), Mr. Garcia Llaquno, referred to the efforts of
regional co-operation in the Secretariat in new technologies which have been
promoted with the active participation of Latin American and Caribbean
governments.

He pointed out that particularly in areas of informatics and electronics
activities in the field of computation regional co-operation took place. He
referred to the Comité de Acción para la Cooperación y Concentración (CACIEL)
and their activities in the electronics and informatics field,

explaining its characteristics, functions, membership and difficulties which hampered the functions determined by the governments. In general terms, he stressed the efforts that are being made in matters of development and technology industrialization, referring to the need for governments to design and execute coherent and articulated industrial policies, specifying the need for regional co-operation in the electronics and informatics area.

39. Mr. Mammana from the Centro Tecnológico para Informática of Brazil gave an account of the situation of electronics and informatics in his country. He explained the importance of microelectronics in the context of informatics technology as well as microelectronics development on a regional level.

The importance of human resources was stressed in connection with the Proyecto Multiusuario Brasileno, Escuela Brasileno Argentina de Informática (EBAI), the programme of the Fifth Centenario del Descubrimiento de America (CYTED-D) and the Paradigm Project. At the end of his presentation he discussed future projects.

40. Mr. Colavita from the International Centre of Theoretical Physics (ICTP, Trieste, Italy) briefed on the history, objectives, scientific personnel and organization of the Centre. He described the microprocessor laboratories, their history, activities and projects. He proposed a scientific capacitance programme for REMLAC and talked of the possibility of microprocessor laboratories acting as a silicon broker.

41. Mr. Carlos Correa, UNIDO Consultant, gave an account of the Regional Project for Strengthening Microelectronics Infrastructure and Capabilities in REMLAC Member Countries (DP/RLA/86/003), a combined initiative of UNIDO and the Conferencia Latinoamericana de Autoridades Informáticas. He said that the project covers the following areas: a) informatics policies co-operation between countries at government level, research institutes and industries; b) hardware and software purchases; c) informatics legislation; d) evaluation of comparative advantages of the local software production; e) informatics diffusion in the small and medium firms; f) informatics trends in Latin America; and g) IC design technical training.

He informed of the possibility of extending this project into another project with a larger scope and emphasized that the project is being executed by local experts.

42. At informal discussions at the end of the Meeting, several countries indicated their interest in requesting UNIDO's assistance in establishing national satellite projects:

Argentina: For strengthening indigenous software capabilities;

Cuba: For strengthening computer applications (e.g. for the sugar industry);

Ecuador: In the field of software production;

Mexico: For the establishment of a computer network for the tourist industry.

43. The need to publish UNIDO studies in Spanish (as well as the English version) was stressed as it is the only possibility of passing on the information to the majority of informatics specialists in the region.

MEETING OF THE CONSULTATIVE GROUP ON
INFORMATICS TECHNOLOGY FOR DEVELOPMENT

Buenos Aires, Argentina
11 - 13 December 1989

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Meeting of Consultative Group on Informatics Technology for Development
Buenos Aires, Argentina, 11-13 December 1989

WORK PROGRAMME

Monday, 11 December 1989

Morning session: 9.30 - 12.30 hours

- Opening of the meeting

- Election of Chairman

- Adoption of agenda

Co-operation in informatics at the regional level including:

- (i) Policy measures for strengthening regional co-operation in
     informatics taking into consideration the world trends - by
     Mr. A. Wad, UNIDO consultant

- (ii) Presentation by participants from the countries of the region and
      representatives of organizations relevant to the above subject

Afternoon session: 14.30 - 17.30 hrs

Co-operation in informatics at the regional level (continued):

- Presentation by the co-ordinator of project DP/RLA/86/003 on the results
  of the preparatory phase and planned activities - by Dr. C. Correa

- Discussion on the subject

- Exchange of views and suggestions on regional and international
  co-operation by participants from the countries of the region and
  representatives of organizations relevant to above subject. Discussion.

<u>Tuesday, 12 December 1989</u>

<u>Morning session: 9.30 - 12.30 hrs</u>

<u>Review of status and prospects of design application of integrated circuits for development</u>

- Presentation of India's experience in design and applications of integrated circuits - by Mr. U. Phadke, UNIDO consultant

- Presentations relevant to above subject by participants from developing countries and representatives of organizations

<u>Afternoon session: 14.30 - 17.30 hrs</u>

<u>Review of status and prospects of regional co-operation, of informatics technology for development and UNIDO assistance</u>

- Discussion on REMLAC focal points' participation in the regional project DP/RLA/86/003 and suggestions and recommendations of other projects in the region assisted by UNIDO, including software

- Discussion

<u>Wednesday, 13 December 1989</u>

<u>Morning session: 9.30 - 13.00 hrs</u>

- Identification of programme elements for UNIDO's approach to informatics development, especially at the regional level

- Discussion

- Presentations relevant to above subject by participants and representatives of organizations, especially in the context of REMLAC co-operation

- Elements of UNIDO's programme and recommendations for regional activities in the field of informatics technology

<u>Afternoon session: 14.30 - 16.00 hrs</u>

Summary of recommendations by the Chairman and its adoption by the participants

MEETING OF CONSULTATIVE GROUP ON INFORMATICS TECHNOLOGY FOR DEVLOPMENT

Buenos Aires, Argentina, 11-13 December 1989

LIST OF DOCUMENTS

	UNIDO's Approach to Assist in Regional Development of Software Industry in Developing Countries' Socio-Technological Environments	Secretariat Paper
ID/WG.491/1	Strategies for Integrated Development of the Electronics Industry including Software	Secretariat Paper (Consultations)
ID/WG.491/2	Electronics Technologies in the Service of Industrial Development	Secretariat Paper (Consultations)
	Policy Measures for Strengthening Regional Co-operation in Informatics taking into Consideration the World Trends	A. Wad
	Microelectronics - World Scenario and the Indian Experience	U.P. Phadke
	The Production of Intelligent Products in Developing Countries	H. Kopetz
IPCT.29	The UNIDO Programme of Technological Advances: Microelectronics	Secretariat Paper
IPCT.81	Guidelines for the Diffusion of Informatics in Small and Medium Companies (SMC)	C. Correa
IPCT.92	Integrated Circuits Trends in Intellectual Property Protection	C. Correa
IPCT.63	Software Production: Organization and Modalities	H.-J. Schneider
UNIDO/IS.500	Overview of the Microelectronics Industry in Selected Developing Countries	S. Lalor
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