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Workshop for Asia and Pacific Region
Representatives from the
Telecommunications Industry
(through Participation at
'Electronics '92' - Electronics
and Telecommunications Fair)
New Delhi, India
24-27 September 1992

REPORT*

* Mention of company news and commercial products does not imply the endorsement of the United Nations Industrial Development Organization (UNIDO). This document has not been edited.

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INTRODUCTION

The Workshop for Asia and Pacific Region Representatives from the Telecommunications Industry (through Participation at 'Electronics India '92' - Electronics and Telecommunications Fair) was held in New Delhi, India, from 24 to 27 September 1992. The Workshop was convened by UNIDO and hosted by the Department of Telecommunications (DOT), the India Trade Promotion Organisation (ITPO) of the Government of India, and the Telecom Equipment Manufacturers' Association (TEMA). Other cooperating institutions included the International Telecommunication Union (ITU), the United Nations Development Programme (UNDP), the Asia-Pacific Telecommunity (APT) and the Asia and Pacific Centre for Transfer of Technology (APCTT). For UNIDO the Workshop was a continuation of a number of activities supporting the development of the telecommunications industry in the region and a specific follow-up to its Meeting on Technological Cooperation for the Development of the Telecommunications Industry in the Asia-Pacific Region held in Bangalore, India, from 9 to 13 December 1991. As recommended at that Meeting, the Workshop contributed to the promotion of enterprise to enterprise cooperation by bringing together industrialists, entrepreneurs and their associations in the telecommunications and feeder industries along with network operators, and facilitating negotiations in joint ventures, transfer of technology, training, testing and standardization. Participants also had the opportunity to visit the Electronics and Telecommunications Fair and acquainted themselves with products and technologies available in India.

The purpose of the Workshop was to develop closer cooperation among the countries of the region in the transfer of technology for telecommunications industry. Identification of potential cooperation areas prior to and during the Workshop through preparation of a compendium of illustrative projects and filling-in of a questionnaire by the participants enabled extensive bilateral discussions among the participants.

I. ORGANIZATION OF THE WORKSHOP

The Workshop was attended by 71 participants, 16 from 11 countries outside India. Participants represented telecommunications manufacturing industries, PTT administrations, telecommunications regulatory bodies and associations of manufacturers. Participating international and regional organizations included the ITU, UNDP, APT and APCTT. The list of participants is given in Annex III.

Inauguration of the Workshop

The Workshop was inaugurated by the Minister of State for Communications in the Government of India, the Hon. Mr. Rajesh Pilot. Further welcoming remarks were addressed to the Workshop by Mr. H. P. Wagle - Chairman of the Telecommunications Commission, Mr. Harsh Gupta - Executive Director of the India Trade Promotion Organisation, Mr. E. Dessau - the UNDP Representative, Mr. A. Narayan - APT's Director for Project Development, Mr. P.K. Sandell - President of the Telecom Equipment Manufacturers' Association and by the Director of UNIDO's Technology Development and Promotion Division. A vote of thanks to the Minister, participants, ITPO and UNIDO was proposed by Mr. Y.L. Agarwal - Chairman and Managing Director of Telecommunications Consultants of India Ltd., (TCIL).

In his inaugural address to the Workshop the Minister stated that the development of well-knit, efficient and reliable telecommunications systems acts as a catalyst in promoting rapid socio-economic development and political as well as cultural integration of a country. While the importance and the need for increasing the availability of telecommunications to their populations are generally recognized, most developing countries find it difficult to keep pace with the rapid technological changes of the industry and therefore need international support. The Asia-Pacific region constitutes the world's largest single market for telecommunications products and services. The region is also the fastest growing telecommunications market in the world. Over US\$1,000 billion in investments in the next 50 years are envisaged that will result in additional 300 million lines. The Minister went on to point out the wide disparities in telecommunications development among the countries of the region with telephone densities ranging from 0.1 to 60. Many countries in the region are still trying to provide the most basic services within easy reach of the people. Underdevelopment of telecommunications services in these countries has been a result of low priority allotted to the sector and inadequate investments in the past. The sudden spurt of demand for reliable telecommunications services at affordable prices has placed enormous strain on the scarce resources of the developing countries in the region.

Mr. Pilot stated that strategies for accelerating the growth of telecommunications involve policy decisions on the restructuring of the telecommunications sector, planning and implementation of domestic, subregional and regional networks, financing telecommunications development and strengthening regional cooperation in matters relating to network development, introduction of new services, transfer of technology, promotion of international standards, setting up of accredited acceptance testing centres, development of human resources and promotion of trade in equipment and services. Organizations like UNIDO have a leading role to play in these matters.

The Minister outlined the measures taken by the Government of India to strengthen the telecommunications network and called upon Governments of other countries in the Asia-Pacific Region to give higher priority to the development of this sector, particularly in rural areas. He drew attention to the wide scope for transfer of technology which can be fully tapped through regional industrial cooperation, by bringing telecommunications enterprises from different countries in the region together to discuss potential cooperation agreements. He expressed his hope that the Workshop will provide the right forum for this purpose and urged UNIDO to take necessary steps in developing, adapting and promoting international standards in the region and in particular to promote regional cooperation and coordination of type approval, acceptance testing and standardization matters which are essential in fostering greater regional cooperation.

The Minister expressed the Government's desire to continue supporting UNIDO's activities in this field and in particular rendered his full endorsement to the proposed Roving Exhibition for Telecommunications Equipment in Africa to be organized by UNIDO with the financial and material support of the Government of India.

The Executive Director of the India Trade Promotion Organisation, Mr. Harsh Gupta, expressed warm welcome to the participants. He introduced his organization, ITPO, which was recently created following the merger of the

Trade Fair Authority of India (TFAI) and the Trade Development Authority (TDA). ITPO functions include organizing and participating in trade fairs in India and abroad, arranging buyers-sellers meet and contact programmes, promotion of specific products in specific markets, exchange of trade delegations and development support for export production. A national centre for trade information will also be set up by ITPO. The Electronics India '92 is the third in the series of such fairs which are held biennially. He paid tribute to all institutions that collaborated with ITPO and UNIDO in preparing for the Workshop.

The Director of UNIDO's Technology Development and Promotion Division expressed appreciation to the Government of India for the support of various UNIDO activities. He referred specifically to the Meeting on Technological Cooperation for the Development of the Telecommunications Industry in the Asia-Pacific Region held in Bangalore, 9 to 13 December 1991, the Workshop for African and Arab Country Representatives from the Telecommunications Industry held in New Delhi from 3 to 12 September 1990 and the International Centre for Genetic Engineering and Biotechnology.

He drew the attention of the participants to the objectives of the Workshop and that is to develop closer cooperation among the countries of the region through technology transfer. He stated that UNIDO will continue to play its part, within available resources, in the development of the telecommunications industry in the region.

Work Programme

The work programme for the Workshop, attached as Annex I, was designed to facilitate the conducive atmosphere for bilateral discussions in various areas covering rural communications, satellite communications, value-added communication services, standardization, testing and certification, telecommunications software and industrial associations.

II. CONCLUSIONS AND RECOMMENDATIONS

Prospective Markets and Complementary Manufacturing Strategies

1. The Workshop recognized that the demand for telecommunications equipment in the Asia-Pacific region would increase exponentially during the present decade and beyond. However, this growth would feature different minimum service requirements and levels of consumption leading therefore to significantly different telecommunications equipment needs for various countries. In most parts of the region, rural telecommunications would remain a significant component of demand. Satisfying this demand cost effectively is crucial particularly in the context of ensuring equitable distribution of the benefits of development. The associated equipment should be inexpensive, of good quality and with capabilities for interconnectivity and interoperability with facilities in the region as well as the rest of the world.

2. Many countries in the Asia-Pacific region had now started to manufacture some or more items of telecommunications equipment locally, but the industrial capacity in nearly all cases was inadequate. In this context, the Workshop noted that the viability of starting local manufacturing operations was enhanced by the prospect of an expanding market in which demand would increase over a period of several years.

3. Noting that there was much interest in intra-regional cooperation in the manufacture of telecommunications equipment, especially as means for optimizing investments and capitalizing on the R and D efforts and the commercial experience in other Asia-Pacific countries, the Workshop agreed that PTT administrations could work together facilitating joint ventures and other similar arrangements and agreeing on equipment standards and specifications, test requirements and other related areas.

4. The Workshop recommended that:

UNIDO, in cooperation with other concerned organizations, should collect the specifications laid down by PTT administrations in the Asia-Pacific region and publish them in a step-wise fashion so as to assess their usefulness to manufacturers and suppliers wishing to match those specifications in the context of technology transfer or trade arrangements.

5. More information and analysis of the industrial aspects of telecommunications was needed and market surveys were necessary to identify both local manufacturing capacity and demand for equipment. There was also latent demand, which exceeds by far the recorded demand, which could be stimulated by appropriate marketing strategies. This would mean market surveys that interacted with both PTT administrations and user groups of all categories whose demands were not yet being fully met or felt.

6. The Workshop reiterated the recommendations of the previous Meeting on Technological Cooperation for the Development of the Telecommunications Industry in the Asia-Pacific Region (held in Bangalore, India, 9-13 December 1991) that UNIDO initiate preparation of a comprehensive regional assessment of needs and capacities for manufacturing telecommunications equipment.

7. To develop this approach, it recommended that:

- (a) On the demand side, such a comprehensive assessment should bring PTT administrations and user groups together in a way that would permit periodic assessments at the national level resulting in studies that could be consolidated regularly into regional assessments.
- (b) UNIDO support and promote manufacturers' initiatives with:
 - (i) assistance in feasibility studies on selected products;
 - (ii) a computerized feasibility study support system specialized to handle selected types of telecommunications equipment; and
 - (iii) publication of product profiles designed to assist newcomers to take decisions for manufacturing telecommunications equipment.

Testing and Certification

8. The Workshop agreed that mutual recognition among countries of each others testing procedures and certification were prerequisites for establishing high quality centres for such work. The Workshop called upon

international and regional agencies such as ITU, UNIDO and APT to draw the attention of PTTs on this issue and to promote necessary cooperation to this end.

9. Recalling the recommendations of the previous Meeting in Bangalore, it was recommended that:

- (a) more intensive use be made of existing test facilities and other activities such as those arising from the UNDP/ITU project on networking of test and development centres (DP/RAS/86/121), the UNIDO study on "Inventory of Existing Facilities for Testing, Certification, Quality Control and Standardization of Telecommunications Equipment in the Asia-Pacific Countries" and the APT study on the same subject;
- (b) UNIDO, in cooperation with other organizations such as ITU and APT, promote the establishment of subregional testing and evaluation centres, taking into account the special needs of the lesser developed countries. A preparatory study should ascertain the manner in which such a centre could be set up, the facilities it would require and the means by which its expertise could be transferred to experts and laboratories at the national level which could later be accredited. The promotion of the centre should be undertaken in conjunction with activities to establish and/or strengthen national capacities in all countries;
- (c) UNIDO and ITU, particularly in their roles as active catalysts for development and standardization, should jointly arrange study tours for PTT's and associations of telecommunications manufacturers to visit testing and certification centres in the region with a view of strengthening capabilities in standardization, quality service, manufacturing and provision of telecommunications services in areas where there is still a large unmet demand.

Rural Communications

10. The Workshop welcomed the offer of India's C-DOT to provide to other interested countries in the region for a specified duration equipment for rural exchanges for the purpose of demonstration and trial. During that period their suitability for the need for possible adaptation and the feasibility of their local manufacture could be assessed. It was understood that C-DOT would undertake this in conjunction with India's Department of Telecommunications and selected Indian manufacturers. UNIDO was requested by C-DOT to assist in promoting this effort within the region.

Telecommunications Software

11. The Workshop noted that software development for telecommunications was complex, involved a large number of people and formed a class of its own. The software should respond to different customer requirements and be flexible. National software development should proceed step-wise. There was also a need to incorporate software in existing equipment to enhance its functions.

12. Software costs were going up and needed to be reduced. Here the low salary levels in most Asian developing countries was an advantage. Yet there

were shortages in software manpower, and human resource development was a paramount necessity.

13. The Workshop reiterated the recommendations of the Bangalore Meeting in December 1991 and the need to pursue them. It also recommended a survey of the current status of telecommunications software development in the Asian region in terms of the institutions and firms involved and the types of software developed. It further recommended that based on such a survey a regional network of software engineering institutions should be promoted by UNIDO and other concerned organizations, contributing to the sharing of methodologies, tools, training facilities and a system of certification of software. Such an activity would also contribute to the promotion of a possible regional centre for telecommunications software development. UNIDO is also requested to prepare a handbook on telecommunications software that will highlight the special characteristics of this type of software and the prerequisites for entering into telecommunications software production. An expert group meeting on telecommunications software should be convened in the region to review status of development and exchange experiences.

14. The Workshop stressed that in implementing the foregoing recommendations the experience of software projects implemented by the ITU should be taken into account. It also noted that for realistic sharing of software developments, it was necessary to adopt an agreed regime of common methodologies.

Role of Telecommunications Equipment and Electronic Components Manufacturers' Industry Association

15. The Workshop noted that with the liberalization of telecommunications and industrial regimes, the role of industrial manufacturers' associations were getting more promotional than one of relations with the government. Industry associations should individually and in cooperation help to promote higher quality, improve productivity, provide training and identify export possibilities. Exchange of information and transfer of technology were important elements of cooperation. It was noted that exchange of information could take place within an extended APTEL framework and also utilize the services of UNIDO's INTIB and APCTT's information and technology transfer activities. The industry associations were urged to adopt a common format in the information submitted to regional and international organizations. The President of the Electronic Component Industries Association (ELCINA) of India offered to make available the information maintained by his association on the electronics industry in India. Industrial associations should also be involved in developing as well as exchanging information on active and innovative measures for mobilization of financial resources for the telecommunications industry.

16. The Workshop recommended that a survey of associations and their constituents in the region be undertaken and the findings be widely disseminated. The survey should include associations of small scale telecommunications equipment manufacturers and address their special needs for guidance and support and their role in promoting appropriate technologies.

Training

17. The Workshop emphasized the importance of training in quality control, repair and maintenance of telecommunications terminal subscriber equipment, test instruments and transmission lines. The Workshop recommended to investigate the feasibility of promoting a regional centre for training, quality control and management repair and maintenance.

18. The Workshop noted the possibility of transferring at concessionary rates testing equipment, spare parts and components at installations and enterprise levels to countries operating mechanical and electromechanical exchanges from those which were no longer in need of such facilities. A concrete offer of this type may be made to UNIDO by one of the participating countries.

General

19. Considering the growing and diversified requirements of telecommunications equipment and products and the liberalization of regulatory requirements in all countries in the region the Workshop recommended that international and regional organizations such as UNIDO, ITU, APT and APCTT promote in cooperation, national and regional dialogues between PTT administrations, manufacturers, software developers and users so as to accelerate telecommunications development in the region in an optimal manner.

20. The Workshop further recommended that APT, APCTT, ITU and UNIDO constitute a nodal group to initiate and monitor the implementation of various activities concerning promotion, transfer and utilization of telecommunications technology in the region.

III. RESULTS OF BILATERAL DISCUSSIONS ON COOPERATION PROJECTS

The bilateral discussions, aimed at identifying specific cooperation opportunities, were held informally during the Workshop and formally on 26 September 1992. A total of 70 working agreements between Asia and Pacific Region representatives and Indian counterparts resulted from these discussions. They envisaged exchange of information, possible joint ventures in manufacturing, feasibility studies, consultancy services and supplies of various types of equipment.

UNIDO would undertake follow-up activities to promote practical realization of the working agreements through use of national TCDC funds and UNIDO consultants.

A summary of the results of the bilateral discussions is attached as Annex II.

IV. SUMMARY OF SELECTED PRESENTATIONS

A representative of the UNIDO Secretariat explained that one of the aims of the Workshop was to engage in bilateral discussions on cooperation projects. To facilitate this, a questionnaire had been prepared and distributed to participants so that they could indicate their interests in terms of products and type of collaboration being sought.

Rural Communications

A representative of the Centre for Development of Telematics (C-DOT) described the achievements made by that Centre in developing rural exchanges based on indigenous technology. Out of 21,000 exchanges in India, close to 7,500 were C-DOT exchanges. India decided to develop indigenous switching technology due to high cost of imported technologies and the dependency that resulted from using foreign switching technologies. C-DOT embarked on a programme to develop switches with capacities from 128 to 40,000 lines - conceived on a modular basis so that PABXs, rural exchanges and main automatic exchanges as well as trunk exchanges are built from the same basic components. Emphasis on rural exchanges was put on simplicity starting with the basic 128 port terminal unit. These exchanges were introduced to the Indian telephone network about four years ago. There has been exponential growth in demand since introduction of these exchanges. The original 128 port exchange was based on analogue environment catering for decadic interexchange signalling. Due to high demand, the 256 rural automatic exchange (RAX) was developed. A digital 10 channel UHF rural radio subsystem has also been developed which is connected to the RAX. This provides high quality voice circuits operating in the 600 MHz UHF band and has a radio single hop capability of up to 40 km. C-DOT has also developed TDMA point to multi-point rural radio systems which give best cost-benefit ratio - with capabilities to handle voice as well as data between a base station and a number of remote stations. No air-conditioning is required in all these rural systems and redundancy is in-built to enhance system reliability. For applications in mountainous rural areas, C-DOT has developed small satellite-based rural telegraph systems and 16 kilo bits per second very small aperture terminals (VSAT) with voice and data capabilities. C-DOT technologies have been transferred to over 50 manufacturers in India. C-DOT technologies are also available for transfer to other manufacturers in the region.

The importance to improve rural telecommunications was stressed by another participant. In planning rural telecommunications, accessibility to a telephone is far more important than ownership. A standard target is accessibility within an hour's walk (approx 5 km). A planning approach based on hexagonalization of the entire rural areas has been adopted in India. The most significant technological development in the recent past has been that of digital multi-access systems for rural areas which has completed changed planning methodologies due to inherent versatility and capability for centralized maintenance and operation. Remote line concentrators, remote switching units and remote switching multiplexes are particularly suitable for integrating development of rural areas along with urban networks.

Planning for rural telecommunications should consider economic benefits and not only commercial viabilities. The CCITT GAS 7 document on the subject of drawing models in the rural areas has identified four distinct types which identified broadly represent the majority of the rural areas. These are:

- Model A - densely populated area in which the distances between the neighbouring villages are rather short;
- Model B - mountainous area where villages are situated on a mountain or a hill and are separated by them;
- Model C - in line type in which the villages are scattered along a river or road; and

Model D - dispersed type in which the villages are sparsely located and populated.

Value-added Services

Demand for value-added services is growing rapidly, especially from the business community. Private operators in collaboration with equipment suppliers are expected to play a leading role in providing value-added services in India. Relevant issues in liberalization of value-added services include specifying types of services that can be provided, selection of franchisee, tariff and licensing. Value-added services are distinguished by value addition to basic services. Value-addition includes electronic mail, video conferences, videotext, radio paging, audio text, etc. Cellular mobile telephones may also be considered as value-added services.

Compendium of Illustrative Projects

A compendium of possible illustrative projects was presented to the participants. The proposed projects included:

- Production of small and medium-sized digital electronic exchanges;
- Production of telephone instruments;
- Production of small electronic private branch exchanges (PABX's);
- Production of jelly filled telephone cables;
- Production of optical fibre digital transmission cables.

Each of the proposed projects was generally conceived as an assembly line operation from bought-out components and materials. In each case the scope could be enlarged and financial viability further improved by in-house production of some components.

For each project, an attempt has been made to estimate requirements of:

- components and raw materials per unit of product and their likely costs;
- basic plant and machinery, jigs, testers and infrastructure; and
- manpower for various levels of annual production.

Using the basic estimates, the economic viability for each proposed project has been calculated for different levels of production. These calculations took into account:

- working capital requirements based on a percentage of annual material and manpower costs;
- provision for capital recovery over an average period of 8 years for all fixed assets investments at an assumed internal rate of return of 12 per cent;

- interest rate of 10 per cent per annum on working capital;
- overhead costs for maintenance and utilities.

The compendium also includes a possible project for a regional/subregional testing and calibration facility. The main functions of the facility would include:

- testing, evaluation and screening of components and systems;
- reliability evaluation of components, systems and subsystems;
- calibration of equipment; and
- quality assurance advisory services.

Standardization Certification, Testing, Quality Evaluation, Repair and Maintenance

The report on the UNIDO study on "Inventory of Existing Facilities for Testing, Certification, Quality Control and Standardization of Telecommunications Equipment in the Asia-Pacific Region" was presented to the Workshop. The study covered several countries in the region including Afghanistan, Bangladesh, People's Republic of China, Hong Kong, India, Japan, Malaysia, Nepal, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand and Tonga. An analysis of the findings of the study revealed inter alia that:

- the adequacy of facilities varies widely within the region - from those with no suitable facilities at all to others like Japan, Republic of Korea and Singapore possessing highly advanced centres;
- generally facilities for testing, certification modalities and standardization evolved with expansion of telecommunications networks but repair and maintenance facilities tended to evolve sporadically in response to emerging crisis situations;
- due to the capital intensive and particularly foreign exchange intensive nature of projects for establishing testing and certification facilities, there is a strong case for promoting networking schemes for existing facilities in the region;
- cooperation between testing and quality-assurance facilities at the factory levels and those of regulatory authorities appears to yield positive results;
- there appears to be a need for greater integration of quality assurance at the service and factory levels;
- type approval procedures should take into account the need for ensuring network reliability as well as the need to avoid work interruptions at the factory level resulting from excessive delays in obtaining type approvals from regulatory bodies.

The report makes a number of recommendations with regard to rectifying the unbalanced development of testing, certification, quality assurance, standardization, calibration, repair and maintenance facilities among the countries of the region. The recommendations also address the issue of type approval procedures.

Telecommunications Software

Another presentation was made on telecommunications software. The main types of telecommunications software for operating companies are:

- network management systems;
- billing and accounting packages;
- network and planning systems;
- operational systems; and
- maintenance systems.

Control and operation of telecommunications equipment is state-transition oriented. Based on this, CCITT has recommended a specification and description language (SDL) for telecommunications software. SDL has two basic forms: SDL/GR for graphical form and SDL/PR for textual form. These two forms are equivalent and can be transformed from one to another. CASE systems based on SDL appear to be more suitable for telecommunications software applications. A relatively complete CASE system used in a telecommunications company is composed of several subsystems, including design, test, maintenance and production subsystems.

Network management is performed by network management centres (NMC) which are organized in a hierarchical manner. An NMC exchanges information with its superior NMC or subordinate NMC and monitors the grade of service of trunk groups of those switching exchanges which are under the management of this NMC. It also issues instructions to switching exchanges in case of abnormal congestion.

Development of telecommunications software requires groups of highly qualified personnel and considerable computer resources including PCs, workstations, minicomputers or mainframes depending on the size and capability of the software networking facilities to interconnect various computers and also corresponding software tools such as language compilers, editors, debuggers, database and many others. To meet all these prerequisites is not easy for a developing country. Therefore, cooperation among developing countries is often essential. The alternative is to develop software step by step.

Selected Country Presentations

Bangladesh

In presenting the country paper, the representative from Bangladesh stated that the telecommunications sector in that country was one of the least developed in the APT region. The telephone density is only 0.2 per 100 population and growth in number of telephones over the last 20 years has been

slow. The main reason for the underdevelopment of telecommunications in Bangladesh is inadequate financing.

Manufacturing activities are limited to small analogue telephone exchanges, telephone sets, PABX's, trunk boards, rectifiers and cables.

Digitalization of the public network is in progress. Investment in telecommunications services is now a Government priority and plans are at hand to expand the system through inter alia, BLT (Build, Lease and Transfer) or BOT (Build, Operate and Transfer) arrangements. Private sector participation in manufacturing certain telecommunications equipment is now encouraged under license.

Testing and certification facilities are virtually non-existent. Only recently the Ministry of Posts and Telecommunications has initiated establishment of a small testing unit under the Standard Testing Laboratory of the Ministry of Industries. Assistance in setting up a testing, repair and calibration centre would be most welcome.

Cambodia

Developments in Cambodia have severely affected the telecommunications sector. The urgent need to reconstruct and expand the network is recognized. However, shortages of finance, technological resources and skilled labour force present major constraints.

The Government would recommend installation of a cellular mobile telephone system. Other preferred technologies are digital microwave systems, domestic satellite and optical fibres. Over the period 1990-2004 the Government plans to spend about US\$352 million for expansion of the telecommunications network. Foreign investment is actively sought through appropriate policies.

China

The public telecommunications network in China has undergone very rapid expansion in recent years. In the period from 1980 to 1991, the telephone density per 100 population rose from 0.4 to 1.3 with a corresponding increase of telephones from 4.2 million to 15 million in total. A technological shift has also occurred in favour of automatic SPC exchanges replacing manual and electromechanical switches. Further expansion of the network is planned for the 1990's with targets of 96 million lines, 65 million telephones and a telephone density of 5.0 by the year 2000.

Industrial production of telecommunications equipment is the responsibility of the China National Postal and Telecommunications Industry Corporation (PTIC). PTIC companies produce full range of telecommunications equipment including switches, transmission systems and terminal equipment.

With the largest rural population in the world, the high demand for rural telecommunications have provided both an opportunity and a challenge to Chinese manufacturing industry. China is willing to share its experience in this field with other countries in the region.

Indonesia

The telecommunications industry is looked upon as a strategic industry by the Indonesian Government. Two million lines are planned to be added to the network over the period 1989 to 1999 at an investment cost of Rp 7.1 trillion. Production of telecommunications equipment has also been rising over the years. From annual production of Rp 97.3 billion in 1985, this reached Rp 201.7 billion in 1989. Local manufacturing of telecommunications equipment is granted preferential treatment by the Government. Telecommunications products and services that Indonesia can offer include: satellite systems, terrestrial systems, telephone systems, specialized networks and technical services.

Nepal

Nepal belongs to the category of countries of the Asia and Pacific region which does not have technical and institutional infrastructure for manufacturing telecommunications equipment or components. The entire expansion of telecommunications networks depends on imports. At present the total capacity of telephone lines in Nepal is less than 100,000. More than 60 per cent of the telephone lines are concentrated in the capital with no penetration to the rural areas. Serious attempts are being made to provide each Ilaka centre with a public telephone booth by the turn of the century. The present telephone density of 0.041 per 100 population will also be increased to 1 per 100 population in the same time frame.

Nepal has recently announced new communications and industrial policies to create an environment necessary to enable private sector participation in the telecommunication and industrial sector of the country. With the new policy, a license is not required for establishment of industrial enterprises except those related to defence, health and environment. A package of facilities and a number of institutional arrangements have been made in the new policy.

With the announcement of the new communications policy the Government intends to issue licenses to the private operators in various telecommunications fields such as paging and cellular radio services. Joint ventures will also be allowed in the development of telecommunications industries and services.

Though manufacturing of telecommunications equipment and components in Nepal may not be possible in the near future due to the market size, assembly of equipments is feasible. Considering the neighbouring markets, telecommunications cables and dropwire manufacturing may be economically feasible in Nepal.

Philippines

The Philippine country paper gave an outline of the status of the telecommunications sector, its development plan and prospects for technology transfer. One major operator controls about 90 per cent of the public network. In addition there are about 47 small franchised operators.

The National Telecommunications Development Program (NTDP) has been approved by the Government. NTDP will guide development of the sector up to

the year 2010. Among its targets are: raising the national telephone density per 100 population from the current 1.3 to 3.5; providing all municipalities with public calling stations; installation of a national maritime telecommunications network; establishing a national domestic satellite network and improving the network grade of service. A total investment of P700 billion pesos is foreseen over the plan period.

On technology selection, all new telecommunications equipment and systems will be digital up to the local exchange level and preference will be on modular systems built to open standards rather than proprietary or closed standards. Technology selection will also favour local manufacturing and consideration will be given to utilizing used exchange equipment based on appropriate cost studies. New opportunities for technology transfer exist particularly for production of switching equipment and telecommunications software.

Republic of Korea

The structure of the Korean telecommunications sector is described in the country paper. The Ministry of Communications sets policies. There are two network service providers - Korea Telecom and DACOM, and two specialized service providers - Korea Mobile Telecommunications Co. and Korea Port Telephone Co. There are also a number of R & D institutions.

Korea has six large telecommunications manufacturers producing a wide range of products including switching systems, fibre optic systems and customer premises equipment. Over 50 per cent of production in 1990 was supplied to the domestic market. Main export markets are the U.S.A. and Europe while imports come mainly from Japan and the U.S.A.

A regional UNDP/ITU project (RAS/86/121) - Networking of Test and Development Centres has been implemented over the period 1988-1992 with Korea as the host country. The project aimed at promoting cooperation and strengthening collective self-reliance of developing countries in the region regarding standards, R & D and new technologies.

Korea is implementing technical assistance programmes for developing countries in switching and optical transmission technologies. Korea is seeking technologies from advanced countries in areas such as satellite systems and high definition television.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

WORK PROGRAMME

**WORKSHOP FOR ASIA AND PACIFIC REGION REPRESENTATIVES FROM THE
TELECOMMUNICATION INDUSTRY (THROUGH PARTICIPATION AT
'ELECTRONICS '92' ELECTRONICS AND TELECOMMUNICATIONS FAIR)
NEW DELHI, INDIA, 24-27 SEPTEMBER 1992**

THURSDAY, 24 SEPTEMBER 1992

- 09.00-09.30** **Registration**
- 09.30-10.15** **Inauguration by the Minister of State for
Communications. Remarks by DOT, UNIDO, ITPO, UNDP, ITU, TEMA,
TCIL representatives**
- 10.30-12.30** **Visit to the Fair**
- 12.30-** **Lunch (hosted by ITPO)**
- 14.00-17.30** **Workshop Agenda No. 1:**
- (a) **Market for telecommunication equipment and components
in the context of regional cooperation with special
emphasis on:**
- (i) **Rural communication**
- (ii) **Satellite communication**
- (iii) **Value-added communication services**
- (b) **Standardization, testing and certification of
components and equipment - impact on industry in Asia
and Pacific region.**
- Dinner** **Hosted by Department of Telecommunications, Government of
India**

FRIDAY, 25 SEPTEMBER 1992

- 09.30-12.30** **Technical visits to the Centre for Development of
Telecommunications (C-DOT) and Testing and Evaluation
Centre (TEC)**
- 12.30-** **Lunch (hosted by Telecommunications Equipment
Manufacturers' Association)**
- 14.00-17.30** **Workshop Agenda No. 2:**
- (i) **Software for telecommunications**

- (ii) Application of software service packages in telecommunications

SATURDAY, 26 SEPTEMBER 1992

09.00-13.00 **Bilateral discussions on potential technology transfer arrangements**

13.00- **Lunch (hosted by Telecommunications Consultants of India Limited)**

14.00-17.30 **Workshop Agenda No. 3:**

- (i) Role of industrial associations in regional cooperation in the field of telecommunication equipment

- (ii) Role of industrial associations in regional cooperation in the field of electronic components.

SUNDAY, 27 SEPTEMBER 1992

09.00-10.30 (i) Adoption of conclusions and recommendations

- (ii) Valedictory

RESULTS OF BILATERAL DISCUSSIONS

Indian counterpart		
Proposer or main beneficiary	Organization	Type of cooperation
Bangladesh		
1. Ministry of Post and Telecommunications	Mekaster Telecomputer	Joint venture Technology transfer
Project:	Possibility of consulting and manufacturing of MDF, DP boxes, CT boxes and long-line equipment.	
Follow-up:	TEMA.	
2. Ministry of Post and Telecommunications	HTL	Exhibitions and demonstrations
Project:	Possibility of supply of chip-card pay phones and bilingual telex/TP machines.	
Follow-up:	HTL/TEMA.	
3. Ministry of Post and Telecommunications	ITI/UNIDO	Technical assistance
Project:	(i) In preparation for establishment of a component and equipment test centre in Bangladesh, ITI (with UNIDO support) to set up a test laboratory for Bangladesh; (ii) ITI assistance to set up repair centres in Bangladesh; (iii) telephone kits to be offered to the Bangladesh TSS; (iv) offer to supply RTS system to be referred to appropriate authority.	
Follow-up:	ITI.	
4. Ministry of Post and Telecommunications	ITI/BEL/UNIDO	Contract services
Project:	Provision of telephones, EPABX, PABX and computer terminals on a loan basis and establishment under UNIDO guidance of an ITI/BEL laboratory (including an industry unit) accredited to Bangladesh and other Asian countries.	
Follow-up:	ITI and a TEMA consultant welcome to contact the Bangladesh Chamber of Commerce for information on which telecommunications equipment is being manufactured and used in the country. UNIDO supported study tour to prepare for setting up a test laboratory in Bangladesh using donated Indian equipment.	

Indian counterpart

<u>Proposer or main beneficiary</u>	<u>Organization</u>	<u>Type of cooperation</u>
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| 5. Ministry of Post and Telecommunications | BPL Systems and projects | Joint venture
Technology transfer
and exports |
|--|--------------------------|---|

Project: At enterprise-to-enterprise level to investigate possibilities for: (i) Supply of EPABX (up to 4000 lines), electronic telephone instruments of all types, and consumer electronics; (ii) consideration of joint venture and/or technology transfer in these areas plus turnkey jobs in networks; (iii) system software development.

Follow-up: TEMA. Potential Bangladesh entrepreneur to be identified.

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| 6. Ministry of Post and Telecommunications | TCIL | Software supply |
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Project: Possibility to supply software packages for operation of telecommunications services.

Follow-up: TBL (TCIL - Bell South) to supply information and follow up.

Cambodia

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|---|-----|---------------|
| 7. Department of Posts and Telecommunications | ITI | Manufacturing |
|---|-----|---------------|

Project: (i) Establishment of a small manufacturing unit for small- and medium digital electronic exchanges, rural exchanges and a variety of telephone instruments (decadic, DTMF, etc); (ii) shipment of ITI MINI ILT system for 3-month trial; (iii) training.

Follow-up: ITI to request Government of Cambodia permit to visit in November 1992 to provide details of: (i) ITI digital transmission systems and switching systems; (ii) optical fibre systems. ITI to forward proposal with respect to MINI ILT system.

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| 8. Department of Posts and Telecommunications | L & T | Product information |
|---|-------|---------------------|

Follow-up: Cambodian delegate to study information supplied on L & T products, especially that on RAX and MAX, and to respond.

Indian counterpart

Proposer or main beneficiary	Organization	Type of cooperation
9. Department of Posts and Telecommunications	TEMA/DOT	Planning
Project:	(i) Radio based planning of rural and urban trunk networks; (ii) All frequency planning, survey and equipment definition; (iii) training of staff in radio systems.	
Follow-up:	Cambodia to request an appropriate Indian expert under UNIDO technical assistance arrangements. TEMA to follow up.	
10. Department of Posts and Telecommunications	BPL Systems and Projects	Joint venture Technology transfer Exports
Project:	(i) Supply of EPABX (up to 4000 lines), electronic telephone instruments of all types, and consumer electronics; (ii) consideration of joint venture and/or technology transfer in these areas plus turnkey jobs in networks.	
Follow-up:	TEMA.	
11. Department of Posts and Telecommunications	TCIL	Consulting Training
Project:	(i) Consultancy to implement short term plans for a trunk network (DAMA), urban and rural telephone and transmission systems, telex and teleprinter services, and fax services; (ii) computerization of telephone accounting and billing, and telecommunications management; (iii) training of staff in operations and maintenance of telecommunications systems, planning and management.	
Follow-up:	TCIL to send further information.	
12. Department of Posts and Telecommunications	BPL Systems and Projects	Joint venture Technology transfer Exports
Project:	(i) Supply of EPABX (up to 4,000 lines), electronic telephone instruments of all types, and consumer electronics; (ii) consideration of joint venture and/or technology transfer in these areas plus turnkey jobs in networks.	
Follow-up:	TEMA.	

Indian counterpart

Proposer or main beneficiary	Organization	Type of cooperation
13. Department of Posts and Telecommunications	Shyam Communications	Technology transfer Training
Project:	(i) To explore the possibility of Shyam's rural telecom products in Cambodia; (ii) provide training for maintenance of such products in Cambodia.	
Follow-up:	Shyam will provide necessary technical specification for study and evaluating the product. Planning a goodwill visit by Shyam to Cambodia in next 2 months for further discussion.	

China

14. Beijing University of Posts and Telecommunications	C-DOT	Product development
Project:	Exchange of information on R and D in switching technology with a view to collaboration in product development.	
Follow-up:	BUPT to initiate correspondence.	
15. China National Posts and Telecommunications Industry Corp	Shyam Communications	Product development
Project:	Exchange of technical information on rural telecommunications equipment and pay phones, with a view to collaboration in product development.	
Follow-up:	TEMA.	
16. China National Posts and Telecommunications Industry Corp	Crompton Greaves	Equipment supply Technology transfer Joint projects
Project:	(i) China to supply equipment similar to RAX, wireless/line telecommunications equipment, and optical fibre terminal equipment; (ii) China to supply know-how for manufacturing the above in India; (iii) joint projects to be undertaken for setting up telecommunications networks in third countries; (iv) joint manufacture of telephone instruments in third countries - rural telecommunication equipment and pay phones - with a view to collaboration in product development.	
Follow-up:	(i) China NTP to provide literature and prices of equipment of interest; (ii) broad know-how transfer arrangements; (iii) broad details of arrangements for joint ventures. TEMMA to follow up.	

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
17. China National Posts and Telecommunications Industry Corp	Eltec	Representation Joint venture
Project:	Consulting, expertise and technology transfer to India for telecommunications equipment, cables, terminals, exchanges, transmission lines and fibre optics.	
Follow-up:	PTIC to send product brochures, price lists, including specification details for a marketing study in India and transfer options as soon as possible.	
18. China National Posts and Telecommunications Industry Corp	Shichar Electronics	Representation
Project:	Locating a representative and users interested in China's telecommunications equipment technology or in the products themselves.	
Follow-up:	TEMA.	
19. China National Posts and Telecommunications Industry Corp	TEMA	Training
Project:	Training in China in the field of CAD for PCB designs.	
Follow-up:	TEMA will identify appropriate Indian partner.	
20. China National Posts and Telecommunications Industry Corp	HFCL/TEMA	Technology Equipment
Project:	Subscriber carrier systems and other telecom equipments.	
Follow-up:	China NTP to send proposal to HFCL for technology development and transfer.	
21. China National Posts Telecommunications Industry Corp	TCIL	Software supply Equipment
Project:	Supply of software packages for telephone administration.	
Follow-up:	TBL (TCIL and Bell South) to follow up with further information.	

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
Indonesia		
22. PT Industri Tele-komunikasi Indonesia	BPL Systems and Projects	Joint venture Technology transfer Exports
Project:	(i) Supply of EPABX, telephone instruments of all types, and consumer electronics; (ii) consideration of joint venture and/or technology transfer in these areas plus turnkey jobs in networks; (iii) systems software development.	
Follow-up:	TEMA.	
23. PT Industri Tele-komunikasi Indonesia	TCIL	Consultancy
Project:	Supply of expertise for design of digital earth station.	
Follow-up:	TCIL to contact PTT Indonesia for further details.	
24. PT Industri Tele-komunikasi Indonesia	TEMA	Technology and material
Project:	(i) Supply of smart card technology; (ii) joint development of digital earth station (TDMA); (iii) optical transmission; (iv) digital cross connect.	
Follow-up:	TEMA to identify suitable Indian partner.	
25. PT Industri Tele-komunikasi Indonesia	L & T	Equipment supply
Project:	Information on possible distributor/dealers in Indonesia.	
Follow-up:	PTINTI to revert if interested; L & T to provide further information.	
26. PT Industri Tele-komunikasi Indonesia	Shilchar	Equipment supply
Project:	Export of radial core transformer for telecommunications applications.	
Follow-up:	Shilchar.	

Indian counterpart

Proposer or main beneficiary	Organization	Type of cooperation
27. PT Industri Telekomunikasi Indonesia	C-DOT	Joint development Technical assistance Licensing
Project:	(i) Technical assistance in R and D; (ii) joint development of transmission products (digital earth station, optical line transmission).	
Follow-up:	C-DOT and PTI INTI.	
28. Ministry of Industry	DOT	Technology transfer
Project:	(i) Vendor development; (ii) role of government in development of telecommunications equipment manufacturing; (iii) C-DOT operations; (iv) technology transfer from large companies to small- and medium scale enterprises.	
Follow-up:	MOI to prepare an implementation programme for the development of the electronics industries.	
29. Ministry of Industry	C-DOT	Expertise Consultancy Technology transfer
Project:	(i) Consultancy and expertise in R and D organization, vendor development and procedures for TOT/royalty/funding; (ii) manufacturing TOT low-capacity switching and transmission systems.	
Follow-up:	MOI delegate to process.	

Malaysia

30. Electra Communications	C-DOT	Technology transfer
Project:	Import or technology transfer for manufacture of tailored systems for the 256 RAX or TDMA-PMP.	
Follow-up:	C-DOT to supply further manufacturing details of products discussed.	

Indian counterpart

Proposer or main beneficiary	Organization	Type of cooperation
31. Electra Communications	Crompton Greaves	Equipment supply Know-how
Project:	(i) Software for hotel management--front office and other services; (ii) voice mail systems; (iii) 1 + 7 subscriber carrier equipment; (iv) automatic call distributor.	
Follow-up:	CG to supply technical and commercial details of equipment discussed; Electra to provide proposal for know-how for telephone instruments supplied in SKD kits.	

Nepal

32. Nepal Telecommunication Corp	ITI	Joint venture
Project:	(i) Possible joint venture with a Nepal firm to produce small digital exchanges (EPABX) and telephone instruments; (ii) possible supply of road traffic signalling system to Nepal.	
Follow-up:	ITI.	
33. Nepal Telecommunication Corp	Eltec Systems	Joint venture Technology transfer
Project:	Consulting, expertise in TVRO equipment and systems and supply of paging systems.	
Follow-up:	NTP will send details of numbers of pagers required. TEMA to follow up.	
34. Nepal Telecommunication Corp	United Telecoms	Joint venture Technology transfer
Project:	Marketing of EPBAX, RAX and telephones with emphasis on PABX.	
Follow-up:	Market study. United Telecoms to follow up.	

Indian counterpart			
Proposer or main beneficiary	Organization	Type of cooperation	
35. Nepal Telecommunication Corp	BPL Systems and Projects	Joint venture Technology transfer Exports	
Project:	(i) Supply of EPABX (up to 4,000 lines), pushbutton telephone instruments of all types, and consumer electronics; (ii) consideration of joint venture in these areas.		
Follow-up:	TEMA.		
36. Nepal Telecommunication Corp	Shyam Communications	Marketing	
Project:	Possible marketing of Shyam products in Nepal.		
Follow-up:	Shyam Communications.		
37. Nepal Telecommunication Corp	United Telecom	Joint venture	
Project:	Manufacturing of EPABX in Nepal.		
Follow-up:	United Telecom.		
38. Nepal Telecommunication Corp	Indchem Projects	Joint venture	
Project:	Manufacturing of EPABX and supply of switching and transmission equipment.		
Follow-up:	TEMA.		
39. Nepal Telecommunication Corp	Hindustan Teleprinter	Equipment supply	
Project:	Supply of charge indicator and rural messaging terminal (in special version).		
Follow-up:	HTL.		
40. Nepal Telecommunication Corp	Industrial and Engineering	Training	
Project:	Training of Nepalese manpower, marketing of TVRO equipment and introduction of paging systems.		
Follow-up:	Industrial and Engineering.		

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
Pakistan		
41. Mirza and Co. Telecommunication Corp.	GNFC Ltd.	Technology transfer
Project:	Transfer of technology for PABX (8 + 16 extendable up to 8 + 126 including testing equipment required for the cards, trouble-shooting manual, parts list, lowest cost of assembled and unassembled cards, training of technical personnel).	
Follow-up:	Provision of above details; UNIDO expert to help set up manufacture of PABX systems.	
42. Mirza and Co. Telecommunication Corp.	C-DOT	Technology transfer
Project:	Expertise on transfer of technology for small PABX systems, rural exchanges, and small capacity digital radio systems, including test equipment for quality control, trouble shooting and training of personnel.	
Follow-up:	Delegate to visit C-DOT to see manufacture of rural exchanges.	
43. Mirza and Co. Telecommunication Corp.	Hindustan Teleprinters	Technology transfer
Project:	Assembly from CKD and SKD kits for sale to Government of Pakistan.	
Follow-up:	HTL to forward price information.	
44. Mirza and Co. Telecommunication Corp.	United Telecoms	Technology transfer
Project:	Transfer of technology for PABX along with methods of improving price competitiveness using selective assembly in Pakistan.	
Follow-up:	Delegate to visit United Telecoms.	

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
45. Mirza and Co. Telecommunication Corp.	Shyam Communications	Technology transfer
Project:	Export of PABX and telephones in CKD form.	
Follow-up:	Prices to be provided by Shyam prior to joint work on feasibility of manufacture in Pakistan.	
46. Mirza and Co. Telecommunication Corp.	ITI	Technology transfer
Project:	Kits for telephones (decadic and DTMF), small EPABX exchanges, rural exchanges, three channel operating centre systems; (ii) manufacture of transducers.	
Follow-up:	ITI.	
47. Mirza and Co. Telecommunication Corp.	Eltec	Study
Project:	Consulting and preparation of a report on EPABX systems available in India and their suitability for Pakistan.	
Follow-up:	Further meeting in September 1992. TEMA to follow up.	
Philippines		
48. National Telecommunications Commission	Crompton Greaves	Equipment supply
Project:	Supply of telephone and telecommunications equipment.	
Follow-up:	TEMA.	
49. National Telecommunications Commission	TCIL	Equipment supply
Project:	Advice to the Association of Small Rural Telephone Companies, Philippines, on economic solutions for upgrading switching systems and external plant.	
Follow-up:	TCIL to contact the Association for precise requirements.	

Indian counterpart		
Proposer or main beneficiary	Organization	Type of cooperation
50. National Telecommunications Commission	UNIDO/ITU	Technical assistance
Project:	Study of costs and revenue sharing in the context of privatization.	
Follow-up:	NTC.	
51. National Telecommunications Commission	Advanced Radio Marti (P)	
Project:	Supply of antennae, multi-access rural radio telephones and UHF equipment.	
Follow-up:	ARM to initiate correspondence.	
52. National Telecommunications Commission	ITI	Joint venture
Project:	(i) Joint venture to produce small and medium exchanges, rural exchanges (MILT), telephones (decadic, DTMF, switchable), telephones for defence; (ii) field trials in Philippines of a rural electronic exchange for three months.	
Follow-up:	(i) ITI to contact Philippines L. Dirbee Telephone Co., the Association of Small Private Telephone Companies, and the Association of Integrated Systems and Manufacturing companies; (ii) NTC delegate to discuss rural exchange offer with private firms.	
Republic of Korea		
53. Ministry of Communications	Tata Consulting Services	Software development
Project:	Software consultancy to develop case tools.	
Follow-up:	TCS presentation of software development activities.	

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
54. Ministry of Communications	TCIL Services	Software development and satellite communication
Project:	(i) Software consultancy to develop case tools and data base organization; (ii) cooperation with the Electrical and Telecommunications Research Institute, Rep. of Korea in satellite communication systems testing and manufacturing; (iii) information exchange on standardization in the field of telecommunications technology.	
Follow-up:	TCIL/DOT to initiate.	
55. Goldstar Information and Communications	C-DOT	Information exchange
Project:	VSAT technology and manufacture.	
Follow-up:	C-DOT to forward details.	
56. Goldstar Information and Communications	Mekaster Telecom	Technology transfer Joint venture
Project:	Manufacture of small switches (300 lines capacity).	
Follow-up:	TEMA.	
57. Goldstar Information and Communications	Haryana State Electronics Development Corp	Technology transfer
Project:	Transmission equipment - 18 Ghz digital microwave radio, fibre optic transmission equipment, electronic displays.	
Follow-up:	MOU to follow further discussions.	
58. Goldstar Information and Communications	Eltec Systems	Expertise
Project:	Korean expertise on networking; promotion of Korean products in India through Eltec.	
Follow-up:	Goldstar to forward details of pager and services for promotion in India.	

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
59. Samsung Electronics Communications	Mekaster Telecom	Transfer of technology Joint venture
Project: Small switches, fibre optic cables, pagers.		
Follow-up: TEMA.		
60. Samsung Electronics Communications	Haryana State Electronics Development Corp	Transfer of technology Financial participation
Project: Technology transfer for selected transmission products: radio paging systems, optical fibre couplers and connectors, 18GHz radio equipment, intelligent switching multiplexers.		
Follow-up: Samsung to review possibility of buyback; Hartron to provide company profile; MOU foreseen.		
61. Samsung Electronics Communications	Vintek RF Products	Technical collaboration Joint venture
Project: Digital multi-access radio relay for telecommunication equipment.		
Follow-up: Forwarded for further discussion within Samsung.		
62. Samsung Electronics Communications	L & T	Information exchange
Project: Information on each company's product range.		
Follow-up: Samsung to forward company profile and product leaflets.		
63. Samsung Electronics Communications	On Watch	Financial participation Joint venture
Project: Business partnership to develop night vision devices for developing country markets.		
Follow-up: Suitable Korean partner to be sought.		

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
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Sri Lanka

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| 64. Sri Lanka
Telecom
Communications | ITI | Technology
transfer |
| Project: | Feasibility study on assembling telephones and small-scale switches, and manufacturing electronic components with a view to technology transfer and possible joint venture with local Sri Lankan manufacturers. | |
| Follow-up: | Within one or two months. | |
| 65. Sri Lanka
Telecom
Communications | Mekaster
Telecom | Technology
transfer
Joint venture |
| Project: | Feasibility study for Sri Lanka manufacture of MDF and CCT boxes. | |
| Follow-up: | Market survey and feasibility report. | |
| 66. Sri Lanka
Telecom
Communications | Crompton
Greaves | Joint venture |
| Project: | Sri Lanka assembly and manufacture of small-scale PABXs and telephone instruments under joint venture arrangements with local Sri Lankan manufacturers. | |
| Follow-up: | Feasibility report within two months. | |
| 67. Sri Lanka
Telecom
Communications | TEMA | Technology
transfer
Joint venture |
| Project: | Transfer of jelly-filled cable technology and supply of materials under joint venture arrangements. | |
| Follow-up: | TEMA will advise on suitable partner. | |
| 68. Sri Lanka
Telecom
Communications | C-DOT | Technology
transfer
Joint venture |
| Project: | (i) Feasibility study by C-DOT engineers on requirements and adaptability of C-DOT technology in the Sri Lanka network; (ii) installation of trial systems. | |
| Follow-up: | Action within one months. | |

Indian counterpart Proposer or main beneficiary	Organization	Type of cooperation
69. Sri Lanka Telecom Communications	Gujarat Narmada Valley Fertilisers	Study tour
Project:	Study tour on repair, maintenance and manufacturing of various types of PCB switches.	
Follow-up:	TEMA.	
70. Sri Lanka Telecom Communications	Eltec	Feasibility study
Project:	Feasibility study on: (i) assembling telephones, PABX and subscriber equipment, with option to manufacture components locally; (ii) manufacturing PCBs and modernization of exchange equipment.	
Follow-up:	Within one or two months. TEMA to follow up.	

WORKSHOP FOR ASIA AND PACIFIC REGION REPRESENTATIVES
FROM THE TELECOMMUNICATION INDUSTRY
(THROUGH PARTICIPATION AT 'ELECTRONICS '92' - ELECTRONICS
AND TELECOMMUNICATIONS FAIR)

New Delhi, India

24-27 September 1992

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