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Workshop on Technological Integration
of the Telecommunications Industry
in Latin America and the Caribbean
Caracas, Venezuela
21-23 June 1993

REPORT*

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* Mention of company names and commercial products does not imply the endorsement of UNIDO. This document has not been edited.

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INTRODUCTION

The Workshop on Technological Integration of the Telecommunications Industry in Latin America and the Caribbean was held from 21 to 23 June 1993 at the Headquarters of the Latin American Economic System (SELA) in Caracas, Venezuela. The Workshop was organized by the United Nations Industrial Development Organization (UNIDO) in cooperation with SELA, and was attended by 25 participants from 8 Latin American and Caribbean countries and 7 regional and international organizations.[1]

The main objective of the Workshop was to provide SELA, the Bolivar Programme and other interested parties with assessed information on the status of the telecommunications industry in order to facilitate policy decisions on its future development. In this respect the Workshop addressed the following issues:

(i) Promotion of local and regional manufacturing of telecommunications equipment;

(ii) Promotion of local and regional R&D programmes and centres with the aim of sharing resources in the context of the Bolivar Programme;

(iii) Modalities for promoting regionally accredited testing and certification centres; and

(iv) Networking arrangements for telecommunications design and manufacturing institutions.

I. AGREED CONCLUSIONS AND RECOMMENDATIONS

The participants welcome the initiative taken by the United Nations Industrial Development Organization (UNIDO) and the Latin American Economic System (SELA) to organize this Workshop on Technological Integration of the Telecommunications Industry in Latin America and the Caribbean which is the first one of its kind held in the region. The Workshop requests UNIDO and SELA in cooperation with the Latin American Integration Association (ALADI) and the Bolivar Programme for Regional Technological Integration, Innovation and Industrial Competitiveness to continue this effort and seek the support of the Latin American Council and the Regional Forum on Industrial Policy in the implementation of the recommendations of this Workshop.

Considering the huge investments planned for the expansion and modernization of public telecommunications networks in the Latin American and Caribbean region and recognizing the increasing trends towards deregulation of the telecommunications sector which foresees an increased role of the private sector and competition in the provision of services, the Workshop concludes that while these changes may be inevitable in the long run, it is important for all countries in the region to take necessary steps to ensure that the anticipated investments contribute to the technological capacity of the region. Regulatory policy changes should therefore take into account the need to build national and regional capacities in telecommunications

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[1] See Annex II: List of Participants.

technologies, through research and development, testing and certification capabilities, local manufacturing and human resources development.

The Workshop recommends that UNIDO in cooperation with SELA should continue to promote contacts and consultations between the principal actors in the telecommunications field, including network operators, equipment manufacturers, research and development inscitutions, universities, the public sector and financial institutions. These consultations should aim at reaching consensus at building technological capabilities in the region in the field of telecommunications.

International and regional organizations like UNIDO, SELA, the Andean Development Corporation (ADC), the Bolivar Programme, the United Nations Development Programme (UNDP), the International Telecommunication Union (ITU), ALADI and the Inter-American Development Bank are requested to support implementation of these recommendations. In particular, the ITU is requested to support these recommendations at the World Telecommunication Development Conference to be held in Buenos Aires in 1994.

With reference to the specific points discussed, the participants made the following recommendations:

Promotion of local and regional manufacturing of telecommunications equipment

The Workshop requests UNIDO in cooperation with SELA and other concerned organizations, to develop a database on the telecommunications industry in Latin America and the Caribbean. The database which would involve adaptation of UNIDO's telecommunications industry database developed under project US/RAF/90/279, should include, inter alia, a directory of manufacturers and their products, inventory of testing and certification centres, installed and planned capacities of telecommunications networks, human resource capacities, directory of telecommunications research and development institutions, and needs and offers for transfer of telecommunications technologies under Technological Cooperation Among Developing Countries (TCDC) arrangements. The database should be installed at SELA Headquarters and made available to all 27 Member States of SELA.

It was likewise requested that UNIDO, with the collaboration of SELA, carry out studies and formulate models of upcoming scenarios of future telecommunications networks. UNIDO and SELA should interact with research and development centres in the furthering of this endeavour.

The Workshop requests that UNIDO, in cooperation with the Bolivar Programme, promote interregional cooperation in the field of rural telecommunications systems and telecommunications software. These two organizations are likewise requested to convene an interregional meeting of entrepreneurs, users and researchers on rural telecommunications technologies and telecommunications software, which will include live demonstrations of rural switches and radio systems, and PC-based demonstrations of telecommunications software developed in Asia and the Pacific and in the Latin American and Caribbean region. The meeting should aim at promoting transfer of technology through joint ventures with the support of the Bolivar Programme. The participants of Colombia proposed that the event be held at the Convention Centre in Cartagena, Colombia, in 1994, with the coordination

of UNIDO and the support of TELECOM and Centro de Investigación de las Telecomunicaciones (CINTEL).

Fundamental to this endeavour is the promotion of technological cooperation among producers and entrepreneurs of Latin America for the manufacture of telecommunications equipment. The different capabilities available in the countries of the region for the manufacture of telecommunications equipment provide technological cooperation opportunities through the transfer of technology within the framework of TCDC agreements. In this respect, it is requested that UNIDO and SELA support TCDC in the field of telecommunications equipment manufacturing by organizing meetings to facilitate bilateral negotiations among those parties interested in obtaining technology and those offering technology within the framework of TCDC agreements.

Promotion of local and regional research and development centres and programmes for the sharing of resources in accordance with the Bolívar Programme's framework

The Workshop requests that UNIDO and SELA:

- Perform a diagnosis of research and development centres in the telecommunications field;

- Encourage the exchange of human resources specialized in telecommunications and informatics, as well as further the establishment of a database on these resources;

- Advance the exchange of specialized information and encourage the holding of congresses for which technical articles related to telecommunications are published.

The Workshop requests the Bolívar Programme to secure funds to support research and development in telecommunications technologies on a grant basis. UNIDO is requested to cooperate with the Bolívar Programme in the development of research and development projects aimed at promoting technological development and local manufacturing of telecommunications equipment.

The Workshop requests the Bolívar Programme to organize a meeting of institutions involved in research and development of telecommunications and equipment manufacturers with a view to elaborating on the support that the Bolívar Programme can offer to promote cooperation between research and development institutions and equipment manufacturers. UNIDO is requested to assist in the identification of priority areas for research and development activities in the region.

Modalities for the promotion of accredited testing and certification centres at the regional level

The Workshop requests that ALADI, together with UNIDO and other pertinent organizations:

- Evaluate the situation of laboratories that provide telecommunications certifications;

- Hold a meeting of experts of accredited institutions responsible for defining the minimum condition which the laboratories must meet and those necessary for mutual acceptance of certifications;

- Draw up a proposal to be signed by the Governments in the sphere of ALADI, with an adhesion clause for the incorporation of the remaining Latin American and Caribbean countries.

Agreements for the establishment of networks among manufacturing and telecommunications entities

Although no recommendations were formulated on this specific issue, it was suggested that information be gathered in this respect for future meetings.

II. ORGANIZATION OF THE WORKSHOP

Opening of the Workshop

The Workshop was opened by Ambassador Noel Sinclair, Deputy Permanent Secretary of SELA. In his opening remarks, Ambassador Sinclair welcomed the participants to the Workshop which was jointly organized by UNIDO and SELA. He drew attention of the participants to the objectives of the Workshop as elaborated in the Aide-Mémoire prepared by UNIDO. The rapid technological changes in the telecommunications sector have re-emphasized SELA's views on the need for Latin American and Caribbean countries to accelerate the process of acquisition, adaptation and application of technologies from industrialized countries. The technological integration process is essential for the advancement of industrial development in the region. He expressed SELA's commitment to support initiatives such as the Bolívar Programme. SELA will present the conclusions of the Workshop to the forthcoming Regional Forum on Industrial Policy for the 27 Member States of that Organization.

The opening session was also addressed by a representative of the UNIDO Secretariat. He referred to the structural and technological changes that were taking place in the telecommunications industry in Latin America and the Caribbean. Underlying those changes were increasing trends towards privatization, liberalization and deregulation of the sector. He described UNIDO's Programme on Telecommunications and its main programme elements. In preparation for the Workshop, UNIDO carried out a study on 'Design, Tropicalization and Manufacture of Telecommunications Equipment in Latin America and the Caribbean'.

Election of officers

The following officers were elected:

Chairman: Mr. Delson F. Siffert (Brazil)
Director Telecomunicaciones, Asociación Brasilera Industria Electro-Electrónica

Vice-Chairman: Mr. Leo A. Boldewijn (Suriname)
Manager, Switching Systems Telephony

Rapporteur: Professor Luis J. Fernandez (Venezuela)
Facultad de Ingenieria
Universidad Central de Venezuela

Adoption of the agenda

The Workshop adopted the following agenda:

1. Presentation and discussion of main background paper on 'Design, Tropicalization and Manufacturing of Telecommunication Equipment in Latin America and the Caribbean';

2. Presentation and discussion of country papers on the status of telecommunications industry;

3. Presentation of SELA's activities in the field of technology and industrialization;

4. Presentation of the Bolivar Programme;

5. Presentation of ALADI;

6. General discussions;

7. Conclusions and recommendations.

The Work Programme is attached as Annex I. The list of documents distributed at the Workshop is provided in Annex III.

Summary of selected presentations

A representative of the Secretariat presented the main background paper entitled 'Design, Tropicalization and Manufacturing of Telecommunication Equipment in Latin America'. He emphasized the role of technological cooperation in the telecommunications industry at the regional and subregional levels in stimulating local manufacturing.

Telecommunications equipment manufacturing operations exist mainly in Argentina, Brazil and Mexico. Other countries with high potential for telecommunications equipment manufacturing include Chile, Colombia, Costa Rica and Venezuela. Key elements in enhancing manufacturing activities include human resources development and forging of strong linkages between R&D institutions and manufacturing industries.

Telecommunications services in the region were characterized by obsolescence, shortage of financial resources and inability to satisfy demand. Modernization of the telephone network and expansion to the level of 20 telephones per 100 inhabitants by the year 2000 as set out in the Acapulco Declaration would require substantial investments to the tune of US$90 billion. Latin American and Caribbean countries recognize that development of the telecommunications infrastructure is essential for economic development. The inability of Governments to mobilize required investment capital for the sector as well as coping with rapid technological advancements have resulted in the search for new models of telecommunications development. Those new models were based on a greater role of the private sector, increased competition, liberalization and deregulation.

Three principal groups were involved in telecommunications equipment manufacturing. The first group comprised multinational firms engaged in local manufacturing, assembly and system integration. In the second group were medium-sized local companies. Many of these companies were struggling to survive in the face of fierce competition from the large multinational firms. Some of the medium-sized local firms have had to redirect their efforts towards service provision and distributorship rather than manufacturing. The third group of companies comprised small-sized firms that manufacture special systems and subsystems, often on a subcontracting basis.

Argentina

Citing the case of Argentina, the representative of the Secretariat referred to the privatization of telephone services in 1991 that involved the creation of two companies, TELECOM ARGENTINA, covering the northern region, and TELEFONICA DE ARGENTINA, for the south. The new companies have embarked on major modernization programmes with massive investments. Local industry has responded favourably in meeting the external plant requirements (air conditioning, power supply, cabinets, controls, etc.) and in installation services. Most of the telecommunications equipment has been supplied by foreign multinational corporations or local manufacturing units wholly or partly owned by multinational companies. Small and medium local firms have supplied equipment for low capacity urban and rural systems.

Prospects for enhancing local manufacturing could be advanced taking advantage of market opportunities offered by subregional groupings like MERCOSUR as well as integration of local manufacturing in major projects. An example of the latter is the launching and operation of the domestic satellite NAHUEL 1.

Brazil

With a population of some 150 million people, Brazil has 10.5 million telephone lines - an average telephone density of 7 telephones per 100 population. Liberalization and privatization of the telecommunications sector have not been as aggressive as in Argentina - yet the sector is very dynamic. The markets for cellular telephones and value-added services are growing very rapidly.

Telecommunications authorities in Brazil have for many years given high priority to local equipment manufacturing - issuing technical standards and tropicalization requirements and promoting exports. Brazil has the strongest telecommunications equipment manufacturing base in the region. Although the former 'Informatics Law' limited the production of new and sophisticated equipment, nonetheless it strengthened manufacturing infrastructure. R&D prototypes were turned into industrial products and engineering schools produced highly trained engineers with capacity to absorb and adapt telecommunications technologies to the Brazilian environment.

A representative from Brazil described the set-up of the telecommunications sector in that country. Public telecommunications services were provided by TELEBRAS operating under the Ministry of Communications. TELEBRAS controls telephone operating companies. The Government holds the majority of the voting stock in TELEBRAS although private investors own some 75 per cent of the total stock.

The TELEBRAS R&D Centre (CPqD) is a prime example of successful R&D activities in telecommunications. Created in 1976, CPqD emphasized transfer of technology to industry. CPqD technological areas include:

- Digital switching;
- Services and network management;
- Optical networks;
- Intelligent networks;
- Personal and cellular communications;
- Satellite and radio systems;
- Terminals;
- Outside plant.

Colombia

Participants from Colombia described the telecommunications equipment manufacturing industry in that country. Main products include telephone sets, low capacity digital switching systems, power equipment and some components and subsystems.

The Centre for Telecommunications (CINTEL) promotes design, R&D and production of telecommunications equipment. CINTEL also promotes joint projects between service providers, equipment manufacturers and universities.

Costa Rica

Telecommunications services are provided by the Costa Rican Institute for Electricity. With connection of digital equipment to the public telecommunications network, the need arose for digital signalling converters and dual tone multifrequency receivers. These products are now produced by a Costa Rican firm which has managed to enter the export market as well.

Cuba

The participant from Cuba described the telecommunications sector in that country. Telecommunications falls under the Ministry of Communications (MINCOM). There are no plans for privatization in the short or medium terms. MINCOM supports technological development through its Institute for R&D in telecommunications. Cuba has the necessary industrial capacity to develop joint ventures with other Latin American countries in telecommunications equipment manufacturing, software and certification.

Mexico

In 1990, Mexico transformed its public telephone company, TELMEX, from a Government monopoly to a private monopoly with a concession extending up to 1996. Liberalization of telecommunications equipment imports had a devastating impact on some medium-sized local manufacturing companies. Some of these companies have been driven out of business by the multinational firms.

The launching of the Morelos Satellite System in 1985 provided important alternatives especially for business communications. Expansions in the satellite sector are planned for early 1994.

Industrial incubators and technology parks are expected to play an increasingly important role in supporting industrial development. The Mexican Institute of Communications (IMC) actively promotes local manufacturing of telecommunications equipment as well as telecommunications software. Among projects supported by IMC are those related to manufacturing of micro-satellites. IMC is also establishing a Project Development Unit with the support of UNDP to link telecommunications industries with Government agencies and R&D centres in the country with a view to promote local production of telecommunications equipment and software.

Peru

Important institutions in the telecommunications sector operating under the Ministry of Transport, Communications, Housing and Construction are:

(i) Instituto Nacional de Investigación y Capacitación de Telecomunicaciones (INICTEL) - responsible for promoting research and training;

(ii) Organismo de Inversión Privada en Telecomunicaciones (OSIPTEL) - supervises trade operations;

(iii) Empresa Nacional de Telecomunicaciones del Peru, S.A. (ENTEL PERU, S.A.) - service provider fully owned by the Government; and

(iv) Compañia Peruana de Teléfonos, S.A. (CPT, S.A.) - a private telecommunications service provider.

Manufacturing activities in Peru are very limited. Emphasis has been on technological development in which INICTEL has implemented several projects.

Regional institutions

Representatives of SELA, the Bolivar Programme and ALADI made presentations on the activities of those institutions.

Offers and needs for technological cooperation

Participating countries presented their offers and needs for technological cooperation as shown below:

Brazil

TELEBRAS and ABINEE offer

(i) TROPICO - a medium and high-capacity digital switching system designed for the operating conditions of the region;

(ii) Low-capacity switching exchanges. A number of Brazilian industrial firms are developing and producing low-cost, computer-controlled switching exchanges to meet the needs of regions with low population density;

(iii) SAU - a subscriber access system - for use in situations of limited traffic per subscriber;

(iv) CLAD - a distributed-subscriber line concentrator to provide a low-cost solution to the needs of small communities and rural settlements;

(v) TP-CARTAO - a card-operated public telephone, using inductive technology and adapted to the operating conditions of the region;

(vi) APL-2 - a radio-digital transmission system with two voice channels, occupying the same frequency band as traditional single-channel equipment. For application in rural areas;

(vii) Utilization of the infrastructure. What is involved is the adaptation of systems already developed and available on the world market for the purpose of maximizing the use of the telecommunications networks of the countries of the region.

Among the possible subjects to be taken up under this heading, the following in particular may be mentioned:

- Network management and services;
- Intelligent networks;
- Introduction of fibre optics in telecommunications systems;

(viii) Testing and certification. Testing and certification activities in respect of telecommunications systems and equipment, particularly those incorporating software, are becoming a major challenge to the telecommunications authorities of the region. The investments required are high and the technical complexity of the task is daunting. Regional cooperation in this area, which would unquestionably be to the advantage of all the participants, might take the form of exchanges of:

- Testing software;
- Testing procedures;
- Training courses.

Colombia

TELECOM offers

(i) The Testing and Certification Centre, providing regional coverage, under the Department of Technology Services;

(ii) The Technology Institute for Electronics and Telecommunications (ITEC) as a regional centre for R&D and training;

(iii) Public telecommunications enterprises offer advisory services on the setting up of information systems;

(iv) CINTEL is prepared to promote and implement bi-national cooperation projects in the telecommunications area.

Requirements

(i) Colombian businessmen wish to explore joint projects with Latin American enterprises in the area of switching and radio systems (mono-hexagonal and 30-channel);

(ii) There is a need for information and experience in network management;

(iii) There is need for experience regarding information systems for the telecommunications sector.

Costa Rica

Offers

Production capacity for:

(i) Digital systems (MUX PCM 2 Mbits/sec. CEPT) for interconnecting the new digital exchanges with existing analog exchanges that still have a long service life;

(ii) Intelligent converters and signalling systems with the ability to convert line and register signalling: decade-type, R2-MFC, ANI subscriber identification, CI, and others;

(iii) Electronic cards to permit electro-mechanical exchanges to receive multi-frequency touch-tone dialling pulses.

Requirements

(i) Advice on the approval and certification of telecommunications equipment;

(ii) Exploration and cooperative production of digital equipment.

Cuba

Offers

(i) Industrial capacity and technical potential for carrying out joint work in the production, testing and certification of equipment;

(ii) Production of capacity for:

- Photovoltaic energy systems;
- Quartz resonators;
- Electronic equipment in general.

Requirements

(i) Cooperative production of digital exchanges;

(ii) Cooperative production of digital radio-relay and MIC systems;

(iii) Cooperative production of telephone cables;

(iv) Utilization of domestic stations (VSAT);

(v) Network digitalization;

(vi) Development of a data transmission network;

(vii) Development of cellular telephone systems;

(viii) Development and application of software for communication systems.

Peru

Offers

(i) The National Institute for Telecommunications Research and Training (INICTEL) is the only State institution in the telecommunications area that has the necessary infrastructure to carry out work in:

- Research and development in technology, and to some degree, the testing and certification of telecommunications equipment;
- Training of human resources in advanced technology both in the area of telecommunications and in that of data processing;
- Preparation of telecommunications engineering studies and projects;

(ii) Digital telephone exchange (ENTEL-PERU):

- 200 subscribers;
- 1,000 subscribers;

(iii) Work in cooperation with other countries in the area of digital signal processing:

- Word codification;
- Text-word;
- Word recognition.

Requirements

(i) Cooperation for completing the 4,096-subscriber digital telephone exchange;

(ii) Advisory assistance on the approval and certification of telecommunications equipment;

(iii) Advisory assistance with regard to rural communications (VHF, UHF, and satellite systems).

ANNEX I

Workshop on Technological Integration of the Telecommunications Industry in Latin America and the Caribbean
Caracas, Venezuela, 21-23 June 1993

WORK PROGRAMME

Monday, 21 June 1993

09.00-09.30	Registration of participants
09.30-10.00	Opening of the Workshop Remarks by UNIDO and SELA representatives
10.20-11.30	Election of Chairman, Vice-Chairman and Rapporteur Presentation of main background paper on 'Design, Tropicalization and Manufacturing of Telecommunications Equipment in the Latin American and Caribbean Countries' by UNIDO Consultant
11.30-12.30	General discussion
14.30-16.00	Presentation of country papers by participants
16.30-17.30	Continuation of presentation of country papers by participants followed by general discussion
17.30	Adjournment

Tuesday, 22 June 1993

09.30-10.00	Presentation of SELA's activities in the field of technology and industrialization by SELA Permanent Secretariat
10.00-10.30	Presentation of the Bolivar Programme by Bolivar Programme Secretariat Discussion
11.00-12.30	Continuation of presentation of country papers and presentation by ALADI Discussion
14.30-16.00	Discussion on (i) Promotion of local and regional manufacturing of telecommunications equipment; (ii) Promotion of local and regional R&D programmes and centres with the aim of sharing resources in the context of the Bolivar Programme; (iii) Modalities for promoting regionally accredited testing and certification centres; (iv) Networking arrangements for telecommunications design and manufacturing institutions.
16.30-17.30	Continuation of discussions and draft conclusions and recommendations
17.30	Adjournment

Wednesday, 23 June 1993

10.30-12.30	Discussion on draft conclusions and recommendations
16.00-17.00	Adoption of conclusions and recommendations
17.00-17.30	Closing of Workshop

ANNEX II

WORKSHOP ON TECHNOLOGICAL INTEGRATION OF THE TELECOMMUNICATIONS INDUSTRY IN LATIN AMERICA AND THE CARIBBEAN, CARACAS, VENEZUELA, 21 TO 23 JUNE 1993

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LISTA DE DOCUMENTOS

LIST OF DOCUMENTS

Taller sobre Integración Tecnológica de la Industria de las Telecomunicaciones en América Latina y el Caribe (Caracas, 21-23 de junio 1993)

Documentos de Trabajo

- Agenda, (SP-ONUDI/TELALC/DT No.1);
- Programa de Actividades, (SP-ONUDI/TELALC/DT No.2, Rev. 1);
- Work Programme, (SP-ONUDI/TELALC/DT No.2, Rev. 1);
- Diseño, Tropicalización y Fabricación de Equipo de Telecomunicaciones en los países de América Latina y el Caribe, (SP-ONUDI/TELALC/DT No.3);
- Design, Tropicalization and Manufacturing of Telecommunications Equipment in the Latin American and Caribbean Countries(SP-ONUDI/TELALC/DT No.3);
- Conclusiones y Recomendaciones, (SP-ONUDI/TELALC/DT No.4).
- Conclusions and Recommendations, (SP-ONUDI/TELALC/DT No.4).

Documentos Informativos

- Lista de Participantes, (SP-ONUDI/TELALC/Di No.1, Rev.1);
- Intervención Inaugural del Embajador Noel Sinclair, Secretario Permanente Adjunto del Sistema Económico Latinoamericano (SELA), (SP-ONUDI/TELALC/Di No.2);
- Opening Remarks by Dr. Geoffrey Mariki, United Nations Industrial Development Organization (UNIDO), (SP-ONUDI/TELALC/Di No.3);
- Monografía de Costa Rica sobre la Industria de las Telecomunicaciones, (SP-ONUDI/TELALC/Di No.4);
- Brasil, Monografía del País, (SP-ONUDI/TELALC/Di No.5);
- Brasil, Country Paper, (SP-ONUDI/TELALC/Di No.5-A);
- Documento de Presentación de la Secretaría de la ALADI, (SP-ONUDI/TELALC/Di No.6);
- Monografía sobre la Industria de las Telecomunicaciones en Cuba, (SP-ONUDI/TELALC/Di No.7);
- La Industria de las Telecomunicaciones en el Perú, (SP-ONUDI/TELALC/Di No.8);
- Centro de Investigaciones de la Telecomunicaciones (CINTEL), Colombia - Presentación General, (SP-ONUDI/TELALC/Di No.9);
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- Industria de las Telecomunicaciones en Colombia, (SP-ONUDI/TELALC/Di No.10);

- Ofrecimientos y Requerimientos de los Paises Participantes, (SP-ONUDI/TELALC/Di No.11).
- Folletos