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Workshop on Technological Services
Delivery System (TSDS)

Vienna, Austria, 10-13 December 1985

REPORT*

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LIST OF ABBREVIATIONS

ACC	Advisory Committee on Co-ordination
ASEAN	Association of South East Asian Nations
BOI	Board of Investment
BPMB	Bank Pembangunan Malaysia Berhad
BSMI	Bureau of Small and Medium Industries
CCU	Central Co-ordinating Unit
CDB	Caribbean Development Bank
CITC	Cottage Industries Technology Center
CRDC	Ceramics Research and Development Center
CTCS	Caribbean Technological Consultancy Services
DTTB	Development and Transfer of Technology Branch
EOMMEH	Greek Organization for Small and Medium Size Enterprises
FRIM	Forest Research Institute of Malaysia
FTD	Food Technology Department
GSRT	General Secretariat of Research and Technology
HRD	Human Resource Development
IFCT	Industrial Finance Corporation of Thailand
INTIB	Industrial Technology Information Bank
ISI	Industry Service Institute
MARDI	Malaysian Agricultural Research and Development Institute
MEDEC	Malaysian Entrepreneural Development Centre
MIDF	Malaysian Industrial Development Finance Berhad
MITI	Ministry of International Trade and Industry
MOI	Ministry of Industry
MOSTE	Ministry of Science, Technology and Energy
NACIDA	National Cottage Industries Development Authority
NPC	National Productivity Centre
RAC	Regional Advisory Services
R+D	Research and Development
SBAC	Small Business Advisory Center
SIFO	Small Industry Finance Office
SIRIM	Standards and Industrial Research Institute of Malaysia
SMEA	Small- and Medium-Scale Enterprises Agency
SMI	Small and Medium Industries
SMSE	Small and Medium Size Enterprises
SSE	Small Scale Enterprises
TISTR	Thailand Institute of Scientific and Technological Research
TRI	Technology Resource Institute
TSDS	Technological Services Delivery System
UNIDO	United Nations Industrial Development Organization

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I. CONCLUSIONS AND RECOMMENDATIONS

1. Through the discussions and exchange of views, the Workshop reached the following conclusions and recommendations:

(a) The SMIs play an important role in fostering development of developing countries. There is a direct linkage between the development of SMIs and the over-all development process of the countries.

(b) Accordingly, it is recommended that the provision of technological services to respond to and satisfy the needs of SMIs should be given high priority in the national economic and industrial development programmes.

(c) In most cases, a fairly high level of technological capability does exist in the developing countries, which should serve as a starting point for building up and strengthening to meet the needs of SMIs.

(d) The Workshop recommends that such existing capabilities be identified and assessed in order that they may be mobilized in a systematic manner to serve the SMIs, particularly in the rural areas.

(e) As a pragmatic approach to link the locally available technological capabilities to serve the needs of SMIs, the Workshop felt that TSDS is a viable concept.

(f) However, it is recommended that the TSDS should be tailored to suit the particular conditions, level of development, existing capabilities and priority sectors of the industrial development policies in each country, sub-region or region.

(g) The Workshop has proposed a framework for setting up a TSDS. It is recommended that the framework be used as a guideline for formulating similar systems in other developing countries.

(h) In building up the TSDS, it is recommended that other programme activities - such as human resource development, institution-building, information services, etc. - be integrated in a mutually supplementary and complementary manner.

II. VENUE

2. The Workshop on Technological Services Delivery System (TSDS) was held from 10 to 13 December 1985 at the UNIDO Headquarters in Vienna, Austria.

III. ATTENDANCE

3. The Workshop was attended by 9 participants from six countries including the donor country, and a representative from the UN Centre for Science and Technology for Development. The List of Participants is attached to this report as Annex A.

IV. INTRODUCTION

4. The need to strengthen technological capabilities is being increasingly recognized as the fundamental precondition for a sound and fruitful industrial and economic development in the developing countries. During the past years much work in international development cooperation has been undertaken in this respect on basic levels by the governments themselves. The number of institutions and organizations established, and the multifaceted spectrum of training programmes organized by or for the developing countries are good indications of these efforts. The increased flow of information, another important aspect, has also been tackled quite intensively, resulting in the creation of a number of information centres and information services in the developing countries.

5. When, however, analyzing and assessing these efforts and more important their anticipated impact on the economic and industrial development of the country, there seems still much more to be desired. Specifically, there appears to be a lack of (some) interlinkage and interaction between and among those measures in the fields of human resources, institution building and information services, that could bring about positive benefits to the maximum extent possible in responding to the needs, especially of the small and medium industries (SMIs) sectors.

6. The integration of the various institutions and organizations into a viable "Institutional Infrastructure" is often missing. An object-oriented programme of manpower building to meet the medium and long-term needs of the industrial development orientation in general and of the priority industrial sectors in particular, is lacking. Information systems may have been established but not trimmed to focus sharply on the priority development objectives and policy orientation of the country.

7. With the financial support of the Government of Japan, UNIDO had undertaken a pilot project "Strengthening and Modernization of the Technological Performances of Small and Medium Industries in Selected Countries of the ESCAP Region". The basic concept of this pilot project was to seek ways and means of mobilizing locally existing technological capabilities, in a coordinated manner by providing required services and thus strengthening and modernizing the technological performances of the small and medium industries (SMI).

8. The TSDS concept foresees the setting up of a supportive network-mechanism interlinking technological capabilities available in indigenous technological resource institutions (TRIs' with the SMIs, and thus promote the self-reliance of developing countries at the national level. In outline, it involves designating a central coordinating unit (CCU) and a number of regional advisory centres (RAC's) which would provide various services to the SMIs in the respective regions, and form a linkage between the SMIs and the TRIs. The regional advisors attached

to the RACs, with the support and cooperation of the appropriate TRIs, would assist the SMI entrepreneurs in identifying plant-level problems, diagnose operational weaknessess, provide managerial, financial, marketing and technical counselling, and pinpoint areas of possible improvement. Problems beyond the scope of the RACs and/or the TRIs would be referred through the CCU to appropriate external sources such as UNIDO, whose assistance would be carried out together with the relevant TRIs and the RAC officials, to ensure that the expertise remains within the country in the form of accumulated experiences at the TRIs.

9. Through such grass-root level activities, the TRIs would be able to come face to face with problems of the SMIs, hence formulate more realistic and useful work programmes, including priority subjects and areas of R+D needs and thus best serve the SMIs and the overall industrial development of the country.

10. Activities related to the implementation of the pilot project at a national level in the Philippines and its extended application at a subregional level in the Caribbean, seems to have demonstrated the viability of the concept. However, it has been made clear that the two cases were specific examples of tailored approaches, suitable in its form only for the respective country or subregion.

11. As a follow up to the Vienna Programme of Action on Science and Technology for Development and its Operational Plan, the UN Advisory Committee on Science and Technology for Development (UN-ACSTD) orgnized a Panel Meeting on "Reinforcement of Linkages between Research and Development Activities at the National and International Levels as well as within the UN System" in Lima, Peru. The experiences of the TSDS in the Philippines and the Caribbean Sub-region were presented and discussed in connection with user-oriented technology delivery mechanism. The Panel considered TSDS to be an effective apprcach, and strongly recommended for promotion in the form of Pioneer Projects.

12. Furthermore, there were other forms of delivery systems being implemented in other countries with similar basic concepts for maximum utilization of local expertise, and the experiences of these programmes would definitely contribute to the improvement of the TSDS concept.

V. OBJECTIVES

13. The Workshop had the following objectives:

(a) To exchange views on the experiences obtained through project activities in the Philippines (TSDS) and in the Caribbean (CTCS), as well as other technology delivery systems;

(b) To discuss whether any improvements can be made in linking small and medium industries particularly in rural and remote areas with existing R+D and related services provided by existing institutions;

(c) To develop a model prototype project framework and guidelines that could serve as a basis for application of the concept in other countries and/or regions;

(d) To recommend ways and means of promoting the project concept.

VI. PROGRAMME AGENDA

14. The Work Programme of the Workshop is attached as Annex B. The Working Group had before them a number of reports and papers as per list of documents attached as Annex C.

VII. OPENING OF THE MEETING

15. On behalf of the Director-General of UNIDO, and the Director for Industrial Studies, the Special Technical Adviser welcomed the participants and referred to the priority concerns of the UNIDO Technology Programme to focus on building up and

strengthening the technological capabilities of the developing countries in order to promote technical self-reliance and accelerated industrial development. In this respect, he referred to the need to create and strengthen the inter-linkages between R+D and other institutions and industries, particularly the small and medium ones in the rural and remote areas. He indicated that the TSDS was an excellent mechanism that could contribute to the above and expressed his hope that the Workshop could give due consideration on how the present TSDS concept could be improved to best serve the needs of the developing countries.

16. Mr. S. Nagaoka , Deputy Director of the International Trade Policy Bureau, Ministry of International Trade and Industry, expressed his gratitudes to UNIDO for having taken up the important subject of small and medium industries which was also a priority area in Japan. He explained how technology services delivery was implemented through various ways and means to best serve its purpose including, for instance, the network formed by the Japan Chamber of Commerce and Industries with over 500 district and regional chambers covering the whole country down to the levels of the cities and towns. In looking into the results of UNIDO's programme of activities, he felt the TSDS/CTCS seemed to be an effective approach to support the needs of the small and medium industries in the developing countries. He expressed his hope that he could benefit from the discussions of the workshop and also his readiness to share the experiences of Japan with the participants for the benefit of all.

17. Ms. H. Morita-Lou, on behalf of the UN-Centre for Science and Technology Development (UN-CSTD) gave a historical review of the subject emerging directly from the Vienna Programme of Action on Science and Technology for Development (VPA) and the relevant action taken by the Advisory Committee on Science and Technology for Development assisted by UN-CSTD. She further referred to the efforts of the UN agencies within the framework of the ACC (Advisory Committee on Coordination) Task Force on Science and Technology for Development, to develop and implement joint activity projects, one of which deals specifically with the subject of the present workshop, as follow up to the UN Conference and the implementation of the VPA adopted by it. She felt that the Workshop was an important phase of the work being undertaken by various sources in

this connection and expressed her hopes that the outcome would prove to contribute positively in identifying practical means of linking the institutions with the productive sectors, especially in the developing countries.

18. The Head of the Development and Transfer of Technology Branch, in his keynote speech outlined the TSDS concept, and gave a historical perspective of its origin. The development of the concept was traced from an experimental project in the Philippines in 1977-1978, to its designation as a key pilot programme by the ACC Task Force on Science Technology for Development in 1983-1984. After demonstrating the importance of a TSDS type of mechanism in the industrial development process of developing countries, the objectives of the Workshop were presented to motivate subsequent discussions.

19. Each participant presented case studies of TSDS or similar types of experiences in their respective countries. Summaries of these presentations are given below and the full texts are available as individual documents.

VIII. TECHNOLOGICAL SERVICES DELIVERY SYSTEM (TSDS) - THE PHILIPPINE EXPERIENCE

20. In March 1978, the Philippine Government, with the financial support and assistance from the Government of Japan through UNIDO, implemented the TSDS Project, which was primarily concerned with developing a linkage mechanism between Metro Manila based Technology Resource Institutes (TRIs) and rural SMIs in the woodworking, food processing and metalworking sectors.

21. The project was spearheaded by the Bureau of Small and Medium Industries (BSMI) which had Small Business Advisory Centers (SBACs) in each of the twelve regions of the Philippines. The SBACs were staffed by an average of ten small business consultants who advised their clients in marketing, sources of financing assistance, accounting systems, production management and general quality control procedures. However, the SBAC staff possessed very limited technical expertise. The project proposed the participation by five TRIs which were not represented in the regions through field offices. These TRIs were as follows:

(a) The Forest Products Research and Industries Commission for woodworking industries (FORPREDICOM);

(b) The Metals Industry Research and Development Center (MIRDC);

(c) The Department of Food Science and Nutrition, College of Home Economics, University of the Philippines (UP-Diliman);

(d) The Department of Food Science and Technology, College of Agriculture, University of the Philippines (UP-Los Banos);

(e) Food Technology Research Department, National Institute of Science and Technology (NIST).

22. UNIDO fielded a project manager, a metalworking expert and a food processing expert.

23. The activities carried out preparatory to designing a TSDS were as follows:

(i) An assessment of the needs of SMIs for technical assistance as well as the identification of opportunities for development. Fifteen SMIs representing each of the three sectors were studied and direct discussions were held with the entrepreneurs and managers of the enterprises;

(ii) A survey on the capabilities of the TRIs to provide technical assistance and other services;

24. As a result of the preparatory activities and comparison of the SMI needs with the TRI capabilities, the BSMI the SBACs and the TRIs determined that the following were the modes for providing technical assistance.

(a) Plant level consultancy.
(b) Technical training.
(c) Technical information dissemination.

25. It was decided that the SBACs would act as the link between the SMIs and the TRIs during the implementation of technical assistance projects. It was also decided that the BSMI head office would act as the central coordinating unit for the TSDS. To upgrade the capability of the SBACs in performing functions such as problem identification, documentation and the referral of problems to TRIs, as well as and the organization of training programmes, it was decided that the SBAC staff members would undergo specific technical training programmes. These training programmes were designed to provide the SBAC staff with the technical background to meet the requirements of the system. The training programmes implemented were a combination of a short term formal training programme held in Metro Manila and an extensive on-the-job training in the field.

26. In order to enhance the effectiveness of the TSDS programmes it was decided that the following strategies be test implemented:

(a) The utiiization of training programmes to enhance the awareness of SMI entrepreneurs on technological options and opportunities for improving plant operations. It was believed that the SMI entrepreneur must first have an idea of how his operations compare with better ones before he can request for specific technical assistance services.

(b) During the training programmes, the recommendations on new production methods and processes were tied up to profitability, cost reduction, etc. Furthermore these processes and techniques introduced were demonstrated to the entrepreneurs. This led to an easier acceptance and understanding by the entrepreneurs.

(c) A cost sharing scheme between the SMIs and the BSMI was adopted for the implementation of technical assistance projects.

(d) Projects which were implemented through industry associations were developed, especially those related to the establishment of common service facilities. Support for the formation and strengthening of industry associations was also adopted as a strategy.

27. Pilot programmes were implemented with a view to identifying weaknesses in the TSDS. At the end of the pilot programme's implementation, the BSMI found it necessary to allocate special funds to finance the continuation of TSDS activities for the woodworking, metalworking and food processing sectors. This was done in recognition of the apparent usefulness of the TSDS and in view of the limited flexibility in budget programming of the TRIs.

28. In the last quarter of 1981, the TSDS concept was adopted for implementation by the National Cottage Industries Development Authority which is well known as the NACIDA. Like the BSMI the NACIDA is represented in each region of the Philippines by its field offices which are staffed by around fifty personnel. NACIDA's field offices assist clients in finding financing assistance, raw materials procurement, equipment importation, market development, organizational development and also provides technical assistance to its clients.

29. NACIDA developed a technology development and delivery programme which was spearheaded by the Cottage Industries Technology Center (CITC), which was one of NACIDA's departments. The CITC has facilities on woodworking, metalworking, bamboocraft, rattancraft, fibercraft and ceramics and is in itself a TRI. Its main activities are as follows:

(a) Provision of technical support to NACIDA field offices.

(b) Implementation of skills training programmes.

(c) Implementation of process research and equipment development projects.

(d) Packaging and dissemination of technical information.

(e) Establishment of regional training centres.

30. NACIDA also established linkages with other technology resource institutions following the example set earlier by the BSMI. Aside from the five (5) TRIs mentioned earlier in this paper, the NACIDA also established linkages with the following institutions:

(a) The Ceramics Research and Development Center (CRDC) at Bicutan, Taguig, Metro Manila;

(b) The Philippine Textile Research Institute (TRI) at Bicutan;

(c) The Design Center Philippines at Ermita, Metro Manila.

IX. CARIBBEAN TECHNOLOGICAL CONSULTANCY SERVICES NETWORK (CTCS) PROJECT

31. The Caribbean Technological Consultancy Services Network (CTCS) was conceived as a "mechanism by which the knowledge and skills accumulated but scattered throughout the Caribbean countries could be mobilized and applied to the needs of Caribbean industry and, where appropriate, adapted and transferred to productive enterprises to make them more responsive to market opportunities, local circumstances, and more self-reliance". In essence the CTCS Network was intended to complement the existing Technical Information Service of the Caribbean Development Bank's (CDB) Technology and Energy Unit (TEU), providing "the 'show-how' component that is needed to ensure that information available from documents and other sources is applied, effectively used and transferred into 'know-how' at the enterprise level".

32. The declared objective of the Pilot Project was the development and demonstration of CTCS as a means of increasing the efficiency and effectiveness of existing nationally-owned or controlled industries, as well as of the capacity for technological self-reliance. This project differs from the Philippine experience which operated at the national level whereas the CTCS Network project operated at the regional level. The beneficiaries are CDB borrowing member countries which are 17, with a total area of 104,977 square miles and a total population of 5,621,517.

33. The CTCS Network was launched in March 1982 with the convening of a meeting of representatives of development banks and major technical institutions of the region drawn from Antigua, Barbados, Belize, Guyana, Jamaica, St. Lucia and Trinidad and Tobago. The Network operated on the basis of each resource institution contributing 60 free man/days per year in the provision of technical services; the CDB/TEU as co-ordinator, meeting such expenses as travel, per diem and honorarium. The client making the request is expected to pay a flat fee of $500 in local currency. This ensured that all countries were able to participate regardless of their foreign exchange problem. For the pilot phase the target sectors were garment, agro and furniture manufacturing.

34. To date the Network has processed 357 requests of which 86 required technical assistance in the field. Network staff comprised of two extension officers, an experienced industrial engineer and an experienced food scientist under the coordination of the CDB/TEU Project Officer as the co-ordinator. In its mode of operation the extension officers travel every 8-12 weeks to different member countries to visit manufacturing enterprises and so identify technical assistance needs. It has been found from the experience of the technical information services that the requesters frequently needed assistance to define their needs, and the use of experienced technical extension officers satisfied this need. These requests are then channelled to the co-ordinator, or where it is not arising from extension activity in the field it is channelled through the Referral Centres (RC) to the CTCS Network Co-ordinator who, with assistance from the Resource Institutions (RI) and other centres of expertise provides the information sought and/or identifies resource persons to provide the TA required. Information and TA, where applicable, are provided directly from CDB's Technical Information System (TIS) data base and from staff resources. Technical assistance provided is limited to 15 man/days inclusive of report preparation. Since its inception the Network has been funded from various sources, as tabled below:

NETWORK EXPENDITURE BY FUNDING SOURCE)

(US$'000)

PERIOD	CDB	USAID	UNDP	IDRC	TOTAL
1982-1984	158	122	-	-	280
1985-1987	321	-	15	466	787

35. In reviewing our experience some of the problems/issues the Network faced were:

(a) the identification and procurement of funds to establish the permanent Network;

(b) the identification of clients willing to pay the fee;

(c) the identification of the right resource person for an assignment;

(d) the level of appropriateness of equipment of the client, which were frequently found very old;

(e) the limits of effectiveness of short-term technical assistance;

(f) the promotion of the Network throughout the territories; and

(g) the difficulty to provide managerial assistance especially in owner managed enterprises.

36. In concluding the disseminating, evaluating and sharing of information, in "hands-on" exposure of technical personnel, in transfer of appropriate technology, in the mobilization of professional personnel of the region to solve technical problems, the CTCS has already made a significant impact. Thoughts are now being given to the self-financing of the Network after 1987.

X. TECHNOLOGICAL SERVICES DELIVERY SYSTEM - THE MALAYSIAN EXPERIENCE

Introduction

37. In recent years, Malaysia has come to realize the importance of small-scale enterprises (SSEs) as an important contributor to the economic development process of the country. Attention is increasingly being paid to finding ways of enhancing the efficiency of SSEs with the objective of ensuring their long-term viability. One way of achieving this objective is through the access to and adoption of relevant technologies.

Background

38. The New Economic Policy adopted by the Malaysian Government in 1971 brought Bumiputras (indigenous population) into the economic activity, placing emphasis on the industrial/manufacturing sectors. This has been achieved through the involvement of Bumiputras in SSE activities. Given the multitude of agencies participating in the programme and the inability to identify the target groups, the assistance given by these agencies was often overlapped and there were also problems of co-ordination.

39.

Summary of The Malaysian Experience

A. Introduction

- Realization of importance of SSE as contributor to economic development process;
- Finding ways of increasing efficiency of SSE objective - to ensure its long term viability;
- Mode - access and adoption of technology.

B. Background

- New Economic Policy of Government 1971, i.e. bringing Bumiputras into economic activity (emphasis - industrial/manufacturing sector)
- Mode - achieved through involvement in SSE;
- Presence of multitude of agencies in programme because of inability to identify target groups;
- Overlapping of assistance given by agencies;
- Co-ordination problem.

C. Strategy for overcoming problems

A project with integrated/total package approach was conceptualized and four manufacturing sectors were identified:

- food processing;
- light engineering;
- construction material; and
- wood, rattan and bamboo products.

D. The project

1. Objective:

- expand and rationalize technological assistance programmes to SSEs, and strengthen institution's force in providing programmes;

- improve co-ordination of financial and technical services to Bumiputra entrepreneurs for full range of services to modernize their enterprises.

2. Executing Agencies identified to provide Technical Assistance

(i) Credit Component - Apex Institution

- Bank Pembangunan Malaysia Berhad
(BPMB - Development Bank of Malaysia)

(ii) Technical Component - Technical Assistance

- National Productivity Centre (NPC)

- Malaysian Agricultural Research and Development Institute Food Technology Department (MARDI/FTD)

- Standards and Industrial Research Institute of Malaysia (SIRIM)

- Malaysian Entrepreneurial Development Centre (MEDEC)

- Small Enterprise Division, Ministry of Trade and Industry (SED.MTI - Co-ordinator)

- Forest Research Institute of Malaysia (FRIM)

(iii) Training - all professional personnel involved in executing the project.

3. Type of service provided	Agencies
a. Training on management and entrepreneurship	MEDEC
- Training and guidance towards the creation/instilling business ideas	
- Training on upgrading and motivation of entrepreneurs	NPC
- Management training for upgrading on expertise/knowledge in matters of finance, procedures, and management.	MPC
b. Technical training and upgrading of expertise on technical knowledge	
- Food processing	MARDI
- Wood based industries, bamboo and rattan	FRIM
- Light engineering, welding, plastics ceramics and other manufacturing industries	SIRIM
c. Guidance/Advisory Services	
- Aspects of management on bookkeeping and effective marketing	NPC
- Technical aspects in establishing factories and modernization processes e.g. choice of material, machines, etc.	MARDI, FRIM, and SIRIM

d. Consultancy services on problems faced

- Management problems	NPC
- Other operational problems	NPC
- Analysis and production/quality control	MARDI (FTD), SIRIM, FRIM whichever is applicable according to industry

XI. TECHNOLOGY SERVICE DELIVERY SYSTEM FOR SMALL AND MEDIUM INDUSTRY IN THAILAND

40. The important role of SMI has long been recognized in Thailand. Agencies for the promotion of small industries in the Ministry of Industry (MOI) had been set up i.e. the small Industry Service Institute (ISI) and the Small Industry Finance Office (SIFO). Nevertheless, promotion has not been at full strength due to the shortage of funds. However, the Small Industry Association had been initiated and thus, gave a strong and direct impact to the SMI scene in Thailand. Although the TSDS has not been institutionalized in Thailand, the recognition among the Technology for Development group for a need for a systematic flow of technical and other information from the Technical Resource Institutes (TRIs) to the SMIs, particularly those located in the rural areas, has been clearly understood. A body or agency is urgently needed to take care of this co-ordinating function where a network of field offices had already been set up by its Department of Industrial Promotion of the MOI.

41. A large number of TRIs are available in Thailand for technological assistance to SMIs. Of these, Thailand Institute of Scientific and Technological Research (TISTR), a state enterprise under the Ministry of Science, Technology and Energy (MOSTE) appears to fit the role of rendering assistance to the SMIs, particularly in technology transfer and

promoting the concept and actual practice of TSDS. Many other specific R+D institutes are actively functioning in universities and ministries of agriculture, education, industry and commerce, etc. Related agencies, including professional associations with special emphasis on SMIs are numerous, most of them having direct impact on the SMIs operation. These are: Board of Investment (BOI), Industrial Finance Corporation of Thailand (IFCT), Commercial Banks, Association of Thai Industries; Thai-Japan Technology Promotion Association, Joint Public/Private Consultative Committee (JPPCC) etc.

42. There are many projects in Thailand which have a somewhat similar concept and operating philosophy as TSDS. However, they are only operated on a limited scale. Of these, three of them seem to be relevant, i.e. - a clinic-like operation of a project to help SMIs by Dept. of Industrial Promotion of MOI, covering technology, finance, market etc. An IDRC sponsored process improvement for an SMI noodle factory with a successful result by TISTR, (MOSTE). And recently initiated by Technology Transfer Centre of MOSTE, a project to create TSDS between regional universities and SMIs. Universities, through their R+D arms, will contact SMIs, identify their problems and find ways and means to help them through grants given by the Ministry.

43. SMIs normally cover vast and varied fields of industry and a formal priority of them is essential. The following group of SMI fields are significant for base line industry and value added export projects i.e. food processing, metalworking, woodworking, gem cuttings and ornaments or jewellery lapidary, ready-made garments, locally- made silk and cotton materials, ceramics, leatherware, bronzeware, etc.

44. A formalization of the TSDS concept is possible in Thailand since the national policy, particularly throughout the National Fifth Year Plan, lays stress on the role of rural development and SMI strengthening. A joint agency as a coordinating unit between the MOI-Department of Industrial Promotion - field offices and MOSTE - Technology Transfer Centre and TISTR for overall operation and linkage of TRIs may be most appropriate. Furthermore, regional collaboration in TSDS may be set up in conjunction with a well established group such as ASEAN where the Philippines, as a member, has already had experience in the actual running of a prototype TSDS programme.

XII. TECHNOLOGICAL SUPPORT FOR THE SMALL AND MEDIUM SIZE ENTERPRISES (SMSE) IN GREECE

A. Introduction

45. The majority of enterprises in the Greek industrial sector are Small and Medium Size Enterprises (SMSE). They occupy about 60 per cent of labour and cover 40 per cent of the total manufacturing production. The SMSE are of significant importance for the development of the national economy.

46. The SMSE are facing the well-known problems arising from their small scale capabilities. These problems are:

- managerial
- technological
- financial

47. The smooth operation of SMSE and the improvement of their position requires governmental support such as:

- finance (loans, subsidies)
- technology (technical assistance, training, infrastructure etc.)

B. Governmental policy for technological development

48. The technology planning and policy-making as well as the practical application of technology are assured by governmental institutions such as the Ministry of Industry, Energy and Technology or by national organizations such as the Greek Organization for Small- and Medium-Sized Enterprises and the Greek Centre of Productivity. A great effort is undertaken for their competence to be defined and the quality of the services provided to be improved.

C. Institutions

(i) General Secretariat of Research and Technology (GSRT)

49. The GSRT, in order to promote the technological infrastructure of the country, has undertaken many activities. A major attempt is the establishment of a new technological research centres network in traditional sectors. These are considered to be of great importance for the development of the Greek economy (metallurgy, ship-construction, textile etc).

50. In addition, we should also mention:

- Financing research programmes oriented to: energy conservation, informatics, marine technology etc.
- Financing research undertaken by the industry itself
- Assessment of university research programmes and possible use of the results by industry
- Promotion of innovative initiatives
- Management of the patent office (acquisition, treatment and diffusion of patent information)
- Development of international cooperation
- Attempts to implement an Information Center (Data Bank Systems)

(ii) Greek Organization for Small- and Medium-sized Enterprises (EOMEH)

51. This is the most competent organization for assisting in the smooth operation and development of SMSE. It functions in direct collaboration with the concerned enterprises. In addition, in order to decentralize its activities it has established four local offices (pilot scale) aiming:

- to identify the problems associated with local enterprises

- to diffuse information

- to develop technological culture.

This plan has contributed immensely to the increase of confidence in the Organization. So, a network of about 50 local offices is expected to be established and the aims of the whole program to be enlarged.

52. In addition 10 innovation centres equipped with appropriate infrastructure, are expected to function in order to supply technological assistance to local enterprises.

Among the other activities of EOMEH we should mention:

- Assistance to SMS enterprises for their participation in cooperatives;

- Training of SMSE's managerial staff;

- Technical assistance;

- Financing the manufacture of product prototypes;

- Promotion of products through national and foreign fairs;

- Assistance in obtaining international patents;

- Others.

(iii) Greek Centre of Productivity

53. Management and advanced technology constitute the permanent preoccupation of the Centre. The sectors concerned are the following:

- microelectronics
- informatics
- biotechnology
- renewable energy resources

Among its activities, the following may be noted:

- Training of qualified personnel through, inter alia, seminars;
- Elaboration of feasibility and technical studies;
- Conception and development of new products;
- Manufacturing of prototypes;
- Quality control;
- Development of new methods for technological advancement of the above mentioned sectors.

(iv) Research Institutions

54. There are many research institutions in Greece (university laboratories, research centres, institutes etc.) which can offer technological support to the SMSE.

XIII. A NOTE ON THE SYSTEM OF TECHNOLOGY TRANSFER TO SMALL AND MEDIUM SCALE ENTERPRISES IN JAPAN

A. Small- and Medium-Scale Enterprises in Japan

55. Small- and medium-scale enterprises (SME) play a major role in Japanese economic activities. SME accounts for about three quarters of employment in the manufacturing sector and more in the overall economy. The direct and indirect contribution to exports by SME is also substantial.

B. System of Technology Transfer to SME

Technology transfer through the subcontracting system

56. The subcontracting system in the Japanese economy is very extensive. 64 per cent of small and medium-scale industries (SMI) are engaged in subcontracted work to a certain degree, and 54 per cent of SMI depends on subcontracted work for more than 80 per cent of their sales.

The subcontracting system works as channels for market-induced technology transfer from big industries to SMI.

A father company is often led by market competition to give technical guidance to SMI, in order to achieve good quality and low cost of components and materials supplied by SMI. The components industry of Japan has strong international competitiveness.

C. Characteristics of the Japanese Technological Services Delivery System

(1) Comprehensive and Systematic System

The Small- and Medium-Scale Enterprise Agency (SMEA) of the Ministry of International Trade and Industry (MITI) is responsible for small- and medium-scale enterprise development policies. It

has a full set of policy instruments covering financial, technical and organizational measures. These policy instruments are utilized both independently and as a package. The system of technological service delivery is shown in Figure 1. It is a network covering all Japan and provides comprehensive services covering training, information service, diagnosis and guidance (both technology and management), etc.

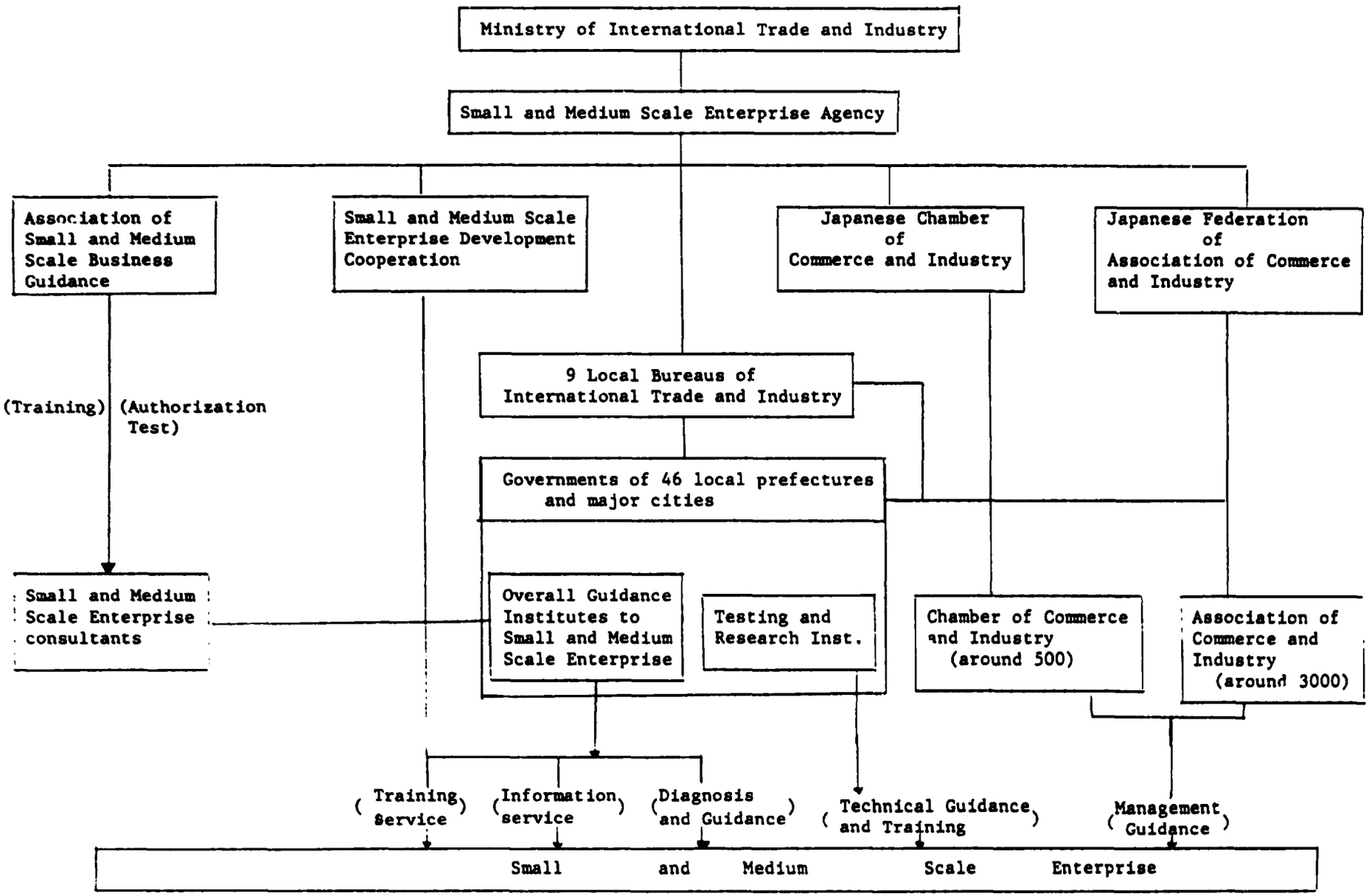
(2) Active participation of local governments

SMEA works closely with local governments through its nine local bureaus of international trade and industry for SME development. In most cases, local governments deliver various technological services to SME through their specialized institutes, and SMEA provides both financial and technical assistance (e.g. training) to local governments in implementing these services. SMEA delivers technological services to SME in advanced technology areas through small and medium scale enterprises development corporation.

(3) Active participation of private organizations

SMEA works closely with the Japanese Chamber of Commerce and Industry, and the Japanese Federation of Commerce and Industry Association, especially for the development of small-scale businesses. There exist around 3,500 local branches of these two organizations and around 7,000 management consultants associated with these local branches extend management guidance to small-scale businesses. Soft loans requiring no collateral and guarantee are provided by the National Finance Corporation, depending on the recommendations of these consultants.

Fig. 1. System of Technological Service Delivery in Japan



XIV. SUMMARY OF DISCUSSIONS

57. After presentation of the Philippine and Caribbean experiences and discussions thereof, it was agreed that TSDS is a very useful concept and in the case of the Philippines has given rise to many new projects.

58. From the presentations of participants from Malaysia, Greece, and Thailand, it was apparent that conscious efforts were being made to create linkages between the scientific and technological institutions and the SMI which to some extent coincides with the TSDS concept.

59. It was agreed that most developing countries still have a long way to go in enhancing the linkages between the TRIs and SMIs in order to fully utilize their existing scientific and technological capabilities in strengthening and developing their SMIs.

60. With increasing emphasis in most developing countries on the SMI sector there has been a proliferation of governmental and non-governmental organizations and of diverse programmes to promote and support SMI development especially in rural areas. The TSDS concept may prove to be a systematic approach to co-ordinate and focus these efforts.

61. The importance of disseminating the Philippine and Caribbean experiences was emphasized. In particular the CDB representative underscored the value of the Philippine experience in the design and implementation of CTCS. Similarly, the Philippine participants were equally convinced that, had they been exposed to an exemplary experience their initial efforts in setting up the TSDS would have been much easier.

62. The participants were in full agreement that due to vast variations between countries in terms of the development of their institutional infrastructure, level of economic development, population size and dispersion, policies and priorities, political structure, etc. no universally applicable TSDS model could be devised. It was felt that aside from relating particular national and regional experiences, an attempt could be made in devising guidelines which could be helpful for each country in developing their own TSDS tailored to their circumstances and existing situation.

63. It was felt that the first step in initiating a TSDS, a pilot project of a limited scope could be launched to a small number of selected priority sub-sectors and regions. The objective of such a pilot project would be to establish initial linkage mechanisms between the TRIs which are related to those sub-sectors by means of developing specific technical assistance activities to selected SMI groups.

64. The pilot project should be designed in such a way that its planned activities would lead to a small network of institutions becoming the seeds for an expanding TSDS. From the experiences of the pilot operations, the network activities could gradually be expanded to cover other sub-sectors and other regions. Furthermore, the experience gained in implementing the pilot TSDS may serve as a basis for the TRIs to redirect their R+D and HRD programmes in a way so as to be more responsive to the immediate and developmental needs of the SMIs.

65. In designing a pilot project and secure resources to initiate a TSDS, the following activities may be considered:

(a) An assessment of the needs of SMIs for technical assistance. This study would focus on the technical problems encountered by SMIs and try to identify common needs. Opportunities for medium and long term perspectives of the SMIs would also be assessed.

(b) An assessment of the capabilities of the TRIs.

(c) A definition of the technical assistance required by the SMIs. By taking into account the needs of the SMIs This would involve a comparison of the SMI needs and TRI capabilities.

(d) The development of strategies to enhance the effectiveness of implementing projects within the framework of TSDS. This could involve any of the following:

(i) devising means to enhance the awareness of SMIs on technological options and opportunities, to stimulate requests for technical assistance (e.g. newsletters, workshop seminars);

(ii) devising means for efficient interaction between entrepreneurs and representatives of institutions involved in the TSDS, especially the field extension offices which would serve as a linkage between the SMIs and the TRIs (e.g. plant visits, questionnaires, etc.);

(iii) the implementation of projects addressed to groups of SMIs with common needs. Examples could be training programmes, promotion of common service facilities, etc.

(iv) devising cost sharing schemes between the SMIs and the government institutions in the implementation of technical assistance projects;

(v) making use of government incentives where they exist;

(vi) other strategies.

(e) The selection of various modes for the delivery of technical assistance. Examples of these are as follows:

(i) technical information dissemination;

(ii) technical seminars or other types of training programmes for SMI entrepreneurs, supervisors, workers, etc.;

(iii) technical advisory services;

(iv) extension services.

(f) The design of the delivery mechanism. This will involve the following:

(i) the definition of functions of field offices and the central coordinating unit as well as the delineation of TRI responsibilities;

(ii) assessment of capabilities of field offices and coordinating units, etc.

(iii) the identification of action oriented linkage mechanisms required.

(g) Training of personnel of participating agencies. Training programmes must be designed taking into full consideration the functions and responsibilities of other agencies involved in the implementation of the TSDS. For example, personnel of field offices may need a certain level of technical training to upgrade capabilities in project identification, problem referral, organization of training programmes and in other functions required of them for ensuring smooth linkages between SMIs and TRIs. TRI personnel may need upgrading of their capabilities to better perform the various services related to the TSDS.

(h) For assessing the effectiveness of the TSDS as well as the strategies adopted, technical asssistance activities should be implemented on a trial basis.

(i) Monitoring and evaluation should be carried out on a continous basis.

(j) Formulation of the TSDS workplan. This should clearly specify the responsibilities of each agency as well as the funding mechanisms for the implementation of technical assistance projects in the immediate future.

Budget

66. The inputs required will be covered by a budget for the implementation of the pilot project. Cost components might be broken down into local currency components and foreign currency components. The latter, as in the case of foreign experts, may be submitted for the consideration by foreign assistance organizations. Portions of local currency requirements may likewise be submitted for financing.

67. After the initiation process (pilot project) the experience gained is expected to be useful in developing an integrated approach for SMI development. This would include the establishment of linkages between the TSDS and financing, marketing and other service institutions to complement the technical inputs of the TRIs.

XV. PROPOSED FRAMEWORK FOR SETTING-UP A T S D S

A. Project Formulation

1. Programme concept
   - a. Background and justification
   - b. Objectives
     - Development objectives
     - Immediate objectives

2. Participating organizations
   - a. Co-ordinating agency
   - b. Field offices
   - c. Technology resource institutions

3. Programme design
   - a. Inputs
   - b. Activities
   - c. Outputs

B. Activities

1. Assessment of needs of SMIs

   a. Problems encountered

   b. Opportunities for improvement

2. Assessment of capabilities of TRIs

3. Definition of TS required/strategies:

   a. Comparison of needs and capabilities, and identification of TS required

   b. Strategies

      - creation of awareness
      - working through associations or groups of SMIs
      - promotion of common service facilities
      - attractive cost-sharing schemes
      - government incentives
      - other strategies

4. Modes of delivery

   a. information dissemination
   b. training
   c. advisory service
   d. others

5. Design of delivery mechanism

   a. definition of functions of field offices and co-ordinating agency etc.
   b. assessment of capabilities of field offices and co-ordinating agency etc.
   c. identification of linkage mechanism required

6. Training of personnel of participating agencies

7. Implementation of pilot project of the delivery system

8. Monitoring/evaluation of pilot project

9. Formulation of TSDS and time schedule

C. Budget

Annex A

List of Participants

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Annex B

Programme of Work

10 December 1985 (Tuesday)

8:30 - 9:45	Registration of Participants (Rotunda C-Building)
10:00 - 12:30	Opening Addresses (Room D-1953)
-	Mr. K. Venkataraman Special Technical Adviser Division for Industrial Studies
-	Ms. H. Morita-Lou, UNCSTD
-	Mr. S. Nagaoka, Ministry of International Trade and Industry, Japan
-	Mr. W.H. Tanaka, Head DTTB (Keynote speech)

TSDS and CTCS presentations (continued)

-	Mr. Q. Tan and Mr. E. Payoyo - TSDS
14:30 - 17:30	TSDS and CTCS presentations (continuation)
-	Ms. Y. Hall - CTCS
-	Discussion

11 December 1985 (Wednesday)

9:30 - 12:30	Presentations of National SMI programmes Specific Issues	
-	Mr. M. Polyzakis	- Greece
-	Ms. R. M. Said	- Malaysia
-	Mr. N. Rattana	
-	Mr. R. Santhad	- Thailand
-	Mr. E. Payoyo	- (Peru)
-	Mr. Nagaoka	- Japan
14:30 - 17:30	General Discussion of Issues	
-	Mr. C. Zimmermann	- UNIDO

12 December 1985 (Thursday)

9:30 - 17:30 Ms. H. Morita-Lou - CSTD

General Discussions and Formulation of TSDS framework for general application, Technical Assistance Needs, Project Proposals

13 December 1985 (Friday)

9:30 - 12:30 Preparation of Draft Report

14:30 - 16:30 Discussion of Draft Report

Closing Remarks

Annex C

List of Documents

ID/WG.461/1	Technological Services Delivery System (TSDS) Issues for Discussion
ID/WG. 461/2	Description of the Organization and Work of the Caribbean Technology Consultancy Services (CTCS) Network
ID/WG. 461/3	Technological Support for the Small and Medium Size Enterprises (SMSE) in Greece
ID/WG. 461/4	Technology Services Delivery Systems The Malaysian Experience
ID/WG. 461/5	Technology Services Delivery System (TSDS) The Philippine Experience
ID/WG. 461/6	The Discussion of Small and Medium Industry Ministry of Science, Technology and Energy (Thailand)
ID/WG. 461/7	Caribbean Development Bank Technology and Energy Unit Annual Report 1984