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19605

Distr.
LIMITED

IPCT.155(SPEC.)
16 April 1992

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

SMALL AND MEDIUM ENTERPRISES INFORMATION
NETWORK - A FRAMEWORK*

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* The views expressed in this paper are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has not been edited.

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Introduction

This paper is divided into two parts. Part I discusses the socio-economic background of the growing global interest in small and medium sized industrial enterprises leading to the present UNIDO proposal to start an information network exclusively for them. Part II outlines an operational framework for the planned information exchange network for the Small and Medium Enterprises (SMEs).

PART I

During the fifties and the sixties, the idea that big size was a necessary condition for technical change and growth gained wide acceptance (Galbraith 1957). But the mid seventies had seen a change in this perception. The intellectual basis for this change in perception was provided by Schumacher (1973). There was a better appreciation of the role of SMEs in sustaining and creating employment, in renewing economies of different regions and in bringing about innovations. As a result, technology and development policies changed increasingly in favour of small and medium enterprises. This change in attitude towards SMEs is reflected in the European Commission in Brussels declaring the year 1983 as the year of the small firm.

The growing appreciation of the role of SMEs in the national economies and their potential for technology transfers, joint ventures and exports has led to the increasing interest in the internationalisation of SMEs in many developed countries. The developing countries also saw partnerships with SMEs as alternative or complementary to collaborations with transnational corporations (TNCs). The rising interest in SMEs in the Third World has led to many governments in developed countries consciously promoting the overseas operations of their SMEs as an essential part of their foreign economic co-operation with the Third World.

The increasing interest in the globalisation of SMEs on the part of both the developed and developing countries has been increasingly shared by the United Nations System. Third Conference of UNIDO January 1980 recommended promotion of access to international markets for SMEs. It also recommended various incentives for investment policies and the creation of assistance programmes to provide SMEs with information flows similar to those enjoyed by TNCs. Recently, Small Scale Industries have been identified by UNIDO as one of the major issues ahead in its medium term plan. In the eighties, United Nations Conference on Trade and Development (UNCTAD) had commissioned a number of studies on the potential for using SMEs as a vehicle for technology transfer between the developed and developing countries. In 1979, the U.N. Conference on Science and Technology for Development (UNCSTD) recommended

that the developing countries should take adequate specific measures in order to encourage and facilitate the transfer of technology by their SMEs and their participation in co-operative schemes including joint ventures with corresponding public and private enterprises in developing countries. The interest of UN agencies in collaboration with SMEs of different countries is partly because of the potential ability of such collaboration to synthesise ideas as a result of the synergistic interaction between foreign and local knowledge.

On Defining SMEs

Any information net-work must have a clear understanding of its end-users. Thus the question of definition of SMEs is not merely a question of semantics. The first issue to be decided before planning a SME net-work is whether its scope should extend to service units also or should it confine itself to purely manufacturing units. Though this is a matter that merits a policy decision, by UNIDO, our suggestion is for striking a via media to cover manufacturing units plus those units that service manufacturing units. (e.g. design and consultancy firms)

A distinction is often made between small and medium enterprises and establishments. The latter includes the small and medium sized firms which are owned and controlled by large enterprises and MNCs. As the information requirements of these firms are met by their parent firms whose resources for information gathering are quite substantial, it may not be necessary to cover these firms by the SMEI net. Besides, the INTIB's present network covers the parent firms of these SMEs already. In this context, it may be noted that the Small Business Act of USA defines a small business concern as one which is owned and operated independently and which is not dominant in its field of operations.

The latter part of the definition clearly points out to one of the criteria for defining a small business firm viz. its economic behaviour. The market power of a small business firm should not be large enough to influence prices. The small firms are also defined in terms of their management style; whether the style is bureaucratic or entrepreneurial. In a small firm, one person or a few persons, often the owners themselves, take strategic decisions. Ownership also is concentrated in one or a few persons.

Most national policy makers have adopted definitions relying exclusively on one or more quantitative indicators like number of employees, size of capital investment or volume of sales turnover. There is no uniformity among countries

with regard to these quantitative definitions. The most widely used definition among developed countries fixes a limit of 500 employees, for their domestic policy purpose. However, some of their agencies in charge of promoting international business use more flexible criteria so as to include larger enterprises and establishments. Such widening of the definition in favour of larger units ultimately affects the interests of the genuine SMEs. Even the ceiling of 500 employees accepted in most of the developed countries is quite high in comparison with the ceiling fixed in the developing countries (APO).

Excessive difference in size between collaborating SMEs in different countries affects the prospect for collaboration itself. It is found that units in the developing countries prefer partners of equal size in the developed countries. Unequal size can lead to unequal bargaining power resulting in unfavourable terms for the small sized partner. Resolution of possible conflicts also becomes difficult. It was found that two thirds of joint ventures of Italian SMEs were with firms of equal size (Onida). Of the, joint ventures by French SMEs, more than two fifths were by SMEs employing less than 200 employees. About one fourth of French SME Joint Ventures abroad were by units employing less than 50 employees. In fact, 12 per cent were by units employing less than 20 employees (Bertin). An analysis of the size of the joint ventures by Japanese SMEs shows that 89 per cent were employing less than 300 employees. Sixty eight per cent were employing less than 50 employees (Ozawa). Though small size is definitely a handicap in the international operations of firms, many high technology SMEs like New Technology Based Firms (NTBFs) with large potential for technology transfer are really small (Rothwell and Zegveld).

Heterogeneity of SME Sector

Any information net-work to cater to the needs of the SME sector has to take cognisance of the size and heterogeneity of this sector. In a large number of developing countries, SMEs are possibly the only units available in many industrial branches. Even in developed countries, they constitute more than 90 per cent of the total number of enterprises (APO, OECD).

To talk about an SME sector, perhaps may be a misnomer in view of the diversity of small and medium enterprises, though such a sectoral categorisation becomes necessary to distinguish it from the large scale sector. Within a country itself, this sector encompasses traditional, rural and folk art units as also high technology based firms. There are also large inter-country differences. Any Small and Medium Enterprises Information Net Work (SMEI-Net) has per force to take into account this intra country as also inter-country diversity of SMEs. Whether a particular SME is a potential receiver or supplier of information depends on the type of the unit. The nature of

technology that is available for transfer, the motives for transfer, the channels of transfer, direction of transfer etc. depend on the type of units.

Broadly speaking, the SME sector can be sub-divided into six sub-sectors. The most important, but less dynamic sub-sector comprises of units in traditional industries like textiles, foot wear, wood working and metal working. The technologies used are mostly mature technologies, though incremental changes do take place in their designs, products and processes. These units are in a position to share their technology and management with SMEs in The Third World. At the same time, they can also benefit from technology information from other sectors and from other countries e.g. those relating to new materials, application of computers in designing and manufacturing.

Another sub-sector comprises of high technology units. This perhaps is the most dynamic sub-sector with plenty of information to share. Some of these firms are 'New Technology Based Firms' with inventions or innovations to their credit. Many of these units are using frontier technologies. Some of them are spin-off firms, linked with research laboratories or Universities or R & D Centres. e.g. units in Silicon Valley near Stanford, Route 128 in Boston near Massachusetts Institute of Technology, Research Triangle in Indiana, high technology units near Cambridge (UK). All these units have firm specific advantages which they are willing to share through licensing or joint ventures.

Even in the developed countries, there are SMEs utilising low level technology and management. These SMEs survive largely by escaping fiscal, social security and labour legislations. These units require infusion of massive doses of technology and management inputs if they are to survive in the long run. But they have very little urge for receiving external information.

Another sub-sector which is very important in the less developing countries (LDCs) comprises of the traditional village industries. They manufacture traditional products, using locally available inputs and historically evolved technologies. They do benefit from information on new production techniques. But their information requirements can be met largely from within the country itself.

The handicraft or craft units fall into an altogether different category. Their products even now reach the international markets. What they require is information on foreign markets, customer preferences and trading channels. They also can benefit from information on new product designs, based on changes in tastes of foreign customers.

A major sub-sector comprises of tiny units belonging to the informal sector in the rural and urban areas. The information requirements of this sector can be met largely within their respective countries.

Technology Potential of SMEs

Support for development of SMEs comes for a variety of economic, political, social and cultural reasons. The main economic argument for SMEs rests on their high share in number of enterprises, turnover and employment. The share of SMEs in existing employment as also in the creation of new employment is sizeable. In many regions, they constitute the principal source of employment. They act as buffer to fluctuations in employment. It is found that during industrial stagnation, the SMEs are much more buoyant than large firms. At all times, they act as spur to competition and check oligopolistic tendencies. The wide variety of products manufactured in this sector by entrepreneurs with different backgrounds adds to the cultural mosaic of society. They also add to the dynamism of the industrial economy as they constitute a genetic pool from which successful techno-economic combinations of the future will be selected (Rothwell). The realisation is growing among national and international agencies that technological potential of SMEs is quite sizeable and can be tapped for sharing among countries, both developed and developing.

Contrary to the views of Galbraith, the 'matchless ingenuity of the small man' is found to be spurring innovations even today. It is no doubt true that technical development has increasingly become the preserve of the scientists and the engineers. Still, the small entrepreneurs do contribute to both major and minor innovations. A number of innovations like ball point pens, zip fasteners, vacuum and cathode ray tubes, automatic and power steering have come from the small firms. No doubt, the share of SMEs in total R & D expenditure is smaller than that of large firms. But the R & D intensity (R & D expenditure in relation to sales turnover) of small firms is not much lower than those of large firms (Rothwell, Ozawa). It is also found that the innovative efficiency of small firms is higher than that of large firms. What is more, the innovative efficiency of small firms has been improving over time while that of large firms has been declining. It is found that the innovative efficiency of small firms was greater than unity in industries like plastics, textile machinery, mining machinery, radio, radar and electronics capital goods (Wyatt).

The new breed of NTBFs have already exhibited their dynamism and potential for innovations. These firms have shown their competitive edge when product development is still in fluid stage. Their innovative efficiency is quite high, in

industrial fields where technology is still not mature, where R & D is not capital intensive, where economies of scale are not important and competition is not based on prices. These firms had contributed to science based industries like semi conductors, micro electronics, software, CAD, Scientific instruments and specialised machinery. Of late, they are also operating successfully in the "new wave" biotechnology industry. Many of them cater to niche markets for highly specialised products.

Existing state of internationalisation of SMEs

Despite the comparatively bigger handicaps of the SMEs, their international operations even now are not insignificant. They are mainly in the form of exports, sub contracting, turn-key projects, licensing, know-how contracts and direct foreign investment. Japanese SMEs accounted for 30 per cent of the country's manufactures exports. Their indirect exports constituted 20 per cent of the industrial exports of large scale units. About 17 per cent of Japanese SMEs are direct exporters (Ozawa). In France, about 9000 SMEs and 15000 craft units (employing less than 10 persons) are exporters. Their exports formed 24 per cent and 3 per cent respectively of French exports (Bertin). In Italy, the share of exports by SMEs was still higher at 47 per cent (Onida).

Even in a developing country like India, the small scale industries sector accounted for 29 per cent of total exports. In engineering goods exports, their share was 31 per cent. In the export of basic chemicals, pharmaceuticals and cosmetics, their share was still higher at 39 per cent. In fact, 91 per cent of exports of the SSI sector comprised of non-traditional items like engineering goods and chemicals (Government of India).

As for overseas operations, it was found that about half the Japanese manufacturing ventures abroad were by SMEs (Ozawa). Direct investments by French SMEs formed 10-15 per cent of French direct investments (Bertin). A sample study of British technology suppliers to India, found that nearly two thirds of them, were small firms having 500 employees or less and a quarter of them had 50 or less (Bell). It was found that 15 per cent of the total value of French technical transfers were by SMEs. Total technology transfers by French SMEs rose by three or four times between 1976 and 1984-85. French SMEs accounted for one third of total royalties received.

In their internationalisation efforts, SMEs everywhere preferred neighbouring countries or countries with which the home countries had historic and cultural affinities. Nearly half the Japanese joint ventures were in Asia. Among the Italian joint ventures with third world countries, majority were with

Latin America. French SMEs had their preferences for Magreb countries and Francophone Africa.

North America accounted for 39.5 per cent of Japanese investments. USA and Europe accounted for 52 per cent of total collaborations by Italian SMEs. There seems to be a pattern in the direction of transfer of technology and investments by SMEs. The SMEs in high technology areas prefer partners in the developed countries whereas SMEs with more mature technologies prefer partnerships with firms in less developed countries. The former group of firms is motivated by their desire to exploit their firm specific advantages. The latter group is driven by macro economic compulsions like appreciation of currency, labour shortage and rising wages.

Demand for Partnership with SMEs in Developing Countries

Apart from the increased capabilities of SMEs, there is a variety of other reasons why firms and governments in developing countries prefer partnerships with SMEs. They are perceived as complementary or alternatives to MNCs. In many countries, the small size of the markets does not attract the MNCs at all. Studies in Kenya, Argentina and Brazil have shown that SME collaborations do not restrict the competition in host country markets (UNCTAD). SMEs unlike the MNCs do not have the bargaining power to insist on and get protection in the host domestic markets.

Unlike MNCs, who insist on intra-firm imports, SMEs do not insist on imports of machinery, equipments, parts and inputs from the home country. Bargaining with SMEs is found to be on more equal footing and therefore the terms of agreements are found to be less restrictive and onerous. The overseas operations of many of the MNCs are motivated by their desire to utilise their corporate assets (managerial, technological and financial) and therefore they prefer wholly-owned subsidiaries. Even when equity participation is allowed, the MNCs normally insist on majority ownership. Most of the SMEs, on the other hand are found to be content with minority participation.

Unlike the developed countries, what the less developed countries are looking for are mature technologies which the SMEs are capable of transferring. The LDCs look for not only state-of-the-art technologies but also intermediate technologies which are easier to be absorbed and adapted. A good deal of technology from SMEs falls into this category. SME technologies come in more unpacked forms. Many LDCs perceive SME technologies as softer and more flexible. The processes are perceived to be more adaptable to meet the skill levels as also engineering capabilities of the LDCs.

It is found that technologies transferred by Japanese SMEs are more human centred than physically based. These technologies are more labour embodied and organisation embodied as against the plant and input embodied technologies of Japanese MNCs. In addition, the SMEs are found to adopt a peoples' centered approach in training operatives, in reorganising production processes and instilling quality consciousness. They are also found to take the Japanese management style with them.

SMEs' Inadequate Access to Information

Despite their large potential and strengths, SMEs suffer from a major handicap in their international operations, viz. inadequate access to information, both technological and industrial. This is due to the inability of SMEs to establish comprehensive library and data retrieval systems and send personnel to conferences and seminars. As a result of this, small firms can become introspective, seeking ideas mainly within and lacking awareness of new technology trends and opportunities (Rothwell). Many of the large firms and MNCs on the other hand have evolved systems "to plug into external sources". Even when technical and scientific information reaches SMEs, they are not inter-disciplinary in nature. As a result, SMEs are locked exclusively into the knowledge bases of their own industrial streams. Therefore, information systems for SMEs should be inter-disciplinary and operate across not only countries and regions, but also established industries which are often self contained and may even be closed systems (OECD).

The absence of reliable information on foreign markets, production environment and collaboration opportunities restricts the scope of even those SMEs already engaged in overseas operations. For this reason, most of them as noted earlier, confine their operations to countries which are geographically proximate or those with which they have cultural and historic ties. The absence of information on distant or unfamiliar markets leads to overrating of risks and costs, discouraging the SMEs from venturing abroad. Sometimes the converse may also happen leading to high rates of failure.

Apart from the absence of specialised personnel to collect market information, the overhead costs of collecting information, is quite high for the SMEs (Cooper). Unlike those of MNCs, their overhead costs cannot be shared among other units.

Even where there are national or international agencies to collect and disseminate technical and market information, their packaging is often not in a form suitable for ready use by the SME entrepreneur or his small band of managers.

PART II

The discussion in Part I of this report has highlighted how the inadequacy and high cost of information have handicapped the globalisation effort of SMEs despite their vast potential and known strengths. But one of the major problems in organising a global information system for SMEs arises from the imperfections and in many less developed countries, the near absence of a national industrial and technological information infrastructure. There is no well formulated information policy. Nor is there a culture of exchange of information within the country.

Many of the SMEs who need information the most are not capable of appreciating the important role critical information can play in helping them to make appropriate decisions. Many of them are even unable to define and articulate their information needs and to seek solutions. It requires a good deal of external professional counselling and help for translating the information needs of many SMEs into effective demand. External help is also necessary for interpreting and applying information and data found in technical journals and databases for meeting the actual needs of SMEs. In other words, both the requirements of information for SMEs and their packaging requirements are quite different from those of large scale units.

SMEI - Net: Products and Services

Before going into the organisational structure of the SMEI Net, it becomes necessary to identify its products and services. The range of information to be handled by the SMEI - Net should be wide enough to help SMEs to venture into international markets. Information on technologies, joint venture opportunities and partners and foreign markets should necessarily have to be handled by the SMEI - Net. Data on markets, products and standards as also information on production environment, changing national policies, regulations and institutional infrastructure will have to be reached to the final end users of SMEI Net. In addition to information gathered from SMEs, bibliographical information from a variety of sources will have to be handled by the SMEI - Net.

Model of an SMEI - Net

The distinctness of the SME Sector calls for a sub system within UNIDO's industrial and technological information system (INTIB). Besides, the special characteristics of the SME sector call for a model quite distinct from that used by INTIB at present. The approach and strategy should also be quite different. The industrial priorities of INTIB and SMEI Net will also have to be different. Though every SME will benefit from international exchange of information, priority

will have to be bestowed on enterprises in high technology areas as well as export-oriented enterprises.

The present model of INTIB's information system is a hierarchical model, with INTIB at the top, Regional and National Focal Points at the middle and Sectoral nodal points at the bottom. This model is not appropriate for the SMEI Net as it presupposes the existence of one pre-eminent national level institution in over-all charge of SME development in a country. Because of the large number of SMEs, the diversity of their problems and their wide geographic dispersal, there is a large number and variety of institutions even at the national level to cater to their requirements.

In federal countries like India, SME development is largely the responsibility of the constituent state governments who have a large number of institutions of their own. Because of the autonomous status of these institutions in their respective fields, they will be reluctant to act as nodal points under any one institution. These institutions are not accountable administratively to others. Therefore, there will not be any clear cut lines of responsibility between an organisation designated as NFP and other organisations designated as nodes. Lines of communication between NFPs and the nodes will also not be clear. Because of the usual bureaucratic deficiencies and inter-agency frictions, a government national focal point may not get full co-operation from other agencies in collecting and presenting information. A national focal point from the private sector might be suspected of using the information exchange only for itself. A more pragmatic approach therefore is to include as many interested organisations as appropriate from the public and private sectors. There can be a nodal institution for each sector or sub sector or industry. In large countries like India and China, there can also be regional nodes. Each will be autonomous and will be free to interact with others independently. Such a system has the advantage of cutting down delays. In a way, it also provides for back up mechanism in case of failure of one or more of the nodes in the net-work. That the failure of a NFP or a node is not a hypothetical possibility has been brought out by UNIDO's report on promotion of industrial information net-working among selected African countries (1989).

The sheer number of SMEs, their immense variety and their wide regional dispersal demand more net-work members than the present INTIB system. These net-work members can be consultancy organisations belonging to private or public or joint sector. They can be government owned promotion or extension or equipment supplying or export promotion agencies. Sometimes, development banks can fill this role. Small industry organisations and professional organisations also can play the role of net-work members. They can also be R&D institutions or technological universities with extension

wings. In the developed countries, the innovation centres located near the Science and Technology Parks, Universities and R&D institutions can act as members of the network. The SMEI-Net as proposed by us envisages to link some of these institutions in a country with similar institutions in other countries. They are also linked to the SMEI-Net head quarters in Vienna.

Though the system does not envisage a National Focal Point, each country will have national level agency whose status will be that of 'first among equals'. This agency will be in charge of collecting and disseminating macro level statistics as well as information on national policies, regulations and administrative practices. This agency can also be entrusted with the task of selecting the members of the net-work in its country and to co-ordinate their activities. It will also be performing link functions with SMEI-NET Head-Quarters as also with their respective governments.

Apart from its administrative and co-ordinating role, the SMEI-Net Head quarters will function as the sourcing and responding agency for information relating to SMEs from all UNIDO's departments as also from other UN agencies. It is understood that UNIDO is planning to assume a lead role in the total UN information system. When this materialises, the SMEI-Net should emerge as the sub-system within this UN information system, for all SM related information. It will also act as system's links with UN and other multinational information systems like Euro-Net and TECHNINET ASIA. It will also provide links with other information systems and agencies of those countries not brought into the SMEI Net at the pilot stage. INTIB can also act as a link with some of the commercial systems. A list of some of these information systems and data-bases which can be linked to SMEI-Net is given in Annexure 1.

Under the non-hierarchical model envisaged by us, the net-work members can communicate with each other directly through any media of their choice-by letters, by telex, by telefax or by electronic mail. It will increase the net-work capabilities and reduce the response time if the members can be linked to UNIDO's electronic mail system. It may be possible to obtain UNDP assistance for this purpose under their Technical Assistance Programme.

As may be seen from the above discussion, what is being proposed is a decentralised system. There will not be any centralised database on SMEs. Instead, each net-work member will be required and also assisted to maintain a computerised database on SMEs coming under its jurisdiction.

What is envisaged is a referral system in tune with the new approach of INTIB. The information net-work which is planned is of the 'Spiders Web' type in which there can be direct exchange of information among members. To facilitate this exchange, information about net-work members in different countries, the membership of their organisations, their range of activities and the type of information which they can supply will form a computerised database. This database has to be prepared by the SMEI-Net Head quarters in a standard format. The format used in the directory of French sources of industrial and technological information prepared on behalf of INTIB will be appropriate for collecting and storing information on SMEI net-work members (Jean Michael). Access to this database will have to be provided to the net work members free of cost.

One of the incentives for net-work members in joining the SMEI-Net will be the possibility of upgrading their professional and organisational capabilities through mutual professional and personal contacts with other net-work members from different countries. Access to bibliographical information systems also will improve their professional capabilities. Periodic meetings of net-work members at seminars, workshops and training programmes should be arranged in different countries to facilitate professional and personal contacts. These meetings will help opening up the mental horizons and shape the world view of the members. Such meetings foster their commitment to the net-work and its activities. Opportunities for periodic training on database and modern communication systems will be yet another attraction. Periodic visits of SMEs in different countries also should be arranged.

At the present pilot stage, INTIB plans to include only nine countries from Europe, Asia and the Pacific region in the net-work (Belgium, Germany, Sweden, Turkey, United Kingdom, India, Malaysia, Philippines and Republic of Korea). The regional spread of the SMEI-Net should be increased as fast as possible. The widening of the net-work at the quickest possible time will increase considerably the effectiveness of the system. At later stages, when the coverage of countries increases and the database becomes sufficiently large, SMEI-Net can think of using CD-ROM technology. Since only information on information sources are going into the SMEI-Net database, widening of the geographic coverage of the net-work will not pose much problem. In selecting countries for inclusion in the SMEI Net in future, priority will have to be accorded to those countries where SMEs play a major role in national economies. These countries must also have shown a commitment for supporting and developing SMEs. Their existing institutional infrastructure should be another criterion.

SMEI - Net Head-Quarters will be in charge of collecting regular feed back and periodically evaluating the system's

working. For this purpose, it will be advisable if copies of queries and responses between members are received by it. On the basis of periodic assessments, members of the system who are not active participants should be weeded out. Thus, the task of periodic revision of the database will have to be undertaken by the SMEI-Net Head-Quarters. When the system expands to include more and more countries, the database will have to be stored on CD-ROM as suggested earlier. Training of members on collection, maintenance and dissemination of information will also be the responsibility of the SMEI-Net Head-Quarters. Net-work members also require training on use of communication systems. A memorandum of understanding between net-work members and INTIB is given in Annexure II.

Though the SMEI-Net is conceived only as a specialised sub system of INTIB's global information system, it should have a separate management board to handle policy making, planning and review of net-work activities. The board, in addition to experts on communications and information systems, should also have economists and experts on SME sector. The Vienna based net-work secretariat should handle day-to-day administration and provide communication links with national nodes as well as other information systems including those of U.N. agencies.

The first stage in organising this net-work is to identify the institutions in each sector and region within a country and to evaluate their range of capabilities as suppliers and receivers of different types of information. The number of members in each country should depend on the number and variety of institutions functioning in a country, the size of the country and the diversity of its SME sector. The success of the net-work depends on identifying properly the net-work members and assessing correctly their capabilities. This task can be entrusted with the national level information agency in each country mentioned earlier. Alternatively, this can be assigned to a reliable consultant whose work can be reviewed by the above information agency. Before enlisting a firm or an agency as a net-work member, its willingness and active co-operation have to be sought and ensured by the SMEI-Net Head-Quarters. These members should be willing to supply SME related information free of cost to other members of the net-work, on request. Similarly, they must be willing to obtain information on behalf of their members or clients from other net-work members or from bibliographical sources.

It is unlikely that many of the potential members of the SMEI-Net especially those in developing countries will have a strong data base on the capabilities and requirements of the SMEs coming under their purview. Therefore, the first task of the net-work members will be to collect and maintain in an easily retrievable format, information and data from the SMEs in their

particular segment or industry or region. The type of information to be collected by each net-work member depends also on its particular mission. But the technical, financial and man-power resources available to many of them for this purpose will be limited. These capabilities will have to be augmented by UNIDO arranging to obtain technical and financial assistance from other aid giving agencies.

Only a limited range of information needs to be collected, and stored by net-work members from all the SMEs, (see Annexure III). In addition to basic information, units' capacity and interest in technology transfers, joint ventures, exports and imports have also to be ascertained at this stage. More detailed information will have to be collected only from those SMEs who are capable or are interested in globalisation of their activities by supplying or receiving technology or entering into joint ventures or through exports and imports. For collecting more detailed information from such units, INTIB's present proforma for compiling technology and joint venture profiles can be made use of by the net-work members.

One of the frequent criticisms against information systems including those of U.N. agencies is that they concentrate more on the supply side and neglect the demand side. "This orientation is based on the assumption that a good supply side will naturally flow to the demand side which is not the case" (Clemente). In the case of SMEI Net, this orientation will have to be changed.

There is very little understanding among national and international agencies on the exact information requirements of SMEs and how they are being met today. There has been very little research on this subject. Information meant for use by the SMEs also requires to be packaged appropriately. All these call for the services of both information specialists and extension staff who should periodically visit SMEs to assess their information requirements as also to deliver the information collected by net-work members through the SMEI Net after appropriate repackaging. The extension staff has to be provided with suitable training on gathering information, its packaging and dissemination. It is pointed out that one of the reasons for the success of TECHNUNET Asia is its cadre of well trained technical information specialists and industrial extension workers who act as vital links between sources of information and SMEs. They undertake periodic factory visits (Leon V.Chico). For training these extension workers, TECHNUNET Asia conducts industrial extension training courses (INDEXTRACT). SMEI-Net also can learn profitably from the experience of TECHNO-Net Asia. In fact, extension service must be built into the total scheme of SMEI-Net and it should endeavour to provide training to grass root level extension workers and to attach them with net work members at least in Third

World countries. SMEI-Net should obtain financial support from aid-giving agencies like UNDP for this purpose. The need for supporting extension activities for agricultural development has been well appreciated by aid giving agencies. The need for similar extension support for dissemination of technology and industrial information among SMEs has also to be appreciated if SMEI-Net has to produce the intended results.

One of the advantages of the SME information system envisaged by us is that its database on sources of information can be made use of, not only by SMEI-Net members but also by outsiders. National and multinational development agencies, information system industries and professional associations, R+D institutions/Universities, development banks, etc. will be potential users of the database. All of them can be given access to the database but at a price. When more and more countries and members are eventually added to the net-work to cover hopefully all the countries of the world, the information can be brought out on CDs which can be marketed globally. Adequate marketing efforts for its database, whatever be its form, can make SME net-work largely self-financing, in course of time.

The SMEI-Net, to be effective should be seen, heard and talked about. This calls for large scale promotion and marketing efforts. Mass media can be appropriate for general publicity. Professional journals and journals of SME associations can be other suitable media. There should be frequent contacts between SMEI-Net representatives, net-work members and representatives of trade and professional associations, development banks, extension service agencies, non-governmental organisations etc. to popularise the net-work. Like the INTIB, the SMEI-Net should publish a specialised journal of its own. This journal, in addition to net-work news, should cover news on developments in SME sector. It should also publish a calendar of events of interest to SMEs in general and members of net-work in particular.

It requires to be emphasised that the system's success depends on the speed with which it is organised and expanded. Members in all the selected countries have to be identified almost simultaneously. Undue delay between selection of members and the operationalisation of the net-work will demoralise them and reduce their commitment to the net-work. Efforts to train members and their extension staff should follow immediately after the creation of the database. Large scale promotional efforts will also have to be made almost immediately. In other words, attention will have to be bestowed simultaneously on many fronts; on identification of members, establishment of the database, training and promotion. Time is an important factor contributing to the success of the system.

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ANNEXURE I

The United Nations System has a number of information net-works and databases on scientific, technological and industrial information. None of them, however, are tailor-made for SMEs and are not meant to cater exclusively to their requirements. However, there is scope for culling out and sifting information relevant to SMEs from these databases. Some of the important databases containing scientific, technological, industrial and economic information are listed below:

1. DHL/UNBIS (Dag Hammarskjold Library/United Nations Bibliographical Information System): About 25 per cent of the bibliographical citations cover scientific and technological documents.
2. DIESA/DIS (Department of International Economic and Social Affairs) - It is a bibliographical information system on unpublished documents prepared by DIESA, DTCDD and UNFSSTD).
3. CTC/CPS (United Nations Centre on Transnational Corporations) covers inter alia foreign investment legislation, direct foreign investment, technology transfer etc.
4. ECLAC/CLADES (Economic Commission for Latin America and the Caribbean) - ECLAC has also got a database, BIBLOS.
5. ECA/PADIS (Economic Commission for Africa) - It is a multi-disciplinary bibliographical system.
6. ESCAP/DEPLADIS (Economic and Social Commission for Asia and the Pacific. ESCAP also has two other information systems viz., RINSCA and RCTT.
7. UNEP/INFOTERRA - It is an on-line Referral Service.
8. INRES/TCDC (UNDP) - UNDP has also a database covering all the projects it has funded.
9. UNFSSTD/TIPS (United Nations Financing System for Science and Technology for Development) This is a current awareness system.
10. UNU/ASSET (United Nations University) This is a bibliographical database.
11. ILO/LABORDOC (International Labour Organisation) The subjects covered include technological change and topics like micro electronics with impact on labour.

12. UNESCO/SPINES (United Nations Educational, Scientific and Cultural Organisation) This is a bibliographical database on science and technology policy.

13. WIPO/INPADOC (World Intellectual Property Organisation) gives bibliographic information on patent documents.

Of the multinational information systems and databases outside the U.N. System, the most important one is the TECHNO Net Asia, a net-work of 14 participating organisations. This is possibly the only net-work meant exclusively for SMEs. Besides, it has nearly two decades of experience to share with SMEI-Net.

Another information net-work which will be relevant for SMEI-Net will be SATIS (Amsterdam). It is a net-work of NGOs connected with rural development including development of rural industries. National Technical Information Service (NTIS) run by the US Department of Commerce disseminates U.S. government sponsored research, development, engineering and other technical reports. It also handles the promotion and licencing of U.S. Government inventions which are assigned to the Department of Commerce.

Another database in U.S.A. relevant to the SMEI Net is VITA of Volunteers in Technical Assistance. This contains references to appropriate technology literature from U.S.A and from developing countries.

DEVELOP database prepared by Control Data Corporation (USA) contains contributions from many development organisations and 'appropriate technology' organisations.

ANNEXURE II

MEMORANDUM OF UNDERSTANDING BETWEEN THE SMEI NET OF UNIDO AND THE NET-WORK MEMBERS

The two parties agree:

1. SMEI-Net will supply to the SMEI-Net work member and vice-versa, as requested, industrial and technological information and its publications as may be available and or could be reasonably obtained, subject, however, to such restrictions and arrangements as may be considered necessary by either party to preserve the confidential nature of certain information and publication.

2. INTIB will, if requested, assist the net-work member in achievement of the role assigned to the latter, to the extent possible. Such assistance could illustratively be in the form of

- a. Training of man-power
- b. Development of systems, codification, software.
- c. Provision of telecommunications facilities
- d. Provision of hardware
- e. Organising programmes such as Workshops, seminars etc. to identify user needs, exchange of experience and other identified areas.
- f. Provision of support material in printed or other audio visual forms for training, etc.

3. Exchange experience in development and application of information technology.

4. Prepare and publish joint publications on specific issues in the field of industrial and technological information using the expertise and data that may be available with the two organisations.

5. Expenditure on facilities and services to be provided for the implementation of the Agreement shall normally be borne by the supplier of such facilities and services. However, where the expenditure is beyond minor or ordinary expenditure (including any publication that is to be charged) which the supplier or receiver is not willing to bear, and/or in joint programmes where expenditure is to be shared, this must be agreed to between the two parties, in advance.

ANNEXURE III

FORMAT OF BASIC INFORMATION TO BE COLLECTED FROM SMES BY NET-WORK MEMBERS AT THE FIRST STAGE

1. Company name and address
2. Contact persons with title
3. Legal status of the enterprise
4. Total investment in plant and machinery
5. Number of employees
6. Sales turnover during last year
7. Main products
8. Standard capacity range per year for each main product
9. Principal raw material for main products
10. Process name
11. Description of process
12. Interest in offering technology? Yes/No
13. Interest in receiving technology? Yes/No
14. Interest in joint ventures abroad? Yes/No
15. Interest in joint ventures from abroad? Yes/No
16. Interest in exports? Yes/No
17. Interest in imports of equipments or components or raw materials? Yes/No