## OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

## DISCLAIMER



## FAIR USE POLICY



## CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

17950

Distr.
LIMITED

IPCT.98(SPEC.)
12 December 1989

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

# FINAL REPORT ON PROMOTION OF INDUSTRIAL INFORMATION NETWORKING AMONG SELECTED AFRICAN COUNTRIES*

Prepared by the UNIDO Secretariat**

* This document has not been edited.

** Based on the work of O. A. El-Kholy, UNIDO consultant.

V.89 62301

## TABLE OF CONTENTS

# I. INTRODUCTION

1- The story of the genesis of UNIDO's Industrial and Technological Information Bank (INTIB) since the UNIDO Lima Conference in 1975 is now well-known. However, attention needs to be drawn here to two significant developments that have distinguished the present decade in INTIB's life. First, there is the metamorphosis of INTIB itself into a multi-faceted system of activities. This came about as an Industrial and Technological Information Programme was developed by UNIDO Secretariat and endorsed by UNIDO Industrial Development Board. More resources were made available, the concept of a network of national/regional focal points was formulated, an Advisory Group began meeting regularly and several specific data bases were established and/or developed.

The second significant development is the change in the global information scene, in general, and industrial/ technological information, in particular. This has involved the scope, content, as well as the means of information acquisition, processing and delivery. The very word "BANK", for which the last letter in the acronym of INTIB stands, is so out of fashion now that it is difficult to believe that it was very much in vogue less than two decades ago.

2- On the other hand, it comes as no surprise that once the Industrial Development Decade for Africa (IDDA) was launched, the importance of the supply of useful industrial/technological information to end users in Africa recieved the attention it rightly

deserves, particularly in the priority sectors identified by the Lagos Plan of Action. Information infrastructure is a key element in strengthening and accelerating the process of industrialisation, since information is now recognised as a valuable national resource in any development effort and that the quintessence of technology is information. The need is both for information on technological alternatives and their sources, and for guidelines for appropriate choices. This has to be provided to SMI's that are young and can ill-afford, or even know how, to obtain such information by their own means. Furthermore, most governments in Africa have not yet articulated their industrial and technological information policies. Consequently, policy planners in these countries need some appropriate guidelines for formulating such national industrial/technological information policies to suit the situations in these countries.

3- It was against this background that UNIDO embarked on a series of relevant projects in the middle of the present decade starting with a project (RP/RAF/85/621) to establish and/or strengthen linkages between national, sub-regional and regional industrial and technological information services in ten African countries* and INTIB headquarters in Vienna. The idea was to establish sub-networks of INTIB made up of national focal points and

---

* These were Algeria, Cameroon, Egypt, Côte d'Ivoire, Kenya Nigeria, Senegal, Tanzania, Tunisia and Zambia.

nodes of industrial technological information activities in each country. Another project (XA/FAF/85/621) provided technical assistance to the African Regional Centre for Technology (ARCT) to become the regional focal point for these 10 countries in the first phase. During the second phase, and in response to the strong plea of the participants for the use of IBM PC-compatible hardware, the network recieved such hardware, as well as some software and INTIB data bases on diskettes. The project also involved the training of the heads of the focal points, at ARCT, on exploiting the network system facility. Furthermore, UNIDO supported ARCT's efforts to establish its local computer network to serve its technological information system (ARCTIS), and provided assistance particulary in the area of food and energy technologies, as well as human resources development. The idea was that ARCT would be the regional focal point in the development and operation of the sub-network.

4- These projects have proved to be both useful and effective. Consequently, UNIDO received a number of requests for assistance from other African member states to join the INTIB network and to recieve the same hardware and software as the first group of countries. It became obvious that activities have now to extend the network to cover at least 11 other African countries based on requests from their focal points, while taking into account their geographic location. The plan was that national information experts, as well as UNIDO field missions, would survey existing

and potential users of industrial/technological information, hardware, software and manpower requirements; as well as information policy at the national level, where it exists either explicitly or implicitly. Details of the present project (XA/RAF/88/684) are spelt out in the project document. This project is in response to requests from six Anglophone countries (Botswana, Ethiopia, Ghana, Libya, Zimbabwe, and Sierra Leone), five Francophone countries (Burundi, Mali, Rwanda, Madagascar and Morocco , as well as the ARCT. Amongst the various project outputs are reports designed in a heirarachy of three tiers. First, country reports prepared by natioonal experts in the eleven countries identifying four main elements, viz. existing status of industrial technological information systems and services in the country, existing and potential users of such information, the nature of the information and services required from INTIB, and finally the hardware, software and training requirements*. At a higher level and based on the national reports two UNIDO missions were fielded to assess on the spot the local scene, to draw the necessary conclusions and to make appropiate recommendations. Finally, the present final report is supposed to sum up, on the basis of the national and mission reports, as well as disscusions with the field missions, the present status in the eleven countries, identify needs, suggest a strategy for satisfying such needs, and outline future actions at the level of INTIB headquarters, the regional and national levels.

---

* A review of the country reports is given in Appendix I.

## II. CONCLUSIONS and RECOMENDATIONS

### The Present Status

5-At the national level the general situation in the countries involved can be described as in the next paragraph. However, these generalisations must not obscure important differences between these countries. It is tempting to attempt some sort of a typology that would arrange the countries in groups where the countries in each group have more or less the same characteristics. In this respect, there are only two distinguishing characteristics that are of relevance in the context of the present report. The first is the obvious distinction between Francophone and Anglophone countries. This is more than just a linguistic distinction. It has important cultural and even political implications -witness the bond that exists between the french-speaking countries whether these be Mali or Canada, and their regular meetings at the highest political level*. The second distinguishing feature is the stage of development the country has reached. This relates to the level of resources of all sorts available to the country, its size and historico-political antecedents. This obviously impacts on the type of information needed and the selection of the appropriate means of delivery.

---

* Particularly in supplementing UN resources by those from donor countries.

6- With all these reservations in mind, the following general remarks could be made :-

6.1 The contribution of the manufacturing industry sector to GDP in all 11 countries is generally rather low. In most countries it is still under 10% of GDP and sometimes considerably less than this rather low percentage. In some cases (e.g. Botswana and Sierra Leone) the primary sector (extraction and mining) is predominant. In others, it is rural/craft industry, while in yet some other countries it is light industry. In very few cases (e.g. Libya) is heavy industry of prominence in industrial development plans.

6.2 There is a general dearth of resources available for industrial/technological information systems and services. In fact, it is no exaggeration to state that industrial/technological information systems, as such, do not exist. There are fragments or building blocks of information systems at very early stages of development in most cases. However, the situation in some countries stands out, as being more developed, e.g. Morocco, Ethiopia, Libya and to a lesser extent, Botswana , Zimbabwe , Burundi or Madagascar.

The equipment in most INTIB national focal points, or centres of industrial/technological information, is of a rudimentary nature. Resource allocations are limited and irregular, relations with

potential users notional rather than real, and their stock of relevant information, either in-house of from outside sources, very limited. Staff are inexperienced and not always with a strong industrial background. Power supplies for electronic hardware, where it exists, is unreliable, suffering from power cuts and irregular voltage. With very few exceptions, particularly Morocco, the telecommunications infrastructure is inadequate.

6.3 There are two generically different situations:

- The planned economy countries, where the parastatal sector is predominant.
- The free economy countries, where the private enterprise is the main engine for industrial development.

In the planned economy countries there are well-established and fairly clear-cut lines of responsibility. The industrial/technological information services are integrated in the bureaucratic system and have fairly clear lines of communication with industrial enterprises and government departments. This does not necessarily mean that such services have the credibility or the capability to meet demand in a manner that would enhance their credibility.

In the free economy countries, the national focal points are by necessity nominated by the government and are, as a general rule, housed in a government department. This has not as yet fostered

smooth access to such sources of information by potential users. nor contributed to their development into effective and useful supporters of the private investor. This may be ascribed to the general lack of resources, as well as to the obvious and understandable reluctance of the entrepreneur to reveal his plans at an early stage in case other entrepreneurs, or the state, become his competitors.

6.4 In all countries there is no explicit industrial/technological information policy, nor do the national or field mission reports reveal the semblance of an implicit policy for industrial/technological information, in any of the 11 countries. In fact, there are no national information policies of a general nature, or for a particular socio-economic sector.

6.5 The national and mission reports reveal a tremendous variety of information needs, but with no well thought-out and convincing priorities that could serve as a reliable guide in developing INTIB databases and services to satisfy active, or potential demand. The needs listed in the reports are most probably those identified by experts. Amongst the heterogeneous variety of needs cited in the reports is information on raw materials, technologies and production techniques, machinery, spare parts, management, legislation, employment, training, quality control, standards, patents, technology transfer, financing, marketing, commercialisation of R & D results, and crafts.

6.6 The main users of the existing industrial/technological information services, as identified by the national and field mission reports, seem to be scientists, engineers and researchers having mainly academic intrests. Some engineers in the field and very few industrialists seem to make use of existing services. This is due to the limited capabilities of such services and the general lack of awareness of the value of information in supporting sound decisions in industrial development.

6.7 Promotional activities are almost non-existent, even though national focal points have been designated and staffed. This is obviously related to the very limited ability of existing centres to provide good service.

6.8 All countries pin high hopes on INTIB and expectations from UNIDO are high indeed. This may be the cause behind some UNDP resident representatives (in Botswana, Ethiopia, Sierra Leone and Zimbabwe)expressing to the field missions their willingness to support the allocation of funds for further development of INTIB activities in their countries.

7- At the <u>regional level</u>, ARCT has carried out with the help of UNIDO, some training activities of national focal points staff as well as building its own in-house information system. However, it is clear that it has a long way to go before acting as an effective regional focal point having smooth and clear lines of communication for the free flow of useful information to the national focal points, on the one hand, and INTIB on the other.

In all fairness, it must be noted here that ARCT has suffered from serious shortage of funds for a long time.

8- At the level of INTIB itself, it is clear that the last 3-4 years have witnessed remarkable developments in its capabilities and scope of operation. INTIB is now a system that has a variety of components, ranging from the Industrial Inquiry Services (IIS) that is as old as UNIDO itself, to no less than eleven information systems and databases, as well as an extensive publication programme that has been going on for more than a decade now.

UNIDO has succeded in the last few years in formulating the conceptual framework and completing the basic ground work and facilities for a network of regional and national focal points, with varying degrees of success in different regions and countries. Pilot experiments on linking them on-line with UNIDO headquarters in Vienna, as well as with world-wide databases, have been successfully carried out. Electronic mail has also been successfully implemented in a number of European and African countries. However, achievements in Africa are comparatively less spectacular than in other regions.

Yet another component of the system has been the provision of technical assistance in establishing and/or strengthening focal points, the training of staff and information officers and in developing national industrial information policies. INTIB has also concluded joint co-operation agreements and has engaged in joint prog-

rammes with several UN and regional organization in areas of mutual intest.

9- INTIB's successes and prominence have resulted in ever-increasing demands on the system. It is obvious that INTIB is in no position to cope with such demand with its present level of staffing or funding. Furthermore, as its activities increase in volume and diversify in nature, a comprehensive evaluation of its holdings, means of access of various sources of relevant information, as well as methods of delivery to the users of its services, will be called for. The field missions have already indicated certain areas where remedial action is needed. These will be elaborated upon and the strategy for dealing with the current situation proposed in the next section. Let it be emphasised here that this is the price of success and is more in the nature of growing pains than a reflection of any serious flaws in the approaches adopted so far.

**Identified Needs**

9- On the basis of the above characterisation of the present situation - at the national, regional and INTIB levels - the needs for the next phase can be identified, again at these three levels. However, a word of caution is called for before detailing these needs, since the needs are a major input in formulating the strategy proposed here for meeting them. While we proceed here to detail the needs without consideration of the possibility of satisfying them, a useful strategy must take into consideration the constraints that define the scope of feasible actions at each of the three levels. With this necessary qualification in mind, we hereunder detail needs as gleaned from the national and field mission reports.

10- At the national level, the needs could be listed as follows :

10-1. The first need is to promote the use of industrial/ technological information. Without such promotion that would create active demand for such information the very raison d'etre of INTIB disappears. A paradox that has bedevilled information systems in the Third World is that those who need it most are precisely those who do not appreciate the critical role reliable information plays in helping them to reach optimum decisions that would save them from committing mistakes, the consequences of which they can ill afford. More specifically, those countries at the early stages of industrial development - and this is very much the case in Africa - are the least sensitive to the role good industrial/ technological information plays in supporting their decisions.

It is only at the more advanced stages of industrial development that the value of information comes to be appreciated. The need for industrial/technological information is then transformed into active demand with clear priorities as to the type of information expected from the information services and centres.

10-2. As a direct corollary of this, emerges the need for active, if not even agressive, information delivery systems as distinguished from passive delivery systems. The mere existence of the most comprehensive information services in a young developing country does not guarantee that it will be accessed by the potential beneficiaries of such service. Here the need for the information officer who goes out to such beneficiaries, try to articulate their needs, and supply them with the information needed (in the appropriate form and at the right time) becomes apparent. Such an information officer is a rare bird of exceptional qualities. He, or she, should have a sound industrial background, in-depth knowledge of the industrial scene in the country (or at least in an industrial sector), be able to glean information from local and foreign sources with equal ease, and have the personal traits of character that would guarantee his acceptability amongst the industrial community and establish his credentials as a trustworthy and useful supporter of the industrial entrepreneur. It is worth remembering that in many cases, the information needed by one user in a developing country is already available elsehwere in the country itself. It could be obtained quickly if only its location can be identified.

The active information officer who moves around continuously amongst the industrial community becomes its "gate keeper" of such information.

10-3. The first task for such an officer, or head of a national focal point for that matter, is to undertake an in-depth survey of industrial/technological information needs, and their priorities amongst different sectors, and within each sector. This has to take into consideration existing needs as well as those implicit in future industrial development plans in the country. Without such surveys, INTIB will not be able to order its priorities effectively or mobilise its resources to address high priority industrial/technological information needs in African countries.

10-4. The above three needs combined mean that the national focal point has to be a hub, smoothly linked up with a number of nodes in the main industrial enterprises, professional bodies and government departments. While this may be an easier task in the planned economy countries, it will not be achieved under any economic system until the national focal point can prove its effectiveness in serving users. This is obviously a long drawn out process that calls for patience, experience, tact, and adequate resources.

10-5. This leaves the need for the means to provide these necessities. Topmost amongst these is qualified manpower. This means that there is need for :

* a comprehensive training/ fellowships/ study tours programme for the various functions, and at the different levels

of responsibility that make up an effective national focal point.

* the software for such training programmes, including training manuals, well-prepared case studies, audio-visual aids.... etc.

* competent trainers who could continue to provide the leadership for such programmes.

UNIDO has been carrying out such activities; but the scope needed for the future is much greater than what it could provide within the limitations of the available resources.

10-6. Next come the financial resources, both capital and operational for bringing the national focal points to an acceptable level of operation. These are substantially more than the modest resources made available so far, either from national budgets or technical assistance and aid programmes. The dearth of finances leaves the national focal points in limbo - they exist, but do not really function.

10-7. Another particulary important future need is for a well-developed telecommunications infrastructure. While such facility is not the only way for accessing information sources, and granting that reasonably effective service can be provided in the early phases of system development using simpler and less sophisticated methods, the fact remains that effective informatics facilities are essential in the long run.

10-8. Finally, it is unlikely that any of these needs can be provided, even to a limited extent dictated by practical

constraints; but in a sustained manner, without a national industrial/ technological information policy. Such policy will provide the framework for effective, realistic and feasible plans to develop the national focal points and build a reasonably effective industrial/ technological information service.

11- At the regional level, and that means so far the ARCT, the first need is for a clear definition of the role of the regional focal point and the nature of its relation with the national focal points, on the one hand, and UNIDO headquarters, or the other. This is an issue which has not been addressed by either the national or the field mission reports. We may venture to suggest here, on the basis of previous work , two priority functions :

11-1. The first is to concentrate on collecting, processing and delivering industrial/technological information generated in the African countries themselves. This is justified on two accounts. First, information needs may not be very different between countries at similar stages of development. Secondly, it is a more manageable - if not necessarily an easy task.

11-2. The second function, which ARCT carries out already, is to be the main training centre in Africa. This would ensure accumulation of experience, concentration of resources, and smooth relations between the regional and national focal points.

This does not imply negligence of other activities which ARCT is engaged in at present, such as its network for hardicrafts.

12- One of the field mission reports has highlighted an interesting fact, viz. the strong links existing between certain

sub-regional groups of countries. Two examples are cited in the field mission report covering the Francophone countries. These are the links between Rwanda, Burundi and Zaire, and those between the Maghreb countries (Morocco, Algiers and Tunisia). This may call for some consideration of the possibility of useful and effective projects at such a sub-regional network.

13- At the level of INTIB, the reports, and discussions with the members of the field missions, have identified a whole range of needs if INTIB is to rise up to current expectations and contribute significantly to the objectives of IDDA, in particular, and to UNIDO mission, in general. The most important of these are:

13,1- At the conceptual level, developments so far call for certain revisions and expansions in the current framework of INTIB as it has emerged in the last few years. Topmost amongst these is the need for INTIB to build an image that distinguishes it amongst the multitude of databases worldwide, and the emergence of the information broker as a new and powerful actor in the information scene. It is the view of the author of this report that INTIB should be known worldwide as the main source of the substantial wealth of in-house generated industrial/technological information. This would be in addition to the original and sound concept of INTIB as essentially a referral system that switches inquires and responses between seekers and sources of information.

13,2- A new, and very important, dimension that needs to be strengthened in INTIB activities is a programme of active promotion of INTIB in a variety of ways, including demonstrations of its databases, both in Vienna and in the field, preparation of attractive and comprehensive documentation in current languages

and active dissemination of such literature, the establishment of INTIB users groups, and the creation of a system of certificates and awards to trainees, leading national focal points and for distinguished achievements. Other promotional activities include a standard INTIB demonstration kit, the design of an INTIB logo, and further development of the INTIB newsletter already started.

13,3- The national and field mission reports lead one to believe that the priority need is for extension services rather than for computer and telecommunications-based delivery systems. This approach in delivery systems is essential at the early stages of industrial development. It is even easier to implement in countries where industrial activity does not extend to too many industrial sectors, or when the country, or its industrial community, is not too big. This means that INTIB programme should include a substantial component for consultants who would help suitable national counterparts in developing such extension services and promotional activities, as well as improvement of the modii operandi of the national focal points.

13,4- In-house, there is an obvious need to promote INTIB databases within UNIDO secretariat itself. INTIB needs to be integrated in all UNIDO developmental projects, particularly those concerned with industrial infrastructure. Even in those projects addressing a particular industrial sectors, industrial technological information is a key element. Including an INTIB- related component would be a very effective way of enhancing the capabilities of the national focal points and, consequently, their prestige

and credibility. UNIDO staff on mission could be briefed to arrange presentations of the standard demonstration kit, and to identify the industrial/technological information needs of the countries they visit. These are policy decisions that need to be taken at the level of top management of UNIDO.

13,5- Within INTIB headquarters itself, the needs seem to be : -

* a thorough review of its databases, based on the best available information derived from analysis of users demands in different countries and sectors and their historical trends. Decisive action needs to be taken to shed off all those databases that have proved to be of marginal value and for which no future demand is reasonably to be expected, and no matter how painful such action may prove to be to some people.

* at a later stage, when national priorities for different industrial sectors are clearly defined, the databases could be revised once more on a more reliable basis.

* The review needs to extend to INTIB publications so as to reflect the information needs in the priority areas, as well as extension to provide the needs of personnel training manuals, guidelines on promotion, system set-up and operation, and on formulating national industrial technological information policies.

13,6- at the technical level, the field mission reports, particularly that of the mission to the Francophone countries, have highlighted the following needs :-

* Improvement of INTIB software and user manuals to become more user-friendly and efficient.

* Providing all INTIB software and worksheets in the French language.

* Establishing a procedure for data selection, provision of semantic control at data entry, and development of INTIB software.

* Carrying out periodical evaluations of operations, including qualitative and quantitative assessments of the system.

* Continuous monitoring of developments in computer and telecommunications technology and adopting the most appropriate.

13,7- Finally, it is the author's firm belief that INTIB needs considerable enhancements of its current manning, equipment and funding levels if it were to fulfill the minimum level of effectiveness in the next ten years.

Funding need not all come from UNIDO regular budget. A lean and effective INTIB would be better placed to receive funds from donor countries and offers for joint operations from other organisations.

14- It is obvious that the above attempt at defining needs has not been confined to those relating specifically to developing operations in the eleven African countries, subject of the present project. Without satisfying these needs at INTIB headquarters, fulfilling its objectives would be difficult, if not wellneigh impossible, particularly in Africa (para.13). Within the domain prescribed by these constraints, we proceed to outline a strategy for further development of INTIB activities in Africa.

**A Strategy for Meeting Identified Needs :**

15- A strategy is a guide to action of a general nature that permits discretion in its application. Strategic planning begins with the development of organisational mission and objectives. It proceeds to consider ways of attaining them (i.e. strategies), choosing the most suitable alternative within the domain specified by existing, or expected, constraints after these have been carefully and clearly defined. This process involves adaptation of the organisational structure, as well as re-orientation of institutional capabilities and internal culture of the system or organisation in desirable directions.

Since such objectives and capabilities shape the future, strategic planning is by definition future oriented. Like all future-oriented activities, it involves consideration of uncontrollable environmental forces that affect organisational performance. Hence, the concern for "effectiveness" of the organisation, i.e. its success in achieving its purpose through meaningful outputs, as distinct from "efficiency" in implementing a particular project, regardless of the value of the planned project outputs themselves.

16- The constraints within which a strategy for satisfying identified needs is proposed are reasonably well defined at the national and reginal levels in the characterisation of the "Present Status"

(paras , 5-7). Those at the level of INTIB headquarters were touched upon implicitly, and without the benefit of an in-depth survey, in the section outlining needs at this particular level (paras. 13-14). With these in mind, the main elements of a future strategy for development of INTIB activities in the eleven countries concerned are outlined below.

17- Establishing a viable information system is a complex, multi-faceted and long drawn out process. This needs to be borne in mind when proposing a strategy for further development of INTIB activities in Africa. Experience so far indicates that the concept of INTIB as it has cryscallised in the last few years is sound and should be maintained. Its main features are that it is an ongoing programme comprising several components. It is based on the premise that it is essentially a referral system that guides the seekers of information to the most appropriate sources of their information needs , while being the main source of UNIDO generated industrial/ technological information. The other main component of the programme is the development of a network of regional and national focal points, with the latter as the hub of a national network linking a number of nodes suitably located in the main government, business and professional centres. The programme also covers dissemination mechanisms ranging from publications to on-line linkages and electronic mail; manpower development projects and technical guidance in formulating national industrial/technological information policies.

18- Proceeding to develop INTIB activities in Africa needs to adopt the motto that "success breeds more success". Consequently activities should be phased, with a first phase dealing with 3 - 4 countries where conditions as depicted by the national and field mission reports indicate that there is a greater likelihood of success. Another reason for recommending this approach is that it is unlikely that enough resources will be available for a large scale and comprehensive project covering all eleven countries with their differences in the present status of their industrial and industrial/technolgical information infrastructures. A third reason is that experience gained in these less difficult countries will be of great value in the design and implementation of the next phases.

19- This selective strategy raises the question of how to select the countries to be involved in the first phase. The following criteria are proposed as guidelines in the selection process :-

19-1- The significance of the industrial sector to the national economy and the role it is expected to play in overall national development. This involves consideration of present and planned values for indicators such as contribution of the industrial sector to GNP and to overall emplayment, and the relative and absolute magnitude of investments in the sector.

19-2- The degree, level, and continuity of government support to the development of a viable national industrial/technological information service. This involves shrewd assessments of such support over the short and long terms, and the level of commitment of resources for developing such a service.

19-3- The level of awareness amongst the industrial community at large of the value of industrial/technological information. Analysis of requests received from the country and the field mission reports can provide some guidance in this respect.

19-4- The current situation in industrial/technological information systems and services. This involves consideration of existing holdings, equipment, personnel, premises, communications facilities and level, and variety, of past operations as revealed by analysis of demand for its services.

19-5- The venue and national standing of the national focal point designated by the government, i.e. its location, prestige, relations with other government departments, industrial enterprises (public and private) and professional bodies, and last but not least, the credibility of the person in charge of the national focal point.

19-6- Other less critical criteria; but still quite important, are :-

* the level, variety and sources of demand for industrial/ technological information, in order to make sure that it originates from the industrial sector and is closely linked to industrial development of the country.
* the working relations with UNIDO, as revealed by previous projects implemented in the country, and indicating reasonably good knowledge of UNIDO's modus operandi, and personal relations with key figures in the country.
* the degree of enthusiasm of UNDP office and its resident representative for developing INTIB activities in the country.

20- A second main element in the proposed strategy is to give promotion of INTIB a high priority. This will guarantec that expansion of its activities will depend on a secure base of increasing demand for its services. Promotion should address not only what INTIB is and what it can do; but also what it is not and what it is not designed to do. This would ensure that requests for its services and for inclusion in its network of focal points is based on proper understanding of its aims and modus operandi. Various operational activities have already been hinted at in para 13, sec. 2.

21- Computer based systems are no substitute for effective delivery systems of useful and timely industrial / technological

information. Consequently consultants who can train information officers in establishing credibility amongst the industrial community, and provide on-the-spot advice in developing the focal points and the national nodes linked to them should figure prominently in future projects. They should also be capable of providing appropriate advice in the formulations of national industrial/technological information policies, and provide INTIB headquarters with clear priorities of information needs of the country.

22- The bilinguality of the African states necessitates that INTIB itself become fully bilingual in every aspect of its activities. This covers all publications, computer software, and manuals.

23- Finally, INTIB activities should be integrated with all UNIDO developmental projects. This calls for concentrated and sustained effort to promote INTIB in-house, so as to ensure greater understanding and exploitation of INTIB's full potential. This would in itself provide very useful feedback in guiding INTIB development in the future.

**Future Action :**

24- Based on the identified needs, and within the proposed strategy, and in order to avoid unnecessary repitition, future actions at the levels of INTIB headquarters, regional, and national levels can be summarised as follows :-

**24-1- At the level of INTIB Headquarters :**

* Expand the scope of activities in INTIB programme to include a substantial increase in the level and variety of promotional efforts (para. 13, sec. 2).
* Promote INTIB data bases in-house, and include an INTIB component in field operations (para. 13, sec. 4).
* review existing and projected INTIB data bases, dropping those for which there is little actual or expected demand and concentrating on those for which sizeable demand is expected (para. 13, sec. 5). and disseminate information on the distinguishing features of INTIB (p:ara. 13, sec. 1).
* improve INTIB software to become more user-friendly, complete its availability in French (particularly the worksheets, (1) and establish a procedure for data selection and semantic control during data entry. (para, 13, sec. 6).

---

(1) This could be carried out within the framework of the ATHOS project.

* continue to monitor informatics developments and introduce the appropriate ones.

* strengthen INTIB infrastructure at headquarters (particularly in hardware) and provide more qualified manpower to cope with increasing demand (para. 13, sec. 7).

24-2- **At the Regional Level :**

This level has not been addressed in the national and field mission reports. In para. 11, a personal view was expressed to the effect that the priority action is to define more clearly, and in detail, the role of the regional focal point, and the mechanisms of interacting with the national focal points and INTIB headquarters. This includes a decision as to the number of regional focal points that could be usefully established in Africa (para. 11). For this purpose it is proposed that a study be commisioned to clarify these points and its findings discussed in a meeting of the INTIB advisory group.

24-3- **At the National Level :**

For the institutions and organisations involved in industrial/technological information in Africa, actions need to be taken both by the national governments, as well as by UNIDO :-

a- national governments that qualify for UNIDO technical assistance should :-

* provide enough resources (equipment, personnel, premises, operating budgets, telecommenications infrastructure,..etc.).
* provide political backing to the promotion of the use of INTIB services.
* facilitate the linkages between the national focal point and the nodes linked to it.
* formulate a national information policy that provides for the unobstructed exchange of industrial/technological information and that recognises that the availability of such information involves a cost element.

b- UNIDO/INTIB should, on its part, help national governments by providing technical assistance and support in obtaining funding for :-

* manpower development in a variety of ways (para. 10, sec. 5).
* consultant to provide on-the-spot guidance in many spheres to the young national focal points, in particular, and to the industrial community at large, in matters relating to the acquisition and use of industrial/technological information (para. 13, sec. 3).
* development of positive information delivery systems (para, 10, sec. 2).

* establishing national priority information needs .

- at the end users of industrial/technological information, future actions should include :-

* systematic effort to define their priority needs, present and future.
* provision of clear and precise information on the nature and scope of INTIB, to avoid disappointment and to enhance its credibility.
* systematic effort to draw in more industrialists, rather than academics and researchers.

## III. PROJECT PROPOSAL

**Development objectives :-**

To strengthen the capabilities in a number of African countries in acquiring, processing, and delivering useful industrial/technological information in the appropriate form and at the right time to support industrial development efforts in these countries.

**Immediate Objecvtives :-**

- To provide guidance and technical assistance to selected existing information systems/centres suitable for handling industrial/technological information so as to become the national focal points within UNIDO/INTIB network for the exchange of industrial/technological information within Africa and with INTIB headquarters.

- To provide guidance and technical assistance to the national focal points in establishing a network of nodes in centres generating and/or using industrial/technological information within the country.

- To provide guidance and technical assistance to the national focal points in promoting the widespread use of industrial/technological information and sensitising potential users to its important rate in formulating sound industrial policies and decisions at a variety of levels.

- To undertake, jointly with national and regional bodies, manpower development programmes to ensure the manning of the national focal points with qualified personnel at all levels and specialisations.

**Existing and Potential Users of Industrial Information and their Needs :-**

**a- Information Users :-**

- The country and mission reports indicate that there are not many existing users of industrial information-a fact that highlights the urgency in implementing this project. Amongst existing users involved in industrial devolopment, policy and decision makers in government circles, rather than industrialists, predominate. Next, come personnel in academic and research establishments. The number of existing users and the frequency of demand for information seem to be closely linked to the level of industrial development achieved in the country.

- Potentially, there is a wide spectrum of users of industrial/ technological information. These indude senior government officials involved in formulating national policies, strategies and plans for industrial development; personnel involved in monitoring and licensing industrial enterprises and transfer of technology transactions, industrial imports and exports of equipment, raw materials and finished products; captains of industry; plant managers; technical personnel;

traders in industrial imports and exports; and personnel in academic and research establishments.

**b- Information Needs :-**

- These will naturally differ form one user to the other. Ths means that the spectrum of information types is broad indeed. In fact some of it, like trade figures and some national statistics are not, strictly speaking, industrial/technological information; but are none the less essential for industrial planning. INTIB need not necessarily be involved in such types of information; but the national focal points should have access to the national nodes housing such information, on the one hand, as well as UNIDO headquarters holdings of such information.

- In general, information is needed in the formulation of industrial development plans (pre-investment, prefeasibility and feasibility studies, technology and supplier choices, negotiations for the acquisition of plant, equipment and technologies, as well as in industrial operations (production planning, quality control, maintenance, product development, ...etc.) and finally in marketing and promotion.

- More specifically, information is needed on industrial project and product profiles in the main industrial sectors in the

country (existing and planned); raw materials, intermediate goods, machinery, equipment, products, and their suppliers; production technologies; management techniques, production and quality control techniques; marketing; standards and patents; financing; technology assessment and transfer methods; manpower development and training; and finally commercialisation of R & D results.

- The tremendous variety in types and sources of information necessitates the implementation of an in-depth study to establish the order of priorities of information needs in each country, taking into consideration existing, as well as future demand as gleaned from the national development plans, in general, and those of industrial planning, in particular.

**Project Outputs :-**

The project outputs can be summarised as follows:

a- characterisation of the national industrial/technological information scene in eleven African countries in considerable detail.

b- preliminary recommendations for the selection of national focal points in each country, as well asa systematic approach for final selection.

c- identification of national nodes to link up with the national focal point in each country.

d- preliminary identification of information users, existing and potential, as well as their information needs.

e- identification of developmental needs at the level of INTIB headquarters, and in a preliminary manner- at the regional level.

f- identification of actions and resources needed to enhance the capabilities of national industrial/technological systems, in general, and the national focal points, in particular. This covers hardware, software, training, consultancy, and sensitisation and promotion activities.

g- establishing stronger links between UNIDO/INTIB personnel and leading personalities in the industrial/technological information fields in the 11 African courtries, leading to common understanding as to future needs and actions.

**Project Activities :-**

The project outputs were achieved as the result of the following activities ;-

a- preparation of a series of country reports by selected national consultants. The country reports characterised existing and potential information systems, information users, existing and future information needs, the resources and actions for enhancing such systems as exist in the country, as well as the inputs (information resources, equipment, expertise, training ... etc.) needed from

INTIB in response to needs and expectations in each country.

b- fielding two UNIDO missions, one to six Anglophone countries (Botswana, Ethiopia, Ghana, Libya, Sierra Leone, and Zambia), and the other to five Francophone countries (Burundi, Madagascar, Mali, Morocco and Rwanda). The two missions reviewed the national scene, held discussions with senior staff, demonstrated INTIB software and information data bases and provided on-the-spot advice and consultations. The mission reports have come up with specific recommendations, based on conclusions reached in the light of the national reports, the field visits and discussions, both for country-specific actions, and for developments at INTIB headquarters.

**Action-oriented Pregramme :-**

**a- At the national level :-**

Actions need be taken both by the national governments, as well as by UNIDO :-

**i- <u>national governments</u> that qualify for UNIDO technical assistance should :**

* provide enough resources (equipment, personnel, premises, operating budgets, telecommenications infrastructure;... etc)
* provide political backing to the promotion of the use of INTIB services.

* facilitate the linkages between the national focal point and the nodes linked to it.
* draft a national information policy that provides for the unobstructed exchange of industrial/technological information and that recognises that the availability of such information involves a cost element.

ii. **UNIDO/ INTIB should, on its part, help national governments by providing technical assistance and support in obtaining funding for :-**

* manpower development in a variety of ways (para. 10, sec.5).
* consultant to provide on-the-spot guidance in many spheres to the young national focal points, in particular, and to the industrial community, at large, in matters relating to the acquisition and use of industrial/technological information (para.10,sec.3).
* development of positive information delivery system (para. 10, sec. 2).
* establishing national priority information needs .

- at the end users of industrial/technological information future actions should include :-

* systematic effort to define their priority needs, present and future.

* provision of clear and precise information on the nature and scope of INTIB, to avoid disappointment and to enhance its credibility.
* systematic effort to draw in more industrialists rather than academics and researchers.
* concerted and sustained promotion and sensitisation effort to convince potential beneficiaries of industrial/technological information of its necessity and value in reaching sound decisions at all levels and varieties of industrial activity.

**b- At the Regional Level :-**

This level has not been addressed in the national and field mission reports. In para. 11, a personal view was expressed to the effect that the priority action is to define more clearly, and in detail, the role of the regional focal point, and the mechanism of interacting with the national focal points and INTIB headquarters(1) This includes a decision as to the number of regional focal points that could be usefully established in Africa (Para.11). For this purpose it is proposed that a study be commisioned to clarify these points and its findings discussed in a meeting of the INTIB advisory group.

---

(1) For a previous attempt at defining this role, see: UNIDO/IS/R.41, of 4 March 1986, pp.34-38. This concept needs to be checked after three years against achievements and constraints and modified accordingly.

**Concrete Project Proposals for the Extension of INTIB Networking In Selected 20 Countries in Africa :**

As mentioned in the section on strategy, the project will be implemented in phases. In phase I, Work will be concentrated in four countries (two Anglophone and two Francophone[1]. Selection will be based on the recommendations of the field missions, the criteria outlined in the strategy and the enthusiasm and commitment of the country to the project.

The activities in the new project are as follows :-

**1- Selection of the national focal point :-**

This will be based on negotiations with the government, based on the recommendations of the field missions, and bearing in mind the reservations expressed earlier on (para. 19). An agreement has to be drawn detailing the responsibilities of each side in the operation of the national focal point during the project.

**2- Upgrading equipment and software of the selected national focal point :**

Based on the information in the national and field mission

---

(1) The field mission reports suggest Botswana, Libya and Zimbabue from the anglophone countries, and Madagascar, Morocco from the francophone countries.

reports, the extra equipment and software needed for each national focal to bring it up to INTIB national focal point standard will be identified and supplied by UNIDO. This does not include other equipment to be supplied by the national government (e.g. typerwriters, copiers, furniture, basic facilities, supplies and communication infrastructure ... etc).

**3- Human resources development**

3,1- Training workshops :- Three types of workshops need to be organised for the national focal point staff, either at the national or subregional levels; but both in English and French. These are on the management and operations of industrial/ technological information centres, on handling information using modern computer technologies, and finally on the establishment and operation of extension services for industrial/ technological information.

3,2- Fellowships :- One each for the director of the national focal point, spending time at INTIB headquarters and visiting well-established national focal points in other regions.

3,3- On-the-job training :- (OJT) for senior national focal point staff extending for 2-3 months in a well-established industrial/ technological information centre in a developed country, as well as a successful national focal point in a developing country. OJT will be provided both to in-house information officers and operators, as well as to personnel operating the extension services.

**4- Development of an effective extension service:**

This activity will be the main responsibility of an experienced consultant, supported by a small number of carefully chosen national counterparts. It is essentially a hands-on type of training supervised by the consultant, supplemented by one-on-one or group training sessions and review of performance in meetings with industrialists and handling their queries.

**5- Development of an INTIB promotion campaign :**

This involves the preparation of an audio-visual presentation kit and supporting literature, development of INTIB newsletter and increasing the participation of end users and focal points, the design of an INTIB logo, establishing a system of merit awards to individuals and organisations for outstanding achievements.

**6- Developing ARCT as a regional focal point**

This involves commisioning a joint study with ARCT to define in detail its responsibilities as a regional focal point and to establish formal procedures and protocols for interaction with the national focal points and INTIB headquarters.

The recommendations of the study are to be discussed by INTIB Advisory Group and a technical assistance package prepared by UNIDO Secretariat.

**7- Supporting in-house activities :**

* promote INTIB data bases in-house.
* closer integration of INTIB components in UNIDO projects, particularly those for infrastructure.

* thorough review of INTIB data bases.
* review of INTIB publications, and their extension to cover training manuals, guidelines on promotion, system set-up and operation, as well as formulating national industrial /technological information policies.
* improving INTIB software and user manuals to become more user-friendly.
* completing availability of all INTIB software and work-sheets in French.
* establishing procedures for data selection & semantic control of data entry.
* periodical evaluation of operations, qualitatively and quantitatively.
* monitoring and assessing technological developments in informatics, so as to introduce them in the most appropriate manner.

**Proposals on the Follow-up of IDDA/INTIB Projects :**

1- Approval and implementation of phase I as detailed above in 2 Anglophone and 2 Francophone countries, selected so as to be "flagship" projects.

2- Evaluation of results to provide useful feedback for a second phase covering at least five of the remaining countries.

3- Implementation and evaluation of second phase, leading to a final phase covering all remaining African countries that apply for joining INTIB network and show commitment and enthusiasm for doing so.

## *APPENDEX I - SUMMARY OF COUNTRY REPORTS*

### *A- Anglophone Countries*

***1- Botswana :-***

*Over the decade 1974-1983, the contribution of manufacturing industry to the gross domestic product (GDP) remained constant at 4.3%, while that of mining and quarrying rose from 13.3% to 46.9%. Apart from the firms belonging to the Botswana Meat Commission (BMC), a main contributor to domestic income and wealth, the majority of manufacturing firms are small by international standards. Out of 319 firms surveyed in 1984, no less than 121 firms employed between 11-50, while 90 firms employed no more than 5 employees. Yet there is a marked trend over the last 15 years towards increase in the number of firms employing less than 10 employees. The priority emphasis in the sixth national development plan is an diversification of the economy. The Botswana Technology Centre (BTC) is being funded by the government since 1983. It maintains communication with information and technology institutions, both within and outside Botswana.*

*The report lists three national and technological information systems within the government, as well as two private/parastatal ones and four in the areas of energy and the environment. However, the report adds that while information is widely acknowledged as essential to any development, existing information systems are currently underused. It attributes this both to lack of knowledge about existing facilities, and to lack of access.*

*The potential users of information are identified as the business community, manufacturing and village industries, researchers, policy makers and the general public.*

*The types of information needed at the macro level are a collection of feasibility studies; more information on business practices and marketing/management issues, as well as trade directories. At the micro level, they are standards and classification of products, technology selection, information on local business procedures, particularly in financing. The report also sees a need for more active training to improve the present low levels of competence.*

*Of the seven information services in the country, only two have computer facilities, one advanced and the second basic. The very few existing collection and compilation systems are manual. There is a general lack of qualified and experienced national manpower. Hence the high proportion of expatriate manpower. The government is predominant in the employment of qualified manpower. Very few students in the University of Botswana are qualifying in the field of librarianship. The country is committed to a programme of improvement and expansion of its telecommunications network.*

*The recommendations of the report are :-*

*- establishing channels and networks for effective collection of information and ensuring policy and funding to support information services.*

*- intensive training of librarians, computer specialists, and development of training facilities throughout the country.*

*- greater coordination between the different organizations in the compilation of available information.*

*- translation exercises and the use of audio-visual aids in information presentation.*

**2- Ethiopia :** [1]

*Agriculture is the dominant sector in the economy. Manufacturing industry accounts only for 11% of the GDP and 5% of employment. The sector is dominated by 235 parastatal manufacturing units. 71% of these are controlled by the Ministry of Industry through ten corporations and the Small Scale Industrias Development Agency. It is planned to increase the share of industry in the national economy to 24% by the fiscal year 1993/94 through the expansion or creation of 216 industrial units.*

*A national industrial information survey of 235 manufacturing units, revealed that 66 have no industrial/technological information service of any sort. However, it is recognised that there is need for a national information policy if a viable and dynamic scientific-technological system is to be created. This is the responsibility of the Ethiopian Science and*

---

*(1) This is one of the most comprehensive and detailed reports.*

*Technology Commision. The national draft policy, to be discussed and adopted shortly, calls for strengthening the microelectronics and informatics sector.*

*Of the information systems in the country, the Ministry of Industry has three centres, one of which has computer facilitics. The corporations have six libraries/documentation centres. The National Scientific Technological Information and Documentation Centre (NASTIDC) is the only fully automated one and currently has 58,000 records in its database. It provides a full range of information services and is mannned by 16 qualified staff members. At the international level, the Pan African Documentation and Information Service (PADIS), has an extensive African socio - economic database. The report lists in tabular form, all organisations, their objectives and the available hardware and software.*

*Manpower available is 41, and it is estimated that there is need for another 15 new well-trained recrcuits.*

*Users profile is given in tabular form for 20 groups of organisations detailing the number of establishments in each group, their activities, employment and value of production and sales. Potential users are identified as researchers, policy and decision makers, planners, engineers, consultants, industrialists, government officials and those in industrial organisations.*

*The types of information needed include that on industrial policies, project development, industrial operations, science and technology, planning and budgeting, administration and finance, public relations and manpower.*

*The telecommunications infrastructure is considered reasonably good and is being modernised periodically.*

**3- Ghana :**

*The manufacturing sector's share of GDP increased from 7% in 1983, to 9% in 1987. Under the Economic Recovery Programme (ERP) the industrial production sector expansion in 1986, was much lower than the 17.9% registered a year earlier. However, in 1987 it recovered to reach 11.34%. The sector contribution to GDP, at constant 1975 prices, is 14.1%. The overall utilisation of manufacturing capacity, which declined from 30% in 1983 to 19% the following year , has now risen again to reach 32% in 1987. The manufacturing subsector is responsible for two thirds of total growth in the industrial sector. The main industries are furniture and aluminium sections. Several priority sectors have been identified. These are food and beverages, mining and metallurgy, wood processing, pulp and paper, textiles, machine tools, electrical and electronic equipment, chemicals, leather, rubber and plastics, building materials, water-related industries, energy, and standardisation. The impact of each on overall growth of the industrial sector is also outlined in the report.*

*Although there is no explicit industrial/technological information policy, broad policy statements, plans and activities could be described as an implicit policy. Scientific-technological information is recognised as a prerequisite for industrial and technological growth. Drafts of a national S & T policy have been prepared and should be finalised by the end of 1989. The Council for Scientific and Industrial Research (CSIR) has taken steps towards formulating a national S & T information policy, of which industrial/technological information policy is a part. In 1987 the last of a series of workshops organised by the CSIR drafted a policy proposal for establishing a national scientific and technological network (GHASTINET).*

*Broadly speaking, there are three categories of industrial/technological information systems in the country : libraries, documentation centres, and those handling information in documentary and non-documentary forms. Each category is described in rather general terms.*

*The information systems pertaining to energy and the environment are also described in narrative form, with particular emphasis on the Energy Information Centre of the National Energy Board and plans for overcoming its shortcomings, including the provision of computer hard and software. The report notes further that two other bodies, viz. the Volta River Authority and the Water Resources Research Institute, have computer facilities. The only organisation exclusively responsible for environmental issues is the Environment Protection Council (EPC), which has computer facilities.*

*The potential users of industrial/technological information are categorised into four main groups : research scientists and academics, policy makers and planners, larger scale entreproneurs and industrialists, and SMI and cottage industry entrepreneurs. The report goes on to describe each group, as well as giving brief user profiles of potential users in each of the top priority industries and the available information facilities.*

*The information required is on raw materials; processing techniques; technological development; management; marketing; R & D; appropriate technologies; machinery, equipment and tools; investment and funding sources. Available sources for each of these, at the macro-and micro-levels are described.*

*The report notes that most information systems are manual, while listing 22 with computer facilities, either existing (in 10 of them), or planned (in the remaining 12,amongst which is the national focal point !). The hard-and software in each is described.*

*As regards manpower, there are 15 professionally qualified librarians, of whom three are trained in information science. Of these, the national focal point has 6, with one trained in information science. There is one educational institution in the country providing training in the field. There is a general need for more personnel with experience in modern information technology, as well as full one year courses, training in management of information resources and participation in short visits, conferences, meetings and workshops.*

*As regards telecommunications, it is felt that Ghana has a fairly good infrastructure, which nas undergone several major developments since 1975.*

*The report concludes by pointing out that the absence of scientific-technological and industrial policies is a serious drawback. It also notes the absence of an industrial/technological information policy, lack of coordination in data collection, the low level of industrial development, the variety of information users calling for a survey of user needs, and finally the end for systematic collection of indigenous industrial/technological information.*

*4- Libya(1) :*

*Industrial production in Libya increased from a few million dollars in 1970 to around two billion dollars. There are 300 plants in seven subsectors, employing 47,000 persons. Some 145 new projects are under implementation, while another 65 are understudy. The largest subsector is food which contributes just over one third of the value of industrial production, followed by metal and engineering which account for a little less than one fifth. Industry is divided into light industries and strategic industries, each run by a General Secretariat of the People's Committee. Ownership is either state, joint state/individuals, or cooperative. The second and third have different management styles from the state-owned industries, which are mainly the heavy industries.*

---

*(1) This is one of the least informative reports.*

*The report has concentrated on seven areas under the control of the Secretariat for Industry. An appendix describes in some detail the activities of the Documentation and Industrial Information Bureau of the Industrial Research Centre while another appendix details the functions and plans for establishing an "industrial information centre". A third appendix describes a proposed "industrial training centre for computer applications".*

*The users of industrial information fall into three groups : middle and tep management (including decision makers); planners, researchers, coordinators, statisticians and technical development individuals and teams; and personnel in the industrial research centre.*

*A survey of their information needs has identified the following types ,, listed in descending priorities:*

*management and administration - productivity and production identification - projects marketing - manufacturing technology - equipment and materials - information and computer technology.*

*The report concludes with some more findings :*

*1- Industrial information should be decentralised except for information from outside the sector. It states that the proposed National Information Centre under the Secretariat of planning will be responsible for all information handling in Libya.*

*2- Most information handling is manual, and functional systems have a long way to go. Computer-based systems are being introduced of late. The Iron and Steel Complex in Misurata (described at some length in an appendix) is a good example.*

*3- Most available hardware is PC's. One or two factories have minis, while the Iron and Steel Complex has a mainframe. The most common software is MS-DOS, DBIII, Lotus 123 and (DSCISIS). Software is Arabised. Some UNIDO software, such as COMFAR is also available.*

*4- Qualified manpower is a major bottleneck. Training at all levels is limited. All this indicates the need for an in-depth survey of the industrial/technological information scene.*

*5- The telecommunications infrastructure is modern and should present no problem.*

***5- Sierra Leone :***

*Manufacturing industry started in the early 60's. It contributes 6% of the GNP and employs 5% of the labour force. It is largely of the assembly type with 90-100% imported inputs in some cases. It faces serious problems that reduce capacity utilisation to 30-40%. While there were 419 establishments in 1981/82, this has fallen to a mere 194 by 1985/86.*

*Due to lack of political will, industrial/technical information is given a very low priority. The scientific approach to automated information handling has barely touched Sierra Leone. The UN has supported the establishment of 4 documentation centres, one of which is within a project for the development of small scale industry. There is no legislation or policy dealing with technological information systems.*

*The report highlights 4 critical subsectors : food production and processing, capital goods/metal work, and energy. A survey of potential users has identified them in industry,commerce/banking and government. The information expected to be needed is on marketing, legislation, labour relations, productivity, credit guarantee and rural banking schemes. A number of determinants of potential usage is given, most important of which are size of enterprise, sophistication, cost and appreciation of the value of information. The greatest need, according to the survey is for maintenance and servicing of equipment and on equipment and processes. It concludes that the absorptive capacity for utilising information is definitaly lacking. Consequently, the need for extension services to SSI's is emphasised.*

*The report gives detailed descriptions of information centres in the country, regardless of whether they deal with industrial/technological information or not, detailing the computer hard-and software in each.*

*Manpower is considered adequate because of the limited focilities in the country. The international communication infrastructure is described without assessment of its stage of development.*

**6- Zimbabwe :**

*The country's First Year Plan assigns a central role to manufacturing industry. Gross output of the sector rose from about Z$ 600 million in 1970 to almost Z$ 2 billion in 1983. Foodstuffs and metal products are the lead subsectors. However, emphasis in future will be on intermediate, metal and non-metallic mineral products, chemicals, petroleum products, and transport equipment. Of 550 enterprises surveyed, 94 have a total annual turnover of Z$ 800,000 - 1.6 million, while 45 have a total turnover of more than Z$ 25.6 millions. 178 enterprises employ 100-499 emplyees, 63 between 1 and 19, and 35 employ over 1,000 employees.*

*The report describes 4 government units, 3 NGO's (the Development Technology Centre (DTC), the Development Innovation and Networks (IRED) and the Technological Information Pilot Systems (TIPS), which is a UN South-South technological information exchange system, computerised and networked, focusing on SMI's). It also describes the information systems in professional associations and finance houses.*

*Users are categorised into 3 groups : the Ministry of Industry and Technology; other government departments, private sector companies and NGO's; and the manufacturing sector. It notes that most companies have no technological information systems. It lists 7 priority subsectors where information will be needed. The types of information required are seen as that on new technologies, opportunities for joint ventures, markets and tenders. Communications infrastructure is described within the very*

*detailed and interesting proposal for establishing a national industrial/ technological information bank. The proposal merits careful examination and should prove useful in finalising modes of operation of the focal points. There is also an appendix on information sources and requirements of the Zimbabwe Development Bank.*

***7- Main Recommendations of UNIDO Field Mission :***

*a- The overall awareness of the value of industrial/technological information is still limited. Furthermore, while the idea of an information centre appeals in general to decision-makers, planners and industrialists, there is little knowledge of their capabilities or needs. To complicate matters further, the wide variety in types of industrial/technological information makes it difficult to identify clear priorities of information needs.*

*This situation highlights the need for strong and sustained promotional and sensitisation elements in INTIB future programme.*

*b- The variation in ministerial and/or high-level executive structures responsible for industrial development strongly influence the type and needs of industrial/technological information and the choice of national focal points. This is a particularly sensitive issue in countries where the private sector is predominant. Governments should be encouraged to consult with industry as to the location of the focal point.*

*The decision on the location of the focal point may be guided by the following criteria:*

- *having full support and top priority within government circles.*
- *having local financing for a core national staff of not less than 3 persons, and an average of 6, for smaller countries.*
- *self-sufficiency in basic office material, filing systems and transportation.*
- *easy accessibility to the final users.*
- *being up-to-date with INTIB information holdings and sources of information.*
- *ensuring good basic and continuous training of staff.*
- *supplement INTIB focal point with a UNDP-UNIDO project to maintain initiative within IDDA.*

*UNIDO should spare no effort to avoid misplacing the national focal point.*

*c- Once a focal point is established, a system of nodes should be quickly established in the country to ensure that the focal point fulfils its function. The nodes could be government departments, industrial enterprises, professional bodies, federations of industry, scientific and research centres.*

*d- Traditional communication methods should not be neglected, while the introduction of modern telematics is pursued and technological developments monitored, assessed and introduced where and when appropriate.*

## *B- Francophone Countries*

### *1- Burundi :*

*Burundi is essentially a rural society. Although industrial activity is quite recent, it is attracting more investment. It presently covers agro-based, food, textile, leather, building materials, chemical, and metal-working industries. The sector contributes 8.8% of GDP, mainly from large public sector units. Private sector investment rose from 3% of the total in 1978, to 19.7% in 1987. Textiles and chemicals are the most dynamic subsectors. The report gives detailed information in tabular form of the volume and value of different products over the period 1984-1986. In the large scale enterprises, raw material processing, textiles, leather and food industries are predeminant,while in SMI's wood, paper and construction are the leaders. Industry is said to face several constraints, paricularly a weak infrastructure and lack of local natural resources-some industries import all the raw materials and equipment they use. The absence of industrial/technological information retards project studies for starting new enterprises.*

*A survey of 9 institutions shows that it is difficult to separate information on industrial activities from that on commercial ones. Management practices and style are not favourable to the continuous flow of information on the performance of national industry.*

*The industrial/technological information policy centres on establishing a documentation centre to provide technical, legal, and economic*

*information. It is planned to collect and disseminate information on investment opportunities, as well as automating the documentation centre. The Centre for Industrial Promotion now has a Department of Industrial Studies and Documentation.*

*The report goes on to describe 7 information centres (their specialisations, hard-and software). The more important ones seem to be the Centre for Industrial Promotion; the Chamber of Commerce, Industry, Agriculture and Crafts, and the National Information Centre.*

*As regards energy and environment-related information, none exist for the latter. For energy, the Bank of the Republic of Burundi, and the National Service for Studies and Statistics are the responsible bodies.*

*The needs of 3 centres, that are just beginning (hard-and software, training, ...etc.) are given without quantification.*

*The types of information likely to be needed, at the macro-and micro-levels are listed. At the macro-level it is on investment, subregional promotional activities and industrial development trends in neighbouring countries. At the micro-level, it is on industrial policy, the national investment programme, as well as a variety of information on national economic operations, information on equipment suppliers, appropriate technologies, standards and quality control.*

*The telecommunication infrastructure is described in detail, including satellite facilities, in tabular form.*

***2- Mali :***

*The report starts by setting the Mali scene(geographically, demographically, economically,...etc.) before zooming on the industrial sector, the development of which is described in detail. The secondary sector contribution to GDP rose from 9% to 14% over the decade 1976/77-1986/87. Its contribution to employment rose from 5% to 9% over the same period. In 1982/83 59% of industry was privately-owned, 30% state-owned and 11% of mixed ownership. The main activity is in agro-based and food industry. Industry is concentrated around the capital. It faces important obstacles in price fixing, marketing, supplies and maintenance, not to mention lack of relevant information.*

*The country has no information policy, nor a proper national industerial/technological information centre. The report gives brief description of 19 information and documentation centres. The important ones are identified as those in the National Directorate for Industry (DNI) and the Centre of Industrial Studies and Promotion (CEPI). Both lack adequate means for information acquisition and processing and are not amongst the 4 automated information centres in the country. The report notes that the National Centre for Scientific Technological Research (CNRST) focuses its attention on reseach institutions of which an appendix lists eleven.*

*The users are categorised in three groups : research institutions, support services (consultation, planning, financing, project development) and industrial enterprises. These are described in some detail. However, rather than addressing their needs of industrial/technological information, the report seems to address their needs to fulfil their functions adequately. However, a cursory remark identifies information on supply of equipment, raw materials, production, commercialisation, possible foreign technical partners and manpower as needed in the country.*

*The telecommunications infrastructure is described in same detail and is said to be expanding rapidly.*

**3- Rwanda :**

*There are 7 main industrial subsectors in the country. Agro-industry is by far the leader, follwed by construction, metallurgical, extractive, chemical, wood and paper industries. The report draws attention to the emphasis placed in the next development plan on the primary sector, so as to achieve self-sufficiency in food.*

*At present, there are four centres dealing with industry-related information (two of which are automated). The most important seems to be the General Directorate for Industry. Others are the National Bank of Rwanda, the Chamber of Commerce and Industry, the Rwanda Association for Promoting Integrated Development, and the Industrial Innovation Development Cell. In its conclusions and recommendations, the report lists six centres as possible choices for a national industrial/technological service.*

*Two organisations are handling energy-related information, and a specialised centre is being established in the General Directorate for Energy. Two very elementary activities are conducted in the field of the environment.*

*The report categorises users as existing and projected industrial enterprises, researchers, public services, and foreign organisations. It estimates their number as between 1,000 and 1,500.*

*As for needs, attention is drawn to the fact that industrialisation is at an early stage and that most public service employees are quite new at the job. Consequently, potential users cannot articulate their needs in any reliable manner. However, the report classified information needs into external, technological, industrial and internal information, listing in detail examples of each for each potential user. It adds, in the conclusions that this needs to be checked against demand.*

*The report goes on to emphasise the urgent need to sensitise potential users to the value of information and human resources training and development. At present, there is some duplication of activity between existing centres. It suggests a pilot centre, describing the hard-and software of a typical micro-informatics system. The needs for upgrading the main centres in the country are also listed.*

*The telecommunications system has been modernised and is considered capable of supporting tele-informatics needs. The report also describes future plans for its expansion.*

*In its conclusions, the report highlights the need to give special attention to agro-industry.*

***4- Main Recommendations of UNIDO Field Mission :***

*a- Considring the complexity, expense, long-term nature and many sidedness of establishing an industrial/technological information system, it has to be planned and implemented under the auspices of the government. This calls for the formulation of a national industrial/technological information policy, and for appropriate co-ordination of all national entities involved and close collaboration with the main users.*

*b- It is advisable to standardise the indexing and search languages and pronote the use of a single thesaurus. Furthermore, INTIB software*

*needs to be made more efficient and user-friendly. INTIB software should be entirely available in French. This could be carried out within the framework of ATHOS. Finally, it is advisable to establish a procedure for data selection and to provide semantic control.*

*c- Promotion of INTIB services is of crucial importance. This could be carried out, interalia, through :-*

- *demonstrations of INTIB databases, at headquarters and in the field.*
- *exhaustive documentation in several languages and regular dissemination to appropriate centres.*
- *establishing INTIB regional user groups.*
- *promotion of new technologics, such as CD-ROM.*
- *awarding certificates to trainees.*

*d- The good telecommunications infrastructure in countries such as Morocco, Burundi and Madagascar encourage the creation of pilot national centres for on-line data transmission.*

*e- The strong links between certain countries, such as those between Rwanda, Burundi and Zaire, or between the Maghreb countries, encourage the creation of INTIB subregional networks.*