ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SCHOOL OF INFORMATION STUDIES FOR AFRICA

INFORMATION NEEDS OF THE PUBLIC MANUFACTURING ENTERPRISES IN ETHIOPIA

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN INFORMATION SCIENCE

BY

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DECLARATION

The thesis is my original work and has not been presented for a degree in any other university.

Bekele negeri

May 19, 1992

This thesis has been submitted for examination with my approval as a university advisor.

A. Neelagmeghan

May 19, 1992

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ABSTRACT

With an overall objective of identifying the information needs and problems of the public manufacturing sub-sector and proposing recommendations for the development of the national industrial information systems and services, a questionnaire survey was made on 34 enterprises and their employees and a total of 159 completed questionnaire were collected and analyzed. Assessments were made on the general features of the manufacturing sector, industrial technology transfer and R&D activities, and the existing industrial information sources, systems and services based on the literature on the subjects and interviews.

Most of the enterprises (91%) do not have any organised information unit nor do they have concrete plans and programmes to establish such a unit in the near future. But the majority of the respondents (81%) believe their firms need their own information units and they think the major factor for the absence such units in the enterprises was lack of management awareness than shortage of the required resources. The major areas of information need were production, technical and marketing in that sequence.

Though the enterprises were depending on various external information sources for the needed information, the dependence

on library/information centres is very low compared to other sources mainly because neither the collection of their information centres nor their services could meet their requirements.

In order to address the identified problems and needs, and to improve the industrial information systems and services, measures needed to be taken at the levels of the Ministry of Industry, industry-groups and enterprises are suggested.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1. MANUFACTURING ENTERPRISES AND INFORMATION (OVERVIEW)

Any manufacturing enterprise either small or large is engaged in the conversion process of certain inputs into some desired outputs, marketing of the products and management of the system to ensure the maintenance of the enterprise. The linkage between the interacting functional components of a commodity/service production-distribution system (PDS) and information can be summarised as follows (Neelameghan 1992):

The major inputs to a PDS are human resources, materials, facilities and equipment (machine), finance and technology/ knowledge resources. The outputs of a PDS include goods, services and technology/knowledge. The proportion of these outputs may vary from one system to another, and the output of one system may be used as input to other systems. It should be noted that under normal circumstances the value of outputs exceeds the value of process inputs resulting in the generation of surplus and this becomes available for any necessary distribution without affecting the continuity of the business. When the PDS is in operation in a business environment, various issues need to be faced and decisions made in time so that the conversion process can generate the

desired output both in terms of quality and quantity. For example, to start with, what is the actual and potential market for the output? What surplus should be achieved? Is the technology currently employed most appropriate for the process? Can the present and potential levels and sources of material inputs and human resources satisfy the enterprise's needs? What are the conditions of availability of financial resources? How far do government policies and regulations favour the business? These are some of the policy issues. Once policy issues are decided upon, another set of decisions are to be taken related to: What should be the optimal mix and timing of input resources in order to minimize the cost? What Should be the optimal mix and pricing of outputs in order to maximize profits? What should be the appropriate quality control mechanism to meet the present quality standards? What should be the best promotional methods and distribution channel to effectively and efficiently reach the market? These are few of the operational planning issues. After these operating plans are prepared and put into operation, continuous monitoring and timely control actions become necessary to ensure things are happening as planned. The performance of the enterprise should be periodically evaluated in order to address current problems and formulate new policies and plans that meet the ever changing business environment.

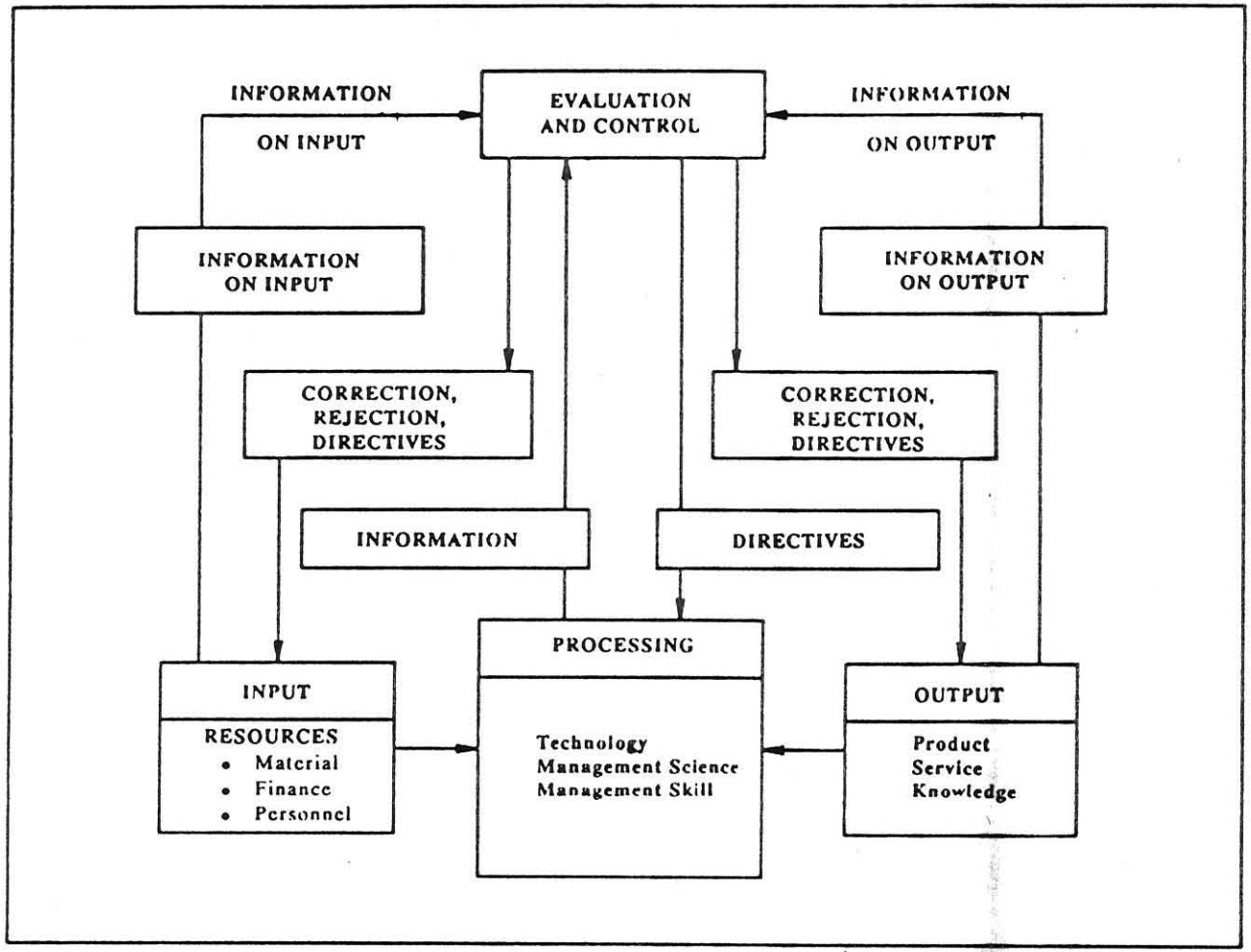

Fig. 1. Business as Input-Output Model

Data/information can be considered as one of the essential inputs for planning, operation and evaluation of an enterprise. In Fig 1. business enterprise is viewed as an input-output system indicating the dynamic flow and use of information within the system and in quality control context (Neelameghan 1991).

In order to effectively and efficiently perform these management functions. the top decision maker and operation controller require timely, reliable and relevant data and information on the above and other related matters.

The above decision of industrial activity does not only emphasize the importance and role of information in manufacturing enterprises, but also the need for timely access to readily applicable information over a wide range of subjects. The problem of information for industry is well expressed in Dr. Alexander King's (OECD Director for Scientific Affairs) introductory address to a conference on the Communication of Scientific and Technical Knowledge to Industry, Stockholm (1963): "I feel that for industry, the problem (of information) is greater in its complexity than the problem of communicating science to the scientist. To provide, from the world's literature, what is important for the research chemist is a difficult but bounded problem, which can be solved. To provide for, say, a textile industrialist,

that proportion of world's literature which is of possible significance to him is infinitely greater because he requires a small proportion of information from many sciences-pure and applied- and this problem can not be solved simply by improving abstracting services." Considering the vastness of the subjects of interest and the need for readily applicable information, information system for the management of manufacturing enterprise should include both factual information and reference services of various kinds based on carefully designed and conducted user studies.

1.2. LITERATURE REVIEW ON ETHIOPIAN INDUSTRIAL INFORMATION SYSTEMS AND SERVICES

It is a historical fact that Ethiopia is one of the nations possessing an ancient civilization with an ancient script of its own that goes back to the Fifth Century B.C. In an unpublished paper entitled. "An Information work in Ethiopia" (Adhane Mengsteab 1974), early information activities are described.

Though early manuscript collections flourished with the growth and strength of Christian monasteries throughout the country, the establishment of modern library came along with the birth of modern school. The Teferi Makonnen School (now known as Entoto Comp. Vocational and Technical School) which opened in

1925 was the first to establish a planned school library. Since then a number of libraries opened in schools, higher education and other government, public and private institutions. The National Library and Archives was founded in 1944 with triple functions of a national library, public library and museum. A fully-fledged department of Library Science was established in Adds Ababa University in February 1966 to provide formal education in the field to produce qualified middle-level librarians to meet the needs of schools, public and special libraries.

Apart from the academic libraries under higher education systems, the establishment of special libraries and documentation centres in the field of industry and technology is a very recent phenomenon. Even then, only a few specialized information units came into being which include the library and documentation unit at the Ministry of Industry, small technical libraries in the Ethiopian Chamber of Commerce, the library of the Ethiopian Management Institute, the library unit in the National Bank of Ethiopia, information systems and services under the Ethiopian Statistical, Standards and Development Project Studies Authorities.

A few studies have been undertaken on Ethiopian industrial information systems and services and as a result a few documentations most of which are in unpublished form could be cited. A survey study on library, information and documentation activities was conducted in 1987 by the National Scientific and Technological Centre (NSTIDC), under the Ethiopian S&T Commission (ESTC) with the objectives of assessing the available resources, identifying problems in the field and providing the required information for information policy formulations. In that study, documentary, financial, manpower resources and information services of the Ministry of Industry, the Handicraft and Small-scale Industries Development Agency (HASIDA), the National Chemical Printing Corporations, academic institutions and Ethiopian Standards Institute were included. The survey identified budgetary and staffing problems as well as inadequacies of collections. Absence of any form of cooperation aimed at information resource sharing and the limitations of the traditional library services rendered were also noted. Another notable study entitled "Promotion of Industrial Information Networking in Botswana, Ethiopia, Ghana, Libya, Sierra Leon and Zimbabwe" was conducted by Mazhor and Padickakudi (1989) UNIDO consultants. The main objectives of the study were to:

- assess the existing and potential information systems, services and networks in the countries;

- assess national focal points of INTIB (Industrial and Technological Information Bank of UNIDO) on their specialized field of industrial and technological information activities;
- assess existing and potential users of industrial and technological information based on their specific needs and priorities, etc.

In addition to assessing information systems and services in the Ministry of Industry, few corporations, HASIDA, ESTC and the potentials of the Ethiopian Telecommunications Authority for foreign voice data communications, the mission gave general comments and recommendations. The following are the most relevant ones:

- The overall awareness for the usefulness of industrial information is still limited. Industrial and technological information is not yet considered the contributing factor to industrial and technological development;

- Industrial and technological information, ranging from hard core manufacturing information needed by the producers, to project related information, to development oriented information, means different things to different people;

- Information banks have a general appeal to decision makers planners and industrialists. There is, however, little knowledge on the capabilities and limitations of such banks;

- Though international communications is possible in countries having sophisticated PTT systems, most countries will have either censorship, technological or budgetary restrictions on this type of communications. Therefore, traditional post, pouch, telex and telefax should not be discarded or neglected until such sophisticated systems are fully operational.

More comprehensive study reports concerned with information activities and associated problems of the industrial sector, printing and publishing in Ethiopia, statistical services, high-level manpower training in information and library science and the communication infrastructure of the country appeared during the seminar on National Policy on Information Systems and Services in Ethiopia (27-29 Nov. 1991). The different papers identified information resources, services and products related to industry, problems of the information sector and proposed a number of recommendations. Among the problems cited, the chronic shortage of information resources and under-utilization of the existing ones due to lack of cooperation and appropriate information services and products

are the outstanding ones. The absence of detailed user needs study in designing and developing information systems and services was also mentioned as a partial cause of wastage of scarce resources. Finally, a draft policy proposal that will guide the effective generation collection, organization, utilization and the development of national information resources.

Regarding the acquisition and transfer of industrial technology and R&D in industry, a paper presented to the First National Conference on S&T Policy of Ethiopia (June 20-25, 1988) by Fikremariam Yifru and his colleagues, emphasized the poorly developed state of institutional infrastructures and S&T information support. Particular attention was given to the need for an efficient system of collection and analysis of relevant technological information as a prerequisite for the appropriate choice of technology and effective transfer of technology. The paper also discussed the inadequacy of the present S&T publications which were supposed to act as the primary medium for the diffusion and dissemination of local R&D outputs. In his term paper on information support for the University-Industry Cooperation Programme in Ethiopia, (Bekele 1991) recommended the need for liaison service between the programme and manufacturing enterprises in order to identify the real research needs of the sector as well as to effectively communicate R&D results to industries.

1.3 STATEMENT OF THE PROBLEM

As discussed in the following chapter, the public sub-sector is dominating the manufacturing economic sector of Ethiopia in terms of volume and value of production, export earnings, employment, etc. Therefore, systematic studies should be made into the information needs of public manufacturing enterprises to answer questions such as: Are the existing industrial information services being effectively exploited? Are the enterprises aware of the information services at all? If the information services are not being utilized properly, what are the inhibiting factors? Are the existing industrial information systems and services effectively address the precise information problems of manufacturers? and are they adequate? What is to be done to streamline the intake of industrial and technological information by manufacturers?

Studies showed that while valuable stores of information exist in libraries, government agencies, in business organizations and so on, they are likely to be under-used because they are ill-adapted for access and assimilation by manufacturers in need of information (Maguire and Kench 1974). Other several reasons were attributed for the seemingly ;lack of demand and under-utilization of information services by manufacturers (Sudhakara Rao 1979) which are summarized below:

- The manufacturers are not fully aware of the present day industrial information services or do not know how to obtain it and from where.
- The enterpeneurs' perception of the problems is totally different. They often do not consider their problems as information related but as marketing, technical, financial, etc.
- There is little motivation to use information centres; it depends on the competence and dynamism of its staff. To make information systems and services of real use to industry, information workers should systematically study the problems of the industry regularly and adapt their services accordingly. But staffs of this level of competence and institutional mechanisms of this sort are often lacking.

The present work is a modest attempt to assess information related problems of public manufacturing enterprises, and to make recommendations that may help in addressing information problems of the sector.

1.4 OBJECTIVES OF THE STUDY

General objective:

To identify information needs of the public manufacturing sub-sector and propose recommendations for the development of national industrial information systems and services in Ethiopia.

Specific objectives:

- To review the overall activities and problems of the manufacturing sector;
- To assess the existing technology transfer and R&D activities of the public manufacturing sub-sector and associated information-related problems;
- To review the institutional sources, systems and services, and assess the information flow pattern of a public manufacturing enterprise with its external environment;
- To assess the information need of the public manufacturing enterprises;
- To study and evaluate the existing industrial and technological information systems vis-a-vis the identified needs;
- To identify the major problem areas of the existing

information systems and services and propose recommendations.

1.5 METHODOLOGY

In order to achieve the general and specific objectives of this study, a combination of literature survey, questionnaire survey, and interview methods were used.

Literature Survey and Review: Literature -published and unpublished forms- were searched in government and academic libraries as well as in various government departments and reviewed on the following major topics of interest:

- Management of enterprises and information;
- Industrial information systems, services and products in Ethiopia;
- Role, management and status of the public manufacturing enterprises ;
- Industrial R&D and technology transfer in the public sub-sector;
- Institutions concerned with the manufacturing industries in Ethiopia in any form.

Questionnaire Design and Administration: Two sets of questionnaire to be completed by the public manufacturing enterprises were designed to identify their information needs (See Annex I). Part I of the questionnaires deals with

institutional information resources, systems, services and products as well as with the overall enterprise-level information-related problems. This part is to be completed by the general management of the enterprise. Part II deals with the use internal and external information systems, adequacy of information services, identification of most needed information sources, and information seeking behaviour of individual users in enterprises. This part is completed by middle managers namely: technical, production, marketing and finance heads of the enterprises. The 40 sample enterprises were drawn from 7 state corporations that manage the food, textile, leather and leather products, beverages, meal works, chemical, and printing manufacturing establishments located in Adds Ababa, Kaliti, Akaki, Sebeta, Mojo and Debre Zeit areas. Adds Ababa and its surroundings were selected for the survey because the bulk of the manufacturing industries are located in this region. (See section 2.3.3 for details on regional distribution). The other major reason is the tight time table given to conduct the survey and produce this thesis . The other three state corporations namely: the Cement, Tobacco and Matches, and Sugar corporations were excluded because each have only a factory in the above named region. The details of the questionnaire administration, response and results of the questionnaire survey are presented in Chapter 5 and subsequent chapters of this thesis.

CHAPTER 2

BACKGROUND TO THE MANUFACTURING SECTOR

2.1. INTRODUCTION

In order to identify the information requirements of manufacturers, evaluate the present industrial information systems and services, and design and develop an appropriate information support system, it is necessary to understand the objective, structure and organisation of the enterprise. This chapter, briefly presents the general features and organisation of the national industrial system.

Industrialization as defined and being understood today is a 20th century phenomenon in Ethiopia. However, Ethiopia had a long tradition of handicraft and various types of small-scale processing which use traditional techniques based on manual labour.

At the beginning of the 20th century some consumer goods and construction materials producing factories began to appear in some areas of the country. Two saw mills in Holetta, and two oil presses, some flour mills, bakeries and the cigarette factory ;were established in Adds Ababa about the ;year 1905. Berhanena Selam Printing Press and St. George Brewery were established in the years 1921 and 1927 respectively. As

Melisachew Mesfin (1986) has quoted Ethiopia observer (2(1),1967), after the Italian invasion, although there was a need for industrialization, the absence of developed infrastructure and electric power acted as major bottle necks for reconstructing the economy and starting the industrialization process. Despite the relative improvements made in the construction of power stations and transport facilities, in the 1930's industrial development was hampered by the shortage of investment. Thus the government issued various investment policies and incentives that encouraged the flow of foreign public and private capital into the country.

Generally, the emergence of modern industry was not based on conscious and deliberate economic development policies and strategies. Manufacturing industries were established to meet demand for consumer goods and building materials.

It was only in the 1950's during the three five-year plans, that some conscious efforts were made to develop the manufacturing sector in the country. Even then like in many developing countries, industrialization was pursued along on inward oriented industrialization strategy on the substitution of imported consumer goods. For instance in the Third Five-year Plan (1959), it was stated that the development policy for the sector was to "continue the present encouragement of import substituting industries, with the objective of saving

substantial foreign exchange." Rather than assisting the development of small scale industries, modern industry was encouraged to compete with them. Above all, according to a paper presented bo the First National Conference of Science and Technology Policy of Ethiopia by Fikremariam, Gebrekiros and Solomon (1988), as the sector historically had been dependent on foreign capital and technology, a strategy for industrialization that could and should change the situation is yet to be implemented.

2.2. GENERAL FEATURES OF THE MANUFACTURING SECTOR

2.2.1. Contribution to National Economy

The contribution of the manufacturing industries to the gross domestic product (GDP) is only 11% on the average. Exports of manufactured products from Ethiopia have always been insignificant in terms of proportions of total export value as it contributes only about 11% of the country's export earnings. Manufacturing industry is not a major source of employment in Ethiopia. The sector employed no more than 94,588 workers in 1986/87, which is only about 0.3% of the total active labour force. In addition, the employment structure shows that it had been more or less static over the years, and concentrated in the "low development linkage" sub-sectors. More than 60% of the total number of workers are

employed in the food, beverage, tobacco and textiles branches. Of the total employees enlisted during the year 1983/84, 5% were categorized as professionals and semi-professionals, 13.1% between 9th-12th grade and the rest 81.9% were below grade 8.

2.2.2. Ownership Pattern

The ownership pattern in terms of paid-up capital and gross value of production showed that the bulk of the manufacturing sector was privately owned before 1975. According to the 1971/72 manufacturing survey, private share in paid-up capital was 64.7% with foreign private capital constituting 42.2% (Melisachew, 1986). In 1975 a proclamation to provide ownership and control by the government of the basic means of production was issued which brought most of the manufacturing establishment under government control.

Table 1. Gross value of Production of Manufacturing Establishments by Social sector and Industrial Branch (1986/87) in '000 Birr.

Industrial branch	MOI	OTHER PUBLIC	ALL PUBLIC	PRIVATE	TOTAL
1. Food	478751	102922	581673	25227	606900
2. Beverages	418668	0	418668	8426	427094
3. Tobacco	151305	0	151305	0	151305
4. Textiles	491015	8791	499806	10932	511305
5. Leather & Shoe	172608	0	172608	6468	179076
6. Wood & products	13498	23176	33674	6579	43253
7. Paper & products	49231	0	49231	1495	50726
8. Printing,publish. & allied works	58843	0	58843	6445	65288
9. Chemical	176507	608895	785402	14128	799530
10.Non-metallic Mineral products	69187	9019	78204	3856	82060
11.Metal	148690	0	148690	8767	157457
Total	2228301	752803	2981104	92323	307342
% Total	72.5	24.5	97	3	100

Source: Ministry of Industry. 1990. Statistical Bulletin VII. Adds Ababa: Ministry of Industry. 111-114.

Key:	MOI:	Ministry of Industry administered industry
	OTHER PUBLIC:	Other public sector industry
	ALL PUBLIC:	All public sector industry
	PRIVATE:	Private industry

According to the 1988/89 statistical data (MOI, Statistical Bulletin, 1990), there are a total of 403 manufacturing establishments out of which 210 fall under the public sector ;and 164 of the public manufacturing establishments are under the Ministry of Industry. As shown in Table 1, the public sector in general and those under the Ministry of Industry in particular account for 72.5% and 97% of the gross value of production of the sector. When we consider contribution of the public sector to the employment in the manufacturing sector, according to the same source, out of the 94,588 employees, the public sector generally and those which fall under the Ministry of Industry specifically employ 89,245 (94.4%) and 79,220 (83.8%) respectively. Export value of manufactured products also further proves the dominance of the public sector. Data on export value of manufactured products during 1986/87 indicates that the country earned about 183 mn Birr[1] while the public sector and MOI administered enterprises

[1] 1 US$ = 2.05 Birr

contributed 99.4% and 76% respectively.

2.3. PUBLIC MANUFACTURING ESTABLISHMENTS UNDER THE MOI

2.3.1. Organization

The bulk of public enterprises are managed and controlled by the 10 state corporations and three share companies which are under the Ministry of Industry. The Ministry was established in 1976 to:

- direct, supervise and plan the development of industrial enterprises transferred to the public sector;
- rehabilitate, expand and organized public enterprises;
- formulate industrial policies and strategies for industrialization of the country;
- handle both bi-and multi-lateral industrial relations with the developing and developed countries in accordance with the foreign policies of the government;
- strengthen the technological capacity in the country by helping the development of indigenous technology and transfer of appropriate technology.

Table 2. Number of Establishments by Corporation (1988/89)

No.	Corporation	No. of Factories
1	Ethiopian Food	37
2	Ethiopian Sugar	6
3	Ethiopian Beverages	26
4	National Tobacco	3
5	National Textiles	20
6	National Leather and Shoe	15
7	Ethiopian Printing	12
8	Ethiopian Chemical	14
9	Ethiopian Cement	6
10	National Metal works	21
11	Share Companies	4

Source: Ministry of Industry. 1990. Statistical Bulletin VII. Adds Ababa: Ministry of Industry.

Each corporation is responsible for enterprises falling in a particular sub-sector to develop the expertise, to manage and operate these industries by upgrading and training the available manpower, to formulate operational, administrative and financial procedures and guidelines, etc.

The private sector mainly comprising of handicrafts and small scale industries owned and run by private entrepreneurs, is developing into the guidance and supervision of the Ministry. The Ministry has been recently restructured in to three main sectors, namely, the Industrial Operations Sector, Industrial Development Sector, and Private Industry and Handicraft sector each headed by a Vice-Minister in order to carry out the assigned responsibilities.

2.3.2 Composition of Output

One of the features of the Ethiopian manufacturing sector as a whole is that it is highly dominated by the production of light consumer goods. The public sector industries under the Ministry of Industry are broadly divided into two categories: those producing consumer goods (i.e food, beverages, tobacco, textiles, leather and printing) and those producing intermediate and capital goods (i.e wood works, cement, chemical and metal works). The share of the former category was over 65% of the total value of production recorded in 1988/89.

The sector's contribution to value added is relatively small. In 1983/84 manufacturing value added consisted of about 43% of the gross value of production. The share of the three dominant branches (food, textiles, and beverages in that

order) which account for over 60% of the total value of production at constant 1978/79 prices was about 65% of the total manufacturing value added at market price. This implies that more than half of the gross value of production in the sector is attributed to material inputs and utilities, and thus payments to factors of production is not large.

2.3.2 Import Dependence

While its export earning capacity is very small, manufacturing industry in Ethiopia is highly import dependent. According to the National Bank of Ethiopia Annual Report (1984), during 1983/84 for instance, the manufacturing establishments imported Birr 271 million worth of raw materials and spare parts which accounted for 13.9% of the total import value of the country. The share of imported raw material including chemicals was 91.8% and that of imports of spare parts was 8.2% of the total value of industrial imports during the same year. As was argued by Fikremariam and his colleagues (1988), the lower value of spare parts mentioned above could be attributed to two factors: First, most machines are too old and thus require inhouse fabrication of spare parts; Second, often factories are forced to buy some parts from local importers or dealers. These are recorded as local purchase, even though from national point of view this should be classified as imports.

Import dependence is closely related to the fact that the manufacturing industry is very much dependent on foreign sources for the acquisition of machineries and equipment as well as for project studies, design and implementation of industrial plants.

2.3.3 Regional Distribution

The geographic distribution of the manufacturing industries shows a high concentration in three regions of the country, namely: The Addis Ababa-Nazareth region, the Asmara region and the Harar-Dire Dawa region. These three industrial regions account for about 97% of total manufacturing establishments, 91% of total fixed assets and 92% of manufacturing employment. This lop-sided development contributes to widening the gap in the level of development between these areas and the rest of the country.

CHAPTER 3

TECHNOLOGY TRANSFER ARRANGEMENT AND INDUSTRIAL R&D IN THE MANUFACTURING SECTOR

3.1 INTRODUCTION

To facilitate follow-up of subsequent parts of this chapter, it is useful to elaborate on the concepts of technology, technology transfer and its impact on technical progress in general and local R&D activities in particular. The cybernetic model of interrelationships between science, technology and production (Fig 2) may represent the interaction among these vital social functions and the significance of information as a vital component in a nutshell.

In the model there are four types of boxes. Boxes I-III represent potentials of science, technology and production spheres respectively. The notions of science and technology have been applied here according to the widespread convention which includes fundamental research in science, where as technology covers applied R&D works.

Boxes IV-VI illustrate processes of transformation taking place in all the three spheres. The essence of science is the

research activity aimed at discovering new phenomena and truths, the technology sphere focuses on transforming these theoretical developments into practical applications while production focuses on converting them into goods and services to satisfy human needs.

Boxes VII-IX present results obtained in the respective stages of the whole cycle. The more relevant for our analysis are Boxes X and XI representing the external environment. Box X illustrates the stock of world technical knowledge which is freely available and may be called non-proprietary. This type of external knowledge directly supplies the local sphere of science and partly also the national technology, speeding up relevant R&D processes and simultaneously diminishing their cost.

Box XI represents the proprietary portion of world technical knowledge. It is protected by property rights and kept confidential and is subject to international transfer on a predominantly commercial basis. The proprietary technical knowledge flows mainly into production and to a lesser degree to the technology sphere.

Technology may broadly be defined as consisting of the scientific, technical,engineering and managerial knowledge, related to the production of goods and services needed by the

society. As applied to manufacturing industries, technology can be considered as the knowledge, skills and methods necessary for the productive functioning of an enterprise. It includes machinery and equipment, process engineering, all kinds of skills including managerial, financial and marketing; process and product know-how; institutional and organizational know-how; and information about equipment and knowledge including information on information (Haile-Meskel 1988). As summarized by Neelameghan (1991), the technology needed for the complex process of resource transformation has the following components which may be needed in different proportions or at different levels of sophistication in different situations:

- Technoware or object-embodied technology;
- Humanware or person-embodied technology;
- Inforware or document-embodied technology; and
- Orgaware or institution-embodied technology.

If technology is essentially knowledge, passing on such knowledge to another is the essence of technology transfer. Accordingly, technology transfer may be defined as a process by which a package of knowledge is transferred from one who either owns it or has access to it to another who wants that knowledge.

Haile-Meskel (1988) quoting Adei (1987), identifies six important channels for the transfer of technology:

- Documentation, i.e. exposure to manuals, drawings, designs, layouts, process instructions, etc.;
- instruction, including formal instruction of firm training sessions or leave-of-absence to study in schools, colleges, or universities and on-the-job training and exposure to the right kind of jobs;
- Conference and seminars;
- Visits and exchanges of specific individuals among affiliates or between them and headquarters;
- supply of specialized equipment for the purpose of technology transfer;
- working with trouble shooting teams.

Technology transfer may be either horizontal or vertical in character, or both. Vertical transfer takes place between different stage of R&D activities, implementation and exploitation of an innovation while horizontal transfer involves the transmission of technology from one place (purpose) to another.

International technology transfer, especially towards developing countries as recipients, predominantly encompasses horizontal flows. Transfer of technology may take commercial

or non-commercial forms. The latter covers all channels through which the freely available technical knowledge is disseminated all over the world (e.g., international conferences and publications). commercial forms involve so-called proprietary technology, access to which or whose use is usually how restricted (through industrial property rights or non-institutionalized methods of keeping it confidential). Effective transfer of foreign technology leads to the building of national technological capacity in which nationals have developed the abilities to carry out tasks and functions successfully as well as to understand the scientific principles governing the tasks so as to be able to undertake improvement, modification or to change them to suit differing situations.

These tasks involve both pre- and post- investment activities: pre- investment tasks and functions comprise project identification followed by techno-economic feasibility studies, detailed technical design and specifications, choice of suppliers and contract negotiations, installation of plant and equipment and start-up operations.

On the other hand, post-investment tasks and functions consist of assimilating the technology through mastering the operations- repair and maintenance, renovation and spare part production. They also include functions of adopting

technology to conditions under which it is expected to operate as well as of generating technology and introducing them into the productive system.

One of the most important determinants of the final balance of gains and losses resulting from technology transfer for the recipient country is the nature and structure of links between science, technology and production spheres. In practice, it has frequently been the case in developing countries that, due to the weak link of local R&D infrastructure and due to weak links between this sphere and production, foreign technology proved detrimental to the domestic innovative activity. It replaced indigenous research efforts, diverted the attention of local R&D staff from the problem essential for the state of backwardness, biassed scientific institutions towards current production issues (UNIDO manual 1989). The isolation of the R&D sphere from production has in turn resulted in the information gap: even if technology required to catch up with imported innovations were available in the country, the local companies' demand has been canalled abroad because of the lack of awareness of existing possibilities. Thus, as a derivative of the initial technology transfer, further continuous purchases of foreign technology have been induced, thereby hampering the development of the indigenous R&D activity.

Adequate technological environment is required for a successful technology transfer. Some aspects of this environment relate to the existence of technology policy defining main direction of technological development within the framework of national development priorities, of people with basic training in fields essential to the successful running of modern industrial activities, of a legal and administrative framework for the transfer and development of technology, of R&D institutions and of industrial and technological information systems and services.

3.2 TECHNOLOGY TRANSFER PROCEDURES AND INFORMATION SUPPORT IN THE PUBLIC SUB-SECTOR

The international technology market consists of disembodied and embodied technologies. Disembodied technology comprises consultancy and engineering services, licences, know-how and related technical services. On the other hand, embodied technology consists of products, especially in the form of machinery and equipment and intermediate capital goods. The disembodied technology market is characterized by its heavy dependence on the performance of highly qualified manpower and/or on technological inventions while the embodied technology market is dependent on individual machinery and equipment, erection of plant; start-up of plant, and supervision of plant, operation in its initial stage.

Ethiopia is technologically underdeveloped and its dependency on imported machinery and equipment is as high as 99%, only about 1% originating from local sources. The country's industrial production is dominated by light consumer goods which accounts for 65% of total manufacturing production in 1981/82 while in the area of intermediate and capital goods, the combined share of metal and electrical, wood and furniture, chemical and no-metal products was the remaining 35%, of which only 4.8% is accounted by metal and electrical products (Haile-Meskel 1988). The country's technological development as measured by the number of scientific and technological personnel engaged in R&D, being 14 per one million population, is very low. According to the current economic and investment policies the country will have to depend on direct foreign investment and transfer of industrial technology. Hence, the discussion below concentrates on the procedures followed for investment decision capability building measures taken in the areas of consultancy services and project studies and information related problems.

At the national level, in 1978, the National Revolutionary Development Campaign and Central Planning Supreme Council (NRDC & CPSC) was established and this body has been responsible for the formulation of a series of annual development plans and development plans and the overall follow-up of their implementation. In 1984 NRDC & CPSC was

reorganized and the Office of the National Committee for Central Planning (ONCCP) was established with an extended plan formulation and follow-up structure which included planning regional office.

In order to promote effectively the development programme based on central planning, it was also found necessary to reorganize anew the previous Technical Agency. Accordingly, the Development Projects Study Agency (DPSA) was established in 1980 with the mandate to:

- identify, study and prepare projects which are relevant to implement in accordance with the central plan;
- ensure that projects which are identified, studied and implemented satisfy the required standards;
- provide, when requested, consultancy services to public, mass and private organizations when they under take project identification studies and preparation activities; and
- fix standards (e.g. through preparation of guidelines for pre-feasibility and feasibility studies) to be fulfilled by all development projects.

An important step taken by the Ministry of Industry in the area of project preparation and implementation related to the establishment of the Industrial Projects Service (IPS) in 1982. IPS was established to undertake pre-investment studies and to participate in the implementation of industrial projects. IPS operates as a self-supporting and autonomous consultancy house. Its services cover planning, engineering and implementation of new industrial establishments with emphasis on cost reduction, production increases streamlined organizational set-up and improve work efficiency. IPS is presently organized around three areas of specialization, namely:

- Industrial Studies Consultancy Service (market, finance, organization and human resources, development, economics);
- Engineering Consultancy Service (basic engineering, technology selection, negotiation and constructing, implementation); and
- Business Development and Information Service (business development and information). Since its services require an integrated expertise approach, its services are provided through a multi-disciplinary team under the leadership of a team leader.

The procedures followed and information flow among the different agencies concerned from the point of project idea initiation up to the implementation of industrial projects, as presented by IPS to the First National Symposium on Industrial Development (Nov. 1986), is summarised below:

Project Initiation and Preparation

- Industrial project ideas generally emanate from the national development plans. New project ideas also originate directly from the Ministry of Industry and its Corporations as well as from other project related organizations. The preparation of such projects is currently entrusted to the IPS or to external consultants.
- Once a project idea is identified, the concerned corporation prepares the terms of reference, defining clearly the purpose and objective of the project as well the scope of work involved. The terms of reference is usually prepared in line with the guidelines prepared by DPSA.
- The terms of reference is then submitted to the Ministry of Industry, and as and when necessary to DPSA for review and approval before forwarding it to selected or short-listed consultants for submission of offers or proposals.

- The project's sponsor then evaluates the proposals submitted by consultants on the basis of a set of evaluation criteria, i.e. qualification, experience including knowledge of local or similar conditions, age, language proficiency, etc. and selects the consultant which is most qualified to conduct the study. On the basis of the proposal submitted, a negotiation is conducted between the client and the selected consultant on the details of the study, the duration of the study and the fees and re-imbursables related to the service to be rendered.
- During the course of the preparation of the project study, the consultant usually works closely with the project sponsor. Normally an inception report as well as an interim report are submitted to the client by the consultant. Those reports are followed by a draft final report before the submission of a final report.

Since its establishment in 1982 (up to 1986), IPS has carried out 28 studies: 3 sectoral studies, and 19 feasibility studies and 6 project implementation related services. However, since IPS is a young institution and the only one of its kind, quite often it requires the services of external individual consultants or selected consulting houses, particularly in the area of technology and engineering expertise. These associate consultants are selected in line with the criteria indicated

above.

Evaluation and Appraisal Decision

- The major evaluation criteria employed for the appraisal of the projects normally include adherence to the terms of reference agreed upon, validity of the basic assumptions made in the study vis-a-vis the economic policies and development strategies of the country; methodologies adopted to assess the market for the product(s); appropriateness of the technology selected; financial soundness of the project and its socio-economic benefits, including employment and foreign exchange generation and/or savings.
- Industrial projects are presently reviewed or appraised at a number of different levels, namely, at the industrial corporation level, the Ministry of Industry, the DPSA and the Executive Committee of the ONCCP.
- In view of the mandate given to the DPSA to appraise projects and to recommend to the concerned parties corrective measures to be taken with respect to projects which do not satisfy the required standards, the role of DPSA remains nonetheless to be of decisive importance.

Implementation

- Once a project is approved and directives given for its implementation, the source of its finance has to be secured. The source of this fund could be local, i.e. government budget or local financing institutes such as the Agricultural and Industrial Development Bank, or foreign, i.e. bilateral and/or multilateral credit and/or aid as well as foreign private capital such as supplier's credit and direct investment.
- The implementation of industrial projects is undertaken under the overall supervision of the Ministry of Industry with close follow-up by the concerned corporation which may establish a project office depending on the magnitude and nature of the project. In most cases, the corporation retains the services of a consultant to check the design and manufacturing of the machinery and equipment as well as the construction and erection of the plant.
- It was reported (IPS, 1986) that during the implementation of recent projects, tender floating is not commonly practised because most of the projects implemented were tied to bilateral agreements signed between the Ethiopian Government and the government that provides the credit for the implementation. In practice offers are made by an identified supplier and after

negotiation on the commercial and technical aspects a contract is signed. The type of contract entered into with suppliers comprises by and large, design, manufacture, supply and supervision of plant erection, during the manufacturing stage, an inspector is retained by the corporation to check that the manufacturing of the plant machinery and equipment is in conformity with the design and specifications.

Information Related Problems

As explicitly spelled out by the IPS (1986), the following are summary of data and information related problems:

- some projects have been implemented without pre-feasibility studies and detailed techno-economic studies. This implies that some investment decisions are political in nature than techno-economic ones restricting the selection of technology. One of the glaring distinctive features of developing countries in the field of project preparation is lack of detailed data and poor storage and retrieval system of what is already available. This short coming has been generally manifested with respect to all project studies carried out in Ethiopia during the past decade.

The lack of adequate data is also keenly felt in the area of market size determination and the requisite raw materials assessment. Accordingly, the market and raw material assessment aspects of the studies so far undertaken have been time consuming and costly. Concerted effort should, therefore, be exerted to develop and continuously update the data and information sources of the country in order to carry out projects as efficiently and as economically as possible.

- In the area of technology and engineering data, information and source, foreign consultancy firms apparently are in a better position than IPS because they have an easy access to the suppliers of data and information and they have developed data banks and accumulated expertise in the field.
- The present decision making process by all the concerned parties during the various stages of project preparation quite often takes more time than is normally necessary.
- When a project is financed by the Government, the budget earmarked for the whole project is subdivided into portions and allocated on a year to year basis. The project sponsor is then expected to justify his request for allocation of fund every year until the project is completed. Such a

practice involves time and cost. In cases when a government budget and a bank loan have been earmarked for a project implementation, it is the common practice of the bank to evaluate projects even if the project is approved for implementation by the government. However, I would argue that this problem is one of the manifestations of poor record management and reporting system almost inherent in project management and could be resolved by improving the same and continuously updating project data and information.

3.3 INDUSTRIAL R&D ACTIVITIES IN ETHIOPIA

Practically, all nations of the world are technologically interdependent in that, even where the S&T potential is high and the country's endogenous scientific development is supportive of national socio-economic priorities, some technologies are of foreign origin. Besides, in developing countries the national research facilities generally are not adequate to meet simultaneously the challenge in all areas of technology. Yet, the effective utilization of technological advances for socio-economic development entails effective communication between R&D centres, S&T promoting bodies and potential users of the technical knowledge and know-how, such as, ministries, corporations and enterprises. In addition to

the social, economic, financial technical and other parameters, the country's S&T potential and capabilities in general and industrial R&D activities in particular should be carefully assessed while conducting pre-feasibility and feasibility studies for the choice of foreign industrial technology.

Cooperation and communication between R&D centres and industry has two advantages of national significance. Firstly, as R&D centres become familiar with the problems, needs and other aspects of industries, researches done in the country in part be pertinent to the specific problems of industries. And through such corporation, the experiences, facilities, information resources, services and products of the R&D centres contribute in solving the technological and industrial problems of industries. Secondly, besides the gainful experiences obtained on the part of R&D centres, through such ventures, industries contribute toward the nations R&D capability building through direct investment (e.g. sponsoring R&D projects, establishing R&D units) and/or by paying for the various services and products of R&D units.

Examples of cooperation between research centre and industry as modalities of information and technology transfer were presented by Neelameghan (1991). Some areas are that the

research centre:

- Establishing and maintaining liaison with industrial units and enterprise agencies, office and organizations concerned with development and management of industries;
- Providing advisory and consultancy services to industries and agencies concerned with industrial development;
- Providing R&D support to industries and trouble shooting;
- Assist in technology assessment, evaluation and selection;
- Identifying and selecting appropriate training programmes and training of industrial personnel;
- Organizing and conducting of courses, workshops, seminars, etc.
- Placement/attachment arrangement and staff exchange;
- Providing testing, research and proving/pilot plant facilities for use by industry;
- Organising exhibits of innovations, new products, processing techniques, equipment, etc. and participating in such events organised by other agencies;
- Providing, preparing and/or undertaking:
    - surveys: market, industry, technology, economic, etc.
    - feasibility studies; forecasts and trend reports; statistical reports
    - company, institutional profiles

- information analysis, consolidation and repackaging
- information bulletins: new products, processes, etc.
- technical enquiry service; referral service
- patent information service

- Supporting the above types of services by preparing directories and inventories, and database of profiles of technological, industrial, commercial, R&D institutions, information sources, etc.

Generally speaking, industrial R&D is at its infancy in Ethiopia. However, industrial R&D activities under the Ministry of Industry (MOI), the Addis Ababa University (AAU) and by the AAU_MOI Cooperation Programme (UICP) require consideration and some elaboration.

3.3.1 R&D Activities Under the MOI

The major technological problems that the manufacturing sector in Ethiopia faces (Gizachew 1986) are:

- inadequate repair and maintenance facilities;
- under-utilization of scarce resources;
- inadequate capacity to diversify product mix;
- lack of capacity to substitute imported raw materials by indigenous materials;

- inability to produce products of a requisite quality and improve production process;
- lack of sufficient capability to develop equipment, machinery, energy sources and other utility systems;

In order to develop the S&T capability of the industrial sector, the Ministry of Industry established a department responsible for coordinating S&T activities in corporations and enterprises under the Ministry. Similar units have been formed at corporation levels and is hoped to be introduced at enterprise levels to coordinate and undertake R&D activities under their respective domains. The Ministry also launched a scheme for planning S&T activities in the industries and incorporating into the overall activity plan of the industrial economic sector from the fiscal year 1987/88. Among R&D institutional capability building measures, the establishment of the Food R&D Centre, the Leather Products Institute, the Textile Research and Training Centre and the AAU and MOI cooperation Programme are the outstanding ones.

The annual research budget allocated by some of the corporations amounted to Birr 0.25 million, involving some ten people in research activity.But in the 1988/88 budget year, the research activities of the sector have grown up to such a magnitude that the budget reached 2.7 million, raising the number of industrial researchers to about fifty.

S&T Services Departments organised in corporations are responsible for the coordination and implementation of the research activities. The Central Laboratory of the National Chemical Corporation, intended to serve the chemical sub-sector, is equipped with insufficient facilities and is highly under staffed. The Ethiopian Sugar Corporation has R&D Department at its head office whose main job is to coordinate and facilitate research activities of sugar cane plantation are Wonji, Shoa and Metahara which are under the Wonji-Shoa Research Centre. The R&D activities of the food leather and textile are conducted under the Food R&D Centre, Leather Products Institute and the Textile Research and Training Centre respectively. Efforts will be to create similar research units for other sub-sectors.

The main areas of R&D activities across all sub-sectors are import substitution of raw materials and, design and fabrication of spare parts and equipment. Even though engineering and technology research units are lacking except at AAU, and past data are lacking, a number of engineering activities have been going in mechanical workshops of many manufacturing enterprises based on replication of machine parts and components. Examples are the manufacture of profile making machine at Kaliti Steel Industry and the Vacuum Pans at Wonji/Shoa and Metahara Sugar Factories. As there are not many organised centres which can conduct tests, the National

Quality Control and Testing Centre of the Ethiopian Standards Authority contributes significantly to testing and inspecting engineering materials and products.

Information and documentation centres at the corporations, which have acquired a few journal articles and books, provide minimal reading services for researchers closer to the head offices. However, the information sources at their disposal as well as the training level of the information workers at the units are inadequate to provide the required library and information services to the R&D workers. For R&D workers in and around Addis Ababa, the Libraries of the Science and Technology Faculties of the AAU provide facilities letting the researchers from the corporations have access to their well developed document collection.

The inadequacies of the number of qualified scientists and engineers actively working on R&D activities, the fund allocated for the purpose as well as the low level of development of the S&T support services which include information services are the principal problems of the industrial R&D activities under the Ministry of Industry.

3.3.2 R&D Activities in the AAU

The academic staff of the AAU carry out basic and applied research along with their teaching programs. A quarter of the AAU academic staff working time can be claimed as of right for doing research while the remaining three quarter is devoted to teaching. Some of the research projects undertaken at the Technology Faculty, Departments of Chemistry and Biology (Science Faculty), and the School of Pharmacy by the academic staff, graduate and undergraduate students have potential significance for industrial applications. The post graduate studies in the Faculty of Medicine, in the areas of sanitary science, community health and industrial health hazards can be helpful in improving the industrial safety of manufacturing enterprises. Some social science research undertaken in the fields of law, sociology, business management, accounting and economics are case studies on industrial enterprises, industrial branches or the manufacturing sector i general. The R&D outputs of the AAU can be accessed in documentary forms (i.e. theses, articles in domestic and foreign journals, conference proceedings) and through seminars, conferences, symposia, etc.

3.3.3 R&D Activities of the UICP

To utilise the potential for industrial development resulting from closer cooperation between industry and universities, the MOI and the AAU have instituted a cooperation programme (UICP) in February 1986 through a formal agreement. Through this mechanism, the contracting parties aim to:

- train employees, management personnel, and students in professions wherein theory and practice are coordinated;
- attain self-reliance by training the necessary manpower in the different industrial fields of the profession;
- provide technical services to enable the different industrial equipment and goods being bought with scarce foreign exchange maintain their capability;
- devise better means for the production of industrial goods, in management and administration, in accounting and other fields of work;
- devise ways that would enable students develop practical experience in their professions of training during their professional study;
- devise ways and means that would enable the collection and joint use of information and documents necessary for education and R&D;
- put in production work, to the extent possible, useful research findings obtained so far and to be obtained in

the future and related to industry;

- conduct joint R&D projects so as to enhance industrial production and to bring about invention of new technologies and adaptation of already invented technologies so that they become suited to the objective realities prevailing in the country;
- engage professionals engaged in industrial work in the evaluation of university's curricula and the manner of education with a view to making education offered by the University related to the extent possible, to the objective industrial conditions and products;
- look for ways and means that would improve the industrial technology in the country; and
- cooperate so as to enable the country's training institutions to have the appropriate standard.

In the course of its five-year existence, the UICP has undertaken the following activities:

Institutional Capability building: The three bodies that administer and finance the programme namely: the Policy Committee, the Executive Committee and the Liaison Office, were constituted as per the Agreement. Guidelines on initiation, submission, approval and follow-up of projects have been prepared. In addition a policy guideline and procedure manual for the programme has been prepared.

Research: One of the permanent Programme activities is R&D work whereby university faculty with or without collaboration of industrial personnel identify and undertake applied research projects of immediate interest to the two parties. Accordingly, nine research projects were considered, six were approved, one is completed and the other five are at different stages of progress.
From 28 projects identified in the "Survey of the Needs and Capabilities of the AAU and MOI", 7 projects have been completed and 2 are in progress.

In order to identify and solve practical problems in industry, post graduate and undergraduate students are encouraged through financial assistance to orient their final year essays to industry problems.

Financial assistance for thesis/essay/project has been given to students for their research studies. During 1988/89 and 1989/90 academic years, a total of 40 projects (35 in engineering, 4 in social science and 1 in law) were financed.

Seminars: The programme of activities of the Agreement recommends that seminars, workshops and symposia are organised each year on themes of direct relevance to industrial development. To date, eight different seminars on different themes have been conducted; and the papers and proceedings

have been distributed to the relevant organisations.

Short-training: Capitalising on the slack season of the University, short training courses of four to five weeks are conducted each summer vacation period for industrial personnel. A total of 288 industrial personnel received training on different themes of particular interest to industry.

Sponsorship of students: Promising engineering students are identified at the end of their third year (of the 5-year study), given some pocket money and two vacation jobs to be acquainted with the industrial environment where they are assigned upon their graduation.

The sponsored students have directly assigned to work in their respective sponsoring corporations and enterprises after graduation without any need for internal on-the-job training.

Major constraints: Considering the recency of the venture and shortage of experience in collaborative engagements of such nature, the Cooperation Programme has managed to execute some successful projects. R&D projects, such as, the "Holeta-Muger Concrete Road", Determination of Gosypol and Aflatoxin in Cotton Seed", and "Characterisation of Indigenous Spices" have been successfully completed. The various skill upgrading

courses provided S&T information exchanges made through seminars and publications of the proceedings have had positive contributions. There are some constraints in the areas of project planning and execution, short term training offerings and provision of information support to both researchers and enterprises. The major impediments identified by the MOI and individuals participated in the training courses are:

- Lack of S&T organs at factory level which implies lack of institutional mechanism to identify projects of higher relevance to industries, to elucidate specific training needs and to apply R&D results to solve technical, managerial production problems prevailing in the factories;
- Lack of the necessary skilled manpower for diagnosis of problems and application of R&D results in solving problems in factories;
- Shortage of foreign exchange to purchase laboratory equipment and supplies required to equip factory workshops for innovative or modification research;
- Weak consultative and communication channels between the Programme and factory personnel in determining training courses themes and contents.

A cooperation programme with such broad objectives requires timely, reliable and complete information from the stage of problem definition, through research undertaking, to the stage of incorporation of research findings into the industrial production system. The following illustrative table may schematically represent the different tasks or activities of the Programme and the type of information required to undertake the same.

Table 3. University-Industry Cooperation and Information

Tasks and sub tasks	Information required and/or sources
1. IDENTIFICATION OF INDUSTRIAL PROBLEMS/NEEDS	
1.1 Analysis of the overall industrial sector	- National development plan, industrial statistics, import /export data,national account - Directory of industrial enterprises, corporations, other related bodies - Register of industry-related R&D institutions
1.2 Assessment of industrial problems/needs	- Inventory of technologies in use and their sources - Inventory of industrial raw materials, spare parts - Survey of industrial skilled manpower: present, retraining needs, future needs - R&D in progress - Evaluation (survey) reports on industrial problems
2. PROJECT IDENTIFICATION AND APPRAISAL	
2.1 Project identification	- Assessment report on industrial problems/needs - Project proposals by university and industry - R&D in progress - R&D information sources including patent sources
2.2 Analysis of university capabilities	- University faculties and course offerings - Staffing, student enrolments - Research facilities - R&D in-progress - University budget for - R&D and publications, Info. systems and services - University policies, regulations, future plans and programmes

Table 3. Cont'd

Tasks and sub-tasks	Information required and/or sources
2.3 Project appraisal	- Identified industrial projects - Short and long term budget plans of industry,university and potential sponsors - Development priorities of the industrial sector - Cooperation programme policies and institutional capabilities
3. PROJECT ADMINISTRATION AND FOLLOW-UP	- Administrative and procedure manuals - Financial reports - Project status reports - Information services
4. DISSEMINATION OF R&D OUTPUT	- R&D results include: conferences, training courses, consultancy services, exhibitions,etc., movement of people between industry and university, S&T publications, extension services, on-the-job training, S&T databases and other information services
5. COOPERATION PROGRAMME EVALUATION	
5.1 Periodic evaluation of plans, programme and projects	- Evaluation criteria, policies and guidelines, project status reports, financial audit reports
5.2 Evaluation of impacts and technology transfer	- Methods of evaluation, operational experiences on incorporation of R&D results into industrial production, survey report on results: goods, services, know-how, social impacts, and benefits
5.3 Adjustment of policies and future plans	- Feed back information, evaluation reports, changes in policies and priorities of university,technological scanning, - changes in the development plan.

In order to provide the required information support, establishing an information and documentation unit that will undertake library and documentation work and services; editorial and publishing tasks; generation of information analysis and consolidation products; devising mechanisms of information resource sharing between AAU and MOI libraries and related bodies; developing liaison and communication capability of the Programme and formation of a national body dedicated to intellectual property and patent system are the measures needed to be taken in the short run.

CHAPTER 4

INFORMATION FLOW AND INDUSTRIAL INFORMATION SOURCES

4.1 INFORMATION FLOW BETWEEN PUBLIC MANUFACTURING ENTERPRISES AND THEIR EXTERNAL ENVIRONMENT

4.1.1 Introduction

The information flow pattern between a public organization and its external environment usually depends on the authority vested in the organization, the vertical and horizontal work relationships with other public and private organizations, and the segment of the general public it is established to serve. A thorough understanding of the information flow may help an organization in developing an appropriate information system that enables it discharge its responsibilities, provide optimal services to the public and get the necessary feed back required for improvement and organizational development.

The profound changes in the socio-political and economic structure brought about by the 1974 Revolution significantly affected both the internal and external environments of enterprises. Enterprises came under state supervisory bodies, central planning was introduced; state organizations were set up in the supply, distribution and services; and state financial regulations were introduced; banks were

nationalized, merged and new ones established; and mass organizations established both in the internal and external environment of the enterprises, etc. Accordingly, the organization and management of public enterprises had to be adjusted. As no significant restructuring has taken place, even after the down fall of the past regime, the discussion on information flow in this section is based on the organizational set-up of the public manufacturing enterprises as was defined by the Government of the Peoples Democratic Republic of Ethiopia.

4.1.2 Authority of Public Manufacturing Enterprises

In the process of creating the corporations, the factories under them lost their legal status, which they had prior to the Revolution. As far as legal entities are concerned (Leikun 1986), the factories can be considered as branches of the corporations, which the regulations establishing them refer to as 'enterprises'. In practice, however, the factories operate as self-contained economic units maintaining their own financial statements on the basis of which they settle their obligations to the treasury, having their own labour unions and collective agreements, etc. Therefore, in reality they operate as 'de facto legal entities' under the legal umbrella of their corporations. The creation of the ten different corporations was necessitated by the fact that the

situation would be unmanageable if all the factories were allowed to report directly to the Ministry.

As an enterprise is subordinate to a parent corporate body, its decision making authority is highly limited to operational matters. For example, if we take the case of personnel management, all levels of employment and promotions are to be determined by corporations and the Ministry of Industry by regulations. But some corporations delegate some part of their duties to the factory management. By this example, we can visualize the type, amount and frequency of information flow between the enterprises and the corporations that administer them.

4.1.3 Information Flow Pattern

As shown in Fig.3, the various government plans, regulations and various circulars are channelled to the enterprises through the corporations. In turn, the various reports originating in the enterprises are chanelled to the government through the corporations. Even though the line of authority is through corporations, enterprises do directly interact with local banks, transit and shipping organizations, the Ministry of Finance and transport organizations. Usually, the various correspondence made by enterprises with other organizations

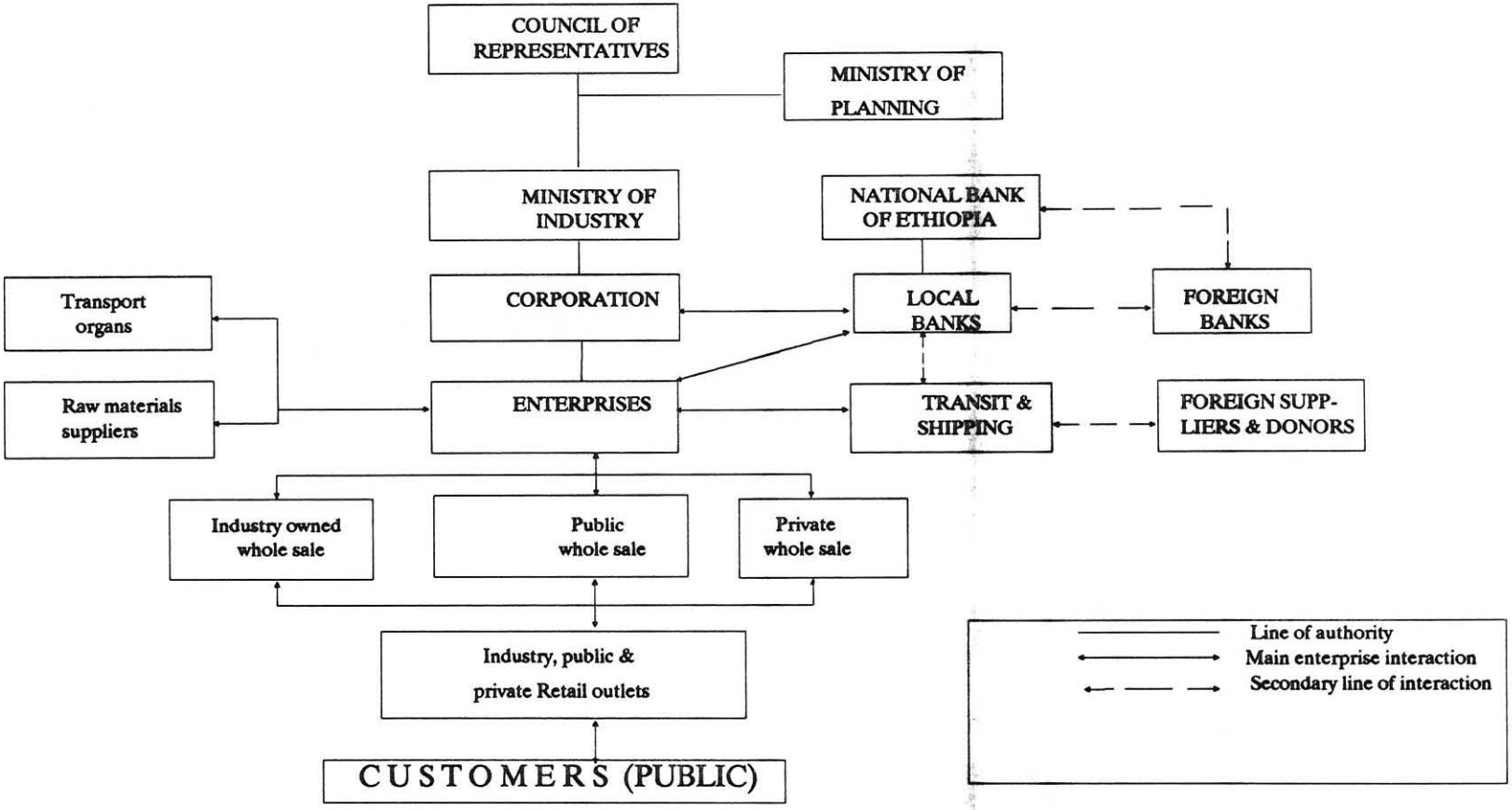

Fig. 3 Pattern of Information Flow with External Environment

are reported to the corporations through copies of the correspondences. From the figure, we can also observe that while selling their products and services, enterprises exchange a considerable amount of data and information with their customers in the form of proforma invoices, receipts, orders, etc.

4.1.4 Problems of Information Flow

The corporations obtain various types of information from their factories for their own use as well as for onward transmission to the Ministry. The bulk of this information is related to reports on plan fulfillment which are submitted every quarter. Other types of information are also prepared by the various departments of the corporations for management use. Delays are experienced in the flow of information. Thus the information collected tends to be of a historical nature in general. Furthermore, information generated is not sifted and analyzed before it is presented to the management. In other words, the management end up getting a variety of information which cannot be readily utilized.

The type of data generated are initiated by various corporate departments, the Ministry and external organs. Many of them are valuable for statistical purposes as well as for other requirements. Therefore, the formats are not standardized in

general, the purpose for which each type of information is required is not clearly documented and the end use of the information generated is not clearly designed.

Another problem area in the information system (Leikun 1986) is that several types of information are asked for by several organs at different times subjecting the enterprises to generation of voluminous data which some believe are not fully utilized. Furthermore, it was also pointed out that the same type of data, or with very slight modification, are requested repeatedly, because of the fact that user bodies either do not refer to information previously sent or the information already obtained is not kept in an organized manner for ready reference. There are also inadequacies of physical facilities to generate the required data in time, including computing and printing equipment. The problem of obtaining the necessary information in time for planning and decision making purposes is common to the higher authorities.

4.2 INSTITUTIONAL SOURCES OF INDUSTRIAL INFORMATION

4.2.1 Introduction

There are several institutions that are either directly engaged in the promotion of industrial development or whose resources and services are of vital importance to public

manufacturing enterprises. These organs regularly produce publications such as journals, newsletters, reports of various types that can serve as information sources to manufacturers. Manufacturing enterprises need information and other assistance on different aspects from time to time and often they face difficulty in identifying the concerned body which they should approach. Therefore, it is felt necessary to highlight the objectives and services of some of the important institutions and associations which are involved in industry-related activities.

The discussion on government agencies as institutional sources is limited to the Ministry of Industry and selected specialized agencies which are felt most relevant and whose resources and services are not much publicized among manufacturing enterprises. The various important government agencies such as the Ministries of Finance, Trade, Labour and Social Affairs, the National Bank of Ethiopia and its subsidiaries, the Public Servants Administration Commission and The Addis Ababa University, which have either been in day-to-day contact with enterprises due to their work relation or believed to be well known among manufacturers are not included in this section.

4.2.2 Government Agencies

4.2.2.1 The Ministry of Industry

The Ministry of Industry is concerned with the overall development of the industrial sector in the country. The duties and responsibilities of the Ministry, corporations and manufacturing firms under it were discussed in Chapter 2. Therefore, here we consider the information resources, systems and services under the Ministry in some detail.

Information Systems and Resources: The Library and Documentation Unit at the Head Office has a fairly good specialized collection of books, documents, periodicals and cassette recordings of conferences and symposia. The main subject areas of book and periodical collections are engineering and technology, health sciences while the documents are primarily various industrial project studies, World Bank and UNIDO publications. The corporations have developed their respective special libraries and documentation centres with modest collection of books, periodicals and unpublished documents.

The Handicrafts and Small Scale Industries Development Agency (HASIDA) has its own small library with few collection of

books and documents on small scale industries, engineering and technology and social sciences. It has also a wide ranging collection of Ethiopian handicraft products and other innovative items permanently exhibited. A large number of feasibility studies, project proposal documents and a registry of licensed private small industries are found in the Projects Study Department of HASISA.

The Ministry of Industry is acting as a national focal point of the Industry and Technological Information Bank (INTIB), which is an information section/programme of the United Nations Industrial Development organization (UNIDO). The overall task of INTIB is to coordinate activities relating to industrial and technological information, strengthen the information systems in developing countries, and compile and disseminate information requested by these countries. Regarding INTIB, some specific services of much interest to manufacturers can be cited: A referral service of producers of industrial equipment in developed countries is available. A series of industry profiles and manufacturing guides are prepared. The information collected on technologies and equipment developed or adopted in developing countries as being appropriate to their own conditions is being actively disseminated. Many volumes in the series Industrial Development Abstracts have been published. The abstracts are computerized using indexing systems compatible with other

United Nations specialized agencies. As its focal point, UNIDO has provided the Ministry with computer and communication facilities, CD-ROM databases and various publications.

For its Management Information System development project, the Data Processing Section at the Ministry acquired a minicomputer system, microcomputers and other accessories and developed a number of inhouse databases.

Table 4 shows the databases developed and maintained by the Ministry on its HP-3000 minicomputer using MINISIS and Image Software upto 1991.

Table 4. Inhouse Databases at the Ministry of Industry

Data base name	Description	No. of Records
LIBRARY	MOI Library holdings	2000
PROJECT	Profile of industrial projects	143
MANPOWER	Manpower in the Industry sector (professionals and semi-professionals)	6000
PRODUCTION	Production and sales information on more than 150 factories	25,955

In addition to the above, effort is being to develop databases on raw materials, foreign purchase and small industries.

Information Products and Services: The Ministry publishes a monthly Industrial Newsletter on its different activities, the corporations and enterprises. In addition, it produces an annual Statistical Bulletin which is an annual compilation on

the performance of the manufacturing sector in general and those establishments under the Ministry in particular. Even though not regularly updated, it produces the Directory of Manufacturing Enterprises in Ethiopia. The monthly HASIDA Bulletin produced by the HASIDA presents the developments made in the sector. HASIDA is also currently engaged in the preparation of the Directory of Private Small Industries. Some corporations are also producing newsletters on their respective activities.

The various libraries and documentation units under the Ministry avail of the services of the Ministry primarily to meet the needs of their respective organizations. However, request for use of the units by external users can be entertained if supported by official letters from their institutions.

4.2.2.2 The Ethiopian Science and Technology Commission (ESTC)

The powers and duties of the ESTC, as defined in the proclamation No.8/1987, include the following;

- Prepare and, when approved, implement S&T policies and plans that expedite the achievement of the development objectives of the country;

- prepare and cause the preparation of the national S&T budget and submit some for approval and, upon approval, follow up the implementation there of;
- follow up and supervise the application of S&T research and development findings;
- establish and organize centres of various national S&T services; ensure the availability of S&T equipment, materials and services necessary for scientific and technological R&D;

Information Systems, Services and Products: The National S&T Information and Documentation Centre (NSTIDC), under the ESTC provides library and information services to researchers and decision makers based on its collections and referral databases it acquired from different sources.

NSTIDC is a member of the Technical Committee of the Pan African Development and Information System (PADIS) and the Eastern and Southern African Development and Information System (ESADIS). It has also started Contacts with Arab League Documentation Centre (ALDOC), the Industrial Information System of UNIDO (INTIB), the Documentation Centre of the International Livestock Centre for Africa (ILCA) and with various national information centres.

The United Nations Development Programme (UNDP) assists the Centre in upgrading its manpower in information services and systems. The Technological Information Projects System (TIPS) under UNDP provides the Centre with current information and data which the Centre distributes to the different sectoral institutions in the country.

The International Development Research Centre (IDRC) Information Science Division has a close relation with NSTIDC. In this regard, the IDRC Information Science Division has provided its information storage and retrieval software "MINISIS" and on-site training on ists the application. This has facilitated the exchange of information with centers using the same type of software e.g PADIS, ILCA, IDRC, UNIDO, AGRIS, CARIS.

NSTIDC has close cooperation with United Nations and other international agencies. These include UNESCO, WIPO, CODATA (Committee on Data for Science and Technology), INSDOC (Indian National Scientific Documentation Centre), and ENSTINET (Egyptian National Scientific and Technical Information Network).

Since its establishment in 1988, NASTIDC has developed a number of databases using MINISIS software on the HP-3000

minicomputer. A List of the databases and descriptions of their content and size is given below:

Table 5. Databases Maintained at NSTIDC

Name of database	Description/Content	No. of Records
NASTIDC	NASTIDC's holdings	11,683
EXPERT	Profile of Ethiopian Experts	22,349
STAT-ESTC	Socio-Economic Statistical Information on Ethiopia	5,000
TIPS	Current information on technological developments	781
REFER 1-4	Referral databases containing data brought from different institutions mainly PADIS and ILCA	26,823
ETHCOLL	Agricultural information on Ethiopia	2,120
UNIREF 2	Technological and industrial information	12,000
IDRIS	Information on development projects (brought from IDRC)	20,000

In addition, there are also the following CD-ROM databases: AGRICOLA (covering the period 1970 - 1990), MEDLINE (1983-1990), APPLIED S&T INDEX (1983-1990), ELECTRONIC ENCYCLOPEDIA, and UNESCO's CD-ROM databases including UNESBIB, IBEDOCS, ICOMMOS, DARE, ENERGY, and UNESDATA.

ESTC publishes a bi-annual Journal of the Ethiopian S&T Commission and a quarterly Newsletter which feature research articles and S&T news of the country.

4.2.2.3 Development Projects Study Agency (DPSA)

The powers and duties of the DPSA include:

- Undertake or cause to be undertaken pre-feasibility and feasibility studies of projects the study of which is approved by the Government; render preliminary civil engineering services with such studies;
- Collect, compile and organize information necessary for project studies and consultancy services; establish information systems, use and make available the use of such systems to other users;
- Conduct research relating to project studies and preparation, methodology and implement fruitful results thereof;
- Render or cause the rendering of consultancy services

relating to project implementation and negotiations; and

- Register project studies; and register, issue certificate of competence to, and supervise, persons engaged in project studies and consultancy services.

Information Systems, Services and Products: The DPSA has a special library at its head office with a good collection of books, journals and documents mainly in the areas of economics, accounting, development planning, and project studies.

The Data Processing Unit of DPSA maintains some databases on project studies using the DBASE IV and CDS/ISIS softwares. These databases are: PROJLIST (a database which contains general information on project studies, and the fields include project title, project consultant, date of study, publication year, place of study, and type of the study) with 1,164 records; PROFIL contains information on detailed description of specific projects; CATLOG, a book and document catalogue database of its library holdings with 1,581 records; and CORIS, which is a database on international contracts registration and contains 34 records.

DPSA produces various guidelines related to development project studies and renders training services on development projects through workshops, conferences, etc.

4.2.2.4 The Ethiopian Management Institute (EMI)

EMI is an autonomous public organization whose overall objective is to upgrade the administrative and managerial capabilities of the various organs of the government. In order to fulfil its legal responsibilities the Institute has the power and duty to:

- advise the government on consultancy service, in-service training, research in management and other related matters;
- conduct applied research in management and related fields, and disseminate findings in a manner that expedites practical application;
- encourage the exchange of experience in management practices among government establishments;
- carry out management training programmes and grant certificates;
- determine the type and standard of management in-service training organs and the content and standard of their curricula and certificates to be awarded; and other management related duties.

To realize its objective the Institute provides management consultancy services, conducts practical and solution-oriented research, and also conducts a series of management and

administration programmes. In addition to its Head Office, EMI has two important centres under it namely, Debre Zeit Management Training Centre (DMTC) and Productivity Improvement Centre (PIC). The DMTC is a management development school which enrolls and trains practising managers and administrators in various fields of management. The major areas of training include: general management, local development administration, human resources management, operations management, financial/accounting management, marketing and distribution management.

The main responsibility of PIC is to help the agriculture, industry, energy and construction sectors achieve better results through training, research and consultancy. It endeavors to increase productivity by improving preventive maintenance, and undertaking motion and work-study programmes.

Information Systems, Services and Products: The EMI has a moderately well stocked Library and Documentation Unit at its head office. Research results and consultancy output, documented in the form of project reports are maintained at the Documentation Unit. The Unit provides only library reading service to the staff of EMI and outside users.

The EMI produces various training manuals and conference proceedings. The principal published output of the Institute is its bi-annual The Manager, a journal which features research articles, case studies and activities of the Institute.

4.2.2.5 The Ethiopian Authority for Standardization (EAS)

The EAS was established in 1972 with the aim of promoting standardization, quality control, certification, metrology activities, and ensuring the quality and safety of products. The major functions of the EAS are to:

- prepare and issue compulsory as well as optional Ethiopian Standards relating to practices, processes, materials, products and commodities in the fields of commerce and industry and enforce the same;
- certify import and export materials, products and commodities which conform to Ethiopian Standards;
- conduct test on products, materials and commodities to attest their compliance with relevant Ethiopian Standards;
- protect consumers welfare, health and safety through standards; and
- introduce the metric system of measurement in the

national economy and verify the accuracy of weighing and measuring instruments used in commercial activities.

The EAS, since its establishment has prepared and published 108 Ethiopian Standards concerning agricultural and industrial products which are under implementation through quality control schemes. A group of 485 Ethiopian Standards are presently ready for publication. Moreover, a further group of 1632 Draft Standards are under preparation.

The EAS, representing Ethiopia, is a member of the International Organization for Standardization (ISO) and the International Organization of Legal Metrology (IOLM). The EAS maintains close working relations with the International Electrotechnical Commission (IEC) and the Codek Alimentarius Commission (CODEX). The Authority is also a founding member of the African Regional Organization for Standardization (ARSO).

Information Systems, Services and Products: The EAS has its own Library and Documentation Unit which is open to its staff and all interested people. The library possesses, among other things, international standards and a number of national standards of different countries. The library has developed a database of Ethiopian Standards using the CDS/ISIS software.

Regarding published products, the Annual Report of the EAS published for each budget year consists of all current information regarding standardization activities. The EAS Standards Bulletin, issued every two months, gives details of the activities of the Authority and provides general information and articles on standards matters.

4.2.2.6 The Central Statistical Authority (CSA)

The CSA was established in 1961 with the aim of collecting, organizing analyzing, publishing and disseminating statistical data to support planning and decision making in the country in all socio-economic sectors.

Some of the major powers and duties of CSA, as was redefined in proclamation No. 8/1987 include:

- collect and cause the collection of, organize, analyze, publish and disseminate, statistical data;
- render statistical services to government organs;
- determine the procedures for the collection of and issue interpretation and classification for statistical data;
- assist government organs with regard to matters pertaining to the collection, organization, analysis and preparation of publication and dissemination of statistical data;

- cause the establishment of procedures for the collection of statistical data showing in detail the work performance of government offices and organizations upto their lowest units;
- review and approve, taking into account the peculiar requirements of each, statistical forms, questionnaires and related documents in use or proposed to be used by government offices.

Information Systems, Services and Products: The Data Processing Unit of the CSA is well equipped with the necessary computer facilities and statistical software packages and inhouse programmes required for encoding and analysis of statistical data.

The Authority has its own Library and Documentation Unit stocked with national and international statistical publications, which renders library services to its staff and to external users upon official request by their respective institutions.

The CSA publishes its various census and other statistical studies. Its regular publication is the annual Statistical Abstracts which covers the major socio-economic indicators and other vital statistics. The publications are distributed free of charge to all appropriate government bodies in the country.

4.2.2.7 Ethiopian Chamber of Commerce (ECC)

The Chamber of Commerce was established as a legal body by General Notice No. 90/1974 with the main duty of finding foreign markets for national products.
Tasks of the Chamber include:

- to find foreign markets for national products;
- to exchange information with Chambers of Commerce of other countries;
- to conduct studies on matters pertaining to the betterment of export products and concerning trade constraints;
- to make members aware of the appropriate government policies, regulations, directives, practices and techniques which have bearing on its activities.
- to collect, prepare and disseminate commercial gazettes, bulletins, reports, directories and statistical information on the country's economic activities.
- to translate, on request, commercial documents from one language to another;

The ECC maintains contacts with Chambers of Commerce abroad, trade promotion offices in other countries as well as international organizations. In Ethiopia it has the full support of the Ministry of Foreign Trade and works in close

cooperation with government, public and private enterprises.

Presently, there are six urban Chambers of Commerce located at Addis Ababa, Asmara, Dire Dawa, Jimma, Gondar and Nazareth.

Information Systems, Services and Products: The ECC and the Addis Ababa Chamber of Commerce which are in the same building, have a library and a separate documentation unit with excellent collections of trade journals, publications of the United Nations agencies and other documents. The Library and Documentation Unit are open to all interested users.

The ECC has produced various publications on various aspects of trade, statistics, opportunity and feasibility studies of exportable goods, etc. The regular publication of ECC include the quarterly Ethiopian Trade Journal, the annual Directory of Ethiopian Chamber of Commerce and its Inter-Chamber Newsletter.

The ECC has organized various seminars, symposia, exhibitions and training to its members in cooperation with concerned national and international agencies.

4.2.3 Associations

4.2.3.1 The Ethiopian Statistical Association (ESA)

The Ethiopian Statistical Association was established on April 8, 1990. The major objectives of the ESA are popularizing statistics and promoting modern statistical practice, research and training. Its membership includes important government and non-government organizations engaged in agriculture, industry, trade, financial, educational and other activities.

The Association, since its establishment, has convened two scientific conferences and published abstracts of the proceedings. The Journal of Ethiopian Statistical Association is an annual Journal published by the Association. The first issue of the journal was released in July 1991. The main objective of the journal is to publish scientific papers arising from statistical research which bears on the Ethiopian experience and research in statistical science, and thereby to provide a medium for the exchange of knowledge and experience in statistical practice, research and statistical education. It also produces a quarterly ESA Newsletter which features news, activities of the ESA and research articles that can not appear in the journal of ESA.

4.2.3.2 The Chemical Society of Ethiopia

The Chemical Society of Ethiopia was founded in 1983. The aims of the Society are:

- to develop and promote chemistry education and research;
- to provide a forum for the exchange of ideas through professional publications and regular meetings;
- to popularise chemistry, especially in schools;
- to enhance the participation and collaboration of professional chemists in matters pertaining to policies in curriculum development and the training of chemists;
- to establish close relationship between chemists and other professionals engaged in chemistry related fields of activity so as to increase the role of chemistry in national development;
- to promote the improvement of the qualification of members, and
- to establish and strengthen links with other societies, national and international, which pursue similar aims.

The Society has been organising and participating in, national and international congresses and created various forums to enable members and non-members exchange their ideas and improve their knowledge in the field. It has also close contacts with national and international societies to

implement its aims. Full membership is open to all bona-fide chemists who wish to join the Society to pursue the above aims. Associate membership is also possible for students and other persons professionally engaged in fields related to chemistry.

The society produces Bulletin of the Chemical Society of Ethiopia. The bulletin mainly focuses on original research results in any field, basic and applied chemistry, short communications containing results of limited investigations, reviews on subjects of active and current interest in chemical science, chemistry and society, chemistry in Ethiopia and chemistry society news. The bulletin is regularly published twice a year and is distributed to over 500 clients in Ethiopia and over 200 outside Ethiopia including 65 departments in Africa.

The Society has been taking a number of measures to facilitate the exchange of information among members and foreign bodies involved in similar activities. These have been done through national, regional and international conferences, seminars and contacts with societies/associations.

The society has close contact with the following associations/ societies:

- Pan African Union of Science and Technology

- International Union of Pure and Applied Chemistry (IUPAC)
- Black Chemists Association (USA)
- Ethiopian Teachers Association
- Ethiopian Pharmaceutical Society

4.2.3.3 The Ethiopian Pharmacists' Association

The association was established in 1967 E.C with the aims:

- to enhance the knowledge of the members by exchanging and disseminating professional information,
- to enhance the quality of the field of pharmacy and thereby provide better services to the society; and
- to promote and develop studies and research activities in the field of pharmacy and related fields.

The Association has been contributing professionally on works such as advising the government in formulating policy on training in higher education, development of traditional medicine, development of community (public) pharmacy, providing technical support on drug quality control/production, importation and distribution of drugs in Ethiopia. In addition, it is encouraging individuals to perform research and making an effort to create relationships with similar and related sub-regional and international

associations to strengthen the role of the Association for the benefit of its members and to the country in general.

Regarding the generation and dissemination of information, the Association publishes the Ethiopian Pharmaceutical journal (biannual) and a quarterly Newsletter, and organizes workshops, symposia and conferences at least once a year.

The Association has planned to (1) produce a high standard journal by involving reputable professionals on its board from national and international levels, (2) organize regular conferences, (3) increase the awareness of the potential contributors to and users of the publications so as to increase the contribution of articles and popularize the activities of the Association, and (4) become a national member of the International Federation of Pharmaceuticals Society.

CHAPTER 5

THE QUESTIONNAIRE SURVEY

5.1 SCOPE OF THE SURVEY

This survey is confined to public manufacturing enterprises in Ethiopia under the Ministry of Industry located in and around Addis Ababa which include Addis Ababa, Kaliti, Sebeta, Mojo and Debrezeit regions. The total number of industrial units responded are 34 out of which 6 are from food processing, 6 are from beverages, 5 are from textile, 4 are from leather products, 5 are from metal works, 4 are from chemical, and 5 are from paper and printing industry groups. Private industries, share companies, and the tobacco and sugar public sector industries are not included in the questionnaire survey.

5.2 ADMINISTERING THE QUESTIONNAIRE

In order to distribute the questionnaire to the 40 representative sample units, it was necessary to secure authorization from the Ministry of Industry and the respective corporations that mange the manufacturing units. Accordingly, the Ministry was requested by the School of Information Studies for Africa (SISA) to cooperate in conducting this survey. The Planning and Programming Division of the Ministry

sent a letter requesting such cooperation to all corporations stressing that the results of the study are likely to benefit all concerned in the effort to develop the national industrial information systems and services. Then the questionnaires were distributed to the selected units along with the MOI letters from the respective corporations and a covering letter. The covering letter outlined the reasons for the survey, its importance to the manufacturing industries, and that it would be most useful if completed by the general managers and department heads who have good knowledge of the business. The questionnaires were delivered to the units by hand to ensure that they reach the right person in time and at the same time to brief the respondents on the nature of the survey and particulars of the questionnaire.

The actual field work took about two months due to a number of difficulties encountered in the work. Firstly, it was found difficult to locate and reach the units by public transport. And after locating the unit, many more visits became necessary to contact the responsible people in the enterprise. Some managers granted time for the briefing but were repeatedly not available at the appointed time. All the enterprises to whom the questionnaires were submitted were given 15 days time to complete the questionnaire. But in most cases they took more than a month time to return the filled-in questionnaire.

It must be stated that some managers did understand the vital importance of the present survey and supplied all the required information in time. Some of them took time to acquaint me with the peculiar problems of their units, commented on the present state of the information services in the country, and requested emphatically to include suitable suggestions and recommendations in the present work.

During the course of analysis of the collected data whenever clarification was required or more elucidation was desired on certain peculiarities observed, some of the respondents were contacted a number of times and they willingly spared their valuable time to discuss the points.

5.3 RESPONSE FROM THE FIRMS

As was mentioned in the Methodology (section 1.4), a total of 5 questionnaires, out of which one is on institutional needs and four on individual needs, were distributed to each of the 40 units. As shown in Table 6, 85% (34 units) of the total sample size responded to the survey. A total of 159 completed questionnaires out of which 34 on institutional information resources, systems, services and needs, and 125 on individual needs, were collected. The Table also shows that all the industry groups are fairly well represented in the response. This allows both sector-wise and industry-group wise analysis

of the questionnaire.

Table 6. Category of Respondents by Industry Group

Industry group	No.of units	Respondents by category				
		GM	Prod	Tech	Mart	Finance	Total
1. Food	6	6	5	6	6	4	27
2. Beverages	6	6	6	6	6	4	28
3. Textile	5	5	5	5	5	4	24
4. Leather	4	4	4	4	4	4	20
5. Metal works	5	5	5	4	5	4	23
6. Chemical	4	4	4	3	4	4	19
7. Paper&printing	4	4	4	3	3	4	19
Total	34	34	33	31	33	28	159

GM = General Managers Prod = production unit
Tech = Technical unit Mart = Marketing unit
Finance = Finance unit

5.4 PARTICULARS OF SAMPLE UNITS

All the manufacturing establishments included in the sample are public or state owned enterprises administered by the Food, Beverages, Textile, Leather and Shoe, Metal Works, Chemical and Printing Corporations, under the Ministry of Industry. Though all are engaged in production and marketing of goods and services, elaboration on the type of products and the size of employment in the sample units may be necessary.

Among the 6 manufacturing units of the food industry group, two units are engaged in the production of edible oil; two units are producing flour, macaroni and pasta; one unit produces bread and one unit produces variety of food stuff for children. Under beverages, out of the 6 units, two establishments produce beer, two units soft drinks, two units alcoholic liquors, and another unit produces wine drinks. In the case of the alcoholic and winery sample units, each of the enterprises manage three plants at different locations. The textile sub-sector includes the 5 sample units that produce textile rolls, thread, garments, and yarn goods. Of the units in the leather industry-group, two units produce leather shoes; one unit produces avariety of leather items like hand bags, jackets, etc; and one unit produces canvas and rubber shoes. The metal industry group includes two units that produce furniture; two units iron and steel bars and one unit metal tools totalling 5 units. The 4 units of the chemical industry-group produce car battery, plastic and foam, paints and soap. Among the 4 manufacturing units under paper and printing, three units are engaged in printing services, one unit produces paper articles like packing, rolling and toilet materials.

Regarding employment, in the firms dealing in textile, leather and beverages, while most them employ more than 700 workers,

only two units have less than 500 employees. The highest number of employment is in the Akaki Textile Factory that has 6143 workers. The majority of units under food, chemical and metal works industry groups have between 170 and 350 employees and only two units employ more than 500 workers per unit. All the paper and printing enterprises have about 500 employees per unit.

Therefore, it can be said that the sample units under textile, beverages and leather are average large scale industries; and sample units that fall under food, chemical metal works, and paper and printing industry groups are medium scale industries.

CHAPTER 6

MANAGEMENT OF DATA AND INFORMATION IN PUBLIC MANUFACTURING ENTERPRISES

6.1 INTRODUCTION

Any manufacturing enterprise generates, acquires, processes, stores and retrieves data and information during its course of activities. However, the volume of data and information generated or acquired, the method of its processing, and the efficiency and effectiveness of its information storage and retrieval system may vary from establishment to establishment. This chapter deals with the analysis and discussion of the survey data on the information services rendered at enterprise level, organisation of internally generated information and the satisfaction of users with internal services and products.

6.2 INTERNAL INFORMATION AND INFORMATION PRODUCTS

In order for a modern enterprise to effectively manage its production, personnel, marketing, financial activities, etc., it must have some formalised structured system of handling internal information. Without formal information handling procedures, even smaller firms have much less understanding of their own activities and past experiences. In such a situation, even a highly gifted manager may find it difficult

to make vital decisions.

Internal information includes internally generated performance reports like production variances and cost effectiveness; personnel related data like recruitment, salary, promotion, retirement, disciplinary measures, etc.; financial reports like sales, profits, balance sheets,; technical reports related to machine failures, maintenance reports; R&D reports; stock levels of input and output materials; evaluation and action reports like the quarterly and annual review of the overall activities of the enterprise. Such data and information are important fro mor structured decisions and in sort and medium term planning. They are also useful in long term planning when used along with environmental information.

With this in view, in the questionnaire, the following statement was made and the respondents were asked their views on it and all of them unanimously agreed: "A lot of data is generated within an organisation as a result of the day-to-day operations like production and sales figures, production schedules, experimental results of R&D, performance reviews, payrolls, balance sheets, and so on. These are highly essential for decision making at all levels, to assess past performance and to predict future trends.

As part of the same question, they were asked to indicate the mode of organisation of the internal information in their

organisations. In all the responding enterprises, data and information are primarily organised and stored department wise; that is, data related production schedule, stock levels of raw materials and products are handled by the production unit; data related to sales, purchases wages and overtime incentives and other financial transactions are in the hands of marketing and finance sections; employee records and records and correspondence letters are under the administration department, and so on. Vital statistics data like quarterly and annual sales, production, employment, etc. figures are produced and maintained by the statistics section.

As there are no computer facilities in any of the enterprises, data and information processing is performed manually. Each department organises its data according to the various guidelines, forms and formats produced by the corporations and the Ministry of Industry. Information flow among departments is based on their work relations. For example, level of stock is reported to the sales unit by the production unit, while request for purchase of raw materials is made to the purchase unit and finance sections upon approval by the general manager using forms designed for the purpose.

Regarding information products at enterprise level, only quarterly and annual reports are regularly produced primarily

for the purpose of informing the corporations as per government regulations. These reports are the single consolidated information products in all manufacturing enterprises.

In part II of the questionnaire, individual respondents were asked whether the internal information was readily available and accessible to them. In response to the question, 85.5% (106) have easy access to internal information while 14.5 % (19) have faced problems. Respondents were also to indicate whether external, internal or both types of information most important to their work. Out of the 125 respondents, 21% (26) showed their preference for internal information and 79% (99) indicated that both types of information are equally important while none of the respondents showed preference for external information only.

Even though the majority of respondents have easy access to internal information which are organised department wise, this finding should be treated with caution because the respondents are at some management positions and do not include the rank-and-file bulk of workers.

The fact that both internal and external information are believed to be essential by the respondents prompted us to

look into the information offered in the enterprises.

6.3 THE NEED FOR AN INFORMATION UNIT

Enterprises need to make themselves aware of the developments in their sphere of activities. For this purpose, there are several varieties of information sources. When the information material is there, irrespective of its quantity, there is some form of handling and also a possibility for rendering some form of information services within an organisation.

The existence of organised library, information/ documentation unit necessitates an enterprise to allocate budget for procuring information materials, to centrally process the information materials and make them available to all staff of the organisation, to recruit qualified information worker for the purpose and to produce a number of secondary and tertiary information products, etc.

In part I of the questionnaire, a number of questions were devoted to library and information services, staffing of library/ information units, budget for procuring materials and adequacy of the budget for the purpose.

Only three enterprises of which 2 are from the beverages industry-group and one from textile industries have reported

to have an organised library and documentation unit. In two other enterprises a sort of reading room was established by the Workers Party Offices for the promotion of political activities and they were closed with the collapse of the past regime. Hence, 91% (31) of the sample units do not have any organised information unit.

Among the three libraries, two are under the Administration Department and one is under the Public Relations Department of the enterprise. All the three libraries offer library reading and lending services. One of the three libraries is run by a diploma holder in librarianship while the others are operated by high school graduates without any training in the field. Regarding library technical processing, non of the three libraries use standard classification and cataloguing systems. The technical libraries are so small that a sort of document register cards or slips, labels and lending forms have been satisfactorily used to effect reading and lending services.

In the 31 enterprises, the various information materials acquired are found dispersed in various departments and only the staff of the respective departments can access and use these information sources. These enterprises were asked whether they had any plan to establish library/ information unit in the near future. As can be seen from Table 7, out of

the 31 enterprises, only 9% (9) have concrete plans to establish a library/ information unit while the majority, 71% (22) do not have any such plans.

The main constraint in most of the public manufacturing enterprises is their limited financial resources for procuring all the information materials they require. Therefore, it is appropriate the pattern in which they spend money to procure information material, the extent to which they meet their information needs with the materials they procure and the extent to which they depend on outside sources. For this purpose, in the questionnaire different ranges of the budget were given and the enterprise managers were asked to indicate the ranges in which they spend money to procure information material, and also to indicate whether the materials they procure is about right, too little or too much for their information requirements.

Though all the sample units reported that they do not have any regular budget for the purpose, they reported that they spent between Birr 100- 500 to procure newspapers, gazettes, and local journals from their operational budget each year. Regarding the adequacy of their spending, all acknowledge that they spent too little for the purpose.

Table 7. Existence of Short term Plan to Establish Library/ Information Unit by Industry Group

Industry-group	Yes	No
1. Food	3	3
2. Beverages	2	2
3. Textile	1	3
4. Leather	0	4
5. Metal works	3	2
6. Chemical	0	4
7. Printing	0	4
Total	9	22

Other information materials like technical specifications, operation and maintenance manuals are acquired along with machineries and spare parts from suppliers and as such their cost is included in the purchase of the equipment. The various brochures and leaflets, newsletters produced by the Ministry of Industry and corporations are acquired free of charge. The corporations also donate their enterprises back issues of some S&T journals, and a few books irregularly.

In part II of the questionnaire, respondents were asked about their frequency of visits to their libraries, their satisfaction with the services offered, their opinion on why

there were not information units in their firms and whether their establishment needs its own library, information/ documentation unit.

Regarding frequency of visits to their firms' libraries, among the three sample units that have libraries, 25% (3)of the respondents visit once in a week, 16.7% (2) once in 6 months and 58.3% (7) seldom sought any information from their libraries.

Regarding the degree of their satisfaction by the internal library/ information services, out of the 12 respondents, 50% (6) indicated that their information units meet their needs by about 25% while the rest 50% (6) of the respondents indicated that their units did not at all meet their information needs. In the next question, their opinions were requested as to why their library/ information unit did not meet their needs satisfactorily. To this question, all the respondents believed the reasons for their dissatisfaction with their units were both poor collection of information sources and inadequacy of the qualifications of the staff that run the units.

In the case of the majority of the enterprises which do not have any organised information service units, question was asked why their firms did not establish such a unit.

Table 8. Opinion of Respondents as to Why Their Firms Did not Establish Library/ Information Unit

Major reason	Respondents
1. Lack of management awareness	64
2. Shortage of fund	28
3. Lack of need	21
4. Any other reason	11

As shown in Table 8, 51% (64) of the respondents think the major reason for the absence of library/ information unit is the low level of awareness on the part of the management of the enterprises; 23% (28), 17% (21), and 9% (11) of the respondents believe lack of the required funding, absence of the need and other reasons as the major factors for the non establishment of the units respectively. As some respondents cited more than one reason this data should be seen in this context. Regarding the option 'any other reason', respondents offered their own opinions of which some are, lack of premises to host such units, corporations' belief that the central library at their head office would be sufficient for the purpose, frequent changes of the enterprise managers as reasons for lack of attention in the area of information services at enterprise level.

Respondents were also asked to provide a clear 'yes' or 'no' answer whether they need a library/ information unit in their

enterprises. This question also helped as a 'check question' in the case of respondents who indicated 'lack of need' was the major reason for the absence of information service unit in their enterprises. In response to the question, out of the 109 responses from firms without library/information units, 81% (90) of the respondents believe their firms need its own library/information unit, while 19% (21) think they do not need one.

From the above discussion, the following conclusions may be drawn:

- While the public manufacturing establishments included in the survey acknowledge that both internal information and environmental information are necessary for planning and decision making processes, the amount of money spent to acquire information materials is inadequate to keep track of the developments in their external environment in their spheres of activity.

- Most of the enterprises do not have any library/ information unit nor do they have concrete plans and programmes to establish such units in the near future. Yet, the bulk of the respondents in these enterprises believe that their firms need its own information service unit for its healthy development. This finding supports

the opinion of the majority of the respondents that lack of management awareness as the main reason for absence information rendering units in the enterprises.

- In the enterprises that have their own library/information unit, the level of staffing, the amount of money allocated for procurement of information materials, the quality and quantity of their collection and the services provided are generally unsatisfactory.

CHAPTER 7

GENERAL TOPICS AND INFORMATION SOURCES OF INTERST TO MANUFACTURERS

7.1 INTRODUCTION

Industrial and technological information is punblished in a great variety of publications, such as, technical and commercial journals, patents, standards, handbooks, reference and operation manuals, newspapers, and so on. The transfer of information also takes place through different publications, associations, institutions and individuals. Manufacturing enterprises need information in various forms on various aspects of their activities, such as, production, marketing, personnel management, etc.

It is therefore, essential to know the relevant information sources as well as the major topics on which information is sought by manufacturers. This chapter discusses these matters based on the analysis of the questionaire survey data.

7.2 INFORMATION REQUIREMENTS OF THE LOGICAL FUNCTIONAL UNITS OF AN ENTERPRISE

It is obvious that the topics on which manufacturers seek information are generally based on the basic functions of

their enterprises. In this context, attempt is made below to introduce the logical functions of an operating manufacturing enterprise and their information requirements.

7.2.1 General Management

In an autonomous environment, the general manager of a public enterprise has to determine the policy formulate the long-term and short-term plans and undertakes the overall coordination and control of the activities of the organization. But in an environment where other corporal bodies handle policy issues and formulate plans and programmes, the duties and responsibilities of the general manager limited to execution of the plans and programmes, reporting, and overall coordination and control of activities.

Information requirements at this level include:

- knowledge of the various regulations that affect the organization.
- Corporal plans and programmes of superior bodies,if any management audit,format for self-audit
- Reporting,inspecting or auditing requirements of other bodies like corporations, State auditing agencies, banks and insurance Companies.

7.2.2 Personnel Management

Management of human resources in an enterprise involves recruiting of staff,training and retraining of personnel, performance evaluation,promotions and salary increment transfers,various incentives, penalties ,recrement etc.

Information Requirement:

- Information on skills necessary to handle different jobs
- Job description of the existing and prospective employees
- Availability of satisfactory employees locally
- Facilities available for getting them trained
- Knowledge of prevailing wage structures
- Information on labour legislations that are likely to affect the enterprise
- knowledge of policies legislations or procedures relating to recruitment, retirement, penalties, incentive structure, promotion, etc...
- Flow of control information, profits, costs, production, raw materials, markets, other factors important for survival of the unit
- Information on preparing plans in production, product line and product-mix growth, profit, markets

- Knowledge of budgets, uses and limitations and how to prepare these
- Information on general economic conditions, changes in government policies, the influence they and their competitors exert on the market
- Knowledge on the impact that the technological advances may have on the organisation's sphere of activity

7.2.3 Marketing

Marketing involves converting the customer purchase power into effective demand for a specific product or service to the final consumer to achieve the profit target or other objectives. the entrepreneur or his marketing staff must be in a position to evaluate and exploit the marketing opportunities. they should be also able to formulate a marketing policy and other promotional objectives which require lot of information.

Information Requirements:

- Information relating to marketing opportunities, activities of the competitors and customers
- The techniques and cost-effectiveness on advertising and sales promotional campaigns
- Details of inventory levels, delivery times and

distribution methods

- Information regarding various distribution channels involved and costs involved in each
- The share of the market that an entrepreneur is likely to capture
- The forward and backward linkage of the product in the market
- The present bargaining position of the manufacturer of the products with distributors or retailers
- Possibilities of organizing distribution agencies either by cooperative market arrangements through the trade associations or small Industries Development Corporations.

7.2.4 Production Management

Production management involves a Wide range of activities and decision points in the production programme.productivity depends on the collection of rights type of information at right time.

Information Requirements:

- Planning required production ,the allocation of production resources and the progress and control of requirements to meet the needs of the forecasted figures.

- The organisation and control of the production process and coordination and optimum utilization on a daily basis,of the machinery and manpower available .
- The physical control of finished stocks, semi-processed stocks, Work-in-progress and stocks and broad-in components in hand.
- Full and precise details of forecasted sales by product or the contracts in hand.
- Data relating to material stocks, the availability of supplies and lead times needed for deliveries and distribution.
- The human factors which might affect the operation of the production planning.
- Information on forward production loads and any modification affecting the plan.
- Information relating to the capability of the company to acquire the needed inputs

7.2.5 Financial Management

Because of the limited financial resources, manufacturing enterprise have to plan their finance in a more flexible manner.

Information Requirements:

- Details of payments to be made
- Details of the sales revenue and other many to be collected
- Various facilities available in banks like,invoice discounting, pledging the raw materials under lock and key etc.
- Information on daily performance of the organisation in a quantitative format.
- The current orders and future orders and past sales position of the organisation.
- The immediate and future capital requirements of the organisation and the wear and tear rate of the assets possessed.

7.2.5 Maintenance and Technical Service

The term maintenance is used to describe areas of activity which are of support nature in that their work can not be directly seen in the physical production process. However, maintenance is vital and without it there would be marked decline in the efficiency of the organisation. Maintenance covers the maintenance of plant and equipment, building, provision of service facilities like the organisation of control and welfare facilities.

Information Requirements:

- Data relating to background and training of each employee
- Detailed specifications of the machinery and the operating characteristics
- Facts relating to service needs and their availability
- Data on the replacement schedules of the machinery and components to implement preventive maintenance
- Details of the organisation's assets and the insurable risks

7.2.6 Quality Control

A quality control programme would cover inspection, testing and implementation of policy for ensuring quality and standards right from the stage of product design through procurement of raw materials and equipment operations to finished products and after-sales service. The objective is the economical production of a maximum quantity of more uniform product at the quality level the consumer wants.

Information requirements:

- Specifications of the finished products as required by the consumers
- Specifications of the raw materials required to make the

products which will conform to the required specifications

- Different standards available
- Testing methods of the finished products and raw materials
- Details of the operations involved in each process and the constraints involved.

7.2.7 Research and Development

The success and competence of any organisation depend on the ability of its R&D is the vital subsystem on which the very progress of the company is based. The main functions include the design of new products and continuous modification of the existing ones and monitoring the quality of the products.

Information requirements:

- Information on the current scientific and technological developments in their sphere of activity
- Present production methods and costs of production
- Company's overall resourcefulness to undertake new projects

7.2.8 Other Facilities

The manufacturing industry would find it useful to have information on the availability and regulations concerning other common service facilities such as the following:

- Warehousing
- Advertising and publicity channels and methods
- Legal advice
- Fire protection
- Accounting and auditing
- Insurance of men and materials
- Clinics, first-aid and hospitals
- In service training and apprenticeship and cooperative and sponsored research facility for:

(i) testing of raw materials and products

(ii) carrying out investigations relating to:

(a) Local substitutes for raw materials imported from abroad or brought from other areas of the country

(b) utilization of by-products and waste products and finding solution to manufacturing process problems, equipment problems, etc. and

(c) Demonstration, setting up pilot plant, consultancy etc. on technical matters including standards and specifications.

7.2.9 Expansion/diversification/development

Competitive conditions today make a broader operating base worth careful thought, even by very small manufacturers. it can be done by adding a new product to the line, by offering an additional service or by marketing through a supplementary channel of distribution. recent business history shows that many companies have profited by diversifying. Many more are continuing to prosper largely because suitable diversification has increased their sales, stabilized their work during seasonal or cyclical variations, and spread the rise over a wider production and marketing base. In addition, from the community standpoint, concerns with a broad operating base are often highly desirable because of their adaptability to changing conditions and their relatively steady employment.

A common sense approach to the question whether or not to diversify involves taking five orderly steps: identifying an actual need, analyzing the type and scope of the need, evaluating the alternative courses of action, putting the final decision into operation and checking upon results (Sudhakara Rao 1978).

Manufacturing enterprises sometimes face special considerations which should be investigated and weighed in a realistic and objective way. Among these some of the most

important are: The characteristics of entrepreneurs' temperament and objectives, their capabilities and limitations, the outside sources from which practical ideas and information may be obtained at supportable cost, and the individuals or institutions who can supply funds and financial management assistance.

Diversification implies more than one product line, more than one type of marketing channel or various combinations of these and other alternatives.

Why should any entrepreneur thin about diversification? Generally of course because it hoped diversification will pay off. But there are some specific reasons too. As far as the small business enterprise itself is concerned, the following are some of the specific reasons are frequently listed in support of diversification (Sudhakara Rao 1979, p. 64).

- To increase profit by adding products or services which will increase sales
- To maintain or increase the share of the market
- To replace unprofitable lines or where forced to carry profitable lines as an offset to them
- To keep up with changing demands for goods and services
- To utilize idle facilities which arise for example in the production of seasonal goods

- To capitalise of the operating advantages of a stale work force
- To gain other benefits peculiar to the company in question

Information requirements:

The following are some of the several aspects on which the information is needed for diversification:

Discovery of Need: In some cases the need may be seen,as in extreme seasonal variations or steadily decreasing profits. In other cases the need may not be apparent. perhaps a company is not keeping its share of the market and yet, because its sales are rising, this is not readily recognized. Therefore, the small entrepreneur should continually endeavour to keep informed over a period of time on what is happening to sales of his products as compared with those in competition. Marketing research at the customer level can often help a producer become aware of early need for diversification.

Analysis of Need: Next it becomes necessary to analyze the need. What is the source? To what stage has the problem progressed? Does it demand immediate action or can the entrepreneur afford to move slowly? Advance planning must be done by collecting the above information so as to avoid having

to make hasty decisions.

Determination and Evaluation of Alternative Solutions: Once their problem is understood the entrepreneur must find out various solutions which might be applied. Perhaps the solution should involve a new or changed product, a new or changed service, a new or changed marketing process, shifts in personnel practices, or some combination of these.

Resources at hand or obtainable in the enterprise: The alternative selected should be conditioned in part by the resources the enterprise can command. a machine shop is capable of doing certain types of jobs. Thus, with the resources in such a shop, it is not likely that it could readily be converted to the production of rubber footwear. Nevertheless, there may be cases in which it would pay to secure new resources and to move into areas not previously exploited. This would be the case, for example, where the basic demand pattern had changed and the business had no choice but to shift or go out of business.

Available financing: If one of the proposed alternatives depends upon the availability of outside capital, that availability will automatically become a limiting factor. Moreover, availability alone is not the only problem.

Some avenues to diversification may require that stock in; or control of a closely held business be opened up to outsiders. The entrepreneur will have to collect information on this and analyze carefully.

Marketing possibilities: The entrepreneur must also think in terms of markets and outlets. For example, if a manufacturer's salesmen are calling on hardware stores selling nuts and bolts, why not hinges also. Or other similar lines? The marketing process may also impose limitations on the choice of alternative solutions; that is, a particular method of selling may be successful for only certain kinds of goods. All production cannot be forced through a given trade channel merely because the manufacturer has already developed that channel.

Putting the Decision into Operation: Once a course of action has been decided on, it is necessary to put it into operation. This requires the assignment of needed resources and personnel to handle the new task, plus the proper mix of men and machines in turning out and marketing new product. Therefore, it is advisable to have a full plan worked out, in detail, the sequence and timing of actions and what resources and manpower are to execute them. As this plan is carried out, changing conditions and new information may force revisions. But

as each change is made, it should be thought through and formalized so that the plan is always specific, always complete -and always correct.

Follow-up and Evaluation: After the diversification step has been taken, it is necessary to assess the results on a continuing basis. Is the project paying off? The answer to this question involves, first, the choice of some pay off yardsticks. second, it involves getting the information to apply the standard. A convenient yardstick is found in calculating the comparative return on investment. What were the figures like before the step was taken, and 3, 6, 9 months or a year afterwards. It must be ensured that the extraneous factors which can be identified are taken into account. Periodic assessment should always be used to determine what the trend of the enterprise looks like. Collection and evaluation of information on all the above aspects leads to the ideal diversification.

7.3 TOPICS ON WHICH MANUFACTURERS NEED INFORMATION

It is evident that manufacturers need information on the various aspects of their acivities. Out of the several aspects on which they need information, the requirements on some

aspects may be regular and on others occasional. The assessment of the regular and occasional information requirements will be helpful for manufacturing enterprises and for those who provide information services to industries in procuring information materials and in developing their services accordingly.

In the questionaire several topics were listed and the sample manufacturing units were asked to indicate on which of the topics they need information regularly and on which occasionaly. For the purpose of analysis of the response obtained, some of the related subjects were merged to give four categories. For example, the topics market trends, trade statistics of products, and competition can be collectively treated as market information. Topics, such as, tenders and contracts, and regulatory information are not included in the topics because such matters are, in most cases, dealt with at corporation levels.

Table 9. Topics on Which Manufacturers Need Information (in percentages)

Topics	Regularly	Occasionally	Not at all
1. Production	94	6	0
2. Marketing	48	40	12
3. Technological developments in the field	18	65	17
4. Product diversfication	21	44	35

Table 9 shows that 94% (32 sample units) out of the total of 34 units require information on production topics frequently while 6% (2 units) require production realted information occasionally. Both units who indicated they require production information only occasionally belong to the beverages industry group. Production related information caters for several issues including the daily, monthly, quarterly and annual quantity of products;level of stocks of raw materials, packing items, etc; and quality control; machine failure and efficiency of production, etc. As these cttivities are at the heart of an enterprise, it is justified that information relatedto production is sought regularly.

Marketing information in the table is the percentage of the sum of the three options presented in the questionaire namely; market trends for products, activities of competitors and

trade statistics of the product. Marketing information is required regularly by 48% (49 units), occasionally by 40% (40 units), and do not being sought at all by 12% (12 units).

Marketing has not been a problem for public manufacturing industries because of the chronic shortage of industrial goods prevailing in the country, and the development of public wholesale and retail enterprises who market goods to the public. These include the Ethiopian Domestic Distribution Corporation (EDDC), Urban Dwellers Associations and Peasant Associations. However, presently, some industry groups like the leather, food and printing industries are facing considerable competition from the private sector.

Information on technological developments is sought by public manufacturing units 17.5% (6 units) of the sample units regularly, 65% (22 units) occasionalyy, and 17.5% (6 units) not at all. Though it is understandable that more than average of the sample units require information on current technological developments that affect their industries, it is worth mentioning that modernisation of public manufacturing and processes are generally insignificant.

Regarding product diversification and development, only 21% (7 units) sought information regularly on the topic, and 44% (15 units) occasionaly and 35% (13 units) did not seek information

on the subject. The most needy groups are the food, leather and textile industries. Among the 6 sample from the food industry group, 50% and 33% require information on product diversification regularly and occasionally respectively. The need for this information is 50% regularly and 50% occassionaly for leather industries while all textile sample units seek the same information occasionally. In the case of units of the metal, beverages, chemical and printing industries, 50% or more did not require information on product diversification at all.

Earlier studies showed that business enterprises do not consider their problems are information related ones. In this study also some enterprises clearly stated both during the briefing sessions and in the open-ended question, that their problem is not information but finance, spare parts, raw materials, etc. Hence, in order to get more understanding of their information needs, the sample units were asked to give an outline of their problems which remain unresolved in therir business. Some options were provided in the question both to choose from and to motivate them to outline additional industry specific problems.

Table 10. Unresolved Probems of Manufacturures

(as a Percentage of the Sample Units)

Rank	Problem area	Percentage
1	Finding sources of raw materials machinery and equipment	88
2	Technical problems	85
3	Improving productivity	79
4	Marketing of products	29
5	Product diversification	12
6	Regulatory matters	9
7	Finding sources of skilled man power	6

It is essential to know the capabilities of enterprises in generating data and information to fill some information gaps. In an attempt to do so, enterprises were enquired on whether they conduct studies in the areas of marketing, raw materials, alternative technologies, manpower, finance, etc. during their post-investment existence. It was found that 38% (13 units) have conducted some studies on one or more of the above mentioned subjects while 62% (21 units) did not conduct any such study. Some of the units who made the studies indicated that they cooperated with consultancy groups. Those who did not conduct their own studies totally depended on corporations and the Ministry of Industry regarding these matters.

7.4 RANKING OF INFORMATION SOURCES

For any agency engaged supplying information to manufacturing industries, it is very useful to identify the sources from which manufacturers locate the required information. Besides, this also helps to make amnufacturing establishments aware of the several variety of existing documentary and non-documentary information sources.

With this idea, in the questionaire, several such sources were listed and respondents were asked to indicate the sources in which they locate the required information.The responses ranked the information sources according to the percentage of the total 506 respondents who located the useful infgormation in at least one type of source.

As presented in Table 11, for the purpose of analysis, similar sources are clubbed together to give a total ten categories of sources. Among the type of sources listed in the options, 'patents' and 'other sources' were not selected by any respondent and as such are not included in the ranking. It should be noted that as a single respondent can show his preference for more than one source type, the total exceeds the number of respondents included in the survey. The observed impact of the information sources is very similar across all industry groups, therefore analysis of the data industry

group-wise became unnecessary.

Table 11. Rank of Information Sources of Interest to Manufacturers

Rank	Sources	%Respondents
1	Manuals, handbooks	23.3
2	Newspapers, gazzetes, advertisment brochures	20.9
3	Ministry of Industry, corporations banks & insurance companies	19.6
4	Books (other than handbooks)	11.1
5	Other people engaed in similar business	10.4
6	standards	6.3
7	Journals	3.4
8	Conferences, conference proceedings	2.4
9	Consultants, legal advisors	1.6
10	Research institutes	1.0
	Total	100

Out of the total of 506 responses, 23.3% (118) of the respondents located the required information in handbooks, technical, operational and other types of manuals. This is mainly because public manufacturing enterprises are required to follow the various guidelines, work manuals, job descriptions, forms and formats prepared by enterprise management, corporations and the Ministry of Industry.

The other enfluencing factor is that the technical specifications and operation manuals supplied by the equipment suppliers are the sole technical information sources. The second ranked type of source are newspapers, gazzetes, and avertisment brochures, with 20.9% (106) of the respondents indicating them. The third ranked source type with 19.6% (99) response are the government bodies that administer and/or support the enterprises, namely, the Ministry of Industry and its corporations, and banks and insurance bodies. Books other than handbooks ranked fourth with 11.1% (56) response. Other people engaged in similar business was ranked fifth with 10.4% (50). Table 11 shows that the information sources ranking sixth to tenth namely, standards, journals, conference & its proceedings, consultants and research institute combined contribute only 14.7% of the total. Though the grouping of the various information sources slightly varies from this, in a similar study on small enterprises (Sudhahkara Rao, 1979, p, 129), journals, associations, meetings and proceeding, consultants and othe rpersonal sources were ranked 1, 3 and 4 out of the 7 groups of sources. On the other hand, these source types have very low preference in the present survey. Books, hand books, newspapers, and standards as information sources have had similar ranking in the earlier and the present studies.

The low level of preference for journals, conference proceedings, and research institutes as well as total absence of needs for patent documents can be generally attributed to the low level of S&T activities in the country. More specific reasons may be the absence of significant R&D activities at enterprise level, low level of technological and industrial publication activity in the country, the weak linkage between research institutes and professional associations on one side and manufacturing enterprises on the other.

CHAPTER 8

ROLE OF EXTERNAL INFORMATION SOURCES, SYSTEMS AND SERVICES

8.1 INTRODUCTION

As it is the case with other organizations, manufacturing enterprises depend on sources outside their establishment for their information needs, irrespective of the quantity of the material they acquire. These may include special library/ information units, trade/commercial associations, various government agencies, research/academic institutions, etc.

The assessment of the role of external sources will be helpful to the people, agencies and institutions supplying information to industries to estimate the extent and the sort of linkages that must be established among such sources. This chapter, therefore, deals with the role of the various external sources in general and of libraries/information units in particular.

8.2 EXTERNAL SOURCES (GENERAL)

In the questionnaire, a number of different sources were listed and respondents were asked to indicate the sources they normally approach for information not available from internal sources.

Table 12 shows particulars of the sources as a percentage of the number of respondents across all sample units who indicated particular source out of the total 125 individual respondents.

Table 12. External sources of Information

Sl.No.	Sources	% of respondents
1	Library/ information unit	22.4
2	Consultants/ legal advisors	5.6
3	Government agencies	42.4
4	Research, academic institutes, S&T professional associations	10.0
5	Trade/ commercial associations	10.4
6	People engaged in similar business	68.8

Out of the total number of the 125 respondents, 68.8% (86) approach someone outside their organization engaged in similar type of business. In a similar study on small scale industries in India (Sudhakara Rao 1979), 68.8% of the sample units and in the case of small industries in Australia (Maguire & Kench

1974), 37.3% approach people in similar business. As this source ranks first and second in the above cases, it seems that small and medium industries behave similarly in this regard.

The second ranked externale sources are government agencies with 42.4% (53) of the respondents. This particular source was not of much significance in the above cited studies on private small industries. The result of this study affirms that public manufacturing enterprises administered by state corporations and the Ministry of Industry regularly seek information from these and other government agencies.

Even though with only about half of the respondents of the second ranked source, i.e.,22.4% (28 respondents), libraries/ information units are the third most sought external source. The role of libraries/ information units is separately treated in section 8.3.

Trade/ commercial associations and research/ academic institutes, and professional associations are approached respectively by 10.4% (13), and 9.6% (12) of the respondents. In addition, another question was posed to enterprise managers and individual respondents to analyze their membership in various associations. Membership in the only trade association in the country, the Ethiopian Trade Union, was almost

compulsory to all public manufacturers during the past regime and now it is in disarray; therefore, the questionnaire data on the same is discarded. As individual membership in commercial association is usually for private businessmen, data on the same is also excluded. Out of the 34 sample units, 29 (85%) of the enterprises are members of the Addis Ababa Chamber of Commerce which is a regional branch of the Ethiopian Chamber of Commerce. Analysis of this data by industry group shows that all the sample units of beverages, textile, leather and printing industries are members of the Addis Ababa Chamber of Commerce, 5 (83.3%) units of the food, 3 (60%) units of the metal and 2 (50%) of the chemical units are members of the same association. The major activities and services of the Ethiopian Chamber of Commerce was described in the chapter dealing with institutional information sources.

A disappointing picture comes from the data on participation of public manufacturers in professional associations. While none of the enterprises are institutional members of professional associations, only 11 (8.8%) individual respondents are individual members of the same association. All the individual members are from production and technical units of the enterprises and are members of the Chemical Society of Ethiopia. Six of the 11 members are from the beverages industries. The low level of membership to professional associations is mainly due to the absence of

specialised industrial professional associations as well as the low level of development of the existing associations of relevance to industry.

Consultants and legal advisors were sought for information by only 5.6% (7) of the respondents. This can be attributed to two major factors: Firstly, the major activities that require consultancy services, such as, pre-feasibility and feasibility studies, and legal matters are handled by the corporations and the Ministry of Industry. Secondly, industrial consultancy is generally poorly developed in the country.

8.2.1 Knowledge of External Sources: The assessment on how the enterprises have become aware of the information sources may be helpful in evaluating the state of development and impact of the popularisation media used by the sources on one hand and to get an insight on the level of exposure to the media and on the information seeking behaviour of manufacturers on the other. Accordingly, respondents were asked how they get their knowledge of the external sources. The following responses were obtained from among the options provided in the question:

75.2% (94) from personal experience;

18.4% (23) from other people;

15.2% (19) from brochures and other advertisements; and

4.8% (6) from directories.

The above data indicates that the majority of enterprise workers depend on their work experience and to a lesser extent on other individuals in identifying the useful sources of information. While the various brochures and other advertisement media used by the sources of information have motivated 15.2% (19) of the respondents, the impact of reference material (directory)
was found to be very minimal.

8.2.2 Frequency of Information Seeking: The frequency of recourse to external sources for information is one indication of their information needs. In the questionnaire, different time periods were listed and the respondents were asked to indicate the frequency of information assistance sought from the various sources.

Table 13. Frequency of Information Seeking from External Sources

Sl.No.	Frequency	Respondents
1	Once in a week	5 (4.2%)
2	Once in a month	38 (32.2%)
3	Once in 6 months	24 (20.4%)
4	Once a year	1 (0.8%)
5	Seldom sought any information	50 (42.4)

As 7 of the 125 respondents did not indicate their preference among the options, the percentage in Table 13 is for the 118 respondents. Over 60% of the respondents sought information only once in 6 or more months. And above all, about 40% have not sought any information from external sources for more than a year. If one month period is considered as a regular interval (Maguire & Robin 1974), only 36.4% of the respondents sought information once in a month or more frequently.

Based on the same assumption, beverage units (12 respondents) rank first in seeking external information regularly, leather units (8 respondents) second, metal work units (6 respondents) third, printing and textile units (each 5 respondents) fourth, chemical units (4 respondents) fifth, and food units with 3 respondents rank last.

Studies on small industries in India (Sudhakara Rao 1979) and Australia (Maguire & Kench 1974) found that 74.5% and 67% sought information from external sources regularly. From this comparison we can deduce that the public manufacturers in Ethiopia seek information much less frequently than the small industries in other countries cited above.

8.2.3 How Information is Sought: On the occasions on which information had been sought from external sources by respondents:

79% (99) telephoned for it;

76% (95) made personal visits; and

44% (55) wrote for it.

The percentages total more than 100 because respondents were free to indicate their use of more than one method. The percentages have been computed for the total of 125 respondents because those who had not sought information for more than a year and those who did not respond to the question on frequency of assistance seeking, indicated the method(s) they use while they seek external information.

Even though there is very slight preference for telephone over personal visit, both methods are significantly favoured over written communication which is relatively time consuming and uncertainty of response is higher.

8.3 ROLE OF EXTERNAL LIBRARIES/ INFORMATION UNITS

Presently, at the national level, there is considerable activity to develop a national information and documentation system which include efforts being made to:

- formulate national policy on information systems and services that will guide the development of the information sector and integrate the same with the overall national development plan;

- develop national S&T information system and network which includes sectoral information systems and services;

-develop national industrial information system that include the computerised management information system being developed at the Ministry of Industry; establishment and strengthening of specialised libraries and documentation centres for the various industry groups (chemical, food, leather, etc.) at corporation levels.

As special libraries/information units maintain relatively comprehensive and current information in their specialities, their proper utilisation will not only keep the enterprises competitive but also minimise their own expenditure in

procuring information material. It is being increasingly felt that the existing library/ information service facilities in government agencies, research/ academic institutions and public libraries are not fully exploited by manufacturing industries to their full advantage.

Therefore, it is essential to know the degree of utilisation of the existing facilities by manufacturers in order to establish mechanisms for optimum utilisation of resources and to provide some guidelines in setting up such units by various agencies.

In the questionnaire the respondents were asked to indicate whether they had ever visited a library/information unit in connection with their firms' information problems and the response obtained is presented in Table 14.

Out of the total sample units, 38.4% (40) of the respondents made visits to external libraries/ information units for obtaining the required information. And in this total, the number of respondents per industry-group gives the following results: 52.4% of the textile respondents, 33.3% of food and metal respondents, 31.8% of beverages respondents and 28.6%of respondents from printing units
made visits to external libraries/ information units.

Table 14. Visits Made by Respondents to Libraries/ Information Units

Sl.NO.	Industry group	Yes	No	Total
1	Food	7	14	21
2	Beverages	7	15	22
3	Textile	10	9	19
4	Leather	7	9	15
5	Metal works	6	12	18
6	Chemical	7	8	15
7	Printing	4	10	14

8.3.1 Type of Libraries Information Units Visited: To assesss the degree of utilisation of each group of library/information unit, the respondents who sought information from external libraries were asked which type they visited. Among the possible options, corporation libraries and the Library and Documentation Unit of the Ministry of Industry (MOI) were frequented along with public, academic and other firms' libraries for two reasons: first, corporation libraries were established with the aim of serving manufacturing enterprises under the same industry group; therefore, evaluation of their utilisation is of much importance in deciding whether establishment of information units at enterprise levels is

really necessary and also to adapt the information systems and services of the corporations to the needs of the enterprises. Second, the fairly large amount of resources invested in developing the Library and Documentation Unit at the Ministry notably the development of automated storage and retrieval system, aroused particular interest to investigate its impact on public manufacturers.

Table 15 shows the number of respondents who sought information from particular type of library/information unit across all industry groups. The number of respondents in the table exceeds the total number of respondents visited libraries because respondents are free to indicate more than one type of library/information unit.

Table 15. Types of Libraries/ Information Units Visited by Respondents

Sl.No.	Library/ Information Unit	Respondents
1	Public library	21
2	Corporation libraries	20
3	Academic library	13
4	Other firm's library	5
5	MOI Lib. & Doc. Unit	2

Public and corporation libraries were sought by 44% and 42% of the 48 respondents who visit library/information units; academic libraries by 27%, other firm's library by 10% and the Library and Documentation Unit of the MOI by only 4%. Most of the public library users have specified that they use the British Council Library in Addis Ababa.

Though it is already evident from Table 15 that the level of utilisation of the MOI Library and Documentation Unit is almost negligible, a little caution is necessary in interpreting this data. For instance, if we take the case of corporation libraries, which are supposed to be the primary suppliers of information to public manufacturers, they are used by less than half of the ones who visit libraries. But when one considers the total respondents, they are visited by only 16.8% of the respondents. Therefore, it is possible to conclude that generally , libraries/ information units are highly underutilised, when we further consider the absence of formal library/information services in most of the sample manufacturing units.

8.3.2 Satisfaction of Respondents by the Services: In an attempt to find the level of satisfaction of respondents who visited the various libraries/information units, respondents were asked about the ease of access and admission to the units and whether respondents managed to find the information they

were looking for.

Regarding ease of access or admission to libraries/ information units, 33 (69%) respondents indicated that they did not have access problems to the facilities while 15 (31%) respondents found access to the visited libraries difficult.

The response to the 'yes' or 'no' question on whether they got the required information from the visited libraries, the majority of respondents, 30 (63%) respondents, did not usually find the needed data/information while 18 (27%) could find what they were looking for from the visited libraries/information units.

From the above findings, we can see that while access to the library/ information facilities was not a major problem, the majority of respondents could not find the required information because of either poor collection of information sources or inadequacy of their storage and retrieval systems.

8.3.3 Why Respondents did not Visit Libraries/Information Units: As mentioned earlier, 61.6% of the respondents did not seek information from libraries/information units. In this case, respondents were asked to indicate their reasons for not seeking information from libraries/information units from among possible reasons provided in the questionnaire.

Among the 77 respondents:

49 (63.6) often did not find relevant information;

43 (55.8%) did not spare time to visit libraries;

4 (5%) found admission very difficult; and

4 (5%) for other reasons.

In the case of respondents who reported lack of time, some specific reasons included that working hours and time of outside libraries and of manufacturing enterprises do overlap; libraries are located far away from factories; and managers often do not permit visit to outside libraries during the working hours.

Regarding the unavailability of relevant information, respondents indicated that their requirement for very specialised industrial information can not be met by any of the existing information units in the country.

Those who did not visit other libraries for other reasons mentioned that they did not need information because of the routine nature of their work and lack of decision making authority; they personally procured the required information from foreign sources, etc.

In general, the discussions in this section show under-utilisation of the existing facilities as well as the ineffectiveness of the information systems and services in motivating and satisfactorily serving the public manufacturers.

8.4 THE NEED FOR TECHNICAL TRANSLATION SERVICES

8.4.1 Introduction

The transfer of technology from the developed to the developing nations makes the translation of the source languages inevitable. This not only brings the know-how to the user but makes the know-why also available to the user nations. In today's world of technology, translation activities have become an integrated part of the technology transfer.

Amongst the developed countries, except for those who use the English language like the United States of America, Britain, Canada and few others, most of the nations use their own language for their technical documents. The world's translation expenditures including research projects in computational linguistics and speech technology as wellas machine translation was estimated to amount 150 million

dollars in 1991 (Rolling 1991). The actual translation volume was estimated to reach 450 million pages in the same year. The majority of this was in the fields of technology and trade. It is the developed world that is leading in the translation activites. Among developing countries, nations like India, where technical collaboration programme are coming up fast, are developing this activity rapidely.

Ethiopia has depended on technology imports almost totally for its industralisation endeavors. Almost all machinery for the public manufacturing enterprises were imported as turnkey plants and these factories were largely in the hands of foreign private enterpreneurs. As these machines originated from different nations, it is natural to assume that most of the documentation like technical specifications, operation and technical manuals would be produced in the languages of technology-exporting countries. And the documentation could be transfered to Ethiopia in their original languages because the core technical staff of the factories were foreigners.

In this light, this section presents the analysis and discussion on problems of enterprises related to the use of technical documents procured in forein languages other than English.

8.4.2 Foreign Languages Other than English in which Technical Documents Procured

In manufacturing enterprises, technical documents are usually maintained and heavily used by technical and production staff of the enterprises. The use of such documents by the others like marketing, finance, administration etc. personnel in an enterprise is generally assumed to be vey minimal. With this assumption, the survey on translation has been restricted to respondents from technical and poduction units.

In response to the question on whether they have encountered non-English foreign technical documents, out of the total 64 respondents from technical and production units, 78% (50) Of the respondents indicated they faced such documents, while 22% (14) did not encounter any such problems. Computation of percentages of respondents who encoutered documents in foreign languages other than English per industry group results: 100% for metal works and leather industries, 91.7 for beverages, 71.4% paper and printing units, 63.6% for the food, 60% fro the textile and 57% for chemival units.

Regarding the languages encountered, Table 16 presents the total number of respondents who indicated particular language and industry groups involved.

Table 16. Particulars of Foreign Languages Encountered

Language	Respondents	Industry groups
German	37	All
Italian	36	All
French	11	Beverages, Textile, Metal works, Chemical and Printing
Dutch	3	Metal works and Chemical
Check	4	Leather
Korean	3	Leather
Arabic	2	Printing
Finish	2	Metal works
Spanish	2	Chemical

Though the actual number of respondents who indicated a particular language does not give much meaning, the number of industry groups involved may show the importance of the languages. In this sense, German, Italian and French languages are the most important languages in which technical documents are acquired by public manufacturing units.

8.4.3 Means of Translation

It is obvious that when any person comes across some important document, he has to be literate in the language in which the

document is prepared, or must find some one who can translate for him and if he fails to find means of transtaing it, he has to procure its translated version if any or discard the document altogether.

Respondents were asked how they handled the documents. The response to this question helps us to know the presence of multilingual staff in enterprises, current translation activities and the extent of the problem of technical translation

Table 17. Handling of Non-English Foreign Technical Documents

Action taken	Respondents
1. Literate in the language(s)	5 (10%)
2. Translated by staff in the firm	10 (20%)
3. Translated by friends outside the firm	19 (38%)
4. Translated by other sources	15 (30%)
5. Could not use it at all	18 (36%)

The percentages in the Table were computed for the 50 respondents who came across non-English foreign technical documents. It totals more than 100 because respondents used more than one means.

Among the 50 respondents who managed to use the documents on their own, 4 are from beverages and 1 from food units. We may note that there are persons (possibly technical personnel) either in the enterprises or outside inm the country who were translating technical documents. The combination of the two local groups, i.e., the staff of the enterprises and friends outside the firm, which were willing and supposed to be capable of translating technical documents were used by 58% (29) of the respondents. This shows that, even though there is no organised technical translation service, there is local potential for practical and immediate purposes.

Those who used other sources for traslation were asked to specify the sources. Accordingly, respondents cited foreign embassies and suppliesr of the machines as the other sources of technical translation. The 36% (18) of the respondents who could not use these important documents because of lack of technical translation services in the country is not a simple proportion to be ignored or overlooked. Among these respondents, some mentioned that they tried to use the technical documents by carefully observing the various design specification drawings though they could not read the text. This indicates that the technical documents are very important for the technical and production staff in their activities that they tried every possible means to make use of them.

CHAPTER 9

CONCLUSION AND RECOMMENDATIONS

9.1 CONCLUSION

Manufacturing enterprises require data and information on the various aspects of their activities for planning and decision making purposes as well as to keep them abreast of current developments in their spheres of activity. From the present study on the information needs of public manufacturing enterprises in Ethiopia and the overall assessment made on industrial activities, industrial information sources, systems and service in the country the following conclusions can be drawn:

1. In order for an enterprise to effectively utilize the data and information generated during the course of its activities or acquired from external sources, it should be properly organized, processed and be readily available for use to all concerned staff of the enterprise. But because of the absence of library/information units in most of the enterprises, the information material available are found dispersed in the various departments in an unorganized manner. These materials can not be easily accessed even by members of the departments as there are no lists, catalogues, registers or bibliography

of their materials. In spite of the fact that there is a felt need for library/information unit at enterprise level as reflected in the survey, the majority (71%) of the sample units do not have concrete plan/programme to establish such a unit in the short term. According to the survey, the main reason is lack of awareness by the management of enterprises, of the importance of library/information unit rather than the lack of resources to establish one. It was also found that all the enterprises do not have a separate budget line for acquisition of information materials, and the amount of money allocated for the same from operational budget is too little to satisfy the information needs of the enterprises.

In the few enterprises (9%), that have their own library/information units, the level of staffing, the amount of money allocated for the units, the quality and quantity of their collection and service provided are generally unsatisfactory. As a result 58% of the respondents from these enterprises seldom sought information from their libraries/information units.

The above mentioned findings of the survey clearly show that there is a strong need to develop library/ information systems and services in public manufacturing

enterprises and that currently, little attention is given to this matter in the enterprises both by the enterprise management and higher authorities.

2. The knowledge of the major subjects or aspects of an enterprise activities on which manufacturers seek information may help in formulating acquisition policies and developing library/information services accordingly. The survey identified that production related information is regularly sought by most of the manufacturers, followed by market information. The need for recent technological developments and diversification of product lines was found to be low. The need for information on sources of raw materials and equipment, and technical information for trouble shooting, maintenance and improving productivity of the plants was identified as indicator of inadequate information provision which correlate with the unresolved problem area of the enterprises.

Information sources of interest to manufacturers, identified as manuals and handbooks, popular publications like newspapers, gazettes and advertisement brochures, government agencies, books and people engaged in similar business ranking 1 to 5 in the same order, constitute 85% of the total responses. The other sources, namely

standards, journals, conferences, consultants and research institutes combined contributed only 15% of the total response.

The high information need on production and marketing, and notably the low need for state-of-the-art industrial technology as well as the high need for work manuals and popular magazines and the low need exhibited for published sources that carry latest scientific and technical activities lead to the following conclusions:

- Public manufacturing enterprises highly dwell on their current problems and hence need information that would have an immediate bearing on their activities and due to this, they tend to ignore the developments and S&T information which may affect their business in the long-run.

- The low level of need for up-to-date S&T information can also partly be attributed to the lack of R&D units in the enterprises, the low level of industrial R&D activities and publications in the country and their little impact on the enterprises as well as to the absence of serious competition among local enterprises.

- While there is a need to meet the existing and urgent information needs of the enterprises, mechanisms should be developed to identify and address the potential requirements that are likely to affect the competitiveness of the enterprises in the long-run.

3. All the manufacturing enterprises depend on several sources outside their organizations for their information need of which the people engaged in similar type of business appear to be the most sought-after source. This shows that manufacturers tend to contact some people to solve their problems. Therefore, there is a need to develop inquiry, and reference services and to motivate manufacturers to use documentary sources as well.

4. Even though there are a modest number of special libraries/information units which maintain relatively comprehensive and current industrial and technological information, their utilization by manufacturers is generally low. This calls for urgent measures in developing appropriate information services and products and promoting their use by enterprises. In this regard, special effort should be made by library/information units of the Ministry of Industry and corporations to

minimize wastage of resources caused by under-utilization of their information resources and services.

5. There has been a lack of cooperation and information sharing mechanism among the various organizations and institutions in the country which generate, process, store and/or disseminate information. Though the National Scientific and Technological Information and Documentation Centre (NSTIDC) has tried to alleviate this problem, there still lack of commitment in supporting its programmes.

6. The absence of scientific and technical translation services in the country, has led to public manufacturing enterprises facing problems in finding personal and institutional sources that could help them in translating technical documents acquired in various foreign languages into English.

9.2 RECOMMENDATIONS

In view of the assessment made on the current industrial information sources, systems and services in the country and the information problems and needs of public manufacturing enterprises identified in the present survey, some concrete measures need to be taken to address the information problems

at different organizational levels of the public industrial system.

The following recommendations briefly present measures to be taken to effectively deal with the information needs and problems of enterprises and to develop the national industrial information infrastructure of the country.

9.2.1 Ministry of Industry (MOI)

In order to achieve its objective of developing National Industrial Information System in general and to alleviate the information problems of manufacturing enterprises in particular, MOI should implement the following measures:

9.2.2.1 Establishing a National Industrial Information Centre

The Ministry should establish a National Industrial Information and Documentation Centre by reorganizing the various sections at the Head Office whose major duties has been collection, processing/ analyzing, storing and dissemination of data/information. The constituents of the Centre may include, the Library and Documentation Unit, the Data Processing Unit which is developing the Industrial Management Information System, the Statistical Services Section, the Office of the INTIB Focal Point under the

Technology Department and the Printing and Publication Unit under the Public Relations Department.

The major duties of the Centre shall include:

- Collect, process, store data and information and provide modern library/information services;

- Produce and/or disseminate:
  - Current awareness products, such as, current acquisitions list, industrial newsletter, R&D news, SDI bulletin, up-coming seminars, conferences, workshops, training courses, etc.;
  - Reference materials in database and/or hard copy forms, such as, company/institution profiles, on-going R&D projects, directory of local and international industrial information centres, database vendors and online networks and services, union catalogue of serials, referral databases, etc.;
  - Information analysis, consolidation and repackaged products, such as, industry and technology digests, forecasts and trend reports, statistical abstracts, technical notes on industrial processes and products, etc.;

- Establish cooperation and information sharing mechanisms among the centre, corporations, public and private industries through various mechanisms, including:
  - inter-library loan agreements;
  - document-delivery and photocopy service;
  - developing and use of bibliographic, statistical, etc. input sheets and manuals by all the units;
  - networking and online information retrieval services;

  - participate in national, regional and international information systems and networks such as the National S&T Information system, the Pan-African Development Information System, the INTIB Programme, etc;

- Participate in the implementation of the National Policy on Information Systems and Services; formulate and follow-up the implementation of sectoral information policy, plans and programmes;

- Train and retrain information workers on major themes, in cooperation with institutions like PADIS, Ethiopian Science and Technology Commission (ESTC), School of Information studies for Africa (SISA), Ethiopian Management Institute (EMI), on such subjects as:

- Organization and management of industrial enterprises,
- Industrial information sources, systems and services
- Computer-based information storage and retrieval systems
- Online services and search strategies, etc;

- Provide consultancy service, to manufacturing enterprises, in the analysis, design and implementation of information systems and services;

- Conduct user studies and evaluate the performance of industrial information systems and services;

- Popularize and promote the use of national industrial information sources, systems, services and products using appropriate promotional media, such as, brochures, leaflets, and mass media;

- Establish close cooperation with local R&D institutions, government agencies and professional associations which are dealing with the generation, collection, processing and dissemination of industry-related information. The various institutional information sources presented in chapters 3 and 4 can serve as a good staring point in

this endeavour.

- Organize and/or participate in, sectoral national and international seminars, conferences, etc.

- Establish Technical Translation Service Unit for:
  - collecting, translating and disseminating important technical documents published in non-English foreign languages,
  - developing technical translation capability into local language(s), and
  - rendering technical translation service to industrial users upon request;

- Prepare budget for the Centre; assist in the preparation of budget for and follow up its proper utilization by the information and documentation units of corporations and enterprises;

In order to undertake these activities the centre should develop the necessary skilled manpower and other facilities. The Ministry may use the assistance of the PADIS, National S&T Information and Documentation Centre, the Ethiopian Management Institute, UNIDO, and expertise at the School of Information Studies for Africa (SISA) in the planning the organization of the Centre and and its implementation.

9.2.2.2 Allocation of Separate and Adequate Budget

The MOI should provide a separate budget line for the National Industrial Information and Documentation Centre and the libraries/information units of corporations and enterprise including a foreign currency component. As a regular budget may not fully cover the establishment expenses of the units at enterprise level, the Ministry should help enterprises in the preparation and appraisal of, project documents for capital budget during the initial years.

9.2.2.3 Preparation of an Appropriate Scale of Payment and Career Development Schemes

Library/information units at all levels should be organised in such a way that the information workers will have opportunities for promotion, career development and transfers within the industrial system. Their salaries and other benefits should also be at par with the staff of other departments requiring similar qualifications in their organizations. Such arrangements may help in motivating the information staff and in minimizing both local and international brain drain.

9.2.2 Industry-group/Corporations

It is evident from this study that manufacturing enterprises are lacking the necessary infrastructure, information sources and other resources to effectively deal with their information problems. In spite of the fact that the enterprises depend to a large extent on external information sources for their information needs, they have not developed the required capability to fully utilize them. In addition, an individual enterprise may not be in a position, and it does not seem cost-effective, to develop an information system that would meet its specialized needs. It is advisable for a group of industries engaged in the production of similar goods and services and hence, have similar information needs and problems, to pool resources and develop industry-group information and documentation centres and services.

Though corporations were organized on industry group basis, their libraries/information units did not serve the manufacturing industries under their respective corporations as expected nor developed the capability to do so. Therefore, there is a need to reorganize corporation libraries/ information units and develop them to information and documentation centres that can provide library and information services to manufacturing industries.

The Industry-group Information and Documentation Centre will have the following duties:

- Build a comprehensive collection on the specialized area of the industry-group and on issues that affect the industry-group, especially, standards, specifications, patents, manuals, trade catalogues, and others,
- Provide library/information services to industrial users;
- Produce and disseminate current awareness and information analysis and consolidation products in the areas of specialty of the industry-group;
- Provide active reference service and products;
- Study the information need and problems of the industry-group.
- Participate in national information systems and networks;
- Compile, maintain and distribute bibliographic information on the holdings and current acquisitions of libraries/information unit of enterprise in the industry group;
- Adapt standard classification and cataloguing systems to suit the special needs of the industry -group for common use by all concerned enterprises;
- Promote its services through appropriate promotional means;

- The various internally generated information, such as, quarterly and annual reports, plans and programmes, and project documents produced over years;
- Work guidelines, technical manuals; handbooks, books, newspapers and gazettes, back issues of local journals, newsletters, standard specifications, trade catalogues, and other information materials that are found dispersed in the various departments of the enterprises;
- Publications currently being procured by the enterprises through subscription, purchase and donations.

Acquisition of reference materials and technical documents should constitute the major areas of collection development. As the services of enterprise library/information units will largely depend on external industrial information sources, they need to maintain a good collection of directories, brochures, registers of institutional sources, union catalogue of serials, national bibliographies, etc. of interest to their respective industries.

ANNEX I

QUESTIONNAIRE FOR SURVEY OF THE INFORMATION NEEDS OF MANUFACTURERS

PART I. INSTITUTIONAL NEEDS

Mark 'X' against your choices

1. Name and address of the organization

   _____
   _____
   _____

2. Year of establishment _____

3. Type of organization
   - [ ] private company
   - [ ] partnership
   - [ ] public/government company
   - [ ] other; please specify _____

4. Type of products manufactured
   - [ ] textile
   - [ ] chemicals
   - [ ] liquors and beverages
   - [ ] food
   - [ ] leather and shoes
   - [ ] paper, paper products and printing
   - [ ] wood products & furniture
   - [ ] metal products
   - [ ] others; please specify

5. Number of employees in each of the following departments:

Administration and finance	_____
Marketing and sales	_____
Technical, R&D	_____
Production	_____
others	_____
Total employees	_____

6. If your organization is a member of the following type of associations please tick the relevant type and write the name of the association.
   - [ ] trade association _____
   - [ ] professional association _____
   - [ ] commercial association _____
   - [ ] Other _____
   - [ ] not a member of any.

7. Do you have any organized library/information unit in your organization? [ ] yes [ ] no

8. Under which department is the library/information unit?
   [ ] administration [ ] public relations
   [ ] planning department [ ] research and development
   [ ] others; please specify

9. Is your library run by professional librarian or information worker? [ ] Yes [ ] no

10. Please indicate the annual budget of your firm of your firm for procuring books, journals, technical reports, standards, news papers, trade catalogues, newspapers and others.
   [ ] no budget [ ] Birr 1,001-5,000
   [ ] Birr 10-100 [ ] Birr 5,001-10,000
   [ ] Birr 101-500 [ ] more than 10,000
   [ ] Birr 501-1,000

11. Is the budget allocated for the procurement of the above materials adequate?
   [ ] about right
   [ ] too little
   [ ] too much

12. What services are being offered?
   [ ] library reading
   [ ] lending documents within the firm
   [ ] literature searches
   [ ] bringing out accession lists of new additions
   [ ] others; please specify

13. Does the organization possess any computing facilities?
   [ ] yes [ ] no

14. If 'yes', are the computers used by the library/information unit? [ ] yes [ ] no

15. Is there any plan to establish a library/information unit in your firm in the near future? [ ] yes [ ] no

16. On which of the following topics your organization need information regularly and occasionally?

	Regularly needed	Occasionally needed
Production problems	[ ]	[ ]
About the activities of competitors	[ ]	[ ]
Relevant technological innovations	[ ]	[ ]
Market trends	[ ]	[ ]
Product diversification	[ ]	[ ]

Trade statistics of
your product [ ] [ ]

17. A lot of data is generated within an organisation as a result of day to day operations like production and sales figures, production schedules, performance reviews, payrolls, balance sheets, experimental results of R&D, etc. These are highly essential for decision making at all levels, to assess past performance and to predict future trends.

a. Please indicate the mode of organization of the above type of data in your organization
[ ] department wise
[ ] centralised
[ ] both
[ ] other forms; please specify

b. Do you produce any of the following products based on your internal information?
[ ] statistical bulletin
[ ] annual report
[ ] newsletter
[ ] others; please specify

18. Did you conduct your own survey/ study on marketing, raw materials, alternative technologies, manpower required, size of investment required to plan production, expand tour plant or during your initial investment?
[ ] yes [ ] no

19. If not how could you fill government forms for investment approval, licensing or to get bank loans?
[ ] handled by corporations
[ ] by parent company
[ ] by the aid of experts in government agencies concerned
[ ] by consultants
[ ] referring to previously completed forms
[ ] referring to published sources
[ ] by the help of friends
[ ] others; please specify

20. Do you have any collaborative arrangements with foreign institutions for information exchange purposes?
[ ] yes [ ] no

21. If yes, what are the forms of the information exchange?
[ ] document exchange or acquisition
[ ] staff exchange
[ ] information exchange upon request
[ ] any other forms; please specify

22. In order to get a better idea of your firms information needs, could you give an outline of your problems which remain unresolved in your business?
    [ ] technical
    [ ] marketing
    [ ] productivity
    [ ] finding sources of raw materials, machinery and equipment
    [ ] finding sources of skilled manpower
    [ ] diversification or new product line
    [ ] regulatory information
    [ ] others; please specify

23. Do you have specific elaboration over the above problems? And is there any plan to address your information related problems? You may use either Amharic or English to right your comments.

QUESTIONNAIRE FOR SURVEY OF THE INFORMATION NEEDS OF MANUFACTURERS

PART II. INDIVIDUAL USER NEEDS

Mark 'X' against your choices

1. Which department are you working in?
   - [ ] Administration and finance
   - [ ] Production
   - [ ] marketing and sales
   - [ ] Technical, R&D
   - [ ] Other, please specify

2. If you are a member of the following type of association, please tick the relevant type and write its name.
   - [ ] Trade association _____
   - [ ] Professional association _____
   - [ ] Commercial association _____
   - [ ] Other _____
   - [ ] Not a member of any _____

3. Do you have any organized library/information unit in your firm?
   [ ] yes [ ] no If 'no' go to 8.

4. How often do you visit your library?
   - [ ] once in fortnight
   - [ ] once in a week
   - [ ] once in a month
   - [ ] once in six months
   - [ ] seldom sought any information

5. What services are being offered?
   - [ ] library reading
   - [ ] lending documents within the firm
   - [ ] literature searches
   - [ ] bringing accession lists of new acquisitions
   - [ ] other services, please specify

6. How far does your firm's library/information unit meet your information needs?
   - [ ] completely
   - [ ] about 75%
   - [ ] about 50%
   - [ ] about 25%
   - [ ] not at all

7. Why do you think your firm's library/information unit does not satisfy your need?

[ ] inadequacy of its collections
[ ] inadequacy of library staff
[ ] other reasons; please specify

8. In your opinion, why your firm did not establish any library or information unit?
[ ] lack of need [ ] shortage of fund
[ ] lack of management awareness [ ] any other reason

9. Do you think your firm needs its own library/ information unit? [ ] yes [ ] no

10. In which of the following sources do you locate the useful information you require in your daily work?
[ ] books [ ] journals
[ ] newspapers, gazettes [ ] advertisement brochures
[ ] standards [ ] patents
[ ] handbooks, manuals [ ] conferences, proceedings
[ ] research institutes [ ] consultants
[ ] legal advisors [ ] banks, insurance comp.
[ ] corporations, Ministry of Industry
[ ] other people engaged in similar business
[ ] others; please specify

11. Some of the manuals and technical specifications of machineries and other similar types of materials might be in foreign languages other than English. How did you handle such reference materials?
[ ] never came across such materials
[ ] literate in the languages
[ ] translated them by other staff in the firm
[ ] translated them by personal sources outside the firm
[ ] translated them by other sources; please specify
_____
[ ] could not use them because of language barriers

12. If you have come across such materials in foreign languages other than English, would you specify the languages by name?

---

13. Do you have adequate access to internally generated information like annual reports, performance reviews, financial data, etc.? [ ] yes [ ] no

14. What type of information do you consider more important?
[ ] internal information
[ ] external information
[ ] both internal and external information

[ ] inadequacy of its collections
[ ] inadequacy of library staff
[ ] other reasons; please specify

8. In your opinion, why your firm did not establish any library or information unit?
[ ] lack of need [ ] shortage of fund
[ ] lack of management awareness [ ] any other reason

9. Do you think your firm needs its own library/ information unit? [ ] yes [ ] no

10. In which of the following sources do you locate the useful information you require in your daily work?
[ ] books [ ] journals
[ ] newspapers, gazettes [ ] advertisement brochures
[ ] standards [ ] patents
[ ] handbooks, manuals [ ] conferences, proceedings
[ ] research institutes [ ] consultants
[ ] legal advisors [ ] banks, insurance comp.
[ ] corporations, Ministry of Industry
[ ] other people engaged in similar business
[ ] others; please specify

11. Some of the manuals and technical specifications of machineries and other similar types of materials might be in foreign languages other than English. How did you handle such reference materials?
[ ] never came across such materials
[ ] literate in the languages
[ ] translated them by other staff in the firm
[ ] translated them by personal sources outside the firm
[ ] translated them by other sources; please specify
_____
[ ] could not use them because of language barriers

12. If you have come across such materials in foreign languages other than English, would you specify the languages by name?

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13. Do you have adequate access to internally generated information like annual reports, performance reviews, financial data, etc.? [ ] yes [ ] no

14. What type of information do you consider more important?
[ ] internal information
[ ] external information
[ ] both internal and external information

15. When you seek information which falls outside the purview of your firm, which of the following sources you are likely to tap?
[ ] library/ information centre
[ ] consultant
[ ] legal advisor
[ ] any government agency
[ ] research/ academic institute
[ ] trade/ commercial association
[ ] professional association
[ ] someone engaged in similar business
[ ] other sources; please specify

16. How did you get your knowledge of the above external sources?
[ ] from directories
[ ] from brochures/ advertisements
[ ] from other people
[ ] from personal experience
[ ] from others; please specify

17. How often you sought assistance or information from outside your firm?
[ ] once in a fortnight [ ] once in a week
[ ] once in a month [ ] once in 6 months
[ ] once in a year [ ] seldom sought any information

18. When seeking information from outside source do you:
[ ] write [ ] telephone [ ] make a visit

19. Have you ever visited or contacted any library/ information unit for any information in connection with your firm? [ ] yes [ ] no

20. If yes, please answer the following.
a. which of the following libraries do you visit out side your firm?
[ ] public library
[ ] corporation's library
[ ] Ministry of Industry's library
[ ] academic library
[ ] other firm's library
[ ] others; please specify

b. How did you find their ease of admission and accessibility?
[ ] difficult [ ] easy

c. Did you find what you are looking for?
[ ] yes [ ] no

21. If no, why?
    [ ] lack of time
    [ ] difficulty of admission to outside libraries
    [ ] often do not find relevant information
    [ ] any other reason; please specify

22. Have you any additional remarks or comments concerning your information requirements, problems in obtaining the required information, the forms in which useful information is/ should be presented, etc. You may insert additional paper if desired.

ANNEX II

LIST OF SURVEYED MANUFACTURING INDUSTRIES

I. **Food Sub-sector**
1. Anbassa Flour and Macaroni Factory
2. Dil Edible Oil Factory
3. Fafa Food Factory
4. Kaliti Food Factory
5. Kokeb Flour and Pasta Factory
6. Mojo Edible Oil Factory

II. **Textile Sub-sector**
7. Adei Ababa Yarn Factory
8. Gullele Garment Factory
9. Akaki Garment Factory
10. Akaki Textile Factory
11. Nefas Silk Thread Factory

III. **Beverages Sub-Sector**
12. Abay Mesk Soft Drinks Factory
13. Addis Soft Drinks Factory
14. Awash Wine Factories
15. Meta Abo Brewery
16. National Liquors and Distillery Factories
17. St. George Brewery

IV. **Leather and Leather Products**
18. Anbassa Shoe Factory
19. Ethiopian Canvas and Rubber Shoe Factory
20. Tikur Abay Shoe Factory
21. Universal Leather Goods Factory

V. **Metal and Metal Products Sub-sector**
22. Ethiopian Iron and Steel Factory
23. Finfine Furniture Factory
24. Kaliti Steel Factory
25. Kotebe Sickle Factory
26. Warka Furniture Factory

VI. **Chemical Sub-sector**
27. Addis Car Battery Factory
28. Addis Foam and Plastic Factory
29. Gullele Soap Factory
30. Tsedey Paint Factory

VII. **Printing and Paper Products Sub-sector**
31. Artistic Printers
32. Bole Printing Press
33. Commercial Printers
34. Yekatit Paper Converting Factory

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