Dissertation

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UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY

Science and Technology Information Networking in Ghana: the Myths and Realities

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SCIENCE AND TECHNOLOGY INFORMATION NETWORKING IN GHANA: THE MYTHS AND REALITIES

BY

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A THESIS SUBMITTED TO THE DEPARTMENT OF LIBRARY AND ARCHIVAL STUDIES, UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY (M.PHIL) DEGREE IN LIBRARY STUDIES

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D E C L A R A T I O N S

I hereby declare that except for references to other people's work, which I have duly acknowledged, this thesis is the outcome of my own investigations, and that, this thesis has neither in part nor wholly been submitted for another degree.

1. .....

2. .....
Supervisors' Signatures

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Candidate's Signature

Date: SEPTEMBER 1993

D E D I C A T I O N

To GOD for his blessings, and to my parents GABRIEL and FELICIA. To NORBERT, WORLANYO and FRANK; and to the loving memory of PHILIP Jnr. and Snr.

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LIST OF ABBREVIATION

AAAS	-	American Association for the Advancement of Science
BRRI	-	Building and Road Research Institute
CRIG	-	Cocoa Research Institute of Ghana
CRRL	-	Central Reference and Research Library
CSIR	-	Council for Scientific and Industrial Research
DLAS	-	Department of Library and Archival Studies
EIC	-	Energy Information Center
GAEC	-	Ghana Atomic Energy Commission
Geol. S.D	-	Geological Survey Department
GSB	-	Ghana Standards Board
IDRC	-	International Development Research Centre
IRI	-	Industrial Research Institute
ISSER	-	Institute of Statistical, Social and Economic Research
NASTLIC	-	National Science and Technology Library and Information Centre
PGI	-	Unesco General Information Programme
STI	-	Scientific and Technical Information
UCC	-	University of Cape Coast
UST	-	University of Science and Technology
UGMS	-	University of Ghana Medical School
UNESCO	-	United Nations Educational, Scientific and Cultural Organization
UNISIST	-	Unesco's Information System in Science and Technology

ABSTRACT

Ghana is directing its efforts to a Science and Technology (S&T) led socio-economic development. However, little attention is paid to the evolution and sustenance of appropriate information systems for scientific interaction and communication which are integral parts of the enabling environment for scientists.

The project provides brief definitions and purposes of information, library cooperation, coordination and resource sharing. A review of the concepts of library and information networking from a universal perspective, as well as library cooperation practices in Ghana was undertaken. Details of some schemes such as inter-lending, photocopying of documents and exchange of materials are discussed.

A survey of existing library and information facilities and resources as well as the current level and degree of resource sharing in Ghana was carried out. The Ghana National Scientific Technological Network (GHASTINET) Project was given an indepth examination. Besides, this state of-the-art study concentrated on the obstacles to information networking in the country.

Recommendations are made for the improvement of library and information systems country-wide. It is argued that not until certain remedial measures are taken resulting in the creation of an enabling environment, information networking schemes will be doomed to failure.

The author accepts that the meaning of library and information resource sharing, cooperation and networking are nearly the same and will therefore be used synonymously.

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CHAPTER ONE

1. INFORMATION AND THE DEVELOPMENT PROCESS

1.1 INTRODUCTION

Science has come to dominate the lives of all human beings. For this reason alone, the material on which it feeds, INFORMATION, is recognized as a strategic national resource of vital importance to the world society[1]. Information is a key element in research and development. From the developmental point of view, some economists insist that information should be classified as a strategic national resource, as a raw material or a commodity. In other words it can be treated as a product to generate wealth.

We in Africa must realise that information is one of the resources we need most to quicken our pace of development. We need more information in a form of managerial/enterpreneural skills and experience to put our economies on course. Equally important is information on socially - relevant technologies to harness other resources for development. To achieve optimum results from the use of our information potentials and emerge from crippling underdevelopment we should be conscious of the fact that we do not only need information already packaged for us by developed countries. We need to continually build our individual and collective capacities at personal, national and continental levels to generate, gather, process, store, repackage and disseminate our own scientific/development information.

Above all, information and communication can only be effectively mobilized for development within an enabling favourable environment of information infrastructures and services.

1.2 DEFINITION OF CONCEPTS

In a study of this nature where many technical terms are used it is necessary to provide operational definitions for such concepts.

1.2.1 Information

Information is so pervasive, and so commonplace, that it almost defies formal definition.

Webster's dictionary defines information as:

(a) the communication or reception of knowledge or intelligence;

(b) knowledge communicated by others or obtained from investigations, studies or instructions; and

(c) facts or figures ready for communication or use.

Webster provides what could be described as an academic definition, whose main emphasis is on source to destination without a developmental aspect.

James Senn[2] defines information as "meaning assigned to data or, more precisely, as data that have been processed into a form that is meaningful to the recipient or user, and is of real or perceived value in current or prospective decision making process". Senn succeeds in establishing a dichotomy between raw data and information, but, like Webster's, his definition is

narrow and devoid of a developmental orientation.

The 1988 Addis Ababa Seminar on National Information and Informatics Policies in Africa[3] noted the often cited absence of a common definition for information as reflected in the attempts made in some of the presentations at the Seminar at providing such a definition. Definitions are sector-oriented in some cases and comprehensive in others, depending on the background and interest of the persons presenting the definitions.

Ahmed Bassit[4], for example, sees information as a resource, a production factor which has its place in every system of creation, an element to be taken into account in all decision-making processes, a commodity which, unlike most others, is not exhausted with use.

Dejen Abate,[5] considers information as intelligence or knowledge that contributes to the social, economic and cultural well being of society irrespective of the form it is encrypted in, or of the mode of dissemination and the social activity that gives rise to it, and the institution that organises and disseminates it. Even though Bassit's definition comes closer to Abate's through its emphasis on the resource characteristics of information, it has inherent weaknesses similar to those of Webster and Senn. The Addis Ababa Seminar cited above adopted Abate's definition because it was considered broadbased, practical and development oriented.

This study will adopt the seminar's more comprehensive definition in which some of the basic pre-requisites of information are presented as currency and accessibility. Thus, information that is outdated or locked up in books and computer

databases will not stimulate development. For instance, scientists and technologists cannot meet their innovative challenges if they do not have access to up-to-date information in their respective fields.

1.2.2 Scientific and Technical Information (STI)

UNESCO and the International Council of Scientific Unions (ICSU)[6] in a study report on the feasibility of a World Science Information Systems, defined STI as the symbolic elements used for communicating scientific and technical knowledge irrespective of their nature (numerical, textual, iconic, etc.), material carriers and form of presentation. Unesco's conceptualization places a high premium on the substance or content of scientific documents and their physical existence.

Gray and Brain,[7] however, define scientific information simply as "the results of scientific research". They emphasized that the results of basic research are of direct interest mainly to other research workers. However, the results of applied research and development concern virtually all types of information users. Gray and Brain's view is that, as scientific information is extracted from its source and put together in different packages for various purposes, it gradually becomes known as technical information.

For its impact to be felt STI needs to be systematically collected, organized and repackaged for the consumer in a format in which it can be most effectively utilized. Information repackaging, according to Boadi (1986), is interpreted here as turning available information into an acceptable and usable

format[8].

1.2.3 Information Networks

Conventionally, an information network denotes a cooperative system of libraries and information centres on geographical, subject or other lines. Its aim is to enhance cooperation in central services like acquisition, processing, inter-lending and other housekeeping routines. The Unesco National Commission on Libraries and Information Sciences[9] refers to Library Networks as two or more libraries and other organisations engaged in a common pattern of information exchange through communication, for some functional purpose. A network usually consists of a formal or informal arrangement whereby materials, information and services are made available to all potential users.

According to Samuelson, Borko and Amey, COMMUNICATION NETWORKS have existed for ages and centuries. From a historical perspective, they referred to the very early communication networks in the form of fires placed on tops of dispersed mountains on point-to-point chains. Then came the use of smoke signals and multipoint distribution of sounds created by means of jungle drums.

Currently, the best known communication networks are the widespread telecommunications represented by the common carriers, telephones, Telex, FAX or mass communications such as the Television. Lately a number of radiolinks, intercoms and picturephones have come into existence, since station, and outlet units are globally distributed among millions of organisations

and people who have reason for communicating.

Gustavo Flores,[10] appearing to sum up the opinions of his compatriots, described a communication network as a set of linkages which allows for the exchange of information among components of an information network. He noted that communication networks may use postal, telephone, telegraph or data transmission channels.

1.2.4 Computer Networks

A well refined definition relating to the more technologically advanced environments has been provided by Senn[11]. He sees computer networks as a system of physically separate computers with telecommunication links allowing the resources of each participatory machine to be shared by each of the users.

The prime reasons for computer networks have been increased reliability, or fall back and shared software of CPU utilization. Computer networks are gradually improving with respect to packet switching, intelligent terminals and interface message processing.

1.2.5 Relational Networks

Samuelson et al. went a step further by drawing our attention to physical networks (represented by information, communication and computer networks) and logical networks (conceived as relational networks). This, they noted, represents the relations between individuals, divisions, departments,

offices, organisations, areas, regions, nations, etc. The relational networks often serve as a frame of reference that the systems analyst can use during the design phase of his work. The logical structure then becomes a target scheme, the mapping of which is later implemented as a physical network depending on the level of ambition for the final design.

For every network, the ultimate solution tends to be a compromise between desirability as derived from the logical relational network and feasibility as realised through the physical information and communication networks. The best known example of relational network is the citation index, which has however been criticised for its bias and incompleteness due to gaps that eliminate actually existing relations.

1.2.6 World Science Information Network (WSIN)

In 1971, there was a joint feasibility study between Unesco and ICSU on how best to serve the information needs of the scientific and technical community in all their member countries. This culminated in the launching of the "Intergovernmental Programme for Cooperation in the field of Scientific and Technical Information (UNISIST)[12].

The erstwhile UNISIST and NATIS programmes of UNESCO have merged to become known as The General Information Programme (UNISIST/PGI). The PGI was established in 1976 by the General Conference of UNESCO at its 19th session held in Nairobi.

Realising the impracticability of the UNISIST objective of "creating a world network of information services based on the voluntary cooperation of existing and future national information

systems, PGI emerged with a more pragmatic programme. The general purpose of the PGI, according to Guinchat Minore[13], is to develop a conceptual framework for the information systems set up by the various organisations of the United Nations Systems, and in particular for all the information activities of UNESCO. More specifically, the PGI is concerned with "the development of national and international systems on the philosophy of international cooperation and participation". With the view of achieving these objects, the PGI evolved four major principles.

The first is the promotion of the formulation of information policies and plans. It is designed to achieve a higher level of awareness of the volume of information as a national and international resource. It also aims at improving cooperation between member states within the PGI framework to achieve a better understanding of the information transfer process.

The second principle concerns the promotion, establishment and use of methods, rules and standards in the field of information. This is intended to ensure the interconnection and compatibility of information systems and contributing to the framework for information transfer.

The third is the development of information infrastructures at both the national and regional levels, in order to contribute to the socio-economic growth of member states and to facilitate the transfer of information. This involves establishment and dissemination of guidelines, the organisation of consultations and meetings, the preparation of pilot projects, advice on setting up or improving technical services, and technical

assistance for member states.

Fourthly, PGI concerns itself with the theoretical and practical education and training of specialists in and users of information[14].

A brief summary on PGI providing a single framework for implementing UNESCO's fundamental programmes in the field of information was provided by Kisiedu[15]. She observed that, the creation of PGI has brought to an end duplication on the part of UNESCO, and to some extent, restored equanimity to developing countries regarding which way the information policy and systems debate is heading.

1.2.7 Development

Development is a value - laden concept with historical, philosophical and ideological dimensions. As a result, various interpretations have been put on the concept with the passage of time. In the early days, development was simply equated to economic growth. Thus, in the words of John Friendman[16], development

refers to "the unfolding of the creative possibilities inherent in society". In this regard, the Gross National Product (GNP) became its index, while the derived index of per capita income was used as a basis for comparing the degree of development of countries.

The early discussion of development placed emphasis on the means of production, the creation of wealth and the indices for measuring economic activity. The priority was on increased commodity output.

The desire to break away from the narrow economic concept arose early in the 1970s in the Economic and Social Council (ECOSOC) of the United Nations, Unesco and other United Nations bodies and institutions[17]. The new concept of the development process marked a departure from the old one in two basic respects. First, the process was viewed in the unity of all its aspects including environmental, technical, economic and social dimensions. Secondly, there was a very keen awareness of man as the central link and principal agent of the whole development process.

In the words of Professor John Galtung[18], Development is "development of the people". It should not be conceived in terms of the production of goods and services, their distribution, the creation of institutions, structural transformation, cultural developments or ecological balance. All these things may be indispensable 'social' means or conditions, but development as such is that of man, of the members of society". This brought in its wake The concept of development centered on man.

A more elaborate, broadbased and mission oriented definition was provided by African experts in Policy Making, Library, Archival and Information Science. This took place at a Seminar on Information for Economic Planning and Development for the African Region which was held at the Ghana Institute of Management and Public Administration (GIMPA), Achimota, from July 24-28, 1978[19]. The expression of the African experts presents development as qualitative and quantitative changes resulting in progress in the whole fabric of individual and societal activities. It implies the efficient management of all kinds of

resources in order to create the knowledge, the skills and the capability to produce the goods, services, facilities and opportunities to achieve national goals.

The economic reconstruction of Western Europe and Japan after the Second World War has exemplified the fact that when the base of scientific knowledge and experience in a country remains intact, and only the tip of the pyramid in the form of factories and communication infrastructure has been demolished, the process of reconstruction is not difficult.

There are however, many examples in developing countries of established industrial complexes which function as islands of advanced technology with no supporting base of knowledge, technical skills and experience extending into the community. A careful study of these established industrial complexes shows large scale dependence on expatriate staff and foreign consultants providing up-to-date know-how required to sustain viability[20].

The need for African countries to intensify efforts in building self reliant technological base for industrial production is paramount. This can only be achieved through the creation of an enabling environment that will lead to the rapid growth of an indigenous science and technology base. With the establishment of the appropriate science and technology culture the potentialities of science and technology in national development would be sufficiently appreciated by all, right from the grass-root level.

1.2.8 Underdevelopment:

The efforts of developing countries in their bid to match the achievements of the industrialised societies can be better perceived in the light of prevailing situations systematically characterised by deficiencies and shortfalls in socio-economic development. This brings us to the concept of underdevelopment.

Like development, the problem of the varied nomenclature used to designate those regions of the world where almost two-thirds of its population live took a lot of time and energy to be resolved. As documented by Briquet[21], Cohen and others saw a partial solution of the problem when international organisations settled for the expression "developing societies". The term underdevelopment was considered susceptible to raise "unfavourable" or "invidious conditions".

In efforts to find a common denominator for developing countries, different schools of thought emerged with varying degrees of interest. Briquet[22] insisted that such a definition embraces a poor or primitive country that is developing better economic and social conditions". In a similar vein, Hodder, as noted by Briquet[23], considered characteristics of developing countries in terms of situations in which levels and growth rates of real income and capital per head of population are low by comparison with Western Europe, North America and Australia.

Several authors have more or less compromised to a large extent on the common characteristics shared by developing countries. Specifically Hodder identified such characteristics as:

(i) low life expectancy at birth;

(ii) high infant mortality rates;

(iii) poor health conditions of the population;

(iv) widespread illiteracy;

(v) low per capita output, together with poverty and indebtedness;

(vi) subsistence production;

(vii) economies non-diversified and geared to the primary sector;

(viii) little manufacturing industry;

(ix) no large scale application of scientific and technological methods to agriculture or industry; and

(x) narrowness of markets.

Other authors such as Dean and Hoogvelt, as quoted by Briquet, also identified similar variables. However, UNESCO[24] employed slightly different criteria in its classification. It noted that developing countries are a world in which the population living in conditions of scarcity and permanent want far surpasses that living in welfare conditions of the developed nations.

1.3 POTENTIALS OF SCIENCE AND TECHNOLOGY IN NATIONAL DEVELOPMENT

There is no doubt that many problems can be solved by scientific and technical means. Existing, adapted and new technologies contribute to industrialisation, create production capacities to satisfy domestic needs and provide or increase export earnings. A proper application of these technologies should therefore be seen as a panacea for developing countries to

break out of their traditional economic role of mere raw-material suppliers and importers of industrial goods.

Isoun,[25] writing on Technological Infrastructure and Self Reliant Development in Africa, stated that "It is now aknowledged that the cost of raw materials constitute only about 20-25% of the final production cost of capital goods." In other words, skills, knowledge and the efficiency of the productive processing of capital goods constitute the value added proportion (about 80%) of the final price of capital goods." This might explain why Japan and South Korea, with limited local resources, import raw materials and still export capital good with profit. This means, in effect, that the industrialized countries' unparalled economic and social development, especially in recent decades, is largely due to making the most of their scientific and technological potentials.

A science and technology-led growth of developing economies will provide the sure road to industrial prosperity, the enhancement of the quality of life and guaranteed protection of the freedom and independence of their nations. Thus, it is only natural for developing countries also to concentrate their hopes for more rapid development on research and technology. To this end, many African countries have resorted to technology transfer from developed countries. However, the total and unpolished transfer of foreign and sophisticated high technology merely increases the developing countries' dependence on imported technologies. Abdus Salam, as cited by Schwarz[26], has cautioned that any declared intention of applying science and technology to development is, and will remain, meaningless until the developing

countries build and deploy indigenous scientifically and technologically trained communities.

Walter Rodney, in his analysis of the current situation and quoted by ISOUN[27], is reported to have said that "The African peasant entered colonialism with a hoe; and came out with a hoe. The hoe he entered with was locally produced; and the one he came out with was imported". This diagnosis may appear an exaggeration of the state of technological underdevelopment and dependence in Africa today. However, the reality of it should be accepted in good faith by objective scholars, scientists, and engineers, as well as decision makers in Africa.

The truth of the matter is that the ability of the African nations to design, innovate, fabricate, manage and mass produce or manufacture the essential consumer goods and strategic machinery for industrialization and defence has not improved significantly over the past 35 years. (This period coincides with the attainment of political independence of most African nations to-date). There is nowadays a fair consensus among politicians, theoreticians and practitioners involved in development strategies that a certain level of indigenous development of science and technology is essential. This should constitute an integral part of national culture as a prerequisite for satisfactory control of local production developments, and thereby reduce dependence on external interests[28].

While no one can deny the advantages of obtaining external help from friends and international financial institutions, the burden of fulfilling social and economic destinies should be sustained by developing countries themselves. Above all, these

countries must have political direction to enable the government and people to focus on the kind of economic development that will be in the national interest.

Bilateral scientific and technical cooperation between the industrialized North and the less developed South could be mutually harnessed to the advantage of developing countries, for example, in the following areas:

1.3.1 Food and Agriculture:

The adoption of eco-farming methods which aim at increased productivity holds a lot of promise. The successful application of these methods could guarantee global food security by increasing agricultural output and improving storage methods. This would also ensure the provision of adequate raw materials for agro-based industries.

1.3.2 Renewable Energy:

Since a sufficient and reliable supply of cheap energy is a prerequisite for economic growth and better living conditions, the search for renewable energy must be stepped up. In the face of depleting fossil supplies of energy, science and technology has potential for tapping alternative sources, especially, the inexhaustible natural suppliers.

1.3.3 Natural Resources and Environment:

The raw materials used in industry are not inexhaustible. Through the development and application of appropriate technologies to permit economic exploitation and utilization,

resources which have been little used so far could be opened up and utilized. Care should, however, be taken to avert any new, detrimental impact on the environment.

1.3.4 Water Supply and Conservation:

As a result of increasing population, industrialization, the green-house effect and the improvement of infrastructures in developing countries, industrial and domestic water supply requirements are growing at a geometric progression. This calls for the application of appropriate technologies for the improved supply of drinking and industrial water, protection of groundwater and removal of noxious substances therein.

1.4 INTEGRATION OF SCIENCE AND TECHNOLOGY INTO DEVELOPMENT PLANS

The potentialities of science and technology in solving national socio-economic development problems in developing countries have been clearly manifested. However, if Africa is to promote sustainable development and dignity of life of its people, then, the existing patterns of development, including scientific and technological capacity building efforts, should be rationally integrated into overall national development plans. These are the observations of Aklilu Lemma[29].

The question of national capacities for the integration of science and technology plans and programmes is a major concern. Recently, UNESCO conducted a survey to examine the scope of such integration in the countries of the West African Sub-region. The result showed that the governments of the countries covered in

the study were fully aware of the indispensability of science and technology in development. However, very few of them had a clearly defined national science and technology policy aimed at systematically bringing about this integration. The report further indicated that countries like Senegal, Ivory Coast, Nigeria and Ghana which have relatively well developed science and technology policy making bodies have made some efforts to incorporate science and technology into the major objectives of their plans[30].

Edward Ayensu[31], reviewing the role of science and technology in Ghana's socio-economic development over a decade ago, not only stressed the integrating factor; he also emphasised that it is imperative that S&T policies should take into account the social and economic objectives of the nation. He pointed out that in addition, the development of S&T policy should not be viewed in isolation, but should be considered as an integral part of the national development strategy.

In his contributions on S&T policies and strategies, Sir Winston Churchill is cited as having once remarked that science is too important to be left to scientists alone[32]. This implies that, in operational terms, S&T policy formulation should actually be the collective responsibility of economists, scientists, administrators and politicians. The body formulating such a policy must as a matter of priority, receive the backing of a permanent support staff capable of indepth studies in all areas of the economy.

In Ghana, the Draft Science and Technology Plan and Options[33] amply confirms that the composition of the body of

facilities and infrastructure, low salary and therefore low morale. This situation must change, he cautioned, if Africa is to rely on S&T for future development.

Above all, S&T should have a strong information component which in no uncertain terms acts as a catalyst in socio-economic development. This is simply because it is the information sector which would collect, store, process, repackage and disseminate the results of both basic and applied scientific research crucial to the survival of mankind.

No matter the situation in which information is found today, it is considered a resource no less crucial to development and progress than natural, human and technological resources. As such, countries lacking information are at an enormous disadvantage in virtually every sector.

This assertion is certified as a well-tested fact by Adzei Bekoe and quoted by Tindimubona and Amy Auerbacher Wilson[35], "that, any scientific community which lacks the facility to communicate scientific research information within its membership and with members of the world's scientific community as well as policy makers and other users of their endeavour will be a dead one. If research results are not made available they cannot be added to the body of scientific knowledge, and will in effect accomplish very little".

This simply implies that with the establishment of the appropriate linkages, coupled with the proper development of the requisite capacities and capabilities, information remains a sine-qua-non for the survival of mankind. In this context Bekoe drew the attention of workshop participants to the close links

between information exchange and the establishment of a new international economic order.

1.5 INFORMATION AND SOCIO-ECONOMIC DEVELOPMENT

Today, the World economy has been dominated by those countries that are information conscious and spend a large percentage of their material and human resources on the generation, processing and dissemination of information. The United States of America, for instance, is estimated to spend one-third to one-half of its entire resource, both in material and human terms, on information generation and processing. The other industrial giants, including Japan, West Germany and Switzerland, are said to come quite close to that figure[36]. By investing so much in information, they are able to maximise their own information resources in particular and those of the world at large, for their continued world economic dominance.

The most crucial areas in which the economies of most developing countries depend on information include among others: agriculture, government decision making, commerce and industry and education.

1.5.1 Agriculture:

The overall objective of agricultural research is the development of technologies for sustainable increases in agricultural production with increasing efficiency while enhancing the resource base as much as possible. To this end, timely and adequate information is needed in the more pronounced areas such as:

(a) the generation and adaptation of technologies which can increase agriculture productivity;

(b) the efficient methods of processing, marketing and utilization of both food and non-food products;

(c) the generation of new technologies which can provide productive employment in rural areas; and particularly

(d) the putting in place of food security apparatus for the nation and the family.

For information to have a profound impact on agricultural development, there should be a well coordinated Research - Extension linkage. This could be exemplified in a circle consisting of researchers, extension staff and farmers.

Agricultural research consists of experiments, trials, tests or studies aimed at the development of new materials, equipments, methods or techniques. It also involves the modification of existing ones so as to increase agricultural productivity with continuously increasing efficiency. The activity requires enormous and well organized informational input at various levels.

With regard to information activities, agricultural extension workers are the most important purveyors of information to the farming community. They locate agricultural information, judge its economic value and suitability to local environments and educate the farmers on improved techniques of farming. The introduction of the miniset yam planting materials developed by the International Institute of Tropical Agriculture, Ibadan has been widely embraced in most yam producing centres in Ghana.

Similarly, the enthusiasm of small ruminant rearers in largely illiterate communities in seeking veterinary services from qualified veterinary surgeons has been commended.

The farmer, through interaction with the extension staff, becomes the final consumer of agricultural research results, adapting the various improved techniques and products which bring about the much needed increase in productivity. However, the flow of agricultural information should not be one way. The farmer's concerns and problems should be transmitted back to the laboratory scientist and scientific institution executives, so that these problems could be incorporated into the research agenda of the agricultural scientists. This then rounds up the research - extension linkages.

Although there is a great deal of available agricultural research information, methods of transmitting such information to the end users are woefully inadequate. This invariably results in lack of sufficient impact of such research on agricultural practice and production. The weak research - extension linkage was identified as a constraint to food production in the 1988 symposium on Ghana's Agricultural Strategy and Growth Issues[37]. This seminar therefore, concentrated on finding possible ways and means of establishing permanent linkages between these two vital components in the technology generation and transfer process.

1.5.2 Government Decision Making

Government would require information on science and technology policies in other countries as well as on the nature and extent of technology flows and payments for foreign

technology. It might also require information on scientific results, technological innovations and trends in different sectors, with the view of broadening its own S & T capacities.

To government, information would be needed to detect socio-economic imbalances. Through monitoring and evaluation mechanisms, social and economic inequities can be pinpointed and strategies to reverse the trends formulated and implemented. Furthermore, information is extremely crucial to the government in managing population growth and movement, including their causes and consequences.

Of equal importance to government is viable information on the lethal environmental effects of the use of harmful agro and other chemicals that have been banned from developed countries.

Internally, timely and adequate information is needed on burning political, economic and social issues such as health and sanitation, housing and educational issues.

1.5.3 Commerce and Industry

External information sources are becoming more and more vital to all sectors of commerce and industry. Companies which do not heed this will fall behind their competitors, for the world is now firmly in the grip of the information age. This category of industrial and commercial users would require information on technology sources, technology alternatives and the implications and experience of using different techniques and processes. They need to have S & T and research and development (R & D) information re-packaged for them in the most appropriate format to enable them make the best technology

(investment) choices.

Information on trade opportunities can help a country or company find out who needs its products, where the opportunities are and how others have confronted problems of production or marketing similar to their own. It would further help determine at what prices others are selling similar goods[38].

1.5.4 Education

Scientific and technical information in Africa is equally important to the general public and in particular to the younger generation who need to acquire the science and technology culture.

1.6 AFRICAN PERCEPTION OF DEVELOPMENT INFORMATION

So much has been written and said about science and technology information being a vital resource, that drawing attention to its importance in development has become a mere cliche. However, a closer scrutiny of its impact in Africa reveals that very little has been done to enhance such a role. This may suggest that the implications of science and technology information are either not well understood or that they are taken for granted. It is thus necessary to often remind ourselves of this all important phenomenon.

It is conceded that no state, especially a developing one, can afford, in terms of human and other resources, to become totally self-reliant in science and technology information, and their social and economic application. Thus, a considerable degree of interdependence in science and technology information

between developed and developing countries on the one hand, and among developing countries themselves on the other, should be well understood and taken into account in devising the strategy for fostering the development of the less developed countries.

It has been noted already that, despite the apparent lack of impact of science and technology information in Africa, African countries are becoming increasingly aware of the fact that information, especially specialised information, is an indispensable factor in the development and rational use of their total natural and human resources. This growing awareness is the result of years of cooperation with, and assistance and encouragement from such United Nations and other aid agencies as UNESCO, the Information Systems for the Agricultural Sciences and Technology (AGRIS) of the Food and Agricultural Organisation (FAO), the International Development Research Centre (IDRC) and the German Foundation for International Development (DSE).

UNESCO's assistance in the development of library and information infrastructures, especially in the developing countries since 1960, has been very notable. Within the context of development from which the new emergent countries were viewed in the early 1960's, UNESCO and other assistance organisations recognised that libraries were no longer mainly cultural, but were seen "in conjunction with other information sources as vehicle for development[39].

Despite all the various efforts, the gap between the "information rich" north, and the "information poor" south has continued to widen. This could be attributed to the increasing inaccessibility of information for viable decision-making, as

well as the persistence of ineffective and inefficient information handling techniques. W.O. Aiyepeku[40] assesses the critical information situation as follows:

> "African states have recognized for some time that the situation with regard to documentation and information about socio-economic development in Africa is far from satisfactory. Many countries do not have mechanisms for keeping track of published and unpublished information generated in the context of the activities of their planners, economists, scientists, and other individuals who have responsibility for implementing national development plans. They often lack organised access to the relevant information produced by bilateral and multilateral aid agencies. Consequently, these countries often continue their planning and programming in ignorance of vital facts that have been documented."

In many developing countries, including Ghana, development projects have failed or have been abandoned and the whole economies of countries have collapsed because of lack of relevant information, or belated and inaccurate information. Indeed, information has become the missing ingredient in the development process in many African countries.

It is needless to say that:

> "Without relevant, accurate information, countries cannot choose the best course of action in terms of their own national interests."[41]

A research carried out for UNESCO[42] in 1981 revealed that many development plans in the less developed countries have not

succeeded because these plans were not based on relevant information. Similarly, the dramatic changes that have occurred and continue to occur have come about because of better information flow to the population. The Soviet system, for example, was only tenable when there were considerable restrictions and distortions in the dissemination of information. This must have spurred on Mike Davies[43] to declared that information is a powerful force and that the Berlin Wall did not collapse because of military might.

Many African information professionals and a growing number of decision-makers and researchers have realized that the salvation of their countries depends on mutual collaboration, more serious consideration of the need for development information and policies and systems which can make that information more readily and easily available. To this end, certain structures have been erected with the view of creating an enabling environment for information to play a leading role in socio-economic development in Africa.

1.7 INFORMATION SYSTEMS AND DISSEMINATION IN GHANA

A draft Science and Technology Policy for Ghana took cognisance of the imbalanced in the state of scientific and technical information provision in the country. In the context of a national S&T plan, information is defined to include the results of research and development activities, accounts of which are recorded in the form of books, primary and secondary journals, reports and other technical documents. Others include information for planning and decision making such as abstracts,

directories, materials in the mass media like films; yet others include slides, microforms and computer storage devices, as well as knowledge in people's minds that needs to be communicated.

It further indicated that, in spite of the growing realization of the need for relevant science and technology information, the essential institutional mechanisms and infrastructural facilities are not yet sufficiently developed to foster the generation, storage, preservation, repacking, retrieval and utilization of information. The result has been a zero growth in the acquisition of scientific literature in research libraries in the country.

In addition, the information sector is described as characterized by broken down equipment, inadequate staffing, shortages of newsprint and other printing inputs, inadequate films for radio and television and inadequate electronic data processing technologies. The result is that the overall performance of the review has been generally poor, having suffered due to the decline in the national economy[44].

In order to find lasting solutions to these endemic problems, the draft science and technology policy outlines certain pragmatic measures. These include the need to

(i) Formulate a comprehensive national information policy and plan which takes account of the needs of various categories of information users;

(ii) Provide financial and material support for the Ghana National Scientific and Technological Information Network;

(iii) Draw up appropriate legislation for the establishment

of a National Library and Bibliographic Centre;

(iv) Provide support for the compilation and production of directories of ongoing scientific and technical research projects, and of high-level scientific and technical manpower;

(v) Provide support for undertaking a nationwide survey of existing facilities of the mass media and their needs;

(vi) Expedite action on the reorganisation and equipping of the National and Regional Archives;

(vii) Institute measures that would not only guarantee access to foreign literature but would equally support book development in the Department of Book Arts in the University of Science and Technology, Kumasi;

(viii) Encourage and support research in the traditional modes of communication with the view of linking them with the mainstream of mass communication;

(ix) Take appropriate measures to establish more community newspapers and more local radio stations at regional and district levels;

(x) Reintroduce the mobile filmshows in villages which hitherto had been instrumental in disseminating scientific and technological information in the communities; and

(xi) Encourage the use of local languages for the dissemination of information.

Now that there is a considerable awareness of the import of science and technology information in accelerating the process of development, it is necessary to assess what structures and arrangements are available to enhance this process in Africa in general and in Ghana in particular.

With a view to streamlining the development of viable STI systems in Ghana, various efforts have been made in the past, the latest being the launching of the Ghana National Scientific and Technological Information Network (GHASTINET) project. In essence, the project seeks to ensure collaboration and the sharing of resources in the S&T information scenario.

1.8 JUSTIFICATION FOR THE STUDY

Considering the wide variety of information needs of the Ghanaian economy, it could be said without fear of contradiction that existing national information resources are grossly inadequate to satisfy the needs of all users. In Ghana today, emphasis on STI is concentrated in the areas of agriculture, public health, renewable and non-renewable energy sources, housing, environmental protection, transportation, industry and tourism.

Users of STI who could be conveniently termed target groups include, among others, the Ghanaian farmer, who is not only a non-agricultural scientist, but also an illiterate. Other illiterates and semi-literates forming the bulk of the Ghanian community are engaged in other ventures like petty trading, small scale cottage industries and processing of agricultural produce.

Political decision makers and planners, government and public agencies such as regional development corporations, and private sector captains of commerce and industry constitute another important user group. Other categories include the scientific community whose members need to broaden their own scientific knowledge with information outside their own fields of specialization.

It is obvious from the foregoing that the focus of information generation, dissemination and utilization should be in the following areas:

(i) Scientific and technical information which fuels research, learning and technical decision making;

(ii) Operational information which is needed to promote production and services (at both the macro and micro levels) and

(iii) Policy and decision making information which will facilitate decisions and choice of alternative strategies[45].

The reality is that until recently, there were virtually no information centres in industry and commerce. Those in state agencies and government departments have not been viable because they have been grossly neglected in terms of funding, staffing and provision of even basic equipment. Obviously many user communities lack access to information centres. The situation is worse in the rural communities where there is absolute deprivation. The result is that utilization of S&T information is not widespread and a large proportion of potential users remains non-users.

It is apparent that, apart from workshop reports, seminar proceedings and related publications, most often at institutional levels, no comprehensive study has been carried out on S&T information networking in Ghana.

It would therefore be worthwhile conducting an indepth examination of the various plans and strategies initiated for the development of S&T information systems in Ghana.

1.9 PURPOSE

The purpose of the study is to conduct an indepth examination of the development of Scientific and Technical Information Networking in Ghana in both theoretical and practical contexts.

1.10 OBJECTIVES

Based on the foregoing assertions, the main objectives of the study are:

i) to examine the general conceptions, ideals and benefits of S&T information networking on a global scale and analyze possible gains to developing countries in general and Ghana in that context;

ii) to identify the various plans and strategies initiated in the past for the development of S&T information systems in Ghana;

iii) to investigate what factors have been identified as the main constraints militating against the development of viable S&T information systems in Ghana;

iv) to examine current trends in information networking, including a critical appraisal of what is attainable in contrast to the desired ideal; and

v) to suggest ways and means towards making S&T information networking play a more meaningful role in the socio-economic development of Ghana.

1.11 SCOPE

To achieve the above purpose, it was necessary to have an appraisal of real developments taking place in the library and information sectors of the economy. This embraced infrastructural development and operational activities such as cooperation, collaboration, coordination and resource sharing.

The Ghana National Scientific and Technological Information Network (GHASTINET) which could be described as a prototype of S & T information system was closely scrutinized. The study was also structured to cover a survey of regional and international information systems and networks with linkages in Ghana. Finally, suggestions were made for improving existing systems and capabilities.

1.12 Methodology for Data Collection

Various methods have been adopted for collecting data for the study. These include the administration of a questionnaire to various institutions and centres, including the National Focal Point of GHASTINET, The Sectoral Nodal Points and The Special Resource Centres. Personal interviews were conducted with librarians and information personnel in the institutions and

centres identified earlier. Field research in the form of visits to the centres and institutions has been carried out. Secondary and related relevant literature, journal articles, legislative instruments, proceedings of workshops, symposia, conferences and research papers both published and unpublished on STI in Ghana have been consulted.

The results of the data collected through field research and other sources are presented and analysed in Chapter Four.

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CHAPTER TWO

2. INFORMATION NETWORK - A CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION:

Networks are meant to link together several institutions with the same or similar areas of activities within the same country or in different countries for the purpose of sharing experiences, facilities, information and expertise. Networking is an important strategy for cooperation among countries, especially in those areas where expertise and physical resources are scarce. A presentation from the UN Centre for Human Settlement (HABITAT)[1] declared that networking has a catalytic role for strengthening the capabilities of member institutions and is a means for institutionalizing contacts among professionals and scientific research innovations. Obviously, an "institutionalized" network must have a coordinating body (Central Focal Point) to be able to function meaningfully and effectively. A satisfactory performance and sustainable commitment on the part of the participating institutions is a prerequisite for the success of a network.

2.2 RATIONALE FOR INFORMATION NETWORKING

The basic objectives of any information network are to improve the exchange of information and communication between participating information units, and between

specialists or researchers in a given area; to compile and disseminate information produced on a given area of knowledge and to create a wider base of information for poorly-defined sectors.

Information networks offer advantages such as better utilization of available scarce resources, a larger base of knowledge available to serve local needs, the capacity to reach a greater number of users, and above all, greater economy and efficiency of operations culminating in cost effectiveness. Essentially, "the establishment of information networks will ensure free flow of information with equal access to available knowledge no matter where people reside". These are the observations of Asiagodo[2] in a report on a UN-sponsored project on information/communication networking for Family Planning in Ghana. However, the realization of these goals depends on networks exhibiting certain inherent basic qualities.

2.3 NETWORK REQUIREMENTS

Any good information network should possess certain characteristics considered essential for effective network functions. These characteristics include, inter-alia, a legal framework, a well defined organizational structure, articulated responsibilities, obligations and rights of members, ability to measure impact and evaluate performance. A detailed examination of these requirements is provided below.

2.3.1 Sound Legal, Organisational and Management Framework:

Successful networking involves a legal, organizational and management framework based upon consultation and agreement by partners to share their resources and experiences for mutual benefit. In his contribution on Regional Information Networks, Akhtar[3], quoting Carlisle (1980), pointed out that "a network comes into being through the formal organic ordering of an activity pursuant to the law from which it derives its existence and authority to act". Each member by agreeing through consultation to participate, assumes a number of obligations with respect to the management of operations, rights to receive the results of joint work, and to benefit by the services designed for the network.

Akhtar[4] cautioned that informally structured network initiatives may be easier to set up, but they also tend to decline quite rapidly, because of lack of continuity amongst personnel or as a result of a weak sense of obligation. This approach, he observed, has consistently led to failure in many Latin American countries and should be avoided as much as possible.

2.3.2 Explicit Organisational Structure

An information network requires an explicit organizational structure defining the responsibilities, obligations and rights of each participating entity with regard to provision and dissemination of data, as well as managerial and administrative collaboration. Considering

the case of CARIS (Current Agricultural Research Information Systems), the National Focal Points are mandated to gather respective national data on ongoing research in agriculture and forward them to the coordinating centre in Rome. The coordinating centre must also be accountable to network members, for only mutual trust provides networks with the authority to maintain the purpose of the networks in spite of occasional differences.

2.3.3 Acceptance of Obligations

In a network of diverse membership, each partner accepts certain obligations to other members. Specifically, a network's function is to marshall resources from its environment to accomplish results beyond the ability of any one of its members. HABITAT[5], dilating on 'Network of African Countries on Local Building Materials and Technologies', stressed that African countries have not been able to achieve the level of self-sufficiency in the process of developing local building materials because they are limited in their technological capacity to tackle the problems involved. It is reported that since 1991, the Network has promoted technical information gathering and processing in the respective countries, resulting in the publication of the Journal of the Network of African Countries on Local Building Materials and Technologies. In effect, network participants should not be passive clients, but active participants in the gathering, processing and dissemination of information.

2.3.4 Common Standards, Procedures and Protocols

If network members are to share information by transmitting it back and forth, a common frame of reference for compatible standards, procedures and protocols is essential. The use of compatible technologies (hardware and software) and exchange of formats for system interconnection should be strictly adhered to.

In this direction, PADIS provides an example in developing common norms, tools and methodologies in information handling, ensuring compatibility with international information systems, and promoting the adoption of such common standards by member countries.

2.3.5 Susceptibility to New Information Technologies

An efficient information network should have the ability to access and utilise new information technologies. No mandate decrees all information networks to be computer based. There are several instances where highly developed electronic networks started strictly as manual systems.

Looking at developments in the United Kingdom, the Kenyon Report (1927) on public libraries in England and Wales stimulated the establishment of major regional library bureaux (regional library networks)[6]. These were cooperative ventures which were the result of the coming together of academic and special libraries to organise and disseminate information at the regional level. The system was so well organised that, with the advent of computers, the need to shift focus from the purely conventional

document delivery towards database construction and other electronic processes was effected without much difficulty.

In most African countries, the problem of integrating information technologies into the mainstream of their information activities is exacerbated by the absence of a culture of formal cooperation, and hence the absence of union catalogues and other manual databases.

2.3.6 Respect for Democratic Principles

The management of a network must essentially be democratic. If participants are to see themselves as equals, then, leadership and participation need to be considered at various levels and throughout all stages of networking, from planning through implementation. With the view of meeting this laudable standard, PADIS has established a dynamic operational framework known as the Regional Technical Committee, on which regional centres are represented. The Committee meets periodically to assess progress of implementation of the network, advise on solutions to problems, and plan strategies for development and promotion of PADIS.

Furthermore, the decentralised Fidonet network which is predominant in Africa has spread in an essentially grassroots (ie. non-hierarchical) manner from user to user. The 'bottom-up' approach has been central to the character of Fidonet. Fidonet is a "store and forward system" which enables messages to be written, stored and later transmitted to any participating system. It was observed

at the 1992 Workshop on Science and Technology Communication Networks in Africa[7] that periodic attempts to impose a 'top-down' organisational structure upon Fidonet have met with successful resistance. From all indications, leadership is always a critical determining factor in the success or otherwise of any such projects.

Managers and staff of networks and their participating institutions should not only provide leadership, but also be technically competent for sustainable network operations. The Egyptian National STI Network (ENSTINET)[8] has developed a comprehensive training programme including short courses in database management, search techniques, computer related subjects, marketing and document processing. To accomplish this target, ENSTINET National Focal Point has been furnished with all the requisite training facilities including computer laboratories and audio visual training equipment.

2.3.7 Provision of Adequate Funding

A key element in the successful establishment and maintenance of a network is the provision of assured and adequate funding. In his presentation on the funding of library and information networks, Robinson, as quoted by Akhtar[9], argued that the funding requirements usually fall into four main phases. These include design (systems analysis and feasibility studies); implementation (the cost of starting up); operations (annual cost of staff, overheads, hardware); and expansion of services

(demonstration projects, software development, production of cooperative tools such as union list, training cost, acquisition of new technologies and software) phases.

One of the best tried and accepted modalities for establishing and funding a network is through the involvement of international organisations. At the forefront of these funding agencies are UNESCO, UNDP, UNIDO, IDRC and FAO. Their contributions significantly stimulated the establishment of PADIS, RINAF (Regional Informatics Network for Africa-Dakar) and a host of other networks in other developing economies.

It cannot be expected that donor support will continue to maintain African networks ad infinitum. It is imperative that economic factors be considered at each stage of network planning and implementation. In order to be sustainable, a network should be able to generate funds. As suggested by Adam and Hafkin[10], the private sector, NGOs with large information exchange needs, research institutions, government research parastatals, international organisations and individuals should form a coalition to support a national network. Besides, marketing of information to be channelled through the network, depending on its efficiency, its technical reliability and responsiveness can also contribute to income generation.

Akhtar[11] insists, however, that regular funding should come mainly from institutions housing the network focal points, from membership fees and from charges levied

for services. This situation could be sufficiently exploited in the information conscious economies. However, in Africa, the onus falls on government which is the main source of funding for public projects. Yet, as has been documented by Boadi and Havard-Williams (1984), "the corrugated and unreliable nature of funding library and information services in West Africa has been a crucial factor in the slow development of regional library cooperation services in Africa[12]". It must be recognised, however, that, as with any 'public good', information networks cannot be expected to become self financing on commercial basis within very short periods of time. It is crucial that governments of participating institutions should lend adequate financial support to the networks.

2.3.8 Provision of User - Oriented Services

Faris[13], in his discussion on the evaluation of networks, noted that the impact of 'network information products and services' should, at the very minimum, be assessed from the perspective of end users, information specialists and the people involved in the development of national and regional programmes and services. In real-life situations, most networks have justified their continued survival from this angle. PADIS produces its Newsletter and DEVINDEX - Africa to meet user demands. In a recent publication, HABITAT[14] confirmed that after a short period of disseminating the Journal of the Network of African Countries on local building materials and

technologies, one important objective has been realised: "the untapped potentials and otherwise unretrievable but vital information at the local level are beginning to emerge through responses from readers". These obviously are healthy signs for the continued sustenance of the network.

2.3.9 Flexibility

An information network must be flexible enough to respond to the information needs of each element in the system. Taking the needs of purely illiterate or semi-literate peasant farmers in the Ghanaian agricultural circle as a case in point, their information services need special orientation.

The Ghana Agricultural Information Systems (GAINS) which is in its formative stage, should have as its long-term objective, the desire to reach out to the most traditional (peasant) farmer in the most remote corner of the country.

There are several possible ways in which available agricultural information, be it locally generated or foreign acquired, is systematically repackaged and disseminated to the end users. On the one hand, simple do-it-yourself printouts in the form of posters and handouts could be circulated as widely as possible. The medium of communication should be as local as possible, embracing all the major vernaculars.

On the other hand, mobile audio visual units could be created with the system. These should be adequately equipped, strengthened and motivated to provide simplified

demonstration services in the major vernaculars countrywide.

In a similar view, the proposed network on Family Planning and Health Care Delivery should, in addition to the above discussed methods, present its popularized versions of technical information using drama. This would go down well with the mass of Ghanaian population, taking into consideration our socio-cultural background.

The rigid rules and regulations set by some libraries and information centres on borrowing of materials can make the system inflexible. A more liberal policy on the use of all materials can make the system more amenable to a wider clientele.

2.3.10 Adequate Provision of Manpower Resources

A good information network must take cognisance of available human and material resources. Its system must be simple enough for virtually all the staff within the membership of the network to understand.

Mark Bennet[15], writing on HEALTHNET (Communications System for Health Workers) in Zambia, counted Zambia - HEALTHNET very fortunate in having a staff of skilled and dedicated people at the Computer Centre who were able to make a new initiative work. Indeed, such skills are not always available in developing countries.

It is equally important to ensure that the number of institutions in the network must be of manageable size commensurate with available manpower, funding and

logistics. A noble example is the Network of African Countries on local building materials and technologies which took off with a modest number of five. It must be stressed, though, that a network must as much as possible utilise available local resources instead of imported ones.

Generally, networks offer tremendous advantages if they display much of the above cited characteristics. However, the success of every network extending beyond the territorial confines of a particular nation depends largely on the creation of an enabling environment in the form of viable national infrastructures. These include, among others, viable library and information systems, functional and dependable telecommunication facilities, and strong linkages between these entities.

2.4 NATIONAL INFORMATION SYSTEMS

The development of a strong national information system is a prerequisite to efficient and effective networking at regional and international levels. Neelameghan,[16] in an overview of networks in developing countries, stressed that a well established national network should have the capacity to

facilitate cooperation arrangements among various information sources and ensure coordination among them; capture, assemble, process and effectively use information and data generated within the country and those acquired from external sources.

Despite the uncoordinated development of library and

information systems in the country, the National AGRIS centre is worth commenting on in this direction. The centre which is located at the CSIR Secretariat has succeeded in participating effectively in international cooperative programmes in diverse ways. These include, among others, inputting relevant local information into the AGRIS database, exchanging data and information with cooperating entities, and providing open access to consolidated agricultural information available from the AGRIS Coordinating Centre. This is available in various media including magnetic tapes, obtainable at no cost by all participating countries.

By far, any such relevant numerical and statistical data collected within the framework of a national network often constitute desirable ingredients for the formulation, implementation, monitoring and for decision support in relation to national development plans. To be able to perform its sacred duties creditably, a worthwhile national network should as a matter of principle possess certain basic characteristics.

2.5 MAJOR ELEMENTS OF A NATIONAL INFORMATION NETWORK

Champions of national information networks should not lose sight of the fact that the sustainability of the system largely depends on its coordination role among the various participating

entities. Most often, failure to identify and accord these elements their due recognition results in stalling or

sidetracking the project.

As noted by Mercado[17], the strategic elements in any network include, among others, nodes, links and information.

2.5.1 Nodes: Several information centres in any country representing autonomous participating entities should be identified and mandated to perform certain essential functions. More often than not, these are the loci of information input, output, storage, processing, organisation, control and use. A node may be a library, an information analysis and evaluation centre, an editorial office, an indexing and abstracting service centre, or any other organisation which makes an extensive use of information services.

2.5.2 Links:

The links constitute the channels of communication which bridge all nodes and through which information may pass from node to node. These may include all channels of information transfer such as computer (including modems and acoustic couplers), radio and television, newspapers, magazines, films, union catalogues and databases of all types. The network may also use the telephone, post office courier services and local institutions and facilities like chiefs, opinion leaders, concert groups, extension officers and field workers as links.

2.5.3 Information:

At the centre of these elements is information which includes data, documents, talks, music, drama, advertisements and other forms of recorded knowledge, both published and unpublished. These could conveniently take the form of abstracts, indexes, newsletters, posters, SDI service, and all forms of repackaged materials for target groups.

This consideration of the crucial elements of networking has necessitated the need for a closer examination of the relationship between communication and networking.

2.6 NETWORKING AND THE COMMUNICATION PROCESS

Networking is essentially a communication process, as such, it is imperative to examine a few developed communication theories which are intricately interwoven with networking.

From the 1940s, a series of communication models emerged, each with emphasis to suit the whims of the proponents as well as the prevailing circumstances of the times. These theories, however, successfully underscored the importance of communication, especially interpersonal communication, in all human activities.

2.7 COMMUNICATION MODELS

According to Rogers and Kincaid[18] two broad schools of communication theories emerged between the 1940s and

1970. These are the Linear and the Convergence Models of communication. They stressed that the more dominant of the two describes a one-way, linear communication and features source - message - channel - receiver components. This is aptly termed the Linear model. On the contrary, the Convergence model sees communication as a cyclical process in which people share information with the view to achieving a common purpose.

2.7.1 The Linear Models:

Communication as conceived by most scholars and practitioners today has been greatly influenced by the linear models, ie. Fig 1 prominent among the proponents are Harold Laswell (1948) and Claude E. Shannon and Warren Weaver (1949).

Laswell's model consists of "who says what, in what channel, to whom and with what effect?"[19]. Here, the conspicuous consistent elements of the communication act include the speaker, the speech, the medium of transmission, the audience and the behavioral change.

Rogers and Kincaid observed that the academic field of communication took off when Shannon and Weaver in 1948 set forth their model in the mathematical theory of communication. In context, the model is a linear left-to-right, one way presentation which defines communication as "all the procedures by which one mind may affect another"[20].

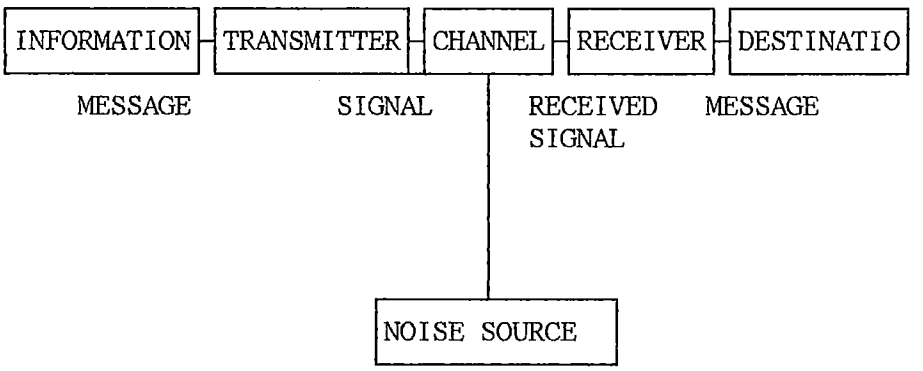


FIG. 1 Shannon and Weaver's Linear Model of Communication Source:

Shannon and Weaver (1949). The Mathematical Theory of Communication, Urbana, University of Illinois Press. p. 34.

Like Lasswell, Shannon and Weaver saw communication in terms of a one-way process by which a message was sent from a source through a channel to a receiver. Their model was to a large extent more detailed, because Shannon and Weaver made a few distinctions that others had not. Specifically, Ruben (1984)
noted that they distinguished between a signal and a message, an information source and a transmitter, and a receiver and destination.

Besides these, Shannon and Weaver introduced the term "noise", as the label for any distortion that interferes with the transmission of a signal from the source to the destination. They also advanced the notion of correction channel, which they regarded as a means of overcoming problems created by noise. The general notion, however, is that this model was designed for the purpose of electronic engineering.

The Shannon-Weaver model had a more tremendous impact on the scientific study of human communications between 1940s and 1970 than any other theory. Rogers and Kincaid attributed this situation to the fact that the "model suited the needs of the then emerging field of communication than any other model". Furthermore, its application led to technical improvements in message transmission and also served to bring together scholars from several disciplines to the scientific study of communication[21].

Thereafter, other communication models emerged. Notable among the proponents are Osgood and Others (1957), Westly and Maclean (1957), and Berlo (1960). All these models are structurally similar to the Shannon-Weaver conceptualization.

A number of critics have questioned the linear models. The main problem with the Linear models of communication, according to Diaz Bordenave (1972), "stemmed from their basic epistemological assumptions about the nature of information, how it is transmitted and what we do with it". He explained that, with these models, there is always a tendency in our daily experiences to treat information as if it could be carried from a source to a receiver, like a bucket carries water.

Rogers and Kincaid (1981)[22] also lend more credence to Bordenave's thoughts by stressing that the linear models represent apt descriptions of the communication act, but do not accurately describe the complexities of communication

as a process. They also expressed concern about the tendency of the earlier theories to consider the primary function of communication to be persuasion rather than mutual understanding, concensus and collective action. Other critics including Baur (1964) Smith (1977) and Berlo (1977) all argued along the lines of Rogers and others.

2.7.2 The Convergence Model of Communication

The criticisms against the linear models stimulated communication researchers to evolve a holistic approach rather than individual centred studies in subsequent researches. Kincaid and Schramm, in their contributions, reiterated that when communication is viewed in its real life, natural settings, it can be understood better if it is examined as complete cycles in which two or more participants mutually share information with one another in order to achieve some common purpose like mutual understanding, and collective action. This ultimately led to the development of the Convergence model of communication to replace the dominant approach which concentrated on the communication effects among individual receivers.

This more recent model of communication is provided by Everett Rogers and D. Lawrence Kincaid[23] in Communication Network : Towards a New Paradigm for Research. The authors described what they termed a convergence model of communication that stressed the importance of information and the manner in which

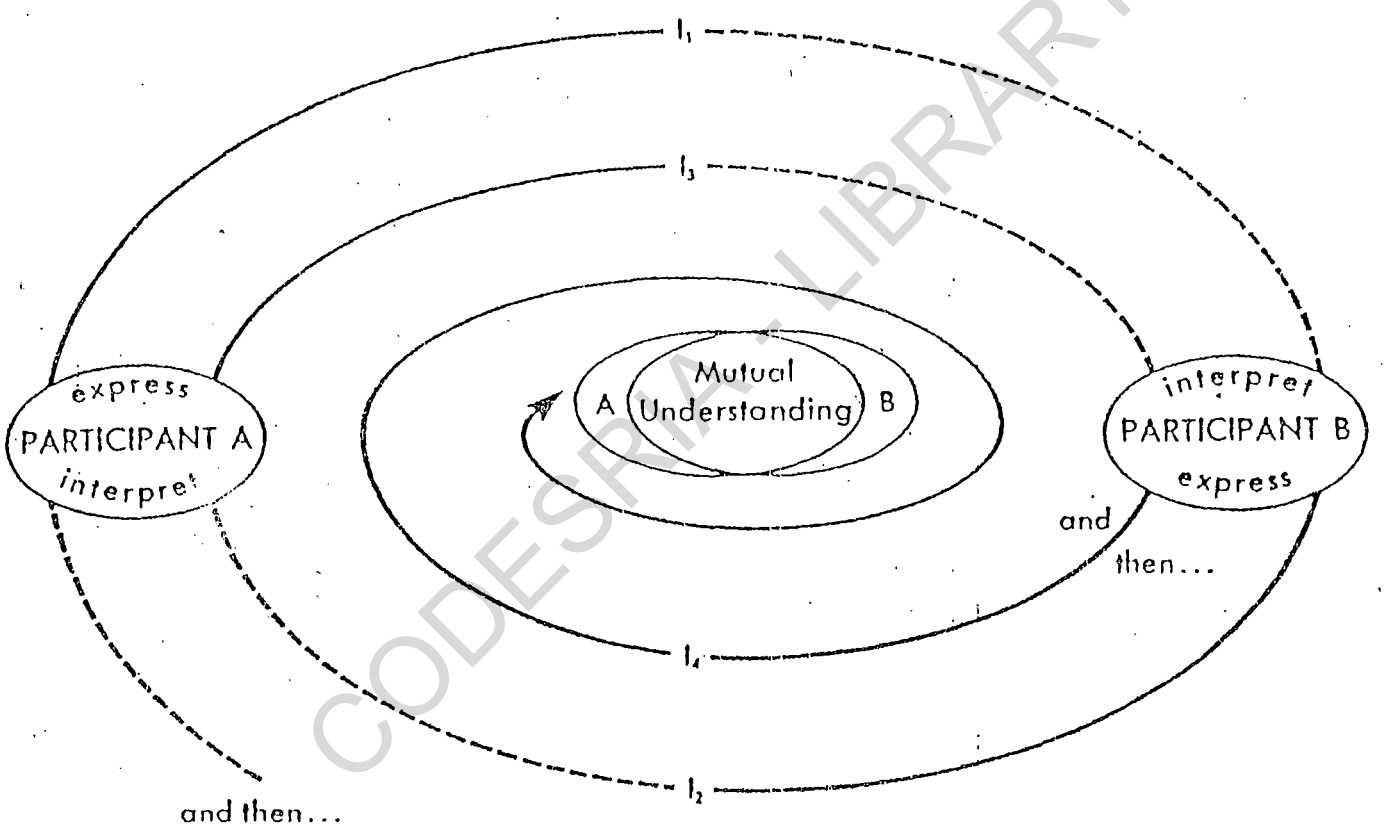
information links individuals together in social networks. Thus, they described communication "as a process in which individuals create and share information with one another in order to reach mutual understanding. This cyclical process involves giving meaning to information that is exchanged between two or more individuals as they move toward convergence which is the tendency for two or more individuals to move toward one another, and to unite in a common interest or focus"[24]. These are illustrated by Figures 2-5

In explaining the manner in which the convergence process was thought to operate, the authors indicated that "communication always begins with 'and then'..." to remind us that something has occurred before we begin to observe the process. Participant A may or may not consider the past before he shares information (1_1) with participant B. This individual must perceive and then interpret the information which A creates to express his thoughts, and he B may respond by creating information (1_2) to share with A. Individual A interprets his new information and then may express himself again with more information (1_3) about the same topic. Individual B interprets this information, they continue the process (1_4 ... 1_n) until one or both become satisfied that they have reached a sufficient mutual understanding of one another about the topic for the purpose at hand"[25]. In an overview of the convergence model, Ruben[26] emphasized that the model explained communication in terms of a progressive sending and

receiving of messages between two individuals in which the goal and predicted outcome are mutual understanding of a topic.

FIG.2

A Convergence Model of Communication.



Note: *Communication* is a process in which participants create and share information with one another in order to reach a mutual understanding. This cyclical process involves giving meaning to information that is exchanged between two or more individuals as they move toward convergence. *Convergence* is the tendency for two or more individuals to move toward one point, or for one individual to move toward another, and to unite in a common interest or focus.

Source: Kincaid with Schramm (1975) and Kincaid (1979).

He also emphasized information exchanged and networks within the mode. Finally, his perspective revolutionalized communication as a process rather than a single event, a point of view acknowledged in nearly all models in recent years.

In context, both concepts exhibit basic dynamics of active participation, resource sharing, mutual understanding and collective action.

With the establishment of a harmonious and indispensable relationship between networking and communication, and with the widespread tendency for renowned information specialists and practitioners to caption almost all information networks as communication networks, it is desirable to isolate the various network typologies. This is most crucial because each network configuration exemplifies a peculiar mode of information communication among the various participating entities within a network.

2.8 NETWORK CONFIGURATIONS

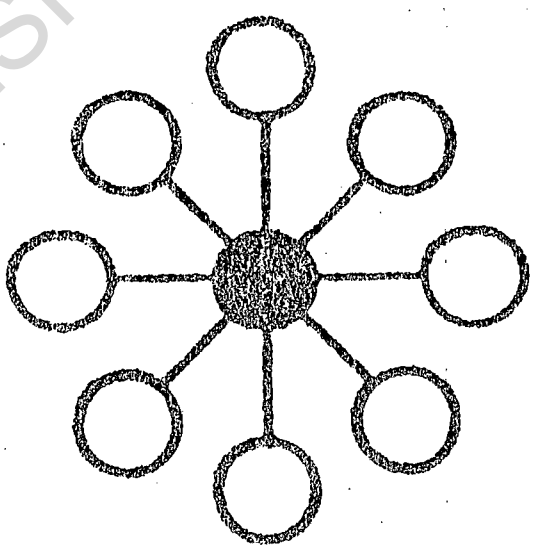
Networks differ in mandate, structure and organization, depending on the type of contact to be established. Gustavo Flores[27] identified networks according to their typology, subject area covered or their geographical scope. A network typology can be centralized, decentralized or composite centralized. To him, these structures denote the manner in which information actually circulates among participating membership.

2.8.1 STAR OR CENTRALIZED NETWORK

A centralized network is the system in which all units are coordinated by a single institution (often the focal point) which usually functions as the 'centre of excellence' on a particular topic. The other units serve as satellites of the focal point for the dissemination of the products of the service.

FIG. 3

Source: Royan, Bruch
Networking models: a comparison of experience in three countries,
Ankara, Ministry of Culture,
1989. p. 171.



STAR or CENTRALIZED

FIG. 3 STAR OR CENTRALIZED NETWORK

In this arrangement, the focal point takes charge of certain pertinent operations including:

(i) Maintaining a management secretariat to organize and operate it the network,

(ii) Collecting, organizing, processing, preparing databases and providing information products and services from a centre,

(iii) Providing communication links between itself and all the members by issuing regular newsletters advising participants about the available information in its own collections, and informing them about major activities, issues and problems which the network should address; and

(iv) Assuming a leadership role in developing programmes for the benefit of members.

In computer networks such as Egypt's ENSTINET[28], a highly developed example of a centralized system in Africa, communication between any two nodes is via circuit switching which is controlled by the Focal Point. Such centralized systems could be most effective particularly in developing countries where there is massive duplication of materials in the face of scarcity of all resources.

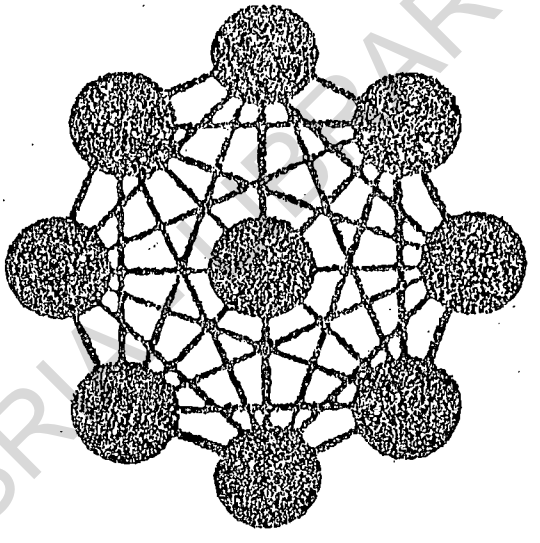
2.8.2 MESH OR DECENTRALISED NETWORK

The Decentralized Network also referred to as the mesh or distributed system is a freely interacting

bilateral/multilateral arrangement which does not rely on a focal point. What is required is a directory of member institutions, and information on their respective information sources.

The decentralized network provides flexibility by allowing any kind of interconnections and adaptive routing of information.

Fig. 4. MESH OR DECENTRALIZED NETWORK



MESH or DECENTRALIZED

Source: Mercado, Cesar M. Information Networking Concepts and Models: Implications for ASEAN POPIN, 1982. p. 85.

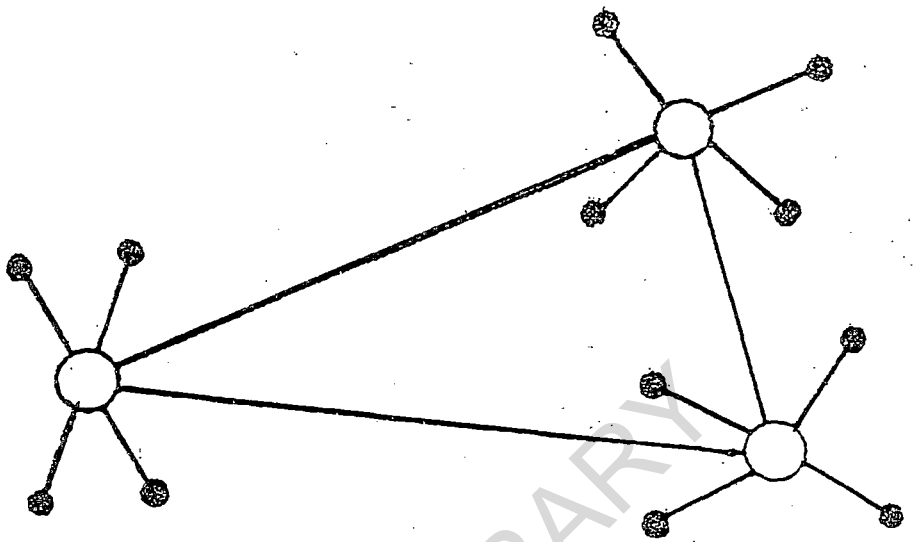
In a decentralized system, geographically dispersed computer systems perform related processing functions rather than relying totally on a central computer. Data can be collected, processed and accessed at multiple sites. In this network structure, all network members hold different resources which can be shared with one another. The Academic and Research Networking in Southern Africa (UNINET -ZA)[29] based in Zambia is a clear example of the decentralized system. Established in 1987, UNINET - ZA now links a network of 25 universities and research organizations to networks world-wide.

2.8.3 THE COMPOSITE-CENTRALISED NETWORK

The Composite Centralized network is a combination of both the centralized and the decentralized models. This implies that there is a focal point with responsibilities similar to those of the centralized network. In addition, however, there is free interaction/contact between members as in the decentralized system, and this allows for needs that may be satisfied without the assistance of the focal point.

In the diagram below, there are at least three major nodes, each with satellite nodes. The link is only between the three major nodes. The major difference is that members may have the choice to either approach the focal point or contact other members directly.

Fig. 5 COMPOSITE-CENTRALIZED NETWORK



Source: Royan, Bruce Networking Models: a comparison of experience in three countries, Ankara, Ministry of Culture, 1989.p.171.

I am inclined to cite JANET[30] (Joint Academic Network - UIC of U.K) as a fairly good example of the composite - centralized mode. In JANET, all UK universities and many polytechnics have access to the system which shares computer resources among the university research community. Here, the University of London Computer Centre is the largest host on the network and acts as a regional switching centre, and at the same time interacts with other centres mutually to satisfy their information needs.

It is extremely difficult to draw a rigid clear cut distinction between the decentralized and the composite-centralized systems. This is because, as in the case of JANET, there is no clearly defined focal point. However, the University of London Computer Centre performs the

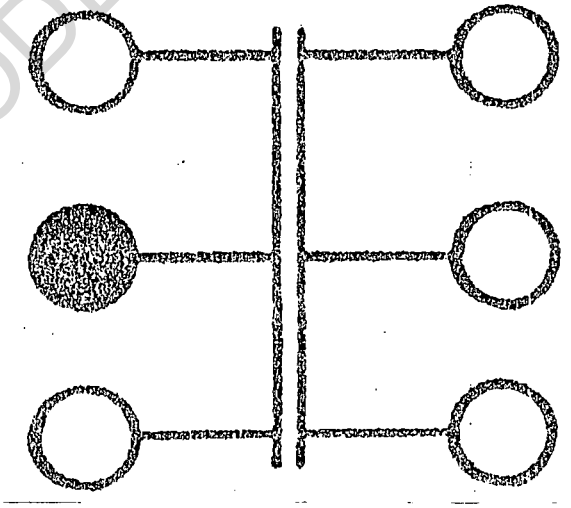
centralized functions in place of a focal point.

Within the framework of general network structures, various other configurations exist. The 'Bus' and 'Ring' models as represented by Royan Bruce and cited by Akhtar[31] are generally more associated with Local Area Networks (LANS) than with inter-institutional or international networks.

2.8.4 BUS NETWORK

A Bus Network has no switches. All stations are connected directly to a linear transmission medium. A transmission from any one station can be received by all other stations. In order to maintain an orderly sequence, a form of access control is enforced and only one device is allowed to transmit data at any one time. (Fig. 6 below).

Fig. 6 THE BUS NETWORK



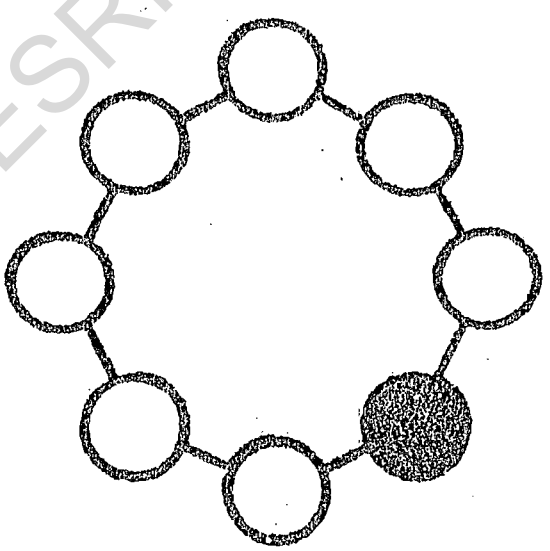
Source: Royan, Bruce, Networking Models: a comparison of experience in three countries, Ankara, Ministry of Culture, 1989. p.171.

2.8.5 The Ring Network

A ring network has no central switch. It comprises a set of devices known as repeaters which are joined into a closed loop by point-to-point links. Data, in packets, circulate around the ring on these links between the various repeaters. When a station has data to transmit, it waits until it is its turn to place a packet on the ring. When the packet reaches its destination, the node copies the data into a local buffer.

The packet then continues to circulate until it arrives back at its original departure point, thus providing a form of acknowledgement. (Fig. 7. below)

FIG. 7 THE RING NETWORK



RING

Source: Royan, Bruce, Networking Models: a comparison of experience in three countries, Ankara, Ministry of Culture, 1989. p. 171.

Network systems can be further categorized in conformity with geographical areas covered. Jancinta Were[32] emphasized that, depending on the efficiency of the telecommunication systems in a country, computers can be networked on small area or wide area basis.

2.8.6 SMALL AREA NETWORKS (SAN), consist of computers networked within a fairly small area like a room. Technically, this type of networking is easy to establish, maintain and often operates more efficiently.

2.8.7 LOCAL AREA NETWORKS (LAN)

Next to SAN is the Local Area Network (LAN), which could go beyond a room. All the computers within a building or an organization could be networked as long as they are within a reasonable area of 20 kilometres[33]. Computer linkages within a university could be an ideal LAN.

2.8.8 WIDE AREA NETWORKS (WAN)

As the area of coverage increases, it develops into a "Wide Area Network (WAN)". The term wide area network as explained by Plaister[34], is applied to a network that covers a large physical

area, for example, a whole country or a large area under one administration. A good example of a WAN is ARP net - (Advanced Research Projects Agency (ARP) Network)- established in the United States by ARP to link together computer centres that had contracts for the government (and

in particular defence) research, so that research workers could share the available computer resources.

2.8.9 NATIONAL AND REGIONAL NETWORKS

A National Network covers all participating institutions and units within a country. In principle, ENSTINET, which comprises nine information service nodes in Egypt's vital sectors exemplifies a national network. A Regional Network incorporates a set of countries outside the domain of national boundaries. 'Regional' as explained by Neelameghan[35] means "geographically contiguous countries, as well as cooperating entities in geographically non-contiguous countries that have common interests. PADIS (1980) and DENVINSA (1986) (Development Information Systems for South Asia) are clear symbols of regional networks.

2.8.10 GLOBAL NETWORKS

A Global Network, above all, constitutes a network in which any country can participate without geographical or agreement restrictions. AGLINET (Worldwide network of agricultural libraries) demonstrates what a global network could be. No matter the network models and typologies, they all have clearly defined objectives to accomplish.

The overriding objective of networking is resource sharing which promotes the pooling of experience, intellectual and other resources for the attainment of common aims. It equally

eases the spanning of boundaries between the jurisdiction of different institutions merely on geographical or other artificial barriers[36].

For a clearer perception of the networking concept, the dominant components embracing Resource Sharing, Cooperation and Coordination should be sufficiently addressed and their relationships examined.

2.9 DOMINANT COMPONENTS OF NETWORKING

2.9.1 Resource Sharing:

Conventionally, resource sharing has been restricted to inter-library lending of information carriers such as books, pamphlets, periodicals, etc. Of late, however, librarians and information professionals have realized that other resources, including staff and equipment, are capable of being shared to enhance their services for the benefit of their clientele. Havard-Williams, quoted by Njuguana,[37] is emphatic on this and considers library staff as inseparable from other resources. He asserts that ".... in discussing resource sharing, personnel is a major resource, and staff input as a resource cannot be separated from other resources such as books and other materials".

2.9.2 Cooperation:

The Longman Dictionary of the English Langauge defines Cooperation as "acting or working with another or

others for a common purpose". To many of us, library cooperation is simply synonymous with resource sharing. N'ganga[38], however, has cautioned that this is not always true, because, while a number

of activities are the same, there are significant areas of divergence. Library cooperation in particular deals mainly with materials and activities, including inter-library loans, exchange of acquisition lists, supply of photocopies, etc. More specifically, cooperation can be considered as a more effective means of pooling and sharing of library resources. Within this framework, Esterquest[39] assumes cooperation "... as a conscious endeavour among libraries and information centres to increase or improve their resources through joint action involving two or more entities or institutions not part of a single administrative organization".

The above is also the domain of resource sharing, however, the latter assumes a much wider dimension, including physical, intellectual and conceptual resources. In addition, as argued by Nganga[40], it incorporates a body of people with library and information needs, and covers the activities in organizing a set of optimum relationships to the needs of users.

2.9.3 Coordination:

The notion of Coordination in networking has been subjected to some amount of criticism. The Longman Dictionary again defines coordination as "bringing into

common action, movement or condition, especially so as to act together in a harmonious way". At first sight, there appears to be little difference in the meaning of the two words (cooperation and coordination). However, Ian Rogerson[41] argues that there is a considerable variation in meaning. He points out that there is a concept of voluntary action in the former, whereas coordination is something that is imposed. In a report of an earlier investigation conducted by D.J. Edmonds in 1986, and cited by Rogerson[42], Edmonds identified coordination as involving and leading to "a loss of autonomy". In sum, Rogerson, [43] again quoting the Library and Information Services Council report of 1986, argued in support of Edmonds that "the idea that by contracting together libraries in a particular geographical area will give wider access to the sources of knowledge and information is naive and a profound insult".

With the advent of information networking on the African continent, librarians and information professionals carry divergent opinions about coordination in networking. It is their belief that in highly motivated, richly endowed and systematized

societies, cooperation can reach great sophistication.
On the contrary, however, where resources are scarce, where there is competition for resources (and a dearth of information), and where organizations are poorly-based, cooperation is difficult to achieve, however willing the agents. Massil[44] in his contribution noted that the distinguishing mark of a network seeking to overcome these

and other constraints is therefore that "whatever the commitment to cooperation, it will be the coordinating factor that will give strength and formality to the arrangement".

Writing on coordination, cooperation and resource sharing, Kisiedu[45] observed that effective cooperation through coordination of efforts is a basic precept of the UNESCO information programme, since national self sufficiency in

information in the modern world is neither possible nor desirable because of the volume and cost of information. She reiterated that resource sharing would ensure the availability of national and world-wide information at a fraction of the cost of each country endeavouring to acquire it individually. She, however, expressed regret that sharing and cooperation have had little impact, particularly on the African continent, because they have neither been formalized nor coordinated. Such then is the importance of the element of coordination to the sharing effort.

Coordination by its nature entails directed policy to ensure maximization of limited resources so as to focus the benefits of improved information access and provision as generally as possible. Whatever the arguments advanced in support of coordination, care should be taken to ensure that the pattern of coordination must balance and reflect the needs, interests and aspirations of the participating autonomous bodies. To this end, any coordinating organ

established within a network should not be seen as a competing entity, but rather as a facilitating service enabling all the participants to operate flexibly.

Be that as it may, resource sharing, cooperation and coordination constitute indispensable ingredients in information networking. In unison, they serve as a means by which the information system can work together to make information universally available and accessible to all.

2.10 BENEFITS OF INFORMATION NETWORKING

When properly manipulated, networks offer tremendous benefits to participating members. Throughout Africa and indeed the world at large, there is an evolving recognition of the importance of information networks and of the linkages among institutions, countries, researchers and other players in the information exchange process. This situation has emerged as a result of the enormous benefits that the pioneers of networking, notably the advanced countries, have derived from their initiatives. It is now worth pausing to assess some of the prospects that networking has for humanity.

2.10.1 Cost Effectiveness:

One of the most important advantages of the networking approach is its cost effectiveness. According to Habitat[46], the essence of a network is to link existing functional institutions to enhance their individual and collective performance with modest financial allocations.

With the existence of good communications links in the geographical area covered, the flow of information, exchange of expertise, organization of joint research activities and workshops could be carried out more efficiently than by any other type of bilateral agreement.

2.10.2. Centres of Excellence

Network member institutions which are better endowed in terms of expertise and facilities may become a source of inspiration and technology transfer to less fortunate members. As Lungu[47] observed, they may indeed develop into centres of excellence which could help to upgrade other institutions in the network.

2.10.3 Wider Information Sources

At the local front, Malima[48] emphasized that networking would definitely enable a better understanding of the extent of information sources available and the gaps that need to be filled. He also agreed that networking can result in the rationalization of the use of technologies needed to make the information accessible to all levels of planning and decision making. This situation would be most rewarding if network participants aspiring for modern information technologies and training facilities could channel their demands through a common platform.

National networks often facilitate improved services as well as the conservation and preservation of the national literature.

2.10.4 Expanded Document Supply Services:

From the international viewpoint, networking can have a profound effect on international inter-lending and document supply. This, according to Cornish[49], is achieved through expanded access to resources, increase in the speed of supply and payment to suppliers. Cornish's views have been supported by a couple of surveys carried out by IFLA Office for International Lending. For instance, the British Library Document Supply Centre (BLDSC) handled over 790,000 international requests in both 1989/90 and 1990/91[50].

Sheila Pantry[51] summed it all up in her observation that networking enhances library and information services by providing quicker routes to the acquisition of a piece of information for a consumer. With the catalogue of benefits accruing from networking, it will be in the best interest of African countries to follow the initiatives of the advanced countries.

2.11 NETWORKING AND PILOT PROJECTS IN AFRICA

The 1980s witnessed the enthusiastic beginning of networking activities among African librarians and information professionals. This took the form of attempts to establish both national and regional networks on pilot basis, with the assistance of a host of international organisations. Among these organisations were those of the United Nations Family, particularly UNESCO, UNIDO, and FAO. Other organisations which assisted this effort include the

World Bank, the International Development Research Centre (IDRC), United States Agency for International Development (USAID), the German Foundation for International Development (DSE) and private foundations.

The Board on Science and Technology for International Development (BOSTID)[52] in a report on STI systems and services in Africa revealed that the current state of STI networks is a major concern for African scientists and researchers who fear becoming even more isolated from their peers both within and outside Africa. BOSTID attributes this unhealthy situation to the general absence of specific policies on STI networks in the African Region. This invariably leaves STI matters to be handled ineffectively by a variety of government bodies.

Despite this major constraint, one is impressed to realise that Africa is not completely left out of the information arena. BOSTID[53], in a later part of its report, recounted that, during

site visits, the panel was impressed to find virtually all of the information technologies, including Desktop publishing, CD-ROM, Electronic Mail and Facsimile Transmission, in use in some African institutions. Isoun in a related issue commended international institutions in Africa for their initiative in the application of modern information technologies.

Abba, Diodarno and Trumpy[54] have also expressed satisfaction with the level at which some African countries are already connected or plan to be connected to a host of

international research networks. At the national frontiers, they cited countries such as Tunisia, Egypt, Senegal, Mauritius, South Africa and La Cote d'voire operating quite effectively. Similarly, they pin-pointed other networking initiatives involving multinational data networks. These include, among others, the Eastern and Southern African Network (ESANET), involving Tanzania, Zambia, Kenya and Zimbabwe; the Network of Non-Governmental Organizations (NGONET) among Tunisia, Senegal, Kenya and Zimbabwe. Others include Communication System for Health Workers (Health-Net Satellite) among Uganda, Kenya, Tanzania and Zimbabwe; as well as PADISNET, the Pan African Development Information System Network. Currently, PADISNET is one of the largest of all African networking projects, with 37 national participating centres associated with it[55].

2.12 PROBLEMS OF INFORMATION NETWORKING

Like any human activity, information networking ventures come up against constraints which have to be seriously addressed if basic objectives of networking should be accomplished. Currently, it is the developing countries which are the worst affected by these common problems. Neelameghan[56] has presented a diagnosis of the problems of information networking in developing countries, and he defined a developing country in this context as "one which does not have the resources and capacities in adequate quantity and quality". Notable among the constraints are:-

2.12.1 Finance:

Networking is an expensive undertaking and the formation of any kind of network requires continuous financial commitment from all parties. Unfortunately, as commented by BOSTID[57], all the African countries visited are experiencing fiscal shortages. In effect, budget constraints have prevented most institutions and systems from participating in any viable form of networking. The worst side of the financial limitations is the chronic shortage of hard currency which drastically curtails the purchase of goods and services particularly modern IT equipment and information products such as databases from abroad.

2.12.2 Communication:

Electronic networking acquires its power and effect through the process and hardware of communication. However, Ayiku[58] specified that "this hardware of communications satellites, digital telephones, packet switching facilities, optical fibres, computers, and complex software is not only expensive, but requires long periods and heavy investment to acquire, maintain and eveOntually manufacture". These characteristics place it far beyond the means of many African countries.

Focusing on Telecommunications systems, Patrick Fitzgerald[59] commented that the systems in many African countries are suffering from deteriorating and obsolete equipment as well as inadequate investment. ISOUN[60], on

his part, described them as unreliable, under-developed and poorly maintained. In Ghana, despite the poor state of development, telephone charges are high and deter potential users of communication equipment such as telex, telefax and telephones. Furthermore, both Fitzgerald and Ayiku expressed concern about the lack of political commitment in implementing plans of regional Pan-African Telecommunications Projects and the Regional Pan-African Telecommunications Union. This has further exacerbated the problems of modernizing and linking-up the telecommunications system in Africa.

2.12.3 Lack of Expertise

Networking requires continuous staff commitment in running the related project agreed upon by the networking participants. Expertise at technical level is required. All parties should be able to share their resources, expertise and should be willing to contribute for the benefit of the networks. BOSTID in its survey also concluded that, even though the African information sector has made much progress in acquiring and using new technologies, there is a shortage of trained personnel. This has actually prevented many information systems from participating effectively in any form of networking arrangement.

2.12.4 Training Facilities:

However observations by Council for the Development

of Economic and Social Research in Africa (CODESRIA)[61] revealed that most African documentation and information centres are still library oriented because of inadequate local facilities for training and retraining of information specialists.

In view of the rate at which IT is expanding, the few training facilities in Africa and the limited training programmes done outside are woefully inadequate to meet both current and future demands.

2.12.5 Social Problems:

Another important problem is the fear of loss of autonomy on the part of network participants. Formation of networks requires high-level decisions such as recognition, acceptance and willingness of related institutions to participate in the network. The coordinating body should be accepted by all members in good faith. However, Batubo[62] noted that most participating institutions in cooperative ventures often entertain the fear of losing their autonomous status in order to meet obligations imposed by the new system. This situation does not augur well for effective and efficient networking. In addition, Musana[63] has cited the apathy of some relatively large libraries towards lending of their materials. He noted, that more often than not, most of these better endowed libraries see themselves as being overexploited by the smaller units who give out nothing for whatever they receive. The apathy on the part of large libraries is also

a manifestation of the desire for autonomy or fear of its loss in a cooperative ventures.

2.12.6 Lack of an Enabling Environment:

Perhaps, the most notorious problem facing networking and the information industry in Africa as reported by BOSTID[64] is "the lack of an enabling environment". To the panel, the absence of a nurturing environment manifests itself in diverse ways such as lack of recognition that telecommunications and information are integral parts of any development project. Others include less incentive on the part of researchers to use information services, insufficient understanding of the value of information as compared to more traditional values, the declining use of librari0es, and the inadequate collection of locally produced data.

ISOUN[65] supports this view and goes further to identify and itemise some of the deficiencies and constraints that result in the absence of an enabling environment. These, according to him, can be grouped together as the unacceptably low development of information infrastructure and services which include, inter-alia, library facilities; educational, research and development institutions; media communications (publishing, public mass media); computer literacy; CD-ROM, facsimile, electronic mail processing and data communication facilities; and insufficient managerial expertise.

2.12.7 Copyright Law Inadequacy:

The question as to who owns the databases which are developed under a particular cooperative programme can be an issue, particularly with respect to international networks. In an attempt to find a solution to this problem, IFLA has commissioned King Research to conduct a survey in order to explore the issues involved in the copyright legislation of bibliographic records in machine readable form. The report, according to Shahar[66], found out that "the copyright law does not provide a consistent mechanism to govern the exchange of MARC records and concluded that bilateral agreement continues to be the most feasible mechanism of achieving this".

2.12.8 Ineffective Coordination Programmes:

The issue of a coordinating centre for databases ranks high among networking constraints in developing countries. In developed countries such as the United States, there are commercial information utilities like DIALOG Information Services which host a number of bibliographic and other databases. In effect, a user logging on to DIALOG information will be able to access a variety of databases, sometimes up to 300 of them. This is time saving and convenient for the user. In support of these services, Shahar[67] reveals that the National Technical Information Services (U.S.) provides a 24 hour document delivery service for any research material available in the US.

Unfortunately, the situation is different in third world countries where such facilities are not yet available. This results in users having to go from one database to another doing searches which are time consuming. This inevitably results in delay in acquiring information available even within one country.

2.12.9 Hardware and Software Incompatibility:

Karunauayake[68], in assessing resource sharing in Sri Lanka, noted with concern the hardware and software incompatibility in developing countries as a result of the proliferation of these high technology equipments. In recent times however, the situation seems to be improving in several developing countries in terms of hardware and software input formats, processing, data exchange and output formats. For instance, the Software Division of National Informatics Centre of India has succeeded in developing reputable software industries that are striving to meet both domestic and export requirements. Similar ventures are receiving serious attention in Brazil and Malaysia. Efforts by international organisations on behalf of Third World countries in this regard have also imporved the situation. Neelameghan[69] acknowledged this changing trend when he noted that the distribution of softwares, notably IDRC/MINISIS and Unesco/Micro - CDS/ISIS, by network coordinating centres and supporting agencies such as IDRC, ILO and Unesco, and the recommended use of data exchange formats based on the Common Communication Format

(CCF) for bibliographic databases has introduced certain compatibility and convertibility among the systems.

2.12.10 Inadequate Reprographic Facilities:

Document delivery through inter-library lending practices according to Boadi[70] has often been frustrated by the general lack of reprographic facilities and the perennial problem of poor communication and delivery systems.

2.13 CONCLUSION

Networks, like all living human organisations, have a life cycle of their own. Their needs, as well as their reasons and circumstances for existence, change with time. Their life cycle will be longer or shorter in direct relation to their ability to generate products and services that correspond to the expectations of those who made the decision to set them up, as well as their ability to redefine their objectives whenever the need for modification presents itself.

Shahid Akhtar, writing on the Latin American situation, noted that when networks in the subregion were established in the 1970s, their structures, products, services and activities were a response to the state of the art of information handling in the region at the time. In the 1980s, however, he noted, with gratification, their ability to adopt new information processing technologies, which in turn have enabled them to redefine their

respective roles where necessary. It is important therefore that, all things being equal, a network should develop a system of storage and information supply with the aim of satisfying user needs, make use of all opportunities for cooperative agreements with other networks operating in the same field in order to cut down cost and, at the same time, exercise optimum flexibility which would make it possible for it to tailor the volume and intensity of network programme activities to the resources available[71]. Similarly, with regard to the capacity of a network to carry on networking activities after the termination or reduction of international support, governments and decision makers of participating countries/institutions should endeavour to sustain networking links by allocating resources which are needed for the execution of planned activities. A network should also develop indicators through cost-benefit analysis with a view to controlling cost and evaluating performance[72].

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CHAPTER THREE

3.0 LIBRARY COOPERATION

3.1 Perspective on Library Cooperation

Library cooperation is not a new concept in the history and practice of librarianship. However, whereas the developed countries have succeeded in evolving and sustaining numerous viable cooperative ventures, most developing countries, particularly in Africa, are yet to make any meaningful impact to that effect.

3.2 RATIONALE

In the last thirty years, several pressures have compelled libraries and information units to move towards greater participation in cooperative schemes. Bowyer [1] identified two fundamental elements as contributory factors to the process. In the first place, he noted the application of computers to library operations and the need to achieve economies of scale; and secondly, the financial stringencies being experienced by many countries and the need to maximise the use of scarce resources. Boadi[2] concentrating on regional library cooperation emphasised the rising costs of information resources and shrinking budgets resulting in the inability of any one nation to satisfy the sum total of her information requirements.

Sangal [3] on his part identified the rapidly growing sophistication in the demands of library users, coupled with the massive growth of the users

themselves. He also noted the exponential growth in the volume of publications in the face of dwindling financial resources of libraries and information centres using a Nigeria as a case in point. Summing it all up, Anafulu[4] enumerated, among others, the rise in professionalism among librarians,the realisation of the fact that no library could possibly satisfy all the requirements of its readers from its own resources, the diminishing values of financial allocations to all types of libraries, as well as the advances in information and communication technologies as some of the main factors which have acted as impetus for speedy interchange of information and materials. There is mutual consensus that greater cooperation is the only concrete way of extending the range of resources and services and in achieving some measure of collective self-reliance.

3.3 Library Cooperation: An Overview

The mechanism of cooperation has been tried with varying degrees of success in several developed and a few developing countries.

3.3.1 In the United Kingdom (UK)

Library cooperation was mentioned in the Kenyon Report of 1927[5]. The report encouraged the setting up of voluntary cooperation among all types of public library authorities ranging from county to borough or

district. An outstanding event in cooperation in the UK has been the formation of the British Library in 1973 by the amalgamation of the National Central Library and the National Lending Library for Science and Technology.[6]

In recent years, the advance in information technology has brought major improvements to existing schemes, to speed up processes such as interlibrary loan requests, computerized cataloguing and bibliographic services. The availability of micro-editions of union catalogues such as LASER (London and South Eastern Regional Library) and BLCMP (Birmingham Libraries Cooperative Mechanization Project) has succeeded in enhancing the exploitation of cooperative computer-based cataloguing systems using both MARC records and records produced locally. In his analysis of current situations, Sangal[7] noted that the UK's most outstanding cooperative scheme was the establishment of the British Library Lending Division (BLLD), which is worth emulating by any country.

3.3.2 The United States has equally achieved remarkable successes in the field of cooperative programmes. Library cooperation in the US could be traced to 1901 when the Library of Congress (LC) started the printing and distribution of catalogue cards. The main objective of the scheme was to help reduce the workload of other libraries in the area of

technical processing, especially cataloguing and the location of materials. With the development and distribution of catalogue cards, the Library of Congress came to the decision to create depository sets of L.C. cards for cataloguing, as well as for locating items, which gave birth to the inter-library loan service in the United States.(8)

A notable postwar scheme was the now extinct Farmington Plan, originated by the Association of Research Libraries, to rationalise foreign book procurement throughout the country.

Prominent among current cooperative services in the US is the OCLC (Online Computer Library Centre, originally Ohio College Library Centre). Established in 1967, the OCLC was designed to share resources and reduce costs of academic libraries particularly in the field of technical processing in Ohio State. This eventually led to the establishment of a computerized bibliographical database with terminals in cooperating libraries to provide cataloguing data.

In 1973, the scheme took a dramatic turn when membership was extended to participants outside Ohio State. The new name was adopted in 1981 and in the same year, a European marketing campaign was launched. Currently, there are over 3,000 members. The OCLC network database consists of MARC records and records created by member libraries for materials not covered by the MARC files. A range of other services is also

provided, including a micro-computer based serials control system, a circulation control system and an Online Public Access (OPAC) system.

An excellent example from a Third World country is the National Information System for Science and Technology (NISSAT). This is a multi-tier organization for coordinating information centres and systems for sharing library and information resources.

Coming nearer home, Alemna[9], quoting Bozimo, traced the history of library cooperation in Nigeria to a 1955 memorandum which was submitted to the Federal Government by John Harris. In his submission, Harris outlined a strategy for national growth of various services including the setting up of a Library Advisory Committee and the coordinated development and utilization of reference and bibliographic services. It is against this background that Anafulu[10] described a couple of cooperative schemes most of which collapsed after a few years practice.

In Ghana, the cooperative environment is still in its embryonic stage. The most active participants are the three university libraries that indulge in intermittent practices of inter-lending. It is however worth noting that the sustanance of the scheme depends largely on the goodwill of the University Librarians, as well as a gentlemen's agreement in the absence of a clearly formulated policy. Besides, there are annual meetings of University Librarians and Head Cataloguers

to discuss matters of common interest. Currently, plans are far advanced with comprehensive proposals for the automation of the University Libraries. These developments, coupled with the establishment of the GHASTINET project, provide ample evidence that the cooperative scenario is receiving considerable attention from well-meaning professionals.

3.3.4 International Cooperative Programmes

Soosai[11] in an article observed that the 1970's ushered in a new era of international cooperation in library development, especially among the developing countries. This need arose as a result of the increasing awareness on the part of the younger library professionals to look beyond their national frontiers for solutions to their many challenging problems.

A UNISIST study report expressing deep concern over the inability of the modern library to meet the growing demands of the scientific and technical community is emphatic that "cooperation with others, wherever their location, is the only workable solution". The mode of cooperation advocated goes beyond the traditional inter-library exchanges.[12]

Against this background, the erstwhile UNISIST and NATIS programmes of UNESCO which merged to become the General Information Programme (UNISIST/PGI) are

aimed at the development of national and international systems on the principle of "international cooperation and participation". In keeping with its international remit, Tell Bjorn [13] recounted UNESCO's continued efforts in enlisting the support of competent international organisations for measures designed to facilitate the circulation of educational, scientific and cultural materials. To this end, series of mechanisms have been put in place to reduce tariffs, freight and currency obstacles to the movement of these materials.

Unesco also encourages the establishment of cooperative publication plans as a means of developing book market in a region. Tell Bjorn cited the case of a multinational publishing enterprise, the Unesco Regional Book Development Scheme, initiated in Japan in 1966. The aim of the project was to ensure adequate publication of children's literature in the Asiatic region. Some of the most outstanding international schemes with strong linkages with African countries and institutions include, AGRIS (The International Information System for the Agricultural Sciences and Technology); AGLINET (The Agricultural Libraries Network); CABI (Commonwealth Agricultural Bureau International); and INIS (The International Nuclear Information System). From the strategic point of agricultural modernization to Ghana's socio-economic development, AGRIS and AGLINET would be

briefly discussed.

The Food and Agricultural Organisation of the United Nations (FAO) is continuously involved in improving the transfer of scientific and technological information, within FAO's field of competence and responsibility among its member nations. This is done through the development, promotion and implementation of an integrated set of information transfer programmes which include the establishment of worldwide agricultural information systems and the execution of field projects for the strengthening of national capabilities in information and documentation[14].

AGRIS, a cooperative worldwide information system on current agricultural literature, and AGLINET, a cooperative system for the exchange of services and information among the main agricultural libraries, are products of the FAO's Library and Documentation Systems Division located at the FAO Headquarters in Rome.

Guinchat and Menou[15] observed that agricultural literature is growing at an estimated rate of 250,000 new documents per year, whereas 1.5 million abstracts are being produced per annum by specialised information centres. Against this background, the AGRIS programme aims at improving the flow of information and services to users through cooperative action involving all countries and their specialised

documentation centres, in order to achieve a better coverage of the newly produced agricultural literature. It also aims at eliminating gaps as well as duplication of efforts and increasing the variety and efficiency of services. Of importance to this cooperative scheme was the feeling among the members from the developed countries that it would make available to them vital materials from the developing countries which could not be obtained through the normal book trade services.

Right from its inception, in January 1975, the system which shares computer facilities with the INIS database in Geneva has developed a comprehensive referral service embracing both the traditional information media and non-conventional types relevant to agricultural development. The references together with author and subject indexes are published monthly in AGRINDEX of which a limited number of copies is made available free of charge to all FAO member states, but which is also available on subscription to non-members. In addition, AGRINDEX also exists in magnetic tape form, obtainable at a subsidised cost by all participating countries.

FAO, in a recent publication titled The First 40 Years, [16] revealed that the AGRIS Coordinating Centre at FAO headquarters is responsible for methodology development, the training of staff in participating countries and the central processing of data. Some of

the specialised subject areas well covered by the AGRIS programme include agriculture, forestry, fisheries, nutrition and rural development.

AGLINET

The primary aim of AGLINET, according to Guinchat and Minou[17], is to promote mutual and national exploitation of agricultural library resources. This is expected to enhance the world's agricultural development, through systematic collaboration among agricultural libraries for the efficient provision of interlibrary loan services (including photo-reproduction) and exchange of bibliographic information and data on the participating libraries' holdings.

AGLINET, which was set up in 1974, consists of a chain of major agricultural libraries in each region or country of the world, supported by the international centre, FAO's David Lubin Memorial Library at FAO's headquarters.

Within the framework of cooperative agricultural information provision, the FAO further provides technical assistance in agricultural documentation information to developing countries or groups of countries. This, according to Gunchat and Minou[18], is executed through consultant missions and field projects including the provision of methodology, expert services, equipment and fellowships.

The overriding objectives of such projects are

"to assist countries in tracing, assembling, processing and making available to users the agricultural documents produced in or on each country during the recent decades"[19]. More often than not, such important documents, crucial for national development, are dispersed in the country itself or abroad.

Despite the increasingly holistic approach to the study of cooperative schemes the world over, it is worth isolating the various components of the system for scrutiny.

3.4 ASPECTS OF COOPERATION

The areas of cooperative activity which have attracted much attention both in the professional literature and in actual practice include joint acquisition programmes, union catalogue building, inter-lending and common access facilities. In addition, there are exchange and redistribution of materials, translation services, collective binding and depository of theses and dissertations in science and technology. Stirling (1986) specifically identified schemes for cooperative storage and retrieval, shared computing and technical processing facilities, as well as joint staff training and similar manpower development projects. All these, he perceived, would enhance greater administrative economies.

statements and well constituted organisational framework is necessary"[22]. The purpose of such a scheme is twofold: to ensure that the total significant output of material on given subjects from national and/or regional sources is made available in at least one of the libraries concerned. In addition, it presupposes the elimination of unnecessary duplication in the acquisition of documents that may either be too costly or too little used to justify multiple location.

Examples of successful foreign schemes based on the concept of subject specialisation or geographical zoning are abundant worldwide. They include The Farmington Plan (USA), mentioned earlier, and the Scandia Plan involving Norway, Denmarks Finland and Sweden, to name only a few. The Scandia Plan brought together public, special and research libraries with a formalized distribution of the obligation to purchase, exchange and store old and new documents in the humanities.

3.4.2 Joint Processing

A natural sequel to the cooperative acquisition of document resources is their bibliographic organisation. Under this heading comes a wide range of activities which permits intellectual and physical access to the document resources. This invariably involves central processing centres.

Sangal[23] defines a central document processing centre as an agency to supply fully processed books and documents to the constituent units along with printed catalogue cards, so that wasteful duplication of work is eliminated. Processing centres, he went on, undertake classification and cataloguing of documents and inscribe call numbers in more than one classification system on the catalogue cards. This enables participating libraries and units to have a choice in adopting one of them to suit local needs.

One of the most important merits of the scheme in terms of interlibrary cooperation, and in the wider context of Universal Bibliographic Control, according to Boadi, is the opportunity it offers for the standardization of the bibliographical record.

On the international scene, the Library of Congress (LC) in the United States and the British National Bibliography (BNB) in the United Kingdom have accomplished immeasurable successes in centralized processing services. The LC on its part started distributing printed catalogue cards in 1901 resulting in the creation of a Cooperative Cataloguing Division in 1932. Participating libraries could readily copy or even incorporate such catalogue cards directly into their files, thus limiting such works and providing de facto standardization within the cooperative entity.

Within the last few years, there has been a dramatic change in standards of bibliographic

description culminating in a shift from the conventional printed bibliographies and library catalogues to Machine Readable Catalogues (MARC).
A leading example of this new approach is the Library of Congress MARC Experiment which became operational in 1966. Its main goal was "to produce a standardized machine-readable catalogue record that can be manipulated and reformatted in different installations to serve local practices and needs"[24].

The MARC overcomes all the shortcomings of traditional printed bibliographies and library catalogues. In this context, MARC is generally used to describe the arrangement of data elements in bibliographic records as agreed upon by certain libraries for the purpose of data communication and exchange. The arrangement concerns the use of tags, identifiers, content designators and field separators in creating records of bibliographic entities in the computer.

The advanced countries have individually developed their MARC formats. Thus we have the US MARC and the UK MARC. There is however an international standard known as the Universal Bibliographic Control International MARC, (UBCIM), lodged with the International Federation for Library Associations (IFLA). This is the pivot around which all national MARCS revolve. For instance, it enables the British Library to convert records in US MARC to

the UK MARC and vice versa.

MARC is usually a project undertaken by a national library for joint participation and for the mutual advantage of the users of its products and services. This is a unique model for all developing countries (including Ghana) aspiring to evolve such cooperative ventures to adopt.

3.4.3 Union Catalogues

Harrod[25] defined a union catalogue as a catalogue of the various departments of a library, or of a number of libraries and information systems participating in a cooperative activity of one kind or the other indicating their location. It may be an author or subject catalogue of all the books or of a selection of them and may be limited by subject or type of material. This could take the form of printed cards or a machine readable database. Notable examples include the IPPEC, a Union Catalogue listing the foreign periodicals and serials received in France by Libraries and Documentation Centres. It is published and maintained by the French National Library in Paris. Another is the National Union Catalogue of the Library of Congress in the United States.

The compilation and use of Union Catalogues for the various cooperative schemes have been described by Tell Bjorn [26] as the corner-stone in the structure of

physical accessibility to dispersed library collections.

Within the confines of foreign currency starved countries, a union catalogue of foreign book acquisitions might be considered an indispensable asset, provided an inter-library loan service is developed between the countries of the region. This could take the form of just a central card catalogue in one designated library to which enquiries must be sent every time an item is needed. Modern trends have made it possible for these tools to be held in electronic format such as magnetic tapes and CD-ROM databases. Similarly, an annual or semi-annual list could be duplicated and distributed among the cooperating libraries, enabling a needed book to be located. As an instrument of cooperation, the part played by union catalogues has often been equivocal, although never negligible. Bowyer[27], reviewing the impact of union catalogues on library cooperation, noted that their efficiency is dependent on regular reporting of acquisitions by the contributing libraries and regular maintenance by the host library. He concluded that the potential value of union catalogues increases with their growth whereas their practical value increases more slowly as they become more and more expensive to maintain. Despite all odds, document resources that have been cooperatively acquired and processed (on union catalogues) must be

made accessible to members.

3.4.4 Inter-lending Programmes

For obvious reasons, even the largest libraries of the wealthiest countries of the world manage to acquire only a small proportion of the world's literary output. Under these circumstances, levels of acquisition of documents fall far short of users' information requirements. In order to solve this problem, libraries and information centres have developed local, national and international document inter-loan systems to facilitate the sharing of their resources in meeting the information needs of their users.

In an attempt to conceptualise document inter-loans, Ilomo and Mwaimu[28] described them as "transactions in which documents or library materials are made available between institutions and between countries for the use of requesting individuals, whether as loans of the original materials or as mere copies". In other words, it is a process by which libraries or information centres obtain for their users documents or information which they do not have in their own collections.

This brief definition shows that the importance of inter-library loans cannot be overemphasized, since documents that have been cooperatively acquired must

of course be made accessible to members. Boadi[29] has stressed that materials that are not heavily used by one library could be obtained for users in another library. To him, an efficient interlibrary lending arrangement is a sine-qua-non for cooperation in the building and sharing of document resources.

A good number of countries the world over have document inter-loan systems. However, as Boadi put it, a country where the internal lending system works well is also the one which will best meet requests from abroad. The United States, Britain, Canada and Japan, for instance, have long established document inter-loan systems of varying degrees of excellence. The OCLC of the US, and the BLAISE (British Library Automated Information Service), postal search service operated by the MEDLARS section of the British Library Lending Division which supplies computer literature searches of the medical database "MEDLINE", are among the best inter-loan systems.

3.4.5. Exchange and Redistribution of Materials

Another facet of cooperation is the exchange and redistribution of materials. This scheme closely resembles document inter-loans, but operates with considerable variations. However, it should be encouraged as one of the methods of improving the scope of a library's collection.

Njuguna[30], confirmed that many libraries receive

a lot of publications in the form of gifts mainly from abroad and, to a lesser extent, from within the country, having no control over their selection. On receiving these materials, one finds that only a few are relevant to the needs of one's library and that the bulk of materials comprises unwanted publications.

Commenting on the system, Sangal[31] noted with satisfaction its success in the UK where the National Book Centre accepts the materials of the libraries which wish to dispose of them. In practice, the centre acts as a clearing house. It circulates the lists of items for disposal and they are sent direct to the recipient library from the donor library. He concluded that many new and impoverished libraries have benefited enormously by this new trend.

The opposite situation obtains in many developing countries. A good example is Njuguna's[32] portrayal of the situation in Kenya. He noted that, more often than not, such materials are stored somewhere in the library for long periods of time until the library has run short of space. When this happens, a decision is made to offer such materials to other libraries and schools which readily accept them simply because they have no alternative method of acquiring publications. It is high time Africa emulated the laudable precedent set by the advanced countries.

3.4.6 Translation Services

Translation Services have always been taken for granted as an essential component of cooperative programmes. Oladele[33] has expressed genuine concern over this anomaly. It is his firm opinion that in real life situations, inter-dependence among organisations and countries with diverse cultural and linguistic backgrounds makes translation services an indispensable tool in any development- oriented cooperative scheme. For instance, a professional with the advantage of a language other than the common language in a cooperative system can be assigned the job of translating any document that is found to be relevant to the operations of librarians and information centres in the system for onward circulation among other participants.

A UNESCO study report (1977)[34] indicated that the last three decades have witnessed tremendous developments in cooperative translation programmes. On the international scene, the report cited the case of the European Translation Centre, established in 1961. It is a giant project with the cooperation of 14 European countries in addition to the US and Canada. Its main objective is to collect, catalogue, abstract and index all available scientific and technical translations regardless of language or origin and to supply copies of them on request. Other programmes of the same purport are also run by national centres.

Notable among them are the "Centre National de la Recherche Scientifique" established in 1950 in France, and the John Crear Library of the US which started operation in 1959[35].

Recent developments include the European Translation Centre (ETC) at Delft in the Netherlands which acts as a clearing house for many translations, particularly from the Slavic languages. It publishes the World Index of Scientific Translations and List of Translations Notified to ETC. Currently, Unesco publishes an annual directory of translations, the Index Translationum.

3.4.7 Cooperative Development and Sharing of Personnel.

Avafia[36] has observed that staff are second only to finance as a prerequisite for a good library or information centre. In support of this declaration, Boadi[37] stressed that the dearth of suitably trained staff is one of the features common to most library and information services in the developing countries. Many other authors, including Rosenberg[38], Bouazza[39] and Mwinyimvua and Habi[40], share similar views. In a state-of-the-art report, Avafia[41] revealed that the size of professional staff in six African university libraries varied considerably, from 120 in Cairo University to only two (2) in the Togolese University of Benin in Lome. This aptly describes the prevailing

manpower situation in Africa, justifying the urgency for cooperative manpower development.

Joint staff development has been described by Mwinyimvua and Habi [42] as shared responsibility for staff development by a number of institutions. It implies shared training goals, uniform status and remuneration and shared manpower utilization. This is naturally one of the best solutions to the chronic manpower problems, considering the endemic budgetary constraints of African countries.

Besides formal educational programmes, informal schemes such as staff exchange, attachments and visiting programmes could offer immense opportunities for cooperation at both national and regional levels. The visiting and exchange mechanisms would particularly help in the acquisition of new knowledge, new skills and new experiences. Boadi concluded that this new development would naturally obviate the waste of intellectual effort and financial resources which are being incurred by individual units as a result of uncoordinated action. Above all, it would provide increased awareness of the problems and opportunities the profession has to contend with and hopefully generate goodwill and better understanding within the professional cadre.

3.4.8 Cooperative Storage and Delivery Schemes

A common feature of most large libraries is the

enormous collections of books which are not constantly in demand. Such books end up cluttering the shelves, creating acute shortage of shelving space. As rightly documented by Sangal[43], very few libraries in the world have been lucky enough to find additional shelving space to cope with its rate of new acquisitions.

A practical solution to the problem, prescribed by Sangal, lies in establishing storage libraries which receive less used materials for deposit from the participating libraries. Complementing his own views, Sangal quoted Eilsworth (1981) who had pointed out that pressurised libraries must retire their less lively materials to cheap storage warehouse on the outer edges of their campuses or in some nearby city. This very practical idea caught up well in both developed and developing countries resulting in the emergence of several operational schemes. The first notable storage library christened the New England Deposit Library in America was established in 1942. In the UK, the Hampshire Inter-Library Centre was created in 1957, while India followed with her Inter-Library Resources Centre (New Delhi) in 1974[44].

One basic fact which has emerged from the foregoing is the enormous and indispensable role of cooperative ventures in the development of modern library and information systems in the advanced countries. Developing countries, particularly those in

Africa, should learn some lessons from these to maximise their meagre resources for the benefit of their users.

3.5 STATUS OF LIBRARY COOPERATION IN GHANA

Library cooperation has been a topical issue for members of the Ghana Library Association for the past three decades. In 1964, the former Director of the Ghana Library Board, A.G.T. Ofori, reviewed the state of affairs and concluded that there was very little cooperation as far as public libraries were concerned. Against this background, he suggested that, since all libraries were funded by the central government, all the resources of all libraries (public, special and academic) should be made accessible to the general reading public[45].

Three other papers delivered at the Congress were entirely devoted to library cooperation. R.J. Young[46], in her presentation on University Library Cooperation, called for a joint plan concerning legal deposit with particular reference to ephemeral literature. She also opted for joint action with regard to the use of the Library of Congress Classification Scheme and a Union Catalogue of Periodicals for the three universities.

E.K. Neequaye[47] reviewing the case of special libraries declared that the time had arrived to institute an official scheme of cooperation. He

provided a theoretical framework for the scheme covering areas such as the development of inter-library lending based on union catalogues. Besides, he envisaged cooperative provision of materials and technical information and the coordination and institution of standard methods such as staff grading and classification. He also advocated a Joint Committee to compile agreed codes for cataloguing.

In 1972, a workshop was organised on The Pooling of Resources Among the Universities and Scientific Research Institutions in Ghana[48]. It was held at the University of Ghana, Legon, from 15th to 17th December 1972, under the joint sponsorship of the Council for Scientific and Industrial Research (CSIR), the University of Ghana, the University of Science and Technology, and the University of Cape Coast. At the close of business, an Ad-hoc Advisory Committee on Scientific and Technical Information was appointed "to study and make recommendations on a broad policy for the organisation, coordination and dissemination of STI resources in the Universities and research institutions."[49].

At the end of its deliberations, the Committee came out with a number of recommendations whose implementation, it believed, would establish the necessary infrastructure for effective cooperation within the library and information sector in Ghana. Included among the recommendations was the call for

the compilation of a Union Catalogue of Scientific Books and a Union List of Scientific Periodicals. Others included the Coordination of Acquisitions (particularly foreign scientific journals as well as locally produced non-conventional literature), the fostering of close links with international and outside organisations such as UNESCO, FAO, WHO, CABI, etc., and joint translation services.

Finally, the committee called for the formalization of inter-library lending, the sharing of equipment, as well as staff development programmes.

To ensure the development of an effective and efficient STI system in Ghana, the UNISIST National Committee was established in 1975. As part of its objectives, the Committee envisaged the effective organisation of scientific information resources of the nation through a cooperatively organised network of science libraries. These institutions, it assumed, would be manned by suitably trained personnel and supported by modern technology and reprographic information requirements and financial resources.

3.5.1 CSIR/US-NAS Collaboration

In February 1976, the (US-NAS) United States National Academy of Sciences invited the International Development Research Centre (IDRC), Ottawa to a meeting in Washington at which the CSIR's request was discussed. The IDRC agreed in principle to collaborate

with and assist the CSIR achieve the objectives of the programme.

Following the Washington meeting, a Joint Consultative Committee of CSIR/US-National Academy of Sciences/International Development Research Centre (OTTAWA) met in July the same year. At the end of its deliberations, the Committee recommended, among others, the development of a National Science and Technology Information Network under the auspices of the CSIR[50]. The proposed network was projected to have a strong element of coordination, cooperation and resource sharing.

The outcome of the foregoing was the drafting of a project document entitled: A PROPOSAL FOR THE ESTABLISHMENT OF A NATIONAL SCIENTIFIC AND TECHNOLOGICAL INFORMATION NETWORK[51]. It was subsequently submitted to IDRC for consideration in September 1986. A revised version of the said document which is the blue-print for the establishment of GHASTINET reflected greater emphasis on a national network involving the major sectors of the national economy.

The responses to the questionnaire sent to twenty randomly selected libraries and information centres brought into sharp focus certain issues on library cooperation in Ghana. These issues are discussed below.

3.5.2 The Public Libraries:

Within this sector, previous records provided overwhelming evidence that the level of cooperation was very marginal. However, the recent study revealed that even though unformalised, there is a strikingly noticeable increase in the volume of interlending between the various components of the Ghana Library Board. Furthermore, there is at least a modest inter-lending between the Ghana Library Board and the Universities of Ghana, with the Research Library on African Affairs playing a significant role. By far, most of the aspirations of A.G.T. Ofori remain more of a dream than reality.

3.5.3 At the University Level, the study showed that all the university libraries are involved in a wide range of inter-library loan services at both local and foreign levels. This is the most spectacular cooperative venture in Ghana today, in spite of the fact that there are no documented guidelines governing the scheme.

Exchanges also feature prominently on the cooperative agenda of the universities. All of them reported exchange arrangements among themselves and with a couple of allied institutions abroad.
Materials covered in the exchange programmes include a great deal of scholarly and research materials which are seldom available through the normal book trade

channels. The service is facilitated by the availability of photocopying facilities in all the libraries involved.

Also worth mentioning is the compilation of the now extinct Union Catalogue of the resources of all libraries in Ghana. The mandate for the production of this document in the Social Sciences and the Humanities was given to the Balme Library.

Inter-lending and exchanges apart, the impact of cooperative schemes and resource sharing on the daily routines of the university libraries was marginal and not a matter of great financial and administrative import.

3.5.4 Research Libraries:

In spite of the several far reaching efforts towards library cooperation within the research environment, no appreciable achievements have been recorded. It is however gratifying to note that within the context of GHASTINET, a modest start has been made in the compilation of a Union List of Scientific Serials in Ghanaian Libraries, as well as joint manpower development programme.

In view of the extremely low level of cooperative practices on the library and information scenario, it is worthwhile considering the constraints militating against such activities.

3.6 BARRIERS TO LIBRARY COOPERATION IN GHANA

In discussing the constraints to library cooperation, Oladele[52], in an overview of the Nigerian situation, observed that, two alternative operational methods readily came to mind. These were cooperation within the context of conventional library practices which have been described above, as well as joint schemes within the purview of information technologies (embracing computer electronics and telecommunications). Irrespective of whichever system, certain constraints remain constant, while some are peculiar to the individual approach.

3.6.1 Economic Factors:

More often than not, economic factors range highest among the numerous hydra-headed impediments to cooperation. In a number of related studies conducted, Alemna and Antwi [53], Boadi [54] and Tell Bjorn [55], all agreed that library cooperation is an expensive undertaking and needs firm financial backing from the institutional authorities to make it work efficiently. Unfortunately, however, according to Alan Mountjoy (1971) and J. Ndegwa quoted by Bouazza[56], the most chronic problem which libraries face in the developing world is a constant shortage of funds. This inevitably makes it extremely difficult or virtually impossible for libraries, not excluding those in Ghana, to achieve any meaningful results in the field

of cooperation.

3.6.2 Poor Library Resource.

The availability of resources in the environment is itself an impetus for cooperation. In such a situation, says Anafulu[57], cooperation becomes a tool for the management of abundance. Contrary to these norms, the paucity of library resources (particularly collections) rather poses a very serious threat to effective cooperation in most third-world countries. Alemna and Antwi, commenting on the Ghanaian situation, stressed that the university libraries, which are often considered better endowed in the country, stock collections that are far from comprehensive or adequate enough to be shared with other libraries and information centres.

Bouzza in his study of the problems of inadequate library collections in developing economies noted that any attempt to promote the sharing of resources among these libraries would be futile, since libraries not able to meet their own needs would not be able to meet the needs of others. He quoted Parker to sum up the argument thus: "Librarians cannot share what they do not have, and may feel that if too little is shared between too many, everyone will end up with even less than they had to begin with"[58]. It could be said quite emphatically that this line of argument is wholly unacceptable within the Ghanaian context. It is

precisely because each does not have enough that sharing is essential. The crucial issue is the proper organisation of the diversity of collections to be shared.

3.6.3 Inadequate Communication Facilities

These are yet other formidable restricting factors in the arena of cooperation. Parker, in an article quoted by Bouzza[59], maintained that poor document delivery time can grossly negate the gains of cooperative schemes. A remarkable feature of most developing countries is the extremely slow and unreliable postal services. This unhealthy situation results in making a mockery of inter-library lending and any written communication between libraries. Drawing from the Nigerian experience, Wynter[60] revealed that it took an average of 17.7 days for the Universities of Ibadan and Lagos to exchange a book, but only 13.3 days for either of them to get it from London. Telecommunications systems are also often so poor that even the telephone cannot be depended upon much of the time. This is an apt description of the Ghanaian situation. For instance, the University of Ghana and its libraries have not had telephone facilities for over a decade. Similarly, facilities in the other universities are so unreliable that they cannot be the bases of any cooperative scheme. Furthermore, such linkages do not exist between most

CSIR institute libraries, let alone with any other library. Worst of all, the National Focal Point of GHASTINET has no direct telephone link with most of its Sectoral Nodal Points or Special Resource Centres.

Anafulu on his part lamented that, despite the tremendous strides in improving telecommunications systems in Nigeria, their impact is yet to be felt in the field of transmission of information for study and research[61].

The prevalence of bad transportation system cannot be ignored. It is common knowledge that most of the cities and towns in Ghana are separated by long geographical distances. Besides, these entities are not properly linked by direct road, rail (and air) networks. Road transportation which is the most fancied cannot be taken for granted, basically because some of the roads are motorable for only limited periods during the year (most often in the dry season). These problems adversely affect document/information delivery systems and cannot be used as a means of promoting nation-wide inter-library cooperation systems.

3.6.4 Absence of Appropriate Legislation

The problem of implementing cooperative projects in the library and information sector in the young economies is further exacerbated by political factors, particularly the absence of appropriate legislation.

Stating the obvious, Bouzza[62] noted that governments often fail to plan for library development, thus bringing the implementation of library cooperation to a standstill. The crux of the issue as presented by Boadi[63] is that cooperative programmes could best be guaranteed at the national level by a national coordinating body (preferably in the spirit of the General Information Programme of UNESCO) with the requisite legal, financial and administrative backing to allocate areas of responsibility and also to ensure that obligations are met. Unfortunately however, not much has been done in this context due to lack of articulate National Information Policies and National Libraries.

While this assertion cannot be dismissed, it is unrealistic for librarians and information professionals to sit on the fence. It is for them to initiate programmes, particularly in establishing the viable structures in readiness for eventual governmental intervention. It is worth noting that GHASTINET and GAINS (The Ghana Agricultural Information Systems) are steadily surging forward without the requisite National Information Policy.

3.6.5 Manpower Development

Staff exchange and joint manpower development programme is one field in which Ghanaian libraries and information systems have never participated. Ofori[64]

attributed this situation to the dearth of trained personnel and "the nobody to exchange" syndrome. Other studies conducted by Sharif, Bowden (1983), Soltani and Sepheri, and quoted by Boauzza[65], perceived the shortage of adequately trained professional staff as one of the most serious obstacles to library cooperation now and in the foreseeable future. Neelameghan (1974)[66] emphasised that with the exception of India, a shortage of professional librarians and information practitioners is a common concern of most developing countries. Almost three decades after Ofori's observations, a recent study by the writer confirms that the situation remains largely unchanged.

3.6.6 Professional Attitude to Cooperation

A notorious human/professional obstacle to the implementation of systems of library cooperation often lies with the attitudes of the professional librarians themselves, most of whom still believe in "empire building" ventures. Expressing his utmost disapproval on this issue, Parker, as cited by Bouazza[67], observed that, in a librarian who should be the most receptive to the provision of exemplary library services for their clients, fear of change could exhibit a "sense of insecurity arising from real or imagined threats to employment or status associated with the idea of cooperation". No doubt these negative tendencies have

This dismal situation could best be attributed to the undue reliance of Ghana on donations which hardly take into consideration our needs and aspirations. In course of the study it came to light that there are various hardware types being used by various libraries and information centres. These include IBM, WANG, MITEC, PHILIPS, COMPAC and OLIVETTI. An array of varieties of computers on display at the Industrial and Technology Fair (INDUTECH) I and II (1988 and 1992 respectively) attest to the issue of the high rate of proliferation of the hardware in the country.

In relation to software incompatibility, the situation is more manageable, with most of the libraries and information centres adopting the CDS/ISIS. There are however a few variations where other softwares like LOTUS, DBASE, PAGEMAKER and WORDPERFECT are in use. Balme Library, for instance, has developed an in-house clipper (dbase) system. This new development is not compatible with CDS/ISIS, but the systems analyst hinted that it could be modified to suit library and information services needs.

Directly related to this phenomenon is the cost of integrating computers with telecommunication facilities in an on-line mode. While computers process information in digital mode, telecommunications in most developing countries including Ghana transmit information in analogue format. The problem is that

the cost of interfacing the two systems may not be within the reach of most libraries. Currently, Ghana is on the threshold of going digital as confirmed by MOBITEL, a promising private telecommunications company.

Oladele[69] confirmed that the experiences of information rich societies amply demonstrate that the implementation of cooperative schemes through the application of IT will have to be on a batch mode until such a time that funds are available to procure the necessary modems and accoustic couplers to effect the integration. As a long term solution, he suggested that governments should aim at converting telecommunications facilities into digital systems, since this will go a long way in promoting the application of IT to cooperative ventures within the library and information sector.

3.6.9 Absence of a National Information Policy

An important factor which emerged after the exhaustive study of the constraints inhibiting cooperative schemes is the virtual absence of a National Information Policy (NIP) in the country. Refreshing our memories, Kisiedu[70] implicitly emphasised that the objective of NIPs is to set goals, provide the inputs and support mechanisms that would make possible the achievement of optimum satisfaction for the information needs of all sectors of the

national economy and to promote effective use of information services. This ultimately requires the harnessing and harmonisation of all existing national information institutions and functions into an integrated system. The general precept is that this all important policy would sufficiently take care of the much discussed problem of fragmentation and duplication that bedevils cooperative efforts in the information profession.

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CHAPTER FOUR

4.0 DATA PRESENTATION AND ANALYSIS ON EXISTING LIBRARY AND INFORMATION RESOURCES AND THE LEVEL OF NETWORKING

4.1 INTRODUCTION

Ghana achieved a very high reputation for her unparalleled development of library and information services in Africa, south of the Sahara as far back as the 1960s. Researchers and enthusiasts in the profession justifiably assume that such developments should by now have attained high levels of sophistication and efficiency. This situation, of course, assumes the context of an enabling environment conducive to the optimum performance of library and information systems all over the country.

In 1975, the Ghana UNISIST National Committee established a sub-committee on Participating Agencies in a National Network for a National Scientific and Technical Information System. As part of its functions, the Sub-committee was mandated to conduct a survey on the existing facilities within the centres that should constitute the basic components of the national network. It was also asked to provide a list of additional facilities that these centres

may 1require (in the form of holdings of scientific literature, skilled personnel, equipment, and modernlibrary hardware), to enable them discharge their f unctions under the national plan[1]

The Sub-committee came out with a comprehensive report in 1976, and noted with concern "the gross inadequacy of existing facilities for acquisition, storage and dissemination of scientific and technical information in Ghana in terms of literature, manpower and services"[2]. It finally recommended ways and means of improving the facilities and services to modernise their typically traditional outlook.

One would like to assume that, almost two decades after such a survey, most of the deficiencies should have been rectified in all the centres identified. Unfortunately, however, despite the public pronouncements of our national leaders on the virtues of sustained scientific and industrial research on national development, the provision and maintenance of efficient library and information systems have not featured prominently on the political agenda of Ghana since economic decline set in in the early 1960s. It is a well known fact that the collapse of the First Republic in 1966 signified the beginning of the dark days for the library and information system in both the public and the specialised

sectors.

4.2 THE SURVEY

This chapter presents an indepth survey of the current level and degree of information networking in terms of cooperation, collaboration and resource sharing among a cross-section of libraries and information centres in the country. In this connection,

certain information units within the major sectors of the economy have been selected for study.

In all, twenty libraries and information centres comprising the Sectoral Nodal Points and the Special Resource Centres of GHASTINET were covered. These include, inter-alia, the Balme Library of the University of Ghana, Legon; the University of Ghana Medical School; the libraries of the University of Science and Technology, Kumasi, and the University of Cape Coast. Others are within the study and teaching sector at the University of Ghana, and include the libraries of the Department of Geography and Resource Development, the Department of Library and Archival Studies and the Institute of Statistical, Social and Economic Research (ISSER).

Information Centres and Units within the sphere of Research and Standards included a few in the CSIR family, comprises those of the Building and Road Research Institute, the Cocoa Research Institute, the Ghana Atomic Energy Commission, the Ghana Standards Board, the

Industrial Research Institute, the Oil Palm Research Institute and the Water Resources Research Institute.

Those within the Ministries and Government Corporations and agencies include the Energy Information Centre, the Geological Survey Department, the Ministries of Agriculture, Trade, Transport and Communications as well as the Statistical Services Department.

Out of these twenty (20) libraries and information units, seventeen (17), constituting 85%, responded, while three (3) important sectors, namely the Ministries of Trade, Transport and Communications and the Statistical Services Department, failed to respond, in spite of several follow-ups. A response rate of 85% was however considered a valid basis of assessment.

The objective of the survey is to find out the extent to which the concept of information networking has been understood and accepted by library and information professionals in Ghana. This survey was conducted between July 1992 and January 1993 covering specific parameters.

The scope of the study covers the available, as well as future requirements of,:-

(i) physical facilities and structures;

(ii) manpower resources; capable of meeting current trends

(iii) information carrying media (both conventional and electronic);

(iv) modern information technology equipment;

(v) modern communication facilities;

(vi) information services and products;

(vii) budgetary allocations, and

(viii) actual information networking activities in operation.

During the study, a questionnaire made up of a combination of both closed and open ended questions was administered to ensure that optimum results were obtained. The questionnaire was supplemented by personal interviews, structured in format to ensure better responses and to elucidate further information which the design constraints of the questionnaire could not bring out. For instance, question 7 of the questionnaire stated: How current are your journal subscriptions?. It was belatedly realised that the term "current" was ambiguous, since no specific date was indicated. During the interview, the currency of journals was interpreted to mean publications dating between 1990 and 1992. Similarly question 18, "Is your library or unit participating in any external science and technology information network?" was not well received. In effect, during interview, it was explained to mean the exchange of science and technology information resources of any kind not restricted to computerised activities only.

The Central Reference and Research Library (CRRL), now designated as the National Focal Point of GHASTINET, was studied on its own merit. The survey was largely based on on-the-spot observation and scrutiny of resources, facilities

and services and products of the centre by the author who is a full time employee of that section of the CSIR. A comprehensive report will be provided in chapter five.

4.3 LIMITATIONS OF THE SURVEY

Like any research in the Social Sciences, a number of problems emerged during the course of the survey. Notable among them were limited time (which is not unique to Social Science research) largely due to the fact that the study was time bound, confined to one academic year; inadequate financial resources; apathy on the part of some librarians and information personnel who formed the target population; the difficulty of accessing literature and the delay in retrieving some copies of the questionnaire. These are explained below in greater detail.

4.3.1 TIME

As an academic exercise, one is bound to work within prescribed time limits imposed to conform with university regulations. As a result, the sample population had to be considerably scaled down through random sampling to ensure an exhaustive study. Despite this, the survey extended as far as Cape Coast, Tafo, Kade and Kumasi, located in three different regions of

Ghana, besides the Greater Accra Region where most of the target institutions are located.

4.3.2 FINANCE

Inadequate financial resources created considerable problems, particularly in the acquisition of foreign literature. In the particular situation of Sub-Saharan African and other developing countries, information on local subjects generally tend to be more available in the metropolitan countries where heavy reliance on literature from such foreign sources is the norm. This is more so in an area where very little research and publication has been done. This is in contrast to the considerable sources that exist in these overseas countries where a great deal of esearch has already been conducted on the subjects.

In the above context, the inability of my sponsors to make funds available for me to procure relevant and up-to-date, yet scarce, literature from foreign sources was a no mean constraint. The author has had to rely on his own meagre resources and those of sympathizers to obtain materials from such sources.

4.3.3 LEVEL OF COOPERATION BY RESPONDENTS

As noted above, 17 institutional responses were received from the total of 20 institutions to which the questionnaire was sent. This rate of response is considered satisfactory. However, it is worth recounting all the frustrating moments the author had to go through in pleading with fellow professionals for the questions to be answered. In some instances, as many as five regular follow-up visits yielded no positive results.

4.3.4 QUESTIONS

A great deal of caution was exercised in formulating the questions. However, it was virtually impossible to achieve absolute clarity. This resulted in the misinterpretation of a few questions, as noted earlier. This anomaly could have been averted if a pilot project had been undertaken. Even though the author is aware of the importance of this exercise, it was not possible because of time and logistical constraints mentioned above. In mitigating some of these problems, the researcher actually sat down with some of the library and information officers, especially the non-professionals, to resolve such issues.

4.3.5 DELAYS IN THE RETURN OF QUESTIONNAIRE

There is ample evidence that people generally dislike answering questionnaires, especially if the questions are not a multiple-choice or simple 'yes' or 'no' type. Questions usually tend to be ignored particularly when personal opinions or data that need a little thought or search to obtain are required. This situation naturally results in undue delays in the return of questionnaires and cases of total lack of response.

4.4 ANALYSES OF RESPONSES

4.4.1 PHYSICAL FACILITIES

4.4.2 ACCOMMODATION

A standard library and information unit should, as a matter of priority, provide a very conducive atmosphere to meet the needs and aspirations of its clientele. On the one hand, there should be adequate accommodation in terms of stack area to house the entire collection conveniently. In addition, there should be enough floor space and adequate seating capacity to cater for at least 25% of the total readership which is the international requirement. Lighting and ventilation should also meet such acceptable

standards.

It should be noted that all forms of printed and photographic materials depend for their preservation on a controlled environment. According to Fairhust and Amedekey[3], in uncontrolled temperatures, paper, particularly mechanical wood-pulp, becomes brittle, cracks and flakes. In excessive humidity, glues and bindings become unstuck and/or deteriorate, resulting in fungus growth. Photographic materials (e.g. microfilms and microfiche) deteriorate in excessive heat and humidity. Similarly, information technology equipment such as computers, photocopiers and other microprocessors have their lifespan drastically reduced in excessive heat. This calls for the provision of sustained airconditioning services especially in our hostile tropical climates.

Results of the survey revealed that, in terms of floor space and sitting capacity, as shown in Table 1, 52.9% of the population (9 out of 17 centres) were satisfied with this basic requirement.

Table I:Adequacy of Available Floor Space and SittingCapacity.

VALUE TABLE	NO. OF UNITS	PERCENTAGE (%)
Yes	9	52.9
No	8	47.1
T O T A L	17	100.0

Storage Facilities

Apart form bookshelves with which 58.8% (10 units) of respondents expressed satisfaction, ,most respondents considered the rest of the facilities, including pamphlet boxes, microfilm storage boxes, newspaper racks and maps/atlas holders, grossly inadequate. This is illustrated in Table 2 below.

Table 2: Existing Physical Facilities

Libraries & Information Centres	Floor space	Seat spac	Book shelve	Pamp Boxes	Micro fiche	Newspaper Racks	Maps /Atlas
1. Balme Library	X	X	X	+	+	+	+
2. U.S.T. Kumasi	X	X	X	X	+	X	X
3. U.C.C. Cape Coast	X	X	X	+	+	X	X
4. Dept. of Geo.Legon	X	X	X	X	X	X	X
5. Dept.Lib.Std.Legon	X	X	X	X	+	X	X
6. UGMS -korle-Bu	X	X	X	+	X	+	+
7. ISSER - Legon	X	X	X	X	X	X	X
8. BRRI - Kumasi	X	X	X	X	X	X	X
9. CRIG - Tafo	+	+	+	+	+	+	+
10. GAEC - Kwabenya	+	+	+	X	+	X	X
11. G.S.B. - Accra	+	+	+	X	X	X	X
12. IRI - Accra	+	+	+	X	X	X	X
13. OPRI(CSIR) Kusi	X	X	+	+	X	X	X
14. WRRI (CSIR)	+	+	+	+	+	+	+
15. Energy Inf.Centre	+	+	+	+	+	+	X
16. Geological Survey	+	+	+	+	X	X	X
17. Ministry of Agric	+	+	+	X	X	+	X
18. Ministry of Trade	NO	RTNS					
19. Min.of Tran.& Comm	NO	RTNS					
20. Statistical Serv.	NO	RTNS					

+ Satisfied adequate
x Not satisfied (inadequate)

The Study showed that all the centres faced with acute accommodation problems are housed in temporary buildings. This simply means that the problem would ever remain so permanent structures purposely designed to serve the needs of modern information systems remain on the drawing board.

4.5 PERSONNEL

The importance of qualified manpower in determining the capabilities of any information system cannot be overemphasised. It is an accepted fact that the best endowed library or information system in terms of stock and equipment would be nothing more than a white elephant without the requisite manpower. It is the quality of personnel manipulating the system in response to user needs that ensures efficiency and viability.

4.5.1 Professional Staff

An important finding of the study is the grossly inadequate and imbalanced distribution of professional manpower over the units investigated. Of the 17 units studied, there are 52 professionals with the requisite qualifications in library and information studies, as shown in Table 3. Out of this number, as illustrated by Table 4, three (3) or 17.6% have no professionals.

41.2% (7) have one each, while 11.8% (2) can boast of 2 each. The remaining 5 centres (29.5%) dominate the scene with over 41 (78.8%) of the total number of professionals at post. The majority of professional staff, 34 altogether, are concentrated in the three universities.

TABLE 3: SHOWING STAFF STRUCTURE - 1992

LIBS. & INFO. CENTRE	PROF	S-PROF	TECHN.	CLERL.	D.ENT	TRANSL	CP.SA
1. BALME LIBRARY	11	29	22	8	-	-	-
2. UST LIBRARY	14	36	1	4	1	-	-
3. UCC LIBRARY	9	10	3	4	1	0	1
4. DPT. OF GEO.LEGON	0	0	1	0	0	0	0
5. DLAS	0	1	0	0	0	0	0
6. UG MEDICAL SCHOOL	3	1	0	5	0	0	0
7. ISSER - LEGON	2	1	0	3	0	0	0
8. BRRI - KUMASI	4	1	0	0	0	0	0
9. CRIG - TAFO	1	2*	7	1	0	0	0
10. GAEC - KWABENYA	1	1	0	1	0	0	0
11. GSB - ACCRA	1	4	0	1	1	0	0
12. IRI - ACCRA	1	1	0	1	0	0	0
13. OIL PALM - KADE	1	0	0	1	0	0	0
14. WRRI - ACCRA	2	1	1	1	-	-	-
15. ENERGY I.C. AR.	1	0	0	0	0	0	1
16. GEOL.SURVEY AR.	0	1	1	1	0	0	0
17. MIN. OF AGRIC.	1	0	1	1	0	0	0
18. MIN. OF TRADE	NO	RETURNS					
19. MIN.OF TRANS	NO	RETURNS					
20. STATISTICAL SERV	NO	RETURNS					
T O T A L	49	89	37	30	3	0	1

Table 4 Professional Staff Position

NO. OF PROF. STAFF	NO. OF UNITS	PERCENTAGE (%)
0	3	17.6
1	7	41.2
3	1	5.9
4	1	5.9
9	1	5.9
11	1	5.9
14	1	5.9
T O T A L	17	100.0

4.5.2 Sub-Professional Staff

At the sub-professional level, the pattern remains structurally the same, with four units (4) ie barely 23.4% of the centres having no sub-professionals. Similarly, 8 units (41.7%) have one each. The imbalance in the system is demonstrated more clearly in Table 5. 75 or 84.2% of the sub-professional staff are concentrated in only 3 centres representing only 19.9% of the total number.

Table 5 Sub-professional levels/distribution

NO. OF SUB-PROF.	NO. OF CENTRES	PERCENTAGE (%)
0	4	23.4
1	8	47.1
2	1	5.9
4	1	5.9
10	1	5.9
29	1	5.9
36	1	5.9
T O T A L	17	100.0

On the whole, the majority of libraries and information centres are manned by single professionals or by single sub- or non-professionals. It can thus be concluded that there is a general paucity of professionally qualified librarians and information workers.

One area with a severe defficiency is that of technical staff. As shown in Table 6 a single unit has (22) 60.0% of available staff, leaving 11 units representing 64.9% to share (15) 40.0% of the available technical staff.

4.5.3 Auxilliary Staff

With other categories of staff such as Data Entry Clerks, Translators, Computer Specialists/Systems Analysts, it is only the larger units that are privileged to have a few of such cadres. On the average as many as 12 (72.2%) have none of these, while 4 (28%) can boast of 14 of such personnel.

Table 6: TECHNICAL STAFF DISTRIBUTION

NO. OF STAFF	NO. OF CENTRES	PERCENTAGE (%)
0	10	59.0
1	4	23.3
3	1	5.9
7	1	5.9
22	1	5.9
T O T A L	17	100.0

For effective and efficient networking operations, notably in an electronic environment, information units should possess, as a matter of urgency, a minimum of professional, sub-professional as well as other related support staff.

4.6 MANPOWER REQUIREMENTS

In response to projected staff requirements in relation to networking demands, Table 7 provides a general but fairly accurate assessment of the prevailing situation.

Table 7: On the adequacy of existing staff:

VALUE LABEL	NO. OF CENTRES	PERCENTAGE
N/S	4	23.5
YES	2	11.8
NO	11	64.7
T O T A L	17	100.0

As shown above 11 (64.7%) of the respondents expressed dissatisfaction with their staff strength. 23.5% were undecided while 11.8% were content with the existing levels.

A comprehensive array of manpower requirements of the 17 respondents is provided in Table 8. However, specific breakdowns for professional and sub-professional demands are illustrated in Tables 9 & 10 respectively.

Table 8: MANPOWER REQUIREMENTS: 1993

LIBS.& INFO. CENTRE	PROF	S-PROF	TECH	CLER	D.ENT	TRAN	CPSA	ABI
1. BALME	20	41	2	1	1	0	1	0
2. U S T	17	38	2	6	2	0	0	0
3. U C C	13	17	3	5	1	0	1	0
4. DEPT. OF GEOG	-	1	-	-	-	-	-	-
5. DEPT. OF L'STD	-	-	-	-	-	-	-	-
6. UG MEDICAL SCH	-	-	-	-	-	-	-	-
7. I S S E R	2	1	0	3	0	0	0	0
8. B R R I	3	2	2	2	1	1	1	1
9. COCOA	-	-	-	-	-	-	-	-
10. GAEC	-	-	-	-	-	-	-	-
11. GSB	1	1	0	0	0	0	0	0
12. IRI	0	1	1	0	0	0	0	0
13. OIL PALM	0	1	0	1	1	0	0	0
14. W R R I	2	1	1	2	0	0	0	0
15. ENERGY	-	-	-	-	-	-	-	-
16. GEOLOGICAL S.	-	-	-	-	-	-	-	-
17. MIN. OF AGRIC	4	3	2	2	2	0	0	2
18. MIN. OF TRADE	NO	RETURNS						
19.MIN. TRANS & COM	NO	RETURNS						
20. STATISTICAL S.	NO	RETURNS						
T O T A L	49	77	13	22	6	1	3	1

Table 9: Professional Staff Requirements - 1993

NO. OF PROFS.	NO. OF CENTRES	PERCENTAGE (%)
0	9	52.8
1	1	5.9
2	2	11.8
3	1	5.9
4	1	5.9
7	1	5.9
13	1	5.9
17	1	5.9
T O T A L	17	100.0

TABLE 10: SUB-PROFESSIONAL STAFF REQUIREMENTS - 1993

NO. OF SUB-PROF	NO. OF CENTRES	PERCENTAGE (%)
0	7	41.1
1	5	29.4
2	1	5.9
3	1	5.9
12	1	5.9
17	1	5.9
38	1	5.9
T O T A L	17	100.0

In brief, as shown by Table 9 nine (9) or 52.8% expressed no need for extra professional staff. Actual requirements, however, indicate that five (5) centres (29.4%) urgently require the services of one professional each. At the same time these centres need to strengthen their capacities with as many as 44 highly qualified persons.

At the Sub-professional level (Table 10), 41% (7 units) are content with their numerical strength, 29.5% (5) requesting for only one each, whereas the minority 29.5% (5) are in urgent need

of as many as 72 sub-professionals, of out a total of 77.

With regard to specialist staff, such as Abstractors, Indexers, Translators, Science writers, and Systems Analysts, the situation is much worse. There is a great demand for such personnel, about 55% of whom would be needed by 1994. Currently there are 71 of such personnel at post, as illustrated in Table 3.

4.7 TRAINING REQUIREMENTS

In addition to the overwhelming demand for additional staff, there is an equally burning desire to upgrade the competence of each calibre of staff in almost all the library and information centres in the country. Generally 94.4% (16) of the centres are requesting for one form of training or another. Only a single unit (1) representing 5.6% appears to be absolutely satisfied as shown in Table 11. Not surprisingly, this was a one-man information centre in which the incumbent is a computer literate professional.

TABLE 11 : TRAINING REQUIREMENTS

LIBS. & INFO.CENTRE	INF.SC	COMPUTER	AB & INDEX	CLS & CAT	TRANSL	SCI.WR
1. BALME	+	+	X	+	X	X
2. UST	+	+	+	+	+	X
3. UCC	+	+	+	+	+	X
4. DEPT. OF GEOG	+	X	X	X	X	X
5. DLAS	X	+	X	X	X	X
6. UG MEDICAL SCH.	+	+	X	X	X	X
7. I S S E R	+	+	X	X	X	+
8. B R R I	+	+	+	+	+	X
9. COCOA	+	+	X	X	X	X
10. GAEC	+	+	X	X	X	X
11. GSB	+	+	+	+	X	X
12. IRI	+	+	X	X	X	X
13. OIL PALM	+	X	X	X	X	X
14. W R R I	+	X	X	X	X	X
15. ENERGY	X	X	X	X	X	X
16. GEOLOGICAL S.	+	+	+	+	+	X
17. MIN. OF AGRIC	+	+	+	+	+	+
18. MIN. OF TRADE	NO	RETURNS				
19.MIN.OF TRP & CO	NO	RETURNS				
20. STATISTICAL S.	NO	RETURNS				
T O T A L	14	13	6	7	5	2

\+ = Training required

x = No training required

Areas in which libraries and information centres expressed the wish for training of their personnel include, among others, Information Science, Computer Science, Information Processing and Translation Services. Within this sector, as illustrated by Table 12, 14 centres (82.4%) opted for formal training. Out of this 11 (64.9%) specifically demanded post-graduate training up to the Masters degree level.

TABLE 12: TRAINING REQUIREMENTS IN INFORMATION SCIENCE

VALUE TABLE	NO. OF CENTRES	PERCENTAGE (%)
N/S	2	11.8
YES	14	82.4
NO	1	5.9
T O T A L	17	100.0

This demand is most welcome, in that, with the shift of emphasis from traditional librarianship to the development of information technology driven systems, training schemes should be sufficiently slanted towards current trends. This new emphasis calls for strong support of a cadre of computer literate staff. It came as little or no surprise that as much as 76.5% of respondents as shown in Table 13 should request for training in computer techniques for their existing staff.

TABLE 13: TRAINING DEMANDS IN COMPUTER TECHNIQUES

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	2	11.8
YES	13	76.5
NO	2	11.8
T O T A L	17	100.0

In other areas, response to training demands are fairly moderate, with six (6) (35.3%) for abstracting and indexing, seven (7) (41.2%) in information processing (ie. classification and cataloguing), two (2) (11.8%) in science reporting, as well as five (5) (29.5%) in translation services.

4.8 INFORMATION RESOURCES

In order to obtain a clear picture of literature resources of the centres studied, specific types of materials held by centres, such as monographs, and their percentage of holdings on science and technology were investigated. Other materials identified included journal subscriptions, technical reports, abstracting and indexing journals in the field of science and technology, micro-records as well as audio-visuals and computerised databases. This analysis is shown in Table 14 below.

TABLE 14: TOTAL STOCK OF CONVENTIONAL LIBRARY COLLECTIONS

LIBS.& INFORMATION CENTRES	MONO-GRAPHS	% S&T	JOURNAL SUBSCR	PAMPH-LETS	TECHN. REPRTS	S&T AB&IND	THESIS DISSER
1. BALME	350,000	30%	350	-	-	-	-
2. U S T	144,000	60%	300	-	-	-	360
3. U C C	160,740	30%	313	9,515	30	22	145
4. DEPT. OF GEO	-	-	27	-	-	-	4
5. DLAS	3,000	0	50	-	-	-	10
6. UG MEDICAL SCH	15,700	95%	156	-	-	3	5
7. I S S E R	28,000	5%	32	478	1870	-	171
8. B R R I	17,000	95%	-	-	450	-	12
9. COCOA	5,036	95%	22	7869	1597	-	3
10. GAEC	3,000	95%	30	-	500	6	7
11. GSB	3,000	90%	10	-	-	-	-
12. IRI	1,950	90%	54	-	101	5	3
13. OIL PALM	650	90%	32	-	-	6	-
14. W R R I	4,000	80%	15	2500	3000	2	12
15. ENERGY	2,000	95%	12	20	-	6	4
16. GEOLOGICAL S.	-	-	-	-	-	-	-
17. MIN. OF AGRIC	2,500	90%	55	-	1500	-	-
18. MIN. OF TRADE	NO	RTRNS					
19. " OF TRNS&COM	NO	RTRNS					
20. STATISTICAL S.	NO	RTRNS					
	740,576	74.3%	1,658	20,382	9,048	50	736

TABLE 15: TOTAL STOCK OF AUDIO VISUAL(S) COLLECTIONS

LIBS.&INFORMATION CENTRES	AUDIO TAPES	VIDEO TAPES	CD-ROM/ DISCS	SLIDES	MICROFILM/ MICROFICHE
1. BALME	-	-	-	-	1050
2. U S T	-	-	-	-	-
3. U C C	-	-	-	-	46
4. DEPT. OF GEO	-	-	-	-	-
5. DLAS	10	10	-	20	35
6. UG MEDICAL SCH	-	63	4	126	-
7. I S S E R	7	-	4	-	136
8. B R R I	11	8	-	82	44
9. COCOA	-	-	-	-	-
10. GAEC	10	-	5	-	18,000
11. GSB	-	6	-	-	-
12. IRI	-	-	39	-	-
13. OIL PALM	-	-	-	-	-
14. W R R I	-	-	6	-	4
15. ENERGY	-	12	-	2	1,200
16. GEOLOGICAL S.	-	-	-	-	-
17. MIN. OF AGRIC	-	-	-	-	-
18. MIN. OF TRADE	NO	RETURNS			
19. " OFTRNS &C	NO	RETURNS			
20.STATISTICAL S.	NO	RETURNS			
	38	99	58	230	20,51

4.8.1 Monographs

A closer look at the monograph collections as shown in Table 16 reveals that, on the one hand, 14 (82.4%) of the centres possess less than 90,000 titles consisting of their total stock. On the other hand, just (3) 17.6% representing the three Universities have a large total of 646, 740 volumes.

This is a true reflection of collection development structure in the country favouring only the larger libraries and information centres.

TABLE 16: MONOGRAPHS HOLDINGS

VALUE (VOLUMES)	NO. OF CENTRES	PERCENTAGE (%)
N/S	2	11.8
1 - 5,000	8	47.2
5,000 - 190,000	4	17.6
120,001 - 150,000	1	11.7
150,001 - 350,000	2	11.7
T O T A L	17	100.0

4.8.2 Journals

The issue of journal subscriptions has remained a thorny one in the collection development policies of most information systems in Ghana. This has necessitated the call for a review of individual acquisition practices to make way for cooperative ventures. This is aimed at correcting the imbalances in acquisition as well as maximising the use of the scarce foreign exchange which goes into such individual efforts.

Table 17 demonstrates current trends in journal subscriptions.

TABLE 17: TOTAL JOURNAL SUBSCRIPTIONS

NO. OF JOURNAL SUB.	NO OF CENTRES	PERCENTAGE (%)
NS/0	3	17.6
10	1	5.9
12	1	5.9
15	1	5.9
27	1	5.9
30	1	5.9
32	2	11.8
50	1	5.9
54	1	5.9
55	1	5.9
156	1	5.9
300	1	5.9
313	1	5.9
350	1	5.9
T O T A L	17	100.0

Out of the 17 institutions covered (10) 58.8% subscribe to less than 35 titles, (3) 17.7% acquire between 50 and 55 titles while (4) 23.6% have their subscriptions ranging between 156 and 350 titles.

This raises another crucial issue of the currency of journal titles, since the relevance of such collections depends, a great deal, on their up-to-dateness. Considering the precarious financial position of Ghana over the past two decades, coupled with the lack of political commitment of successive governments to cater adequately for library and information services, this unsatisfactory situation is not too unexpected. During the interview schedules, all the librarians and information practitioners contacted lamented the haphazard acquisition of

journal titles, particularly those depending solely on foreign currency transactions.

Table 18 depicts a very high degree of currency of titles (76.4%) within a target period of between 1990 and 1992.

TABLE 18: CURRENCY OF JOURNAL SUBSCRIPTIONS

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	2	11.8
CURRENT	13	76.4
NOT CURRENT	2	11.8
T O T A L	17	100.0

Gifts and donations present an entirely different picture. One thing which emerged from the survey is that, most often, a greater proportion of these donations hardly meet user needs, simply because the needs and requirements of the recipients, as a rule, are never taken into account and have never been the bases for such donations.

4.8.3 Technical Reports

The pattern of collection for technical reports (both foreign and indigenous), pamphlets, science and technology abstracting and indexing journals are basically the same. Available data confirm that on average, four (4) 23.6% of the centres possess the bulk 94.8% of the collections, leaving the majority (13) or 76.4% of to share an insignificant 5.2% of the collections.

4.8.4 Audio - Visuals

Non-traditional information carriers such as audio and video tapes, discs and micro editions (microfilm and microfiche titles) are yet to have very significant impact on the holdings of Ghanaian libraries and information centres. Precisely, as illustrated in Table 15, seven (7) or 41.3% are holding 3,265 microfilms and microfiche. However, out of this figure, a mere two (2) or 11.8% of the units are stocking as much as 91.8% (3,000) of the entire collection. This leaves the remaining five (5) or 29.5% with 265 (8.2%) of the titles. In addition, five (5) or 29.5% have 58 discs of any sort, while another five (5) or 29.5% own 137 audio and video tapes. In all only four (4) or 23.6% have 58 discs as part of their collections.

4.9 INFORMATION TECHNOLOGIES

One of the main objectives of the study is to investigate the rate of adoption of modern information technologies in Ghana, as shown in Tables 19 and 22 on general information technology equipments and computers respectively. Although it is not mandatory for any information network to be strictly electronic, it has been proved beyond doubt that optimum benefits can be derived through the adoption of the appropriate technologies. On the local scene, information technologies have the potential of maximising interconnections with participating centres and institutions. With the establishment of viable information technology oriented national structures,

the chances of enhancing the establishment of appropriate linkages with regional and international systems could be very bright. Above all, newly emerging opportunities, including desk-top publishing, electronic mailing and computer conferencing, could be adequately exploited to enhance information networking in all its ramifications.

4.9.1 Photocopying Facilities

This is one area in which a high degree of success has been achieved. This is illustrated in Table 20.

A high 13 (76.5%) of the information units have functional photocopying facilities. Of these, at least nine (9) or 52.9% possess one each while the remaining 23.5% own between two and six, bringing their total to 15 (out of a grand total of 24). The fairly even distribution structure of this facility will in no small way contribute to the success of replication and exchange of materials with a reasonable amount of speed.

TABLE 19: ITEMS OF EQUIPMENT

LIBS.& INFORMATION CENTRES	CPY FACIL	M.FILM PROJ.	M.FICHE READERS	M.FILM READERS	CD-ROM PLAYER	VIDEO CA.SYS	SLIDE PROJ.
1. BALME	+	X	+	+	X	X	X
2. UST	+	X	+	+	X	X	X
3. UCC	+	X	+	+	X	X	X
4. DEPT. OF GEOG	X	X	X	X	X	X	X
5. DLAS	X	+	+	+	X	X	+
6. UG MEDICAL SCH	+	X	X	+	+	+	X
7. I S S E R	+	X	X	X	X	+	X
8. B R R I	X	X	X	X	X	+	+
9. COCOA	+	X	+	+	+	X	+
10. G A E C	+	X	X	+	X	X	X
11. G S B	+	X	X	X	X	X	X
12. I R I	+	X	X	X	+	X	X
13. OIL PALM	+	X	X	+	X	X	+
14. W R R I	+	X	+	X	X	X	X
15. ENERGY	+	X	X	+	X	+	X
16. GEOLOGICAL S.	+	X	X	X	X	X	+
17. MIN. OF AGRIC	+	X	X	X	+	X	X
18. MIN OF TRADE	NO	RETURNS					
19.M. OF TRNS&COM	NO	RETURNS					
20. STATISTICAL S.	NO	RETURNS					

+ - Yes/Available

x - No/Not available

TABLE 20: AVAILABILITY OF PHOTOCOPYING FACILITIES

NO. OF PHOTOCOPIERS	NO. OF CENTRES	PERCENTAGE (%)
0	4	23.5
1	9	52.9
2	1	5.9
3	1	5.9
4	1	5.9
6	1	5.9
T O T A L	17	100.0

MEAN - 1.412

4.9.2 CD-ROM Players

CD-ROM facilities, the new sensation and highly fancied technology in developing countries, are fast gaining ground in Ghana's libraries and information Centres. So far, nine (9) or 52.9% possess the facility. As a result of its numerous advantages, it is hoped that many more centres would add it to their stock of acquisitions in the near future.

4.9.3 Computers

Computers started appearing on the library and information scene in Ghana less than a decade ago. This dates back precisely to 1986 when the first personal computer (PC) was installed in the Energy Information Centre of the Ministry of Energy.

Currently 11 (64.2%) of the units under review have installed between one and five personal computers each. The most conspicuous feature of the increasing sponsorship of computers is the high variety of models in use in the various institutions. These include, among others, MITAC MPC; WANG; PHILIPS; COMPAQ; OLIVETTI and IBM, with the last named being the most dominant of

all the groups, taking as much as 47.1% of the lot. However the remaining 17.1% are also IBM Compatible.

TABLE 21 COMPUTER VARIETIES

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	6	35.3
IBM	8	47.1
IBM COMPATIBLE	3	17.1
T O T A L	17	100.0

TABLE 22: COMPUTER FACILITIES

LIBS.& INFORMATION CENTRES	TYPE OF COMPUTER	DATE OF INSTALL	SOFTWARE	MODE OF ACQUIST	TYPE OF PRINTER	USAGE
1. BALME	WANG PC IBM PS 80	1988 1991	DBASE W/PERFEC	DONATION	DOT MATRIX EPS.LQ1050+	CIRCU-LATION
2. U S T	MITAG MPC WANG	1992	DBASE,WP CDS/ISIS	DONATION	EPSON LQ. 1050	DBASE CREATION WORD P.
3. U C C	IBM MICRO	JAN. 1990	WORD PER CDS/ISIS	DONATION	IBM PRO-PRINTER	CAT.&CIR CULATION
4. DEPT. OF GEOG	-	-	-	-	-	-
5. DLAS	IBM PC/260	1992	CDS/ISIS W/PERFEC	DONATION	DOT MATRIX	TEACHING
6. UG MEDICAL SCH	IBM PS2/80	1991	WPERFECT & OTHERS	DONATION	DOT MATRIX	N/S
7. I S S E R	-	-	-	-	-	-
8. B R R I	-	-	-	-	-	-
9. COCOA	IBM PC/2 386	1991	WPERFECT CDS/ISIS	N/S	IBM LASER JET	N/S
10. G A E C	-	-	-	-	-	-
11. G S B	IBM/PS/2 355X	JULY 1992	WPERFECT CDS/ISIS	DONATION	EPSON LQ. 1050	LIB.WORK & STAND.
12. I R I	PHILIPS P3348 SX	NOV. 1992	PATSOFT	DONATION	HEWLET PACKARD	N/S
13. OIL PALM	-	-	-	-	-	-
14. W R R I	IBM PC/2 MODEL 60	7TH FEB 1992	LOTUS CDS/ISIS	PURCHASE	IBM PROPRINTER	LIBRARY USAGE
5. ENERGY	OLIVETTI PCS 386X	1986	WP&DBASE CDS/ISIS	N/S	IBM LASER	N/S
16. GEOLOGICAL S.	-	-	-	-	-	-
17. MIN. OF AGRIC	COMPAQ	1990	WPERFECT CDS/ISIS	DONATION	EPSON LQ. 1050+	CIRCU-LATION
18. MIN. OF TRADE	NO	RTUNS				
19. MIN. OF TRANS. & COMMUNICATION	NO	RTUNS				
20. STATISTICAL S.	NO	RTUNS				

This implies that despite the differences in models, the problem of hardware incompatibility could be reduced to the barest minimum.

The related problem of software incompatibility, which was once a major problem in computer application in developing countries, has also been significantly reduced, thanks to the promotion of the use of the CDS/ISIS software by UNESCO. Table 23 shows that so far,seven (7) centres (63.6%) have adopted the CDS/ISIS. Two (2) centres (18.2%) use Dbase while the remaining (2) 18.2% (2) or 18.2% combine both the Dbase and the CDS/ISIS. It is obvious that things are changing for the better. It should, however, be noted that the 63.6% compatibility is not very satisfactory for Ghana with limited information resources.

TABLE 23: SOFTWARE

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
CDS/ISIS	7	63.6
DBASE	2	18.2
CDS/ISIS & DBASE	2	18.2
T O T A L	11	100.0

The cost of computers is plummeting but it is still beyond the means of most African countries including Ghana. This is reflected by the fact that this technology arrived late on the Ghanaian library scene and is used in only a few libraries, and also by the fact that what is available has been acquired largely as donations.

As shown in Table 24 below, only two (2) centres (18.1%) acquired their computers by direct purchase, with the majority 72.9% depending on donations from sympathetic institutions and international organisations. With the present unfavourable economic situation in which the country finds itself, it is highly probable that the acquisition of such equipment would continue to depend largely on charity for some time to come. This could result in further proliferation of the hardware

variety and aggravate the hardware incompatibility problem.

TABLE 24: MODE OF COMPUTER ACQUISITION

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	1	9.0
GIFTS	8	72.9
PURCHASED	2	18.1
T O T A L	11	100.0

4.10 LEVEL OF AUTOMATION

On the automation of library and information services, the situation is far from satisfactory. In all, 63.6% of respondents responded that some of their activities have been computerised. Observations, however, reveal that the routine library and information services such as ordering, acquisition, processing, storage (of bibliographical information) and circulation control are still largely manually operated. Actual figures reveal that only three (3) centres, or 27.3% have embarked on the creation of databases for their serial holdings, while two (2) or 18.2% cater for their monographs. Two university libraries have embarked on the automation of cataloguing processes, while only one university library (9.09%) has actually deployed one PC for circulation control on a rather limited scale (for a particular collection of the library).

4.11 COMMUNICATION FACILITIES

Every dynamic electronic networking system undoubtedly depends heavily on the availability of functional (modern) communication facilities. Within the African context, however, there is a perennial problem of poorly developed communication

facilities. The severity of this deficiency is most pronounced among the universities and research institutions surveyed where the facilities are either located in the Vice-Chancellor's or the Director's office.

TABLE 25: COMMUNICATION FACILITIES

LIB.& INFORMATION CENTRES.	TELEPHONE	TELEX	FACSIMILE	MODEMS	E-MAIL	LOCA-TION
1. BALME	+(L)	+(VC)	+(VC)	X	X	
2. U S T	+(L)	+(VC)	X	X	X	
3. U C C	+(L)	+(L)	X	X	X	
4. DEPT. OF GEOG	X	X	X	X	X	
5. DLAS	X	X	X	X	X	
6. UG MEDICAL SCH	+(L)	X	+	X	+	
7. I S S E R	+(D)	+(D)	X	X	X	
8. B R R I	X	X	X	X	X	
9. COCOA	X	X	X	X	X	
10. GAEC	+(D)	+(D)	+(D)	X	X	
11. G S B	+(L)	X	X	+(L)	+(L)	
12. I R I	+(L)	+(D)	+(D)	X	X	
13. OIL PALM	X	X	X	X	X	
14. W R R I	+(L)	X	X	X	X	
.15. ENERGY	+(NS)	+(NS)	+(NS)	X	X	
16. GEOLOGICAL S.	+(D)	+(D)	+(D)	X	X	
17. MIN. OF AGRIC	+(L)	X	X	X	X	
18. MIN. OF TRADE	NO	RETURNS				
19. M OF TRNS & COM	NO	RETURNS				
20. STATISTICAL S.	NO	RETURNS				

LOCATION: D = Director's Office

L = Librarian's Office

VC = Vice Chancellor's Office

N/S = Not stated

\+ = Available

x = Not available

A consolidated picture of current trends is provided in Table 26.

TABLE 26: TELEPHONE FACILITIES

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	2	11.8
YES	12	70.6
NO	3	17.6
T O T A L	17	100.0

In theory as many as 12 (70.6%) of the centres have telephone facilities physically installed in their premises. However, statistics from actual field research has revealed that only four (4) or 23.6% possess real functional telephones. Further, only two (2) or 11.8% have linkages outside the confines of their parent institutions. It is equally interesting to note that currently there are no such linkages between any two of the country's universities. Similarly, no such connections exist between research libraries and information centres located in different towns. Thus, paradoxically, in Ghana, it is easier, faster and more reliable to resort to road transport than communicate via telephones.

A striking feature of this aspect of the survey is that information units are finding it extremely difficult to install more sophisticated and expensive equipment, resulting in a zero growth rate in their acquisition. This downward trend does not

augur well for modern information networking which thrives on easy accessibility to existing databases and databanks elsewhere.

Table 27 indicates that seven (7) or 41.2% of the library and information centres have telex facilities installed in their own premises or within their parent organisations.

TABLE 27: TELEX

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	5	29.4
YES	7	41.2
NO	5	29.4
T O T A L	17	100.0

TABLE 28: FACSIMILE

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	5	29.4
YES	5	29.4
NO	7	41.2
T O T A L	17	100.0

TABLE 29: ELECTRONIC MAIL

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	5	29.4
YES	3	17.6
NO	9	53.0
T O T A L	17	100.0

As shown in Table 28, Facsimile machines are in operation in only five (5) or 29.4% of the information units with the remaing 70.6% completely devoid of such facilities.

Electronic mail which offers a very fast and relatively inexpensive means of document delivery first appeared on the Ghanaian information scene in 1991[4]. It is being tried among (3) 17.6% of potential users within the framework of a pilot project initiated by PADIS/IDRC/AAAS (Pan African Development .Information Systems/International Development Research Centre/ American Association for the Advancement of Science). The eventual acceptance or rejection of the system by the majority (14) 82.4% would be contingent on the positive results of the trial project, as well as the availability of reliable facilities and funding.

TABLE 30: LIBRARY AND INFORMATION SERVICES AND PRODUCTS

LIB.& INFORMATION CENTRES	ABST. & INDEXG	CR. A SERV.	LIT. SEARCH	ACCESS BULLET	TRANS-LATION	PHOTO-COPYING	DBASE SERV.
1. BALME	X	+	X	+	X	+	X
2. U S T	X	+	+	+	X	+	X
3. U C C	X	X	+	+	+	+	X
4. DLAS	X	X	X	X	X	X	X
5. DPT. OF L'STD	X	X	+	X	X	X	X
6. UG MEDICAL SCH	X	+	+	+	X	+	+
7. I S S E R	+	X	+	X	X	+	X
8. B R R I	X	+	+	+	X	X	X
9. C O C O A	X	+	+	X	X	+	+
10. G A E C	+	X	+	+	X	+	X
11. G S B	+	+	+	+	X	X	X
12. I R I	X	+	+	+	X	+	+
13. OIL PALM	X	+	+	+	X	+	+
14. W R R I	+	+	+	+	X	+	X
15. ENERGY	+	+	+	+	X	+	+
16. GEOLOGICAL S.	X	X	X	X	X	+	X
17. MIN. OF AGRIC	X	X	+	X	X	+	+
18. MIN. OF TRADE	NO	RTNS					
19. M. OF TRNS&COM	NO	RTNS					
20. STATISTICAL S.	NO	RTNS					

\+ = Available

x = Not Available

4.12 INFORMATION SERVICES AND PRODUCTS

The viability and sustenance of any information system depends predominantly on the provision of a series of essential services tailored to meet user demands. The services often vary with each system's priorities. However, in areas of scientific and technical information, the following are or should normally be provided.

4.12.1 Abstracting and Indexing Services

Abstracting and indexing services have never received the much needed attention they deserve on the Ghanaian information scene particularly in areas of research and development. This situation is sufficiently demonstrated in Table 31, which shows that only five (5) or 29.4% of the libraries and information units provide these all essential services, while twelve (12) (70.6%) are yet to embark on such ventures.

TABLE 31: ABSTRACTING AND INDEXING SERVICES

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	3	17.7
YES	5	29.4
NO	9	52.9
T O T A L	17	100.0

4.12.2 Current Awareness Services

With regard to the provision of Current Awareness Services, Table 32 indicates that on average 58.8% (10) provide this unique service.

TABLE 32: CURRENT AWARENESS SERVICES

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	4	23.6
YES	10	58.8
NO	13	17.6
T O T A L	17	100.0

4.12.3 Accession Bulletins

The publication of accession bulletins announcing the acquisition of new additions to existing stock receives a modest priority. As shown in Table 33, 11 (64.8%) of the units produce such a bulletin. It is worth mentioning here that, although 64.8% appears fairly high statistically and therefore significant, it is not considered of great import. This is simply because accession bulletins, by their very nature, are routine tools for any worthwhile information system and do not offer specialized dissemination services.

TABLE 33: ACCESSION BULLETINS

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	3	17.6
YES	11	64.8
NO	3	17.6
T O T A L	17	100.0

Available information points to a high degree of inconsistency in the frequency of publication ranging between fortnight and bi-annual releases. Precisely 54.4% (9) are silent over this issue. This is a high figure for such a routine service.

4.12.4 Translation Services

Translation services are yet to make any significant impact on library and information systems in the country, even though the need has long been felt. All the science-oriented information units visited have stockpiles of publications, notably technical reports and periodicals, in the Japanese,

Chinese, German and Russian languages. However, all these remain virtually inaccessible to potential users, because of the linguistic barrier. So far, only 5.9% (representing just one centre) has a French - English translator. Unfortunately, none of the remaining 16 (94.1%) is able to share the expertise of this rare human resource.

As discussed in Chapter Three under cooperative schemes, the only feasible solution lies in the joint exploitation of such rare expertise since every single unit may not find it economically prudent to acquire such a service for itself.

TABLE 34[A]: NETWORKING (COOPERATIVE) SCHEMES

LIBS. & INFO CENTRES	SELECTION TOOL SHARING	COOP. BOOK ACQUISITION	COOP. SERIAL ACQUISIT'N	JOINT PROCESSING	STORAGE & DELIV'Y	STAFF EDUC.& TRAN'G
1. BALME	X	X	X	X	X	X
2. U S T	X	X	X	X	X	X
3. U C C	+	X	X	X	X	X
4.DPT. GEOG	X	X	X	X	X	X
5.DLAS	X	X	X	+	X	X
6.UG MEDICAL	X	X	X	X	X	X
7.I S S E R	+	X	X	X	X	X
8. B R R I	X	X	X	X	X	X
9. COCOA	+	X	X	X	X	X
10.GAEC	X	X	X	X	X	X
11.G S B	X	X	X	X	X	X
12.I R I	X	X	X	X	X	X
13.OIL PALM	X	X	X	X	X	X
14.W R R I	X	X	X	X	X	X
15.ENERGY	X	X	X	X	X	+
16.GEOL.SURV	X	X	X	X	X	X
17.MIN AGRIC	X	X	X	X	X	+
18. MIN. OF TRADE	NO RETURNS					
19. MIN. OF TRANSPORT	NO RETURNS					
20. STATIS-TICAL SERV.	NO RETURNS					

\+ - Participant
X - Non participant

TABLE 34[B]: NETWORKING (COOPERATIVE) SCHEMES

LIBS. & INFO CENTRES	EXCHANGE OF PROFESSIONAL	TECHNICAL SERV.(BIND)	THESIS&DISS DEPOSITS	INTER-LENDING	U.CAT COMPIL	U.LIST SERIAL
1. BALME	X	X	X	+	+	+
2. U S T	X	X	X	+	+	+
3. U C C	X	X	X	+	+	+
4. DPT.GEO	X	X	X	X	X	X
5. DLAS	X	+	+	X	X	X
6. UGMS	X	X	X	+	X	+
7. ISSER	X	+	X	+	X	X
8. BRRI	X	X	X	X	X	X
9. COCOA	+	X	X	+	X	+
10. GAEC	X	X	X	X	X	X
11. GSB	X	X	X	X	X	X
12. IRI	X	X	X	+	X	X
13. OIL PALM	X	X	X	X	X	X
14. WRRI	X	X	+	+	X	+
15. ENERGY	+	X	X	+	X	+
16. GEOL.SUR	X	X	X	X	X	X
17.M. AGRIC	+	X	X	X	X	+
18.M. TRADE	NO	RETURNS				
19.M.TR&COMM	NO	RETURNS				
20. STATISTI	NO	RETURNS				

\+ - Participant
x - Non participant

4.14 NETWORKING ACTIVITIES

All the libraries and information centres within the scope of this study have been identified and notified as either sectoral nodal points or special resource centres of the GHASTINET Project. It is however noted with concern that almost three years after the inception of the Project, three of the participants are not aware of their participation in the on-going project. (Table 35).

TABLE 35: PARTICIPANTS AWARENESS IN NETWORKING

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	1	5.9
YES	14	82.2
NO	2	11.9
T O T A L	17	100.0

Furthermore, Table 36 which analyses the role of each centre indicates that as many as five participating organisations could not state clearly their specific functions as special resource centres. This state of affairs could be attributed to lack of proper coordination among network participants and the National Focal Point.

TABLE 36: ROLE OF PARTICIPATING CENTRES

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	5	29.4
TRAINING CENTRE	5	29.4
INFO. ON STAFF PUBLICATIONS	1	5.9
INFORMATION CENTRE	6	35.3
T O T A L	17	100.0

4.13.1 Sharing of Selection Tools

Relating to the sharing of selection tools such as the British National Bibliography, Books in Print, and Gaylord Library Supplies and Furniture Reference Catalogue, only two units confirmed their joint usage of such expensive resources. Similarly, only one unit liaises with the National Focal Point of GHASTINET. The remaining 14 (82.3%) have not established such a relationship.

4.13.2 Joint Acquisitions

Other schemes including cooperative book/serials, acquisition, subject specialisation, document delivery, joint depository of theses and dissertations, as well as exchange of professional staff are practically non-existent in the Ghanaian context (Table 34). Despite a few isolated efforts, particularly in the area of proposed joint serials acquisition, nothing substantial has been achieved.

4.13.3 Cooperative Technical Services

In the area of joint technical services, notably, binding, only two confirmed their engagement in such ventures (Table 34B). In this situation, the Technical Services Unit of the Balme Library, University of Ghana, which stands unique as the best endowed bindery in the system, could be effectively utilised by other smaller units. However, an interview with the head of the unit revealed that only the various departmental and faculty libraries of the University avail themselves of this opportunity.

4.13.4 Joint Processing

Similarly the three university libraries process materials centrally before passing them over to the various departmental libraries. This is more of an internal arrangement within institutions than a fully fledged cooperative venture between different institutions.

4.13.5 Document Inter-loan Services

Document inter-loan services often considered as the bedrock of cooperative schemes on the library and informtion frontier have been implemented informally but largely on "gentlemen's agreement" basis. Table 37 indicates that nine (52.9%) of the centres participate in this process outside the

realm of GHASTINET.

TABLE 37: INTER-LENDING OUTSIDE GHASTINET

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	6	35.3
YES	9	52.9
NO	2	11.8
T O T A L	17	100.0

TABLE 38: INTER-LENDING IN GHASTINET FRAMEWORK

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	9	52.8
YES	4	23.6
NO	4	23.6
T O T A L	17	100.0

On the other hand, only four engage in any form of document inter-lending exercise within GHASTINET. (Table 38)

One area which is receiving farily positive attention is the compilation of the Union List of Serials. So far, nine respondents are contributing actively to this exercise. However, as shown in Table 39, as many as seven repondents gave no indication of their awareness of this important undertaking.

TABLE 39: PARTICIPATING IN UNION OF SERIALS

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	7	41.1
YES	9	53.0
NO	1	5.9
T O T A L	17	100.0

A project aimed at compiling a Union Catalogue of all libraries of the country was mooted in the early 1970s. The mandate for covering the holdings in the Humanities and the Social Sciences was given to the Balme Library. The responsibility for the sciences was given to the Central Reference and Research Library of the CSIR. This exercise had to be abandoned soon after its inception due to lack of commitment on the part of the participating libraries and information centres. Other contributory factors included inadequate funding, shortage of qualified personnel, as well as other logistic supplies.

4.13.6 Joint Staff Education and Training

Of major importance to the on-going networking project is the joint development of core networking personnel covering the entire spectrum of the programme. Areas of particular interest, however, include the use of common methodologies and modern information technologies. To this end, a number of workshops and seminars were conducted locally to sharpen the capacities and capabilities of a sizeable number of such personnel. In addition, a number of staff of the National Focal Point participated in a series of foreign programmes aimed at keeping them abreast with latest developments in the information industry.

As shown in Table 40, even though six of the sample population is aware of a joint manpower development programme, only three centres actually participated in the programme. The remaining three did not and a majority of respondents (eleven of them) are largely ignorant of any such programmes.

TABLE 40: JOINT STAFF EDUCATION AND TRAINING

VALUE LABEL	NO. OF CENTRES	PERCENTAGE (%)
N/S	11	64.6%
YES	3	17.7
NO	3	17.7
T O T A L	17	100.0

4.14 BUDGETARY ALLOCATIONS

In the words of Shahid Akhtar[5], a key elements in the successful establishment and maintenance of an information network is the provision of assured and adequate funding. Over the past two decades, most of these professionals had to operate their systems without proper budgetary allocations. The results of a series of interviews with most of these professionals reveal that, more often than not, they are made to believe that their allocations are tied to other sectors such as the administrative units of their parent organisations.

Available statistics from the questionnaire largely support this trend as shown in Tables 41, 42, 43 and 44.

TABLE 41: BUDGETARY ALLOCATIONS

LIBRARIES & INFORMATION CENTRES	ø 1990	ø 1991	ø 1992
1. BALME	18,000,000.00	18,000,00.000	22,000,000.00
2. U S T	NOT	AVAILABLE	-
3. U C C	8,155,000.00	15,500,000.00	17,140,000.00
4. DEPT. OF GEOGRAPHY	NOT	AVAILABLE TO	LIBRARY
5. DLAS	NOT	AVAILABLE TO	LIBRARY
6. UG MEDICAL	-	-	15,000,000.00
7. ISSER	NOT	AVAILABLE TO	LIBRARY
8. BRRI	3,000,000.00	4,000,000.00	6,000,000.00
9. COCOA	NOT	AVAILABLE TO	LIBRARY
10. GAEC	5,900,000.00	6,000,000.00	8,700,000.00
11. GSB	NOT	AVAILABLE TO	LIBRARY
12. IRI	4,400,000.00	2,800,000.00	6,250,000.00
13. OIL PALM	NOT	AVAILABLE TO	LIBRARY
14. WRRI	4,300,000.00	3,000,000.00	5,000,000.00
15. ENERGY	NOT	AVAILABLE TO	LIBRARY
16. GEOLOGICAL SURVEY	NOT	AVAILABLE TO	LIBRARY
17. MIN. OF AGRIC	1,000,000.00	2,000,000.00	7,000,000.00
18. MIN. OF TRADE	NO	RETURNS	
19. MIN. OF TRNS & COM	NO	RETURNS	
20. STATISTICAL SERV.	NO	RETURNS	

TABLE 42: BUDGET ESTIMATES FOR 1990

AMOUNT (... MILLION CEDIS)	NO. OF CENTRES	PERCENTAGE (%)
N/S	10	58.7
1	1	5.9
3	2	11.8
4	1	5.9
6	1	5.9
8	1	5.9
18	1	5.9
T O T A L	17	100.0

Table 43: BUDGET ESTIMATES FOR 1991

AMOUNT (... MILLION CEDIS)	NO. OF CENTRES	PERCENTAGE (%)
N/S	9	52.8
2	2	11.8
3	1	5.9
4	1	5.9
6	1	5.9
9	1	5.9
15	1	5.9
18	1	5.9
T O T A L	17	100.0

TABLE 44: BUDGET ESTIMATES FOR 1992

AMOUNT (... MILLION CEDIS)	NO. OF CENTRES	PERCENTAGE (%)
N/S	7	41.0
5	1	5.9
6	2	11.8
7	1	5.9
8	1	5.9
10	1	5.9
13	1	5.9
15	1	5.9
17	1	5.9
22	1	5.9
T O T A L	17	100.0

Table 42 reflecting the 1990 estimates clearly shows that as many as 10 centres (58.7%) had no idea how much money they were allocated for the period under review. Similarly, as shown in Tables 43 (1991), and 44 (1992), several units operated without proper financial records.

On actual estimates to the more fortunate and better informed units, the 1992 records show that between five and twenty-two million cedis have been approved for the various units. It is worth stating here that all respondents (with estimates) clearly pointed out that amounts actually released during the period fell far short of the estimates. This invariably made planning very difficult and affected the performance of all the units involved.

Despite the uncertain financial climate in which the institutions find themselves, at least 41% of the sample provided rough estimates of the percentages of real expenditure on scientific and technical literature, as shown in Table 45.

TABLE 45: PERCENTAGE OF EXPENDITURE ON S & T MATERIALS

% EXPENDED ON S&T MATS	NO. OF CENTRES	PERCENTAGE OF CENTRES
N/S	10	58.8
2	1	5.9
33	1	5.9
40	1	5.9
50	2	11.8
60	1	5.9
95	1	5.9
TOTAL	17	100.0

Foreign assistance to supplement government subvention in funding library and information services is becoming more and more difficult to find. In all, only four units provided information on external support in the form of fiscal and material donations. Notable among the donors are the British Council, The Food and Agricultural Organisation (FAO), the International Atomic Energy Agency (IAEA), The Health Foundation

of New York, the United Nations Fund for Population Activities (UNFPA), the International Development Research Centre (IDRC) and the American Association for Advancement of Sciences (AAAS).

In this bleak financial situation in which the majority of libraries and information centres find themselves, the onus is on the centres to justify their existence. This would inevitably attract better governmental attention, as well as sympathy for external assistance of any sort.

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CHAPTER FIVE

5.0 GHANA NATIONAL SCIENTIFIC AND TECHNOLOGICAL INFORMATION NETWORK (GHASTINET)

5.1 INTRODUCTION:

A Project Document on the establishment of a National Scientific and Technological Information Network was submitted to the International Development Research Centre (IDRC) in 1986. In response, IDRC sent two of its officials to Ghana from 3rd - 7th August 1987 to carry out an on-the-spot appraisal of the information situation in Ghana(1).

The CSIR, desirous of mobilizing all available international support, also sent a copy of the Project Document to UNCSTD (UN Council on Science and Technology for Development) for consideration. UNCSTD reacted swiftly by selling the idea to other potential donor agencies. It succeeded in inviting these agencies to a workshop in Ghana to coincide with the visit of the IDRC officials and other donor agencies.

5.2 THE WORKSHOP ON GHASTINET - 1987

A five-day workshop was organised from 3rd-7th August, 1987 at the CSIR Secretariat. The main objective of the workshop was to brief representatives of the potential donor agencies on the state of science and technology information provision in Ghana.

It also served as a platform for negotiating with these agencies, and the specific areas in which they could provide assistance in the implementation of the proposed project. Representatives of the agencies who attended the workshop included, those of IDRC, the German Agency for Technical Cooperation (GTZ), the United Nations Industrial Development Organisation (UNIDO), International Business Machines (IBM), and the Commonwealth Science Council[2].

Soon after the workshop, the PNDC government allocated an amount of ø60 million towards the completion of the building to house the National Focal Point (NFP) of the proposed network[3]. It is worth noting that the construction work which started on the NFP building in 1974 had ground to a halt for almost a decade due to lack of funds. However, after the revival, work has been progressing steadily towards eventual completion in the near future.

The most important outcome of the historic 1987 workshop was that, after the submission of a revised Project Document in conformity with IDRC guidelines, a Memorandum of Grant Conditions prepared by IDRC was ratified on June 26, 1989. This is an agreement between the governments of Ghana and Canada in which IDRC, representing the Canadian Government, approved an initial grant of $200,000 - (CAD) (Two Hundred Thousand Canadian Dollars) for the commencement of the first phase of the project[4]. This preliminary phase

of the project was scheduled between June 1989 and June 1991. During this period, maximum efforts were to be made "to put in place, the basic requirements and facilities that would enable the National Focal Point to provide the necessary outreach for participating agencies in the network, through the sectoral nodes and the Special Resource Centres"[5].

5.3 GHASTINET: A THEORETICAL FRAMEWORK

GHASTINET is conceptualised as a framework for linking together the various information systems within the major sectors of the Ghanaian economy with the view of sharing expertise, information and experience. The underlying core of the project is the strategy of cooperation, resource sharing and collaboration. This is most desirable, considering the fragile nature of the Ghanaian economy characterised by the scarcity of finance, expertise and physical resources.

In principle, the network plays the catalytic role of strengthening the capabilities of participating institutions. It is an equally viable means of institutionalising contacts among professionals within the library and information sector in Ghana.

5.4 AIMS AND OBJECTIVES OF GHASTINET

The project aims at raising the socio-economic

standard of Ghana by supplying relevant and up-to-date information to decision makers at all levels of the Ghanaian economy[6]. It hopes to achieve this through the establishment of the necessary infrastructures and mechanisms capable of enhancing the provision of effective and efficient information services.

The overall objective of the network project is "to establish a sustainable national network system for the identification, collection, storage, retrieval, repackaging and timely dissemination of scientific and technological information to various user categories through the application of appropriate modern technologies"[7]. These user categories include research scientists and academics, government planners and policy makers, public and private industrialists and manufacturers, rural peasant farmers and small entrepreneurs.

Within the framework of the above long term and broad objectives, the memorandum of Grant Conditions[8] isolated the specific and immediate objectives which were to be achieved during the preliminary implementation phase (June 1989 to June 1991). These included,

(i) to develop an efficient system for the bibliographic control of indigenous science and technology literature with priority in agricultural, industrial and energy information;

(ii) to create computerised databases for indigenous science and technology literature, on-going research projects, high-level scientific and technical manpower, and a union list of scientific

and technical periodicals;

(iii) to generate and produce from the database, publications including the Ghana Science Abstracts bulletin at regular intervals, a Directory of scientific research projects, a Directory of high-level scientific and technical manpower, and a union list of scientific and technical periodicals;

(iv) to establish a facility for the microfilming of indigenous science and technology literature, and maintain a national microfiche collection of such materials;

(v) to undertake a national survey of various user categories and their information needs;

(vi) to identify and fill gaps in science and technology literature collections, particularly journals and other standard reference materials;

(vii) to arrange training programmes for core personnel including a systems analyst, an Abstractor/Indexer, a Technical Information Officer/Science writer, and a reprographer, and also to arrange a study visit for the Project Coordinator to well established systems elsewhere;

(viii) to organise one training/sensitization workshop for information workers in the network;

(ix) to advise on the review and revision of the curriculum of the Department of Library and Archival Studies in line with modern information science and technology;

(x) to arrange a review workshop for network members to evaluate progress and plan future action; and

(xi) to promote, by various means, the implementation of the network and its services.

Basically, the project hopes to establish all the necessary structures and mechanisms to assist decision makers and problem solvers to access and apply quality data that would help the sustained development of Ghana.

5.5 ORGANISATIONAL STRUCTURE

GHASTINET is one of the semi-autonomous special projects under the umbrella of the Council for Scientific and Industrial Research. In context, it is an amalgamation of both conventional and electronic public information utilities.

The GHASTINET structure is that of an open-ended network of autonomous sectoral information services nodes. These are conveniently referred to as Sectoral Nodal Points (SNPs) and Special Resource Centres
(SRCs). All these nodes and centres are coordinated by a central organising body known as the National Focal Point (NFP). The attainment of these laudable objectives would depend to a very large extent on the organisational structure of the GHASTINET project.

5.5.1 The National Focal Point

The National Focal Point of GHASTINET is an offspring of the Central Reference and Research Library (CRRL) which as noted earlier had been

established in 1964 with clearly defined objectives within the Secretariat of the CSIR. The NFP finally moved into its permanent premises off Agostino Neto Road, adjacent to the CSIR Secretariat. The building is almost completed and could be ready for commissioning before the end of 1993.

The principal role of the NFP is to provide the basic infrastructure in order to ensure the necessary outreach and leadership. To this end, the National Committee for Information and Documentation has drawn up specific functions for the NFP. These include the development and maintenance of national standards and codes of practice for the network. These would take the form of prepared/draft guidelines for various operations and procedures. These tasks are expected to be undertaken by the various special committees that have been set up since 1991 (these committes are discussed in detail towards the end of this chapter). Other functions include hosting a comprehensive database made up of computerised databases of the various sectoral nodes and special resource centres; the production of microfiche holdings for sectoral nodal points and resource centres. Besides, the NFP is expected to embark on the publication of network documents and information sheets; coordination of training and manpower development; and coordination of surveys and support studies on network operations and improvement. The development and maintenance of

various union lists, handbooks and directories are other tasks of the NFP. Finally, the NFP is mandated to serve as a National Referral Centre for network enquiries and to establish and maintain links with other relevant information networks[9].

In order to perform those numerous functions creditably, the NFP has a Project Coordinator and six senior professional staff, including a computer science graduate, supporting staff including a principal accounting assistant, five data entry clerks/typists, three senior library assistants and four cleaners. Plans are far advanced to recruit additional staff comprising a senior administrative Officer and professional librarians.

Items of equipment at the NFP include five IBM Personal Computers with peripherals, one CD-ROM player, one page printer (Laser); an Alcatel Roneo 800 Duplicating Machine; one Electronic Stencil Scanner and a Nashua 7125 II Photocopier. There is an operational telecommunication line linked to a Hayes Compatible Modem.

With the active cooperation of participating nodes, the NFP hopes to ensure a sustained coordination of network policies and operations, advanced planning, manpower development and, above all, representation of GHASTINET's interests at the national and international levels.

5.5.2 The Sectoral Nodal Points

The Sectoral Nodal Points and Special Resource Centres constitute libraries or information units or documentation centres within certain identifiable sectors of the Ghanaian economy.

Currently, the network comprises nine (9) Sectoral Nodal Points (or information service nodes) representing such vital sectors of the national economy as agriculture, forestry and fisheries; water resources; energy; industry and technology; socio-economics; as well as geology, mining and metallurgy. Others include transport and communication; health and the environment; and finally building and road construction. Each of these nodes representing an accredited library, information or documentation unit is responsible for the organisation and coordination of information activities within their respective sectors. For a better appreciation of their scope and functions the rest of this sub-heading will be devoted to a discussion of each of these nodes.

5.5.2.1 The Agriculture, Forestry and Fisheries Sector

The Reference Library of the Ministry of Agriculture is the sectoral node for this sector. Established in 1890, the library was mandated to cater for the reference and research needs of the staff of the Ministry of Agriculture. The library was recently rehabilitated with a grant from the Food and

Agricultural Organisation (FAO), to cater for its traditional clientele and at the same time enhance its capabilities for a more expanded programme. The FAO has provided one IBM personal computer, one photocopier and a CD-ROM player.

Institutions within the Agricultural Sector include several of the CSIR institutes such as the Animal Research Institute, Crop Research Institute, Food Research Institute, Institute of Aquatic Biology, Oil Palm Research Institute, Soil Research Institute and Water Resources Research Institute. The non-CSIR research units include the Cocoa Research Institute, Forestry Research Institute and the Fisheries Research Unit. Others include the Irrigation Development Authority, Fisheries Department, Agricultural Development Corporations, Agricultural Development Bank, as well as the Agriculture faculties of the three universities of Ghana.

Under a World Bank initiated programme of rehabilitating the Agricultural Research Systems in Ghana, the libraries and information centres of the agricultural research institutes and centres are to be resuscitated. They are to be developed into a coherent information system as a sub-network of GHASTINET, to be known as the Ghana Agricultural Information Network Systems (GAINS). The main node for GAINS is the proposed National Agricultural Library, based on the Reference Library of the Ministry of Agriculture which

is to be transformed into an ultra-modern library.

Under the GHASTINET project, the Agricultural Sectoral Nodal Point is expected to perform certain basic functions. It is to acquire and document all relevant literature on agriculture in Ghana, both indigenous and foreign. This information is expected to be processed and stored for retrieval and dissemination to potential consumers as and when necessary. Besides, it is to actively coordinate the information handling activities of the institutions under the agricultural sector. In terms of manpower development, it is expected to organise periodic training and workshops on documentation practices for sector participants. The Librarian has been sent overseas for a masters programme in Library and Information Studies.

Furthermore, in a bid to strengthen the Department of Library and Archival Studies (DLAS) to train manpower to meet national aspirations, two ladies are currently studying in the United Kingdom under the Overseas Development Assistance (ODA) grants. Their areas of specialisation include Management of Agricultural Information. At the end of their training, they are expected to teach at the DLAS.

The centre is presently manned by one Professional Librarian, one Library Assistant and two supporting staff.

5.5.2.2 The Water Resources Sector

The sectoral node for the Water Resources Sector is the Research Library and the Water Resources Documentation Centre of the Water Resources Research Institute (CSIR). Institutions within this sector are the Ghana Water and Sewerage Corporation, the Institute of Aquatic Biology, Meteorological Services Department, the Volta River Authority, the Architectural and Engineering Services Corporation and the Volta Basin Research Project.

With the view of meeting its obligations within the GHASTINET structure, the centre is supposed to organise and bring together information and documentation centres and units of all water related institutions by establishing the necessary linkages. With the inauguration of this Sectoral Node in May 1989, the Librarian of the Centre expressed the desire to develop among participants within the water sector[10] a local network of information resources which would provide a comprehensive and readily available information on all dimensions of water resources development in Ghana.

The centre's staff include two professional librarians, one sub-professional and two supporting personnel. It is stocked with one personal computer, one Nashua photocopier and two microfiche readers.

5.5.2.3 The Energy Sector

The Energy Information Centre (EIC) is the sectoral node for the Energy Sector. The centre was established in 1985 and is located within the Ministry of Energy. Under the umbrella of the sector are the Electricity Corporation of Ghana, the Ghana Atomic Energy Commission, the Tema Oil Refinery, the Volta River Authority (VRA), and the Ghana National Petroleum Corporation (GNPC).

The prime objective of the EIC is to undertake a study of the needs, sources, current status and future requirements for energy information necessary for effective planning and policy formulation in Ghana. The centre is in the process of establishing an annotated bibliographic database on energy information for Ghana and a complementary database of appropriate external energy information. The database is currently on the centre's own collection and is yet to be incorporated into the GHASTINET databases.

Coordination with other energy information centres is in the form of periodic meetings. No centralised database of energy resources has yet been developed. On the international scene, the EIC is the designated National Node for the Economic Community of West African States (ECOWAS)/UNESCO Regional Network on New and Renewable Energy.

The centre is manned by one professional librarian and two supporting staff. Its operations

are facilitated by an Olivetti Personal Computer S386 SX and Hewlett Packard Laser Jet II Printer, a microfiche reader and a photocopier.

5.5.2.4 The Industry and Technology Sector

The Library of the Industrial Research Institute is the sectoral nodal point for this sector. Established in 1965, the library was conceived of strictly as a Reference and Research unit for the parent institute.

Within this sector are institutions such as the Ministry of Industries, Science and Technology; Ghana Industrial Holding Corporation (GIHOC); the Food Research Institute; the National Investment Bank; Scientific Instrumentation Centre; State Enterprises Commission and the Technology Consultancy Centre. The rest are the Ghana Investment Centre, Association of Ghana Industries and Ghana Institution of Engineers.

In pursuit of its expanded role within the context of GHASTINET, it has drawn up a programme of collaboration with the above mentioned institutions within the sector. Some of the strategies outlined include, a national survey of the information needs of small and micro industrial enterprises and the establishment of a patent information unit of the node with the consent of the World Intellectual Property Organisation (WIPO). To enhance the sharing of the resources of node participants, special emphasis is

placed on the possible publication of sectoral union catalogues, union lists of serials, accession bulletins, newsletters, bibliographies, abstracts and indexes[11]. These are yet to be fully operational.

It has a staff strength of one professional, a sub-professional and a cleaner. Equipment includes a Phillips P3348 SX Personal Computer, a Hewlett Packard Printer, a Philips CD-ROM Player and a Canon Photocopier.

5.5.2.5 The Socio-Economic Sector

The library of the Statistical Services of Ghana acts as the nodal point of the socio-economic sector of GHASTINET. Established in 1948, this library was purely a reference library attached to the office of the Government statistician. It was recently merged with the Library of the Ministry of Finance and Economic Planning. Currently, it addresses itself to the information needs of a wider clientele. These include, the Ministry of Trade, Bank of Ghana, the various commercial banks, the Institute of Statistical, Social and Economic Research (ISSER) and the Regional Institute for Population Studies (RIPS) (Legon). Others include the Centre for Development Studies, University of Cape Coast, and the Ministry of Mobilisation and Social Welfare.

The centre is actively playing the role of coordinating information activities and services

within the sector. Personnel at post include a professional librarian, three sub-professionals and four clerical staff. The library has a Canon personal computer, with peripherals and a Microfiche reader/printer.

5.5.2.6 The Geology, Mining and Metallurgy Sector

With the inception of the GHASTINET project, the Geological Survey Department has been acting as the coordinating centre for library and information services within the sector. The Ministry of Lands and Natural Resources, University of Science and Technology (UST) School of Mines, the Mineral Commission, Ghana Consolidated Diamonds Limited, the Ghana Chamber of Mines and the Volta Aluminium Company are some of the institutions within the sector. Others include the State Gold Mining Corporation, the Ashanti Goldfields Corporation, the Ghana National Manganese Corporation, Department of Geology (Legon), and the Institute of Mining and Mineral Engineering (UST).

Besides its role as the sectoral node for GHASTINET, it is also the focal point in Ghana for the Pan African Network for Geological Information Systems (PANGIS).

5.5.2.7 The Transport and Communication Sector

The Information Centre and Library of the

Ministry of Transport and Communications is the approved sectoral node for the sector. Created under the Planning, Budget and Research Unit, the centre plays the role as the nexus of the nine organisations within the sector. Thus, it has under its umbrella The Ghana Broadcasting Corporation, the Ghana Airways Corporation, the Ghana Railway Corporation, the State Shipping Lines, the Ghana Ports and Harbours Authority, the State Transport Corporation and the Volta Lake Transport Company. In addition, other participating institutions include the Post and Telecommunications Corporation and GIHOC Boatyards.

As part of its role, the centre is expected to collect, collate, process, store and disseminate information generated from these organisations, most of which have their own libraries and computer centres.

5.5.2.8 The Health and Environment Sector

The Health Sector is represented by the University of Ghana Medical School (UGMS) Library. Soon after its establishment in 1966, this library was merged with the National Institute of Health Library and charged with the responsibility of providing relevant information for the education and training of medical students, and also for ensuring the promotion of informed health care decisions through timely access to biomedical information.

In its capacity as the sectoral nodal point, it is essential that the library expand its operations to cover other strategic institutions within the sector. These include the School of Medical Sciences (UST), Faculty of Pharmacy (UST), GIHOC Pharmaceuticals, the Centre for Scientific Research into Plant Medicine, Mampong-Akwapim, the Environmental Protection Council and the newly created Ministry of the Environment. The rest are the Noguchi Memorial Institute for Medical Research (NMMIR), Institute of Aquatic Biology, the Medical and Dental Board, and the Pharmacy Board.

Towards the execution of its health care delivery responsibilities, the library has acquired CD-ROM technology and has, for the first time, been able to disseminate practical therapeutic information to rural and urban primary health care professionals who previously had none. Furthermore, a quarterly Digest of Current References on Diseases and problems of relevance to Ghana is compiled by the library and distributed to ninety-six hospitals in Ghana[12].

The centre has also acquired access to a satellite communication known as (Healthnet) the International Health Telecommunication Network. The system is designed to facilitate the exchange of information among health professionals in developing countries and link them with their counterparts in the developed world.

Pending the completion of its permanent building, the library has a current staff strength of ten, consisting of three professional librarians, one sub-professional, five clerical staff and two cleaners.

Items of equipment at the library include a computer, one CD-ROM player, two sets of Video cassettes, one tape/slide projector, one microfiche reader and a photocopier.

5.5.2.9 The Housing and Public Construction Sector

The Building and Road Research Institute (BRRI) Library has been given responsibility as the Ghastinet Sectoral nodal point for the building and road construction sector. Established in 1962, one of the main objectives of the library was the provision of timely and up-to-date scientific and technical information to the BRRI research staff, members of the construction industry and students of related disciplines. In its coordination role, the library is expected to establish strong linkages with the library and information units of other sector institutions, including the Architectural and Engineering Services Corporation, the Ghana Highway Authority, Public Works Department, the State Construction Corporation, and the Technical Division of the Ministry of Education.

The BRRI library has three professionals, one para-professional and three supporting staff.

As conceived by the National Committee for

Information and Documentation and sanctioned by the Chief Executives of each sectoral nodal point[13], the centres would, inter-alia, harmonise the activities of all participating agencies within their units.

5.5.2.10 Functions of The Sectoral Nodal Points

As can be seen, the nodal points would ensure effective bibliographic control of literature within the confines of their sector. This could be effectively accomplished through the adoption of sustainable mechanisms for identifying, collecting, documenting and disseminating appropriate information. The production and maintenance of union lists of journals on sectoral basis would represent some of the means for achieving this goal. Data and information on pertinent issues like on-going research activities and specialist personnel are expected to be provided on standardised formats to the National Focal Point. These are viable inputs into the databases on Highlevel Manpower and On-going Research Projects.

The projected roles of the nodal points in manpower development would include organisation of workshops and seminars, lectures and symposia. Presumably, these services and products would enhance the provision of improved systems and services in diverse ways, bearing in mind the overriding principles of cooperation, coordination and resource sharing.

Besides the sectoral nodes, certain libraries and information units have been designated as Special Resource Centres whose work is to complement the activities of these nodes.

5.5.3 Special Resource Centres

The designation of these centres stems from certain unique functions and services which some of them perform. Within this category are the Ghana Standards Board, the National Archives of Ghana, the Ghana Museums and Monuments Board. Also included are the main libraries of the three universities of Ghana, namely, the Balme Library of the University of Ghana, the Library of the University of Science and Technology and the University of Cape Coast Library. Others include the Department of Library and Archival Studies, Legon, the Registrar General's Department, the Ghana Library Board and the Ministry of Information.

The main role of the Special Resource Centres, according to Villars[14], "is to collaborate with the network and other agencies, with the ultimate objective of evolving a uniform national information policy and plan, as well as common operational methods and procedures in the collection, processing, dissemination of information and document delivery". These centres will also collaborate in the compilation of the Ghana National Bibliography and the National

Union List of Serials, and a National Union Catalogue, if found feasible.

5.6 PROJECT MANAGEMENT

The GHASTINET Project is under the management of a Project Coordinator, with the assistance of an Advisory Committee. The latter was appointed by the CSIR as the main governing council in 1990[15].

At its inaugural meeting on the 18th of February 1991, the committee was assigned certain broad functions to perform. Among them are:

(i) to assist the Project Coordinator during the early stages of the project;

(ii) to draw up programmes of activities for the approval of the CSIR Council;

(iii) to assist the CSIR Council through the Chairman, to ensure that CSIR rules and regulations are adhered to;

(iv) to set up sub-committees as appropriate, and

(v) to consider budgetary provisions and ensure that they are well utilised, and to supervise the accounts of the project.

These programmes and activities have given the Project a considerable degree of autonomy as one of the Special Projects of the CSIR. In effect, the GHASTINET prepares its own budget estimates, seeks its own funds and manages its financial resources. It is anticipated that with the passage of time and the

growth of its functions, GHASTINET would be accorded a status equivalent to that of any CSIR institute with its own management board.

Augmenting the managerial duties of the Project Coordinator and the Advisory Committee are six Technical Committees which are essentially sub-committees of the Advisory Committee. These include

(i) TECHNICAL COMMITTEE ON COLLECTION, RESOURCE DEVELOPMENT AND ACQUISITION. Part of its objectives covers advising on joint acquisition programmes of all book and non-book materials, preparation of modalities for gifts and exchanges, as well as enforcement of legal deposit provisions. The publication of joint accession lists and the compilation of union lists are some of its projected functions.

(ii) THE TECHNICAL COMMITTEE ON CATALOGUING, ABSTRACTING AND INDEXING. It has been mandated to prepare guidelines and codes of practice for cataloguing, abstracting, indexing and thesaurus construction for processing documents for input into the projects bibliographic database.

(iii) THE TECHNICAL COMMITTEE ON REPROGRAPHY AND PUBLICATION. Its terms of reference include, advising on modern techniques of conserving book and non-print materials

particularly within the tropics. It has also been mandated to provide guidelines for the microfilming of ephemeral indigenous literature and advice on modern reprographic techniques for the production and replication of GHASTINET publications.

(iv) TECHNICAL COMMITTEE ON COMPUTERISATION AND APPLICATION OF INFORMATION TECHNOLOGIES. This committee has been charged with providing expert advise on the identification, selection and methodologies for the application of modern computer and telecommunication technologies in networking.

(v) THE TECHNICAL COMMITTEE ON INFORMATION MARKETING COMMUNICATION AND PUBLICITY. Its special responsibility is to provide advice on the adoption of appropriate strategies for publicity and awareness creation for information services and products of GHASTINET. It is also required to adopt workable strategies for the marketing and dissemination of GHASTINET products and services to various users and user agencies. To ensure optimum utilisation of information resources, the Committee is expected to advise on suitable methods of conducting

surveys on user needs, and on subsequent adoption of appropriate information repackaging techniques to meet user request, and

(vi) THE TECHNICAL COMMITTEE ON EDUCATION AND TRAINING, which is empowered to advise on and draw up programmes of training of personnel in the various sectors of the network.

There is also a STANDING COMMITTEE OF SECTORAL NODES AND SPECIAL RESOURCES CENTRES of the network, as well as a CDS/ISIS USER GROUP[16].

Technically, these committees are enjoined to prepare comprehensive guidelines for adoption by network participants. Such guidelines, it is assumed, would promote standardisation and enhance uniformity of practice. The committees are required to conduct training programmes towards the development of the manpower in their areas of specialisation.

5.7 NETWORK SERVICES AND PRODUCTS

Currently, the provision of a number of information services and products has been initiated at the National Focal Point. This is in indirect response to the requirements of the preliminary implementation phase of the Project. These include database building, photocopying and manpower

development programmes.

5.7.1.1 Database Building Activities

Database building is one of the major preoccupations of GHASTINET. Information service nodes within the system are engaged in the generation of a host of sectoral databases. Cummulatively, these valuable resources are expected to be transformed into unique databases at the National Focal Point. Such crucial areas of cooperation and resource-sharing include information on recent publications in science and technology and relevant social sciences, specialised manpower resources, and on-going research projects in Ghana. Available databases include THE GHANA SCIENCE ABSTRACTS, HIGH-LEVEL MANPOWER, ON-GOING RESEARCH PROJECTS, UNION LIST OF SERIALS AND THE INTERNATIONAL INFORMATION SYSTEM FOR THE AGRICULTURAL SCIENCES AND TECHNOLOGY.

THE GHANA SCIENCE ABSTRACTS (GHASABS)

This database is a bimonthly abstract bulletin of current indigenous scientific and technological literature originating from Ghana. In recent times, the scope has been expanded to include publications by Ghanaians outside Ghana, and relevant literature on Ghana produced by foreigners both in Ghana and elsewhere.

The decision to publish the GHASABS was taken by the CSIR Library Committee in November 1973. This became necessary when the results of a survey on an erstwhile "Literature Summary" revealed that, although the service was popular, it was found expensive and not sufficiently comprehensive since emphasis was mainly on agriculture.

Basically, it aims at the bibliographic control of scientific and technological literature, with high premium on "grey-literature". It further serves as a medium of current awareness to research scientists on publications by their colleagues. Within the framework of GHASTINET, the database dates back to 1988 after about ten years of dormancy. Currently, it has a total of 1,500 records, out of which 721 have actually been input into the electronic database. There is also a backlog of records dating back to 1975 totalling some 6,000 items.

5.7.1.2 THE DATABASE ON HIGHLEVEL MANPOWER (HILMAN).

This database consists of a list of highly trained and qualified professionals and technocrats in the different strata of the Ghanaian economy. It includes researchers in a variety of disciplines, particularly in science and technology and research and development (R&D) as well as the academic staff of the universities.

The database is a unique treasury of information on the research pursuits of the personnel involved. The names, qualifications, areas of specialisation, location and backgrounds of thousands of Ghanaians have been provided. To date, there are five thousand and twelve (5,012) records in the database. HILMAN is expected to contribute to the global information on highlevel manpower in less developed countries.

5.7.1.3 DATABASE ON ON-GOING RESEARCH PROJECTS (RESPRO)

The main objective of the database is to document the variety of current research projects being undertaken in Ghana. The records are grouped in five disciplines, namely, Agriculture; Health Sciences and Medicine; Industry and Technology; the Natural Sciences and the Social Sciences. Each record in the directory provides detailed information on name of researcher, name and address of research institution, title of the project, keywords, starting and termination dates of the project. Information on funding and sources of funding is also provided.

5.7.1.4 UNION LIST OF SERIALS (ULIST) DATABASE

This is a record of current periodicals in Ghanaian libraries. At its inception in 1966, the scope of the database was restricted to periodicals on science and technology, and publications issued

serially by scientific and technical institutions and societies.

The term serial is interpreted in its widest sense to include periodicals, annuals (reports and yearbooks), memoirs, proceedings and transactions of societies, institutions, governments and other organisations. An update of the 1966 and 1976 publications brings the current strength of the database to ten thousand (10,000) records.

5.7.1.5 AGRIS DATABASE

A national database for AGRIS has been created at the GHASTINET National Focal Point. It is responsible for collecting, processing and inputting local agricultural information into the AGRIS database located at the FAO Headquarters in Rome.

In large undertakings of this nature (database construction exercises), there are bound to be some omissions and inexactitudes. However, with regular updates, such shortcomings could be successfully addressed.

Projected databases most of which are in their planning stages include those on local conferences, workshops and seminars. An intensive data collection exercise on such meetings has yielded some 600 records to date in draft form.

Also under consideration is a database on special libraries, documentation and information centres in

Ghana. Provision has also been made for a database of all CSIR institutes and staff publications and research findings. There are a thousand one hundred and seventy (1,170) records in the pipeline so far.

5.7.2 Electronic Database Searches

Another important information service provided by GHASTINET is electronic database searching. A great deal of emphasis is placed on retrospective database searches for users, on request. This service is largely limited to the GHANA SCIENCE ABSTRACTS database. Access to the required information is largely facilitated by the availability of photocopying facilities which makes it possible for full length articles to be copied for users on request.

5.7.3 Manpower Development Programmes

A major concern of GHASTINET is manpower development, particularly within the context of modern information technologies and other network activities.

A number of personnel training programmes were arranged or organised for the core staff of the National Focal Point and other participating nodes. Some of the programmes took place locally, a few outside the country. An example of a local training programme was a ten-day training workshop organised from 17th - 27th April, 1990, in Accra for library and

information professionals in Ghana, with the assistance of PADIS. The training workshop was on the application of the CDS/ISIS software and PADIS Methodologies[17].

A less direct training programme but one which relates to curriculum review of Ghana's only structured library and information training establishment was undertaken a couple of years ago with the assistance of IDRC. A consultant in Information Science in the person of Prof. W. Olabode Aiyepeku was engaged by the IDRC for the Department of Library and Archival Studies - Legon. His terms of reference included, "to advice on the review and update of the Information Science component of the Postgraduate curriculum of the department[18]. This exercise, it is hoped, would help in streamlining the training programmes of the department in that subject area, to meet the manpower requirements of the country in general and GHASTINET in particular.

Besides the above, the GHASTINET project benefited from some training programmes organised outside Ghana between 1990 and 1993. The Project Coordinator and the professional staff at the National Focal Point attended a series of short courses ranging between one week and three months outside the country. The host countries included India, Italy, Yugoslavia, Botswana, Japan, Ethiopia and the United Kingdom.

The rationale for this priority training

programme for the staff of the National Focal Point is two-fold. On the one hand, it is meant to strengthen the capacities and capabilities of the staff to successfully accomplish the first phase of the project. On the other hand, it is designed to lay a firm foundation for a national training programme that would be organised by beneficiaries. This would cover training in database management, search techniques, document processing and other computer-related disciplines.

Experience elsewhere suggests that the successful implementation of such a programme is contingent on the ready availability of requisite training facilities such as computer laboratories, audio-visual training equipment, and, above all, sustained governmental support[19].

5.8. REGIONAL AND INTERNATIONAL COOPERATIVE PROGRAMMES

GHASTINET has established viable cooperative relationships with existing regional institutions such as PADIS, for which it is the designated Focal Point in Ghana. Special relations also exist with UNIDO under which a number of items of equipment, including an IBM personal computer with a dot matrix printer, an electronic stencil scanner, a CD-ROM player and a Hayes compatible modem, were donated to the GHASTINET National Focal Point[20].

Other international programmes include the acceptance of the National Focal Point as the focal point for UNESCO's Intergovernmental Informatics Programme (IIP).

In response to an agreement of cooperation between the CSIR and the American Association for the Advancement of Science (AAAS), a pilot project was initiated in electronic mailing (E-mail) and messaging. According to Third World Information Network (TWIN)[21], "E-mail is really only an extension of the telephone, so that you can type out messages on your computer keyboard and have them printed out on the computer printer of other people in different parts of the world who also have the necessary equipment".

The pilot project participants include the GHASTINET National Focal Point, the Policy Research and Strategic Planning Institute (PORSPI), formerly the Technology Transfer Centre (TTC), and the Association of African Universities (AAU). The rationale behind the project was to explore the possibility of establishing such linkages between Ghanaian researchers and research institutions and their counterparts all over the world. The idea of E-mail is receiving fast recognition as a result of its extra and tremendous benefits over conventional methods of information transfer such as postal and telex processes. With the E-mail, communication is

very fast, uses less time and is comparatively cheaper in terms of long messages. In addition, messages are memorised in the computer and could be recalled exactly as and when needed. Messages can also be sent by one mailing to many different correspondents, while information can be entered into and received from databases associated with the network. Of special importance is the confidentially of messages in transit.

5.9 THE UNFULFILLED ASPIRATIONS

There are a number of services which receive little or no attention as a result of a number of constraints. These include Selective Dissemination of Information (SDI) Services, the compilation of bibliographies, publication of current awareness bulletins, and the consolidation and repackaging of highly technical information. Inter-library loan services and document delivery schemes are also yet to receive the much needed attention. All these setbacks could be attributed to the problems of inadequate finances, logistics and manpower supply. So far, the first phase of the project initially scheduled to end by June 1991 is yet to be completed by 30th November, 1993.

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CHAPTER SIX

6. GENERAL OBSERVATIONS, RECOMMENDATIONS AND CONCLUSIONS.

6.1 GENERAL OBSERVATIONS

The clasic information network is said to succeed only when certain parametric factors are available and remain constant. These factors, include inter-alia, the willingness to cooperate; high corporate interest in resource sharing; sound legal, organizational and management framework within which the system would function. Above all, provision of adequate funds should be guaranteed to sustain information networking in the country. All these and other factors have been exhaustively discussed in chapter two.

The study sought primarily to investigate science and technology information networking in Ghana. The main areas of concern include, an assessment of the extent to which information networking has been embraced and incorporated into the library and information scenario in the country. A survey of existing library and information facilities and resources, as well as the current level and degree of cooperation and resource sharing among Ghanaian libraries and information centres was also envisaged.

With the help of a questionnaire completed by librarians and information officers, and from on-the-

spot observations, several issues have emerged. Prominent among these issues are those relating to the numerous constraints confronting the planning and execution of information networking projects. Most of these obstacles appeared at different stages of the study, but they have been coordinated in the form of brief summaries of each that follow.

6.2 PHYSICAL FACILITIES

The study discovered that physical facilities in terms of building size and accommodation for both readers and stock of library resources are grossly inadequate. Furthermore, since most of the affected libraries and information centres are housed in temporary structures, the standard of ventilation and lighting is poor.

6.3 FINANCE

Probably, the most persistent problem facing all libraries and information centres is inadequate funding, particularly foreign exchange. This singular factor has had a devastating, multiplier effect cutting across all facets of the information industry. The worst affected area is in collection development which tends to be very slow and expensive. This is due to the fact that very little publishing is done locally, with the result that most publications have to be imported from overseas. It has also been

speculated that the expenditures on foreign publications limit the capabilities of the libraries and information centres to expand and improve their services in other directions.

The heavy reliance on donations of books and periodicals is another issue resulting from inadequate financing of libraries/information centres. This inevitably results in some centres stocking collections of small amounts of current, useful literature and large quantities of inappropriate, obsolete and marginally used materials.

The financial crisis is further exacerbated by the fact that a good number of libraries and information centres have been denied information about their budgetary allocations, and as such they could not exercise any control over their fiscal matters. In a number of instances, funds meant for the information and documentation sectors have been diverted to other areas. This is a further manifestation of the apathy of some heads of institutions and departments towards libraries and information centres. This is one major crippling factor which prevents the sector from fulfilling its basic obligations.

6.4 MANPOWER

The study also clearly identified inadequate staffing, especially at the professional level, as a

major problem having adverse effects on information networking in the country. This problem has been viewed from different perspectives.

A number of interviewees held the view that the only professional training establishment in the country, the Department of Library and Archival Studies, has not produced enough personnel to meet the ever increasing demands. One should, however, not lose sight of the fact that the unacceptably low status accorded librarians, particularly in the public sector, has a direct negative impact on the number of aspiring professionals. Besides there is a considerable number of Graduate Diploma holders who cannot find jobs, or who are working outside the profession because of this fact. The situation results from the negative employment policies of parent institutions towards the library profession.

6.5 RESOURCE SHARING

Areas of cooperation and resource sharing most attractive to the respondents include inter-loan services, exchanges and photocopying services. The most active units are the libraries of the three universities which have succeeded in augmenting their stock in highly pressurised disciplines. Books in high demand but not heavily used elsewhere are loaned out. Besides, periodicals and technical reports are often photocopied and sent out to potential users. It is

gratifying to note that photocopying machines, indispensable tools for replicating articles destined for inter-library loans, are the most dominant of all information technology equipment in use.

The three universities have equally excelled in obtaining some amount of scholarly and research materials, both published and unpublished, from within and without the country. In most cases, a lot of these materials could not be obtained through the normal book trade processes.

6.6 INFORMATION TECHNOLOGIES

An important feature of the findings is that a substantial amount of information technology equipment in the system has been acquired through donations. This trend has its own attendant problems, particularly in hardware incompatibility due to the high proliferation of equipment.

6.7 LIBRARY AUTOMATION

Library automation is undoubtedly a relatively new concept in Ghana. To this end, real commitment and aggressiveness towards library automation are glaringly absent. Currently, most of the computers are deployed for secretarial duties. Nevertheless, some librarians and information practitioners have realised the immense potential of computers as versatile information storage and retrieval tools. With this

awareness, the chances of fully integrating computers into the mainstream of information management are brighter than ever.

6.8 COMMUNICATION FACILITIES

A number of obstacles linked with the development of appropriate and modern communication infrastructures also emerged from the survey. Some of the problem areas include poor road networks, limited functional telephones (and other newly emerging components such as telex, facsimile and electronic mail), as well as the slow and often unreliable postal systems. Together, all these shortcomings adversely affect the development of information networks in Ghana. Though the fact cannot be denied that tremendous efforts are being made to improve telecommunication infrastructure over the past five years, a lot more remains to be done. So far, no conscious efforts have been made by government towards integrating telecommunications into the mainstream of library and information services in the country.

6.9 INFORMATION SERVICES AND PRODUCTS

The provision of information services and products has suffered a lot of setbacks due to the several reasons already discussed.

The compilation of the still-born Union Catalogue of holdings in the Humanities and Social Sciences by the

Balme Library and that of the Natural Sciences assigned to the CRRL of the CSIR are cases in point. With the inception of the GHASTINET project, fresh efforts are being made in a few areas.

Receiving considerable attention is the publication of the Ghana Science Abstracts which aims primarily at bibliographic control over indigenous S & T literature. Currently, it is far from being an authoritative and comprehensive record of the country's output in S & T information. Other areas in which significant strides have been made are in the development of databases in Union List of Scientific Serials, research projects in progress and high-level manpower that have been discussed in detail already.

To all intents and purposes, the study has confirmed the urgency for the effective communication of accurate and timely development information as a panacea for systematic and sustained socio-economic development. It has also found out that there is a fairly high degree of consciousness within a limited number of libraries and information professionals/practitioners. Besides, there is ample evidence that some amount of information networking in terms of cooperation and resource sharing is in progress. However, all these activities are carried out discretely, without any effective coordination.

It is against this background that workable suggestions are made with the view to correcting the

imbalances in our information delivery systems. It is hoped that these suggetions will open a new chapter in creating an awareness of the role of scientific and technical information in Ghana's socio-economic development and, hence, the need for creating an enabling environment for the development of viable and sustainable information systems in Ghana.

6.10 RECOMMENDATIONS

The following recommendations are made on the grounds that it has been sufficiently established that information is an indispensable production resource. However, unlike other such resources (like land and capital) whose supply is finite and easily exhausted if used imprudently, the amount of information tends to increase over time, often at a geometric rate. Undoubtedly, as the reserves of information grow, so does the need for more efficient means of processing them. Information networking which refers to any of the diverse forms of information exchange, both conventional and electronic, is rapidly spreading as a fast, reliable, and, in most applications, inexpensive form of communication.

Ranking high among the recommendations are:-

6.10.1 Sensitizing the population to the importance of information

A sensitisation programme would be needed, as a matter of urgency, to increase public awareness of the

value of information and to encourage its effective use, as well as adequate provision. This could be implemented through well programmed, periodic activities including durbars, symposia and workshops. To achieve its objectives, the programme should place special emphasis on finding out the potential information needs of the diversified target groups. These should include, government decision makers, planners and policy makers, researchers, agriculturists (including the peasant farmers), industrialists, traders, students and the general public. The rationale behind the exercise should be to increase up their enthusiasm on the import of timely, accurate and qualitative information as a sine-qua-non to better planning, decision making and national development.

6.10.2 Formulation of a National Information Policy (NIP)

From all indications, there is a compelling need for Ghana to come out with a clearly formulated national information policy that would integrate all the information services and infrastructures in the country. There is an urgent need for all piecemeal policies (on information) existing in the country to be articulated into a comprehensive NIP, since factors that influence such policies cut across many frontiers.

Thus, the NIP must be woven into our National Development Plans. In so doing, care should be taken to ensure that:

(i) it serves as a reference point in the total development of the nation's information structure;

(ii) it serves as a guide in the use of information power in all facets of the nation's development effort

(iii) it helps to eliminate our present duplication of efforts and leads to better coordination of information management in the country;

(iv) it serves as a guide in the rational allocation and utilization of money, human resources, equipment and technology for national information development;

(v) it helps in the creation of an enabling environment for national and transborder information resource sharing.

6.10.3 Establishment of a National Library

Closely related to the issue of a National Information Policy is the absolute necessity for a nerve centre to coordinate all library and information cooperation practices in the country. This centre of

excellence is the National Library whose establishment is long over-due in Ghana. It is a fact that the absence of a national library has caused a great deal of anxiety among not only librarians and information practitioners, but also agencies associated with the book trade.

The Third World Academy of Sciences (TWAS) strongly holds the view that a National Library should be endowed with a complete updated collection of scientific literature, principally books and journals[1]. This, the Academy holds, will essentially guarantee a ready access to the world's scientific literature.

Furthermore, a National library will be responsible for compiling and publishing the National Bibliography, Union Catalogues and Union Lists of Serials. It will also serve as a nexus of inter-lending of books and other literary output, and establish bibliographic and related standards for the country's information profession.

6.10.4 Adequate Funding

Generous provision of money is the only way to ensure the purposeful development of information networks in the country. This could best be achieved in the context of a policy clearly stipulating the percentage of the national expenditure to be devoted to that purpose. Besides, it is suggested that an

organ solely for library and information systems/activities should be created and placed high in the state apparatus, such as the office of the President or Vice President (as obtains in most Caribbean States).

6.10.5 Adoption of Pragmatic Cooperation and Resource Sharing Policies:

6.10.5.1 Formulation of Inter-Lending Operational Policies:

For any scheme to work between two parties, there must be agreed principles and guidelines of operation. Likewise, there is need for dos and don'ts of the inter-library lending services. There should be procedures for request, what materials are loanable, the requirement of borrowing and lending library materials, the duration of the loan period, the settlement of costs and the penalties for and/or disciplining of defaulting libraries. All these guidelines must be properly written, published and given sustained publicity, before any meaningful inter-library lending service can work.

It is worth mentioning here that one of the university libraries which has been largely over-exploited in inter-lending operations could initiate the necessary processes towards achieving this objective. This will invariably replace the "gentlemen's agreement", eliminate the imbalances in

the system and instil sanity into the inter-lending procedures.

6.10.5.2 Provision of Viable Communication Facilities

Good communication facilities such as telephones, telex, facsimile, electronic mail and postal services are prerequisites for effective inter-loan services. These facilities are required for both bibliographic and delivery services.

6.10.5.3 Ready Availability of Reprographic Equipment:

The provision of photocopiers in some participating libraries and information centres is very important because the bulk of inter-loan requests are fulfilled through photocopying. Audio-visual equipment including microfilm/microfiche readers and printers, slide projectors, video tape/ cassette readers are necessary equipment for the reading and printing of microform materials that may be involved in inter-lending.

6.10.5.4 Introduction of the Courier Service:

The courier service which facilitates the safe transfer of materials from one location to the other should be introduced and sustained. Within the context of our university libraries, it has been observed that vehicles of the two university libraries

located outside Accra visit the metropolise regularly. This situation needs to be fully exploited so that inter-loan materials could be conveyed to and from Accra. Those belonging to Balme Library could be directly delivered while consignments destined for Kumasi and Cape Coast could be deposited at the respective guest houses for onward transmission to their final destinations.

6.10.5.5 Compilation of Union Catalogues and Union Lists:

At present, it is very difficult for librarians and information officers all over the country to know who has what. This makes cooperation cumbersome. Since union catalogues are the pivot around which cooperation revolves, there is a compelling need for such tools to be developed. Equally important is the urgent need for the compilation of a comprehensive list of all theses, dissertations or research project reports submitted by the students of each of the three universities, as well as research projects carried out by the faculties. This would eliminate unnecessary duplication of researches.

6.10.5.6 Development of a Central Bindery:

The idea of each library or information unit aspiring to develop individual binderies should be discarded. Instead, resources should be reoriented

(especially by the university libraries) towards the joint development of binderies on a large scale. Balme Library has taken an inspiring initiative in establishing such a unit.

6.10.5.7 Development of Standards:

There should be an immediate identification and establishment of bibliographic and performance standards which should be agreed upon individually and collectively to enhance cooperation. In addition, uniform software should be employed in order to aid automation.

6.10.5.8 Staff Development and Exchange:

Since one of the main causes of inadequate manpower in the library and information services is the low status and/or poor remunerations, it is suggested that personnel in this sector should be motivated with appropriate incentives. These should include competitive salaries and-on-the-job training schemes to attract the right calibre of staff and retain them at post to facilitate job satisfaction, continuity and effectiveness. Besides, the necessary measures should be put in motion to ensure the exchange of personnel between the various libraries and information centres. This will go a long way in promoting the cross fertilization of ideas and enhance information networking.

6.10.6 Introduction of Translation Services

It is now known that a sizeable collection of S & T materials is in languages other than English. To this end, it is recommended that the services of proficient translators (in French, Russian, Japanese and possibly Chinese) should be jointly engaged. Their duties should include, the translation and onward circulation of documents found to be relevant to the operations of the various nodes within the network.

6.10.7 Regular Interaction among Professionals

A mechanism should be instituted for heads of libraries and information centres to come together regularly to identify and discuss common problems essential to the development of library and information services in the country. In addition, the head and representatives of the Department of Library and Archival Studies should periodically interact and have dialogue with practising professionals to evaluate the relevance of the academic programmes to practical demands of the profession. This will help tremendously in improving the performance of these institutions.

6.11 C O N C L U S I O N

It is an established fact that the funding of library and information services in Ghana varies from

one service to the other, and also from one regime to the other. The obvious solution to the problem lies in pooling and sharing our limited resources. The fact of the matter is that some professionals have been disappointed with the indifference of the others towards on-going networking activities.

So far, many academics, researchers and information practitioners desirous to see the genuine development of effective and efficient networks in Ghana view the prospects with mixed feelings. This is because it is obvious that there is a considerable difference between the ideal of networking, at least on paper, and what is actually happening on the ground; between what the textbooks say is attainable, and what is possible of being achieved within existing constraints.

Available information from the survey confirms that Ghana has set in motion a National Science and Technology Information Network. However, weighed against the ideals of networking, the Ghanaian situation is far from satisfactory.

Against this background, the realities of S & T information networking show that traces of unwillingness to cooperate and the empire building syndrome are still visible on the library and information scene in the country. Such weaknesses have been amply demonstrated by the still-born attempt at union catalogue compilation and the lack of

cooperation between CSIR libraries prior to the inception of the GHASTINET project.

Ignorance of the value of information networking, lack of interest and the absence of a cooperative culture are common features of Ghanaian information systems. These unfavourable characteristics are exemplified by the persistence of individual acquisition and processing programmes with its attendant problems. Also prevalent and equally constraining is the reluctance to attend meetings and to share ideas and knowledge, lack of experience in modern information networking, and a high proliferation of information technology equipment (notably computers). The last named has resulted in a high degree of hardware and software incompatibility in the country. This singular factor has been demonstrated by the line-up of over (25) twenty-five different models of computers displayed at COMPUTECH I (1991) and COMPUTECH II (1992) noted elsewhere in this study.

Equally important is the conspicuous lack of commitment on the part of governments to give library and information services the much needed support. This invariably results in the perpetual poor financial predicament in which the sector finds itself.

Not least among the constraints is lack of adequately trained personnel and the institutions and

related resources for training.

All the above cited problems are real and represent the difficulties in setting up a National Information Network. However, definite steps have been taken in that direction for the establishment of information networks. Reference has already been made to the modalities.

Gradually, people are beginning to see and accept the necessity for networking, at the national level. Besides, other regional and international networks have appeared on the Ghanaian scene. These include, the Geographic Information Systems (GIS), Trade Information Network (TINET), Energy Inforamtion Network; and the number is still growing.

All these constitute incontrovertible evidence that a lot is happening which will ultimately lead to the emergence of a coherent system, firstly, of sharing the meagre resources of the library and information community in the country and, secondly, of reaching out to further maximize our resources by becoming partners in external systems. Currently, the ideal is far from being achieved. It is, however, gratifying to note that the old isolationist system is gradually giving way to realistic recognition that with the resources becoming more and more limited, the only alternative to viable individual access to all information is to share the little that is available. This should be given all the necessary encouragement

and support to develop into realistic and effective information networks.

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Questionnaire on a Survey of Library and Information Resources and the Level of Participation in Science and Technology Information Networking in Ghana

Annex C37A Legon Hall,
University of Ghana,
Legon.

10th July, 1992.

Dear Sir/Madam,

I am currently engaged in a study of Science and Technology Information Networking in Ghana. By Information Networking. I mean the pooling together and sharing of information resources to maximise their use. Networking may involve institutions, individuals and sectors in Ghana.

To this end, certain Libraries and Information Centres within the major sectors of the economy have been selected for study. The objective is to try to uncover the extent to which Information Networking has been embraced and incorporated into the Library and Information scenario in Ghana.

In order to have a clearer perception of the exercise, I need to conduct a survey of existing Library and Information facilities and resources in these institutions. In addition, the current level and degree of cooperation and resource sharing among Ghanaian Libraries need to be determined. I cannot achieve these objectives without your assistance I am therefore requesting you kindly to complete the enclosed questionnaire and return it in the enclosed self-addressed envelope by 31st July 1992.

Please feel free to communicate your views by way of criticisms, comments and suggestions that may seem to you to be relevant to the theme. All these remarks will be treated in strict confidence.

Your cooperation is extremely crucial to the success of this exercise, therefore I would be happy to hear from you at your earliest convenience.

Thanks.

Yours faithfully,

(T.E.K. DANDZO)

(1) Name of Library/Information Centre:

.....

.....

(2) Name of parent Organization:

.....

(3) Date Established:

.....

(4) Categories of users for which established.

Please tick as appropriate

a.Research
b.Study and Teaching
c.Industrial
d.Commercial
e.Planning
f.Agricultural
g.Any other (Please indicate):

.....
.....
.....

MATERIALS

(5) What type of materials does your library/information centre stock comprise? Please tick below as appropriate

MATERIALS	YES	NO
(a) Science and Technology Books		
(b) Scientific Journals		
(c) Technical Reports		
(d) Patents and Standards		
(e) Computerised Databases		
(f) Audio-visual materials		

Any other? Please specify:.....

6. What is the total stock of your

(a) Monographs:

.....

(b) What percentage is on Science and Technology:

.....

(c) Total Journal Subscriptions:

.....

.....

(d) Total of Technical Reports

(i) Indigenous:

.....

(ii) Foreign:

.....

(e) Pamphlets

(f) Science and Technology Abstracting and Indexing journals:

.....

(g) Microform materials

Microfiche titles:

.....

Microfilm titles:

.....

(h) Discs:

.....

(i) CD-ROM:

.....

(j) Audio tapes:

.....

(k) TV Cassettes/Video tapes:

.....

(l) Slides:

.....

(m) Doctoral Dissertations:

.....

(n) Masters Theses:

.....

(7) How current are your journal subscriptions:

.....

.....

(8) What has been the staff strength of your library in the categories and years indicated below? Please state the exact number.

Year and Number

CATEGORIES	1990	1991	1992
a. Professional Librarians			
b. Sub-Professional Librarians			
c. Technical Staff			
d. Clerical Staff			
e. Data Entry Clerks			
f. Translators			
g. Computer Systems Analysts			
h. Any Others			
i.			
j.			

(9) Please indicate the qualifications of your Staff as required below:

CATEGORIES	QUALIFICA-TIONS	AWARDING INSTITU-TIONS	NUMBER
a. Professional Librarian			
b. Sub-Professional Lib.			
c. Technical Staff			
d. Clerical Staff			
e. Data entry clerks			
f. Translators			
g. Compt. Systems Analysts			
h. Others (Please indicate)			

(10) Is your staff position adequate? Please tick as Necessary

(11) If no, which sectors need to be strengthened? Please give numbers projected for the years stated.

Year and Number

CATEGORIES	1992	1993	1994
a. Professional Librarians			
b. Sub-Professional Librarians			
c. Technical Staff			
d. Clerical Staff			
e. Data Entry Clerks			
f. Translators			
g. Computer System Analysts			
h. Abstractors/Indexers			
Others:- Please Specify			

(12) Do any of your current staff require further training in any of the subject areas stated below? Please specify.

SUBJECT AREA	YES	NO	TYPE/ LEVEL OF TRAINING
a. Library & Inf. Science			
b. Computer Techniques			
c. Abstracting & Indexing			
d. Classification & Cataloguing			
e. Translation			
f. Science Writing			
g. Any Others			

EQUIPMENT

13. What items of equipment do you have? Please Specify

Equipment	No	Type	Date of Acquisition
a. Copying Facilities			
b. Microfilm Projectors			
c. Microfilm Readers			
d. Microfiche Readers			
e. CD-ROM Player			
f. CD-ROM Printer			
g. Video Cassette Systems			
h. Slide Projectors			
i. Others			

(13)B. COMPUTER

Type of Compu-ter	Date of Instal	Hard Disc	Memo-ry Cap.	Soft-ware	Mode of Acqui.	Type of Prin-ter	Usa-ge

14. Do you have access to any of the above (13A and B) if your Institution does not have them? Please indicate how if you do.

.....

.....

.....

.....

.....

15. Do you have or have access to the following communication facilities,
Please you may tick more than one.

	Yes	No	Inhouse	Location or Source
a. Telephone				
b. Telex				
c. Facsimile (Fax)				
d. Electronic Mail (E-mail)				
e. Modems				

16. Do you provide any of the following services? Please you may tick more than one

Services	Yes	No	Frequency
a. Abstracting and Indexing			
b. Current Awareness of Information			
c. Literature Searches			
d. Accession Bulletins			
e. Translations			Language
f. Photocopying			
g. Databases Services			
h. On-line Searches			
i. Others: State please			
j.			

NETWORKING ACTIVITIES

17. Is your library or centre participating in the National Scientific and Technological Information Network?

    Yes No

    Please indicate your role and activity so far:

    .....

    .....

    .....

18. Is your library or Unit participating in any external Science and Technology Information Network?

    Yes No

19. If yes please specify giving name, country and level of participation

    .....

    .....

    .....

20. Do you engage in any of the following networking activities locally with (a) other libraries (b) GHASTINET

ACTIVITIES	Yes	No	Yes	No
a. Sharing of Selection Tools				
b. Cooperative book acquisition				
c. Cooperative Serial acquisition				
d. Subject specialization scheme				
e. Joint processing of materials				
f. Cooperative storage & delivery				
g. Joint staff education & training				
h. Exchange of Professionals				
i. Joint technical services (eg. Binding)				
j. Depository of Theses & Dissertations				
k. Inter-Library lending (a) Local				
(b) Foreign				
l. Union Catalogue Compilation				
m. Union List of Serials				
n. Any other, please specify				
o.				

21. Are any of your activities computerized?

Yes No

If yes, please specify.....

.....

.....

.....

22. Do you have access to any computerised databases?

Yes No. If yes please specify

Name of Database	Country	Activities including Searches/Year

23. Do you have any other form of linkage with any foreign library?

Yes No

If yes, please specify as in (20)

.....

.....

.....

.....

24. Any special training undertaken either normal or for expertise in connection with resource sharing activities? Please specify

Form of Training	Duration	Country	Institu-tion	Cert. Awarded Plse. Specify

25. Are the following facilities adequate for you/use?

Facilities	Yes	No
a. Floor Space		
b. Seating space		
c. Bookshelves		
d. Pamphlet boxes		
e. Microfilm Storage Boxes		
f. Newspaper racks		
g. Microfilm/fiche boxes		
h. Map/Atlas storage		

26. Please give your budget estimates for:-

(a) 1990

.....

.....

(b) 1991

.....

.....

(c) 1992

.....

.....

27. Please give actual expenditure on equipment, books, periodicals, etc.

(a) 1990

.....

(b) 1991

.....

(c) 1992

.....

28. Please specify any Non-Governmental sources of funding (if any) in cash or kind

(a) Local

Name:.....Amount

items.....

(b) Foreign:

Name.....Amount

items.....

29. What proportion of your overall budget goes into acquisition of Science and Technology materials?

.....

.....

30. Please give the percentage of library budget to the overall budget of the parent organisation for the years indicated below:

(i) 1990.....

.....

(ii) 1991.....

(iii) 1992.....

31. Kindly provide any relevant information pertaining to Information Networking in Ghana.

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.....

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THANK YOU

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