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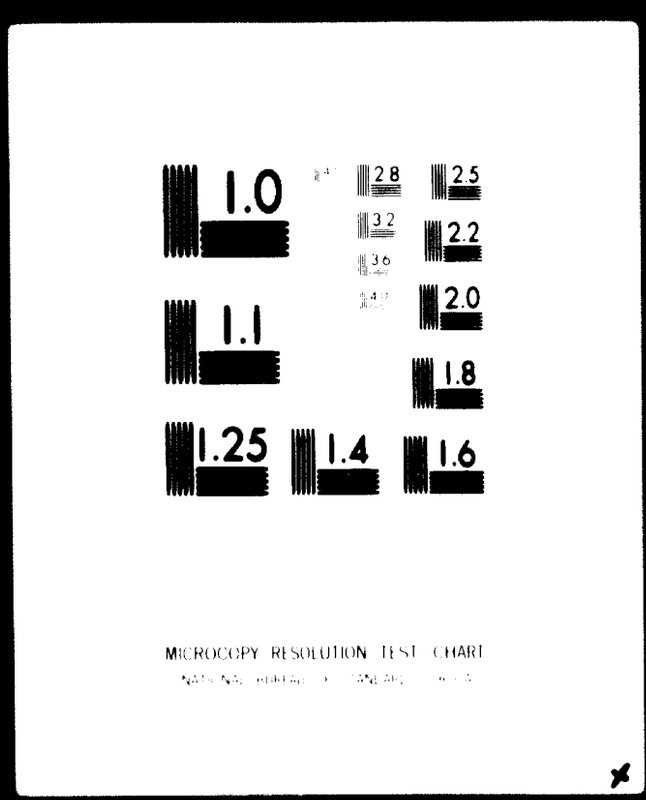

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PLANNING AND DEVELOPMENT COLLABORATIVE INTERNATIONAL

A REPORT PREPARED FOR UNIDO FOR ASSISTANCE IN THE ESTABLISHMENT OF A CENTRAL INDUSTRY DATA BANK IN THE PHILIPPINES NO. 68871/1911 (PH-67) JANUARY 1970

PADCO

AN INTERNATIONAL COLLABORATIVE FORMED TO PROVIDE GOVERNMENTS AND PRIVATE CLIENTS IN AFRICA, ASIA, LATIN AMERICA AND THE NEAR EAST WITH INTEGRATED RESEARCH, PLANNING AND MANAGEMENT SERVICES FOR URBAN AND RURAL DEVELOPMENT

A REPORT PREPARED FOR UNIDO FOR ASSISTANCE IN THE ESTABLISHMENT OF A CENTRAL INDUSTRY DATA BANK IN THE PHILIPPINES

NO. SIS 71/1311 (PHI-27)

PADCO, Inc.
1911 Connecticut Avenue, N. W.
Washington, D. C. 20009

January 1972

PLANNING AND DEVELOPMENT COLLABORATIVE INTERNATIONAL
SUITE 509 • 1211 CONNECTICUT AVENUE, N. W. • WASHINGTON, D. C. 20036 • (202) 296-0004

January 16, 1973

Mr. D. C. Newton
Chief, Technical Equipment,
Procurement and Contracting
Officer (TEPCO)
United Nations Industrial
Development Organization
UNIDO
Vienna, Austria

Dear Mr. Newton:

PADCO is pleased to submit the final report to UNIDO for assistance in the establishment of a Central Industry Data Bank for the Philippines (UNIDO Contract No. 72/21). PADCO was assisted in this project by the firm of Sycip, Gorres, Velayo & Company.

We are indebted for the excellent support provided to our team in Manila by the UNIDO Representative, UN Resident Representative, and many government officers. Unfortunately, our team had to work in the field under extremely difficult conditions resulting from the extensive floods in Manila in July. These floods caused extensive disruptions in the work program because of the resulting power failures, transportation breakdowns, and the natural disruption of government's normal business.

We feel, however, that the report provides an excellent framework for the establishment of a Central Industry Data Bank and has been enthusiastically received by the government representatives.

We have taken into consideration the comments of UNIDO in preparing this final report. Among these comments are two of major importance: Is the Central Industry Data Bank to be a separate agency independent of the existing structure of related

governmental agencies? Does the proposed flood disaster study make sense as a part of the development of the CIDB? These two points require special mention here.

The CIDB is not proposed as a separate agency to be newly created. What is proposed is that the CIDB be a semi-autonomous function within an existing agency. We believe the CIDB must be relatively free from existing agency constraints so that it can interact freely with both the source data agencies and the potential user agencies. Hence the need for some independence from its host agency. On the other hand the need is for a reduction of the variety of agencies dealing with industrial data, if anything, and, therefore, the CIDB should be included within the overall structure of one of the key existing agencies. We believe that there are four potential host agencies for the CIDB: The Executive Office of the President, the Presidential Economic Staff, the National Economic Council, or the Board of Investments.

Presently the government is undergoing a considerable reorganization which may affect the logical choice of a host agency for the CIDB. Thus, we have not attempted at this time to select among these agencies. Most of these agencies are substantially overworked and under-staffed with sufficiently experienced professionals and to a greater or lesser extent need to have their EDP capabilities expanded. Therefore, in our opinion the Government of the Philippines must make this decision with the understanding that the agency selected will need a considerable increase in budget and staff to implement the CIDB.

We have elected to leave in the report the recommendation for developing a Disaster Impact, Rehabilitation, and Recovery Program at an early stage in the development of the CIDB. We recognize the concern expressed by UNIDO that such a program is not essential in order to justify the implementation of the CIDB. We agree with this conclusion as the CIDB is important primarily as a tool for facilitating the overall industrial planning of the Philippines. The system can and should stand independently of the recommended Disaster Impact Study. Nonetheless our experience has been that it is highly desirable to have such a system generate specific, useable, and important outputs early in its implementation phase. Such demonstrations of its effectiveness can encourage continued support during the relatively long implementation period. Furthermore, in this particular case the need for better information regarding the

effect of the frequent disasters which strike the Philippines is an urgently felt need on the part of the Government and one to which the CIDB will be uniquely capable of making a contribution.

It has been a great pleasure to assist UNIDO and the Government of the Philippines in outlining the CIDB. We have appreciated this opportunity and extend our best wishes for the successful implementation of the CIDB.

Very truly yours,

Alfred P. Van Huyck
President

PADCO

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Table of Abbreviations

NEW ACTIVITIES PROPOSED IN REPORT

CIDB . . . . . .Central Industry Data Bank
EAU . . . . . .Economic Analysis Unit

AGENCIES OF THE PHILIPPINE GOVERNMENT

BAE . . . . . .Bureau of Agricultural Economics
BIR . . . . . .Bureau of Internal Revenue
BOI . . . . . .Board of Investments
BCS . . . . . Bureau of the Census and Statistics
CBP . . . . . Central Bank of the Philippines
CEPO. . . . . .Congressional Economic Planning Office
DCI . . . . . Department of Commerce and Industry
DER . . . . . Department of Economic Research
DBP . . . . . Development Bank of the Philippines
FFPC. . . . . Financial and Fiscal Policy Committee
IPO . . . . . .Industrial Planning Office
NCC . . . . . .National Computer Center
NEC . . . . . National Economic Council
OSCAS ...Office of Standard Coordination and Statistics (NEC)
PES . . . . . Presidential Economic Staff
PSC . . . . . Public Service Commission
SEC . . . . . .Securities and Exchange Commission

TERMS IN USE IN THE PHILIPPINES

EPP . . . . . .Export Priorities Plan
IPP . . . . . .Industrial Priorities Plan
ISIC. . . . . .International Standard Industrial Code
LSS . . . . . .Labor Statistics Service
PSIC. . . . . .Philippines Standard Industrial Code
SIS . . . . . .Special Industry Studies (UNIDO)

COMPUTER TERMS

ADP . . . . . Automatic Data Processing
CRT . . . . . .Cathode Ray Tube
CPU . . . . . .Central Processing Units
CDC . . . . . .Control Data Corporation
COBOL . . . . . .(Programming Language)
DANR. . . . Department of Agriculture and Natural Resources
DADD. . . . . .Direct Access Data Directory
FORTRAN . . . . .Formula Translation (Programming Language)
FACOM . . . . . .Japanese Computer Firm
IBM . . . . . International Business Machines
KWIC. . . . . Key Word in Context
OCR . . . . . Optical Character Recognition
SIC . . . . . .Standard Industrial Code
SYMAP . . . . . .Symbolic Mapping

INTRODUCTION

This report presents the findings and recommendations developed in the Central Industry Data Bank (CIDB) project for the Philippines carried out by PADCO (Planning and Development Collaborative International) in collaboration with Sycip, Gorres, Velayo & Co. (SGV) under UNIDO contract number 72/21 (Project No. SIS 71/1311). The overall purposes of the project are:

> To prepare an outline plan for the long-term development of an information system to serve the needs of analysts in the major state and parastatal agencies concerned with industrial development.
>
> To formulate a plan of work and concrete guidelines for the establishment of an immediately useful system on a pilot scale. The pilot system is to be capable of being expanded as an integral part of the long-term system.

The work was undertaken in two phases -- the first extending over approximately four-and-a-half weeks and the second over five-and-a-half weeks for the drafting of the project report. Phase I was intended to take approximately three weeks but was delayed because of the flood disaster which struck the Republic in July.

The overall scope of work for the project was as follows:

> Phase I
>
> A review of all pre-project studies and proposals conducted by the Inter-Agency Committee on the Establishment of an Industry Data Bank in the Philippines (hereinafter referred to as the committee) and other groups.
>
> A preliminary determination of the scope of the data bank to be established initially on a pilot basis, with proposals for its phased expansion.

Phase II

Systematic analysis of the needs of the prospective users of the data bank.

Preparation of a preliminary inventory and assessment of relevant statistical and other information available in existing sources.

Design of the basic information system needed, with sufficient detail to permit early implementation.

Formulation of a program of work for an Economic Analysis Unit to be included in the structure of the bank.

Formulation of guidelines for the organization of the data bank, including guidelines for its internal organization and its links with user groups and suppliers of information.

Identification of the steps necessary for the development of the bank over the next several years.

The PADCO-SGV team has worked directly with the staff of the Industrial Planning Office (IPO) in the Presidential Economic Staff (PES) and with staff in the National Computer Center (NCC). A significant counterpart staff was assigned to the project by the PES and the NCC, reflecting a high degree of cooperation and interest on the part of the government. Excellent collaboration has been received from all of the other agencies and groups participating in the work also, including the National Economic Council (NEC), the Board of Investments (BOI), the Congressional Economic Planning Office (CEPO), the Financial and Fiscal Policy Committee (FFPC), the Central Bank of the Philippines (CBP), and the Bureau of the Census and Statistics (BCS).

The results of Phase I were reported in the interim report submitted to UNIDO on August 6, 1972. The draft final report was submitted to UNIDO on October 17, 1972. UNIDO comments were received by PADCO on December 12, 1972. The final report was then prepared.

The participating staff of the consultants included:

Dr. John D. Herbert, PADCO, Team Leader
Dr. Robert Keston, PADCO, Information Systems Specialist
Alann Meadows, PADCO, Senior Programmer
Emmanuel Borromeo, SGV, Senior Economist
Jose Encarnacion, SGV, Senior Economist
Pedro Sandoval, SGV, Senior Economist
Napoleon Vergara, SGV, Senior Economist

The Need For A Central Industrial Data Bank

The initiation of the present project reflects the increasing data problems being encountered by the principal users of industrial data. The range and frequency of activities in which better information is needed are increasing and now include the preparation and annual review of the industry status reports, the National Four-Year Plans, and the preparation by the BOI of Annual Investment Priorities Plans (IPP) and Export Priorities Plans (EPP) which are reviewed by the NEC. Project proposals, including requests for external financing, and reviews of basic industrial policies also need to be prepared and evaluated. The committee was established as early as 1969 to work on an ad hoc basis to try to coordinate the development of a cooperative program aimed at the establishment of a centralized source of industrial statistics.

The central concept of the proposed Central Industry Data Bank (CIDB) is to provide in one easily-accessible system the major types of data needed for industrial planning and analysis (or a directory service indicating where they can be obtained if they cannot be maintained in the CIDB itself). In addition, there should be processing capacity designed to serve the specific needs of the principal state and parastatal agencies concerned with industrial development. The CIDB should achieve greater standardization and quality control in industrial data and it should respond to the needs of its users on a timely basis.

In evaluating the role and status of an information system in government a distinction must be made between the basic operational and planning functions of an organization. Operational functions involve the direct activities of governmental agencies in providing services, regulation and control, revenue and taxation, enforcement, legislation, etc. The administration of these operations requires detailed information and data support at the level of the individual entities with which the government deals -- that is, persons, corporations, property, monetary transactions, and the like. Thus, operational agencies such as BIR, DANR, PSC, and SEC collect detailed information on transactions related to their functions for purposes of direct administration.

In contrast, the planning functions involve longer range application of management, policy and legislative influence through evaluative analytical methods. Planning involves support of the higher-level echelons of government in evaluating the effectiveness of direct operations, formulating policy and applying remedial actions where operational programs prove to be inadequate. The administration of the planning functions

requires aggregated statistical information not only on government operations themselves but on the socio-politico-economic conditions of the nation as well. A common and often unique characteristic of planning information requirements is the need for cross-correlation of data concerning a wide array of national or regional characteristics. Rarely is such diverse and aggregate data available from any single operational agency of government. The planning agencies, on the other hand, usually have neither the resources nor the communications channels to be able to collect and assimilate such a wide range of information.

The problem of the planning agency is further compounded by the fact that most of the information required for performance of its function originates at the operational level in far greater detail than is actually required for planning purposes. Consequently, the economic planning agencies must rely heavily on dissemination and extraction of information from base level files maintained by the operational departments. This is by far the weakest link in the country's statistical data system and one which the CIDB attempts to overcome by its establishment as an independent activity performing a necessary data coordination function (not presently effectively exercised). It will capitalize on the best qualities of the available data sources and attempt to standardize statistical data collection, quality and processing.

An actual example of the difficulty in acquiring industrial information in an effective and timely manner occurred after the recent flood disaster. The government, as a starting point in assessing the economic impact of the calamity, requested data on the industrial base in the affected area in terms of types of industry, location, productive capacity, employment, etc. The source data and economic planning agencies could not produce this detailed a level of information in terms of industrial sector parameters vs. province or geographic region. The data available in Census Bureau publications were too highly aggregated to serve the purpose. Upon investigation, it was found that the required raw data did exist in detailed computerized files, but the capability to retrieve and extract a customized tabulation was not available. The CIDB would provide the solution to such requirements not only by maintaining relevant data, but more importantly, by providing the mechanism to produce meaningful information to aid in the solution of economic problems.

In the course of conducting this study, it was found that a wide range of governmental and parastatal agencies collect source data relevant to the economic development of manufacturing industry. Likewise, there is a broad range of organizations

that could benefit from the user services to be provided by a CIDB system. Four organizations were identified which serve as both source data and user agencies, but for the most part, this is a mutually exclusive relationship. That is, the primary source agencies are exclusively data gatherers (particularly the Bureau of Census and Statistice -- BCS) and the primary users are basically economic policy making bodies which participate minimally in data collection. Figure 1 illustrates this distinction.

Since this investigation was not to attempt a revamping of the basic statistical data collection system of the government of the Republic of the Philippines, it was assumed that the CIDB would use this basic existing mechanism for data acquisition on information related to manufacturing industry development. The primary data collection agencies -- BDS, Bureau of Internal Revenue (BIR), Securities and Exchange Commission (SEC), Department of Agriculture and Natural Resources (DANR), and Public Service Commission (PSC) -- are already heavily overburdened by their fundamental tasks of information acquisition, tabulation and reporting. With the possible exception of the BCS, nearly all of the source data agencies are highly specialized and could not appropriately undertake a program as comprehensive as the CIDB system.

This, in conjunction with the factors discussed above, has led to the concept of the CIDB as a separate activity within an existing agency but without the handicap of playing a secondary priority role to the fundamental operations of the source data agnecy.

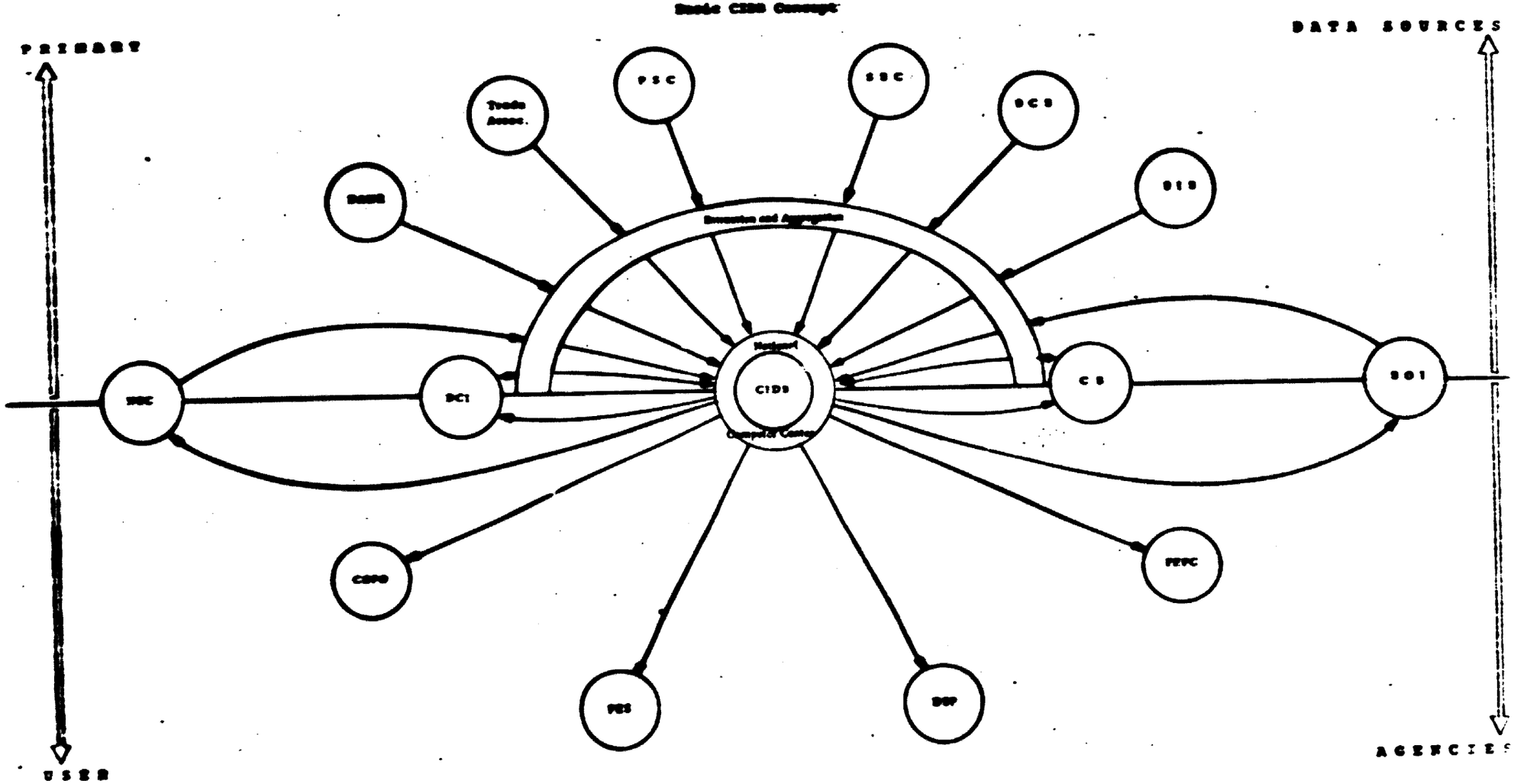
The CIDB should not be organizationally separate from the existing user agencies. Either the Presidential Economic Staff (PES), National Economic Council (NEC), or Board of Investments (BOI), are deemed to be appropriate organizations for the administration of the CIDB.

The most significant characteristic of the CIDB is its role as a multi-agency, intergovernmental service organization supporting diverse governmental and parastatal agencies on an equitable basis (see Figure 1). In order to achieve this objective most effectively, the CIDB must be organizationally placed to equitably serve its various users and avoid any significant bias in the priority and performance of its responsibilities to many user organizations.

In order to effectively serve the needs of industrial economic planning, the CIDB will have to extract, collate and correlate data from numerous source agencies as illustrated in Figure 1. The extraction and aggregation process shown will

Figure 1

Basic CIDS Concept



not only provide the most useful data categories and dimensions but will at the same time exert quality control, standardization and reconciliation of influences resulting in a vast improvement in the quality and accuracy of critical information used in the planning/decision processes.

A critical factor affecting the ability of the CIDB to acquire and cross-correlate data relates to the legislative integrity and organizational independence of most of the source data agencies. These source agencies perform legislative functions mandated and protected by both legislative prerogatives and tradition. This entrenchment is further compounded by substantial protection of the confidentiality and privacy of much of the crucial information maintained by the source agencies. These guarantees of confidentiality often do not allow free exchange of information between sister government agencies even where similar data is maintained from the same sources to serve related purposes. Such assurance of privacy is often the key factor in obtaining sensitive information from the private sector on a voluntary basis. The CIDB will seek to sustain such protection while at the same time cross-correlating data in a centrally available data bank by a delicate process of extraction and aggregation.

The overall result of the establishment of the CIDB will be an initial increase in the total information system effort in the Philippines. This increased effort must be forthcoming in order to establish a cohesive body of industrial planning information which is currently lacking and unavailable.

The CIDB will also remain heavily dependent on the integrity of data acquired by the primary data gathering agencies. However, by instituting long-needed standards the CIDB will exert a favorable impact on quality control of economic data collection. It will be able to screen out and protect itself from certain forms of faulty information. A program aimed at aiding the primary data gathering agencies in accomplishing major improvements would be of great value, particularly in the field of census.

One of the ways in which the CIDB will bring to light data collection inaccuracies is through comparison of figures having divergent values collected independently by different agencies on the same data element. A primary responsibility of the CIDB Economic Analysis Unit (EAU) will be to investigate and analyze the reasons behind these discrepancies. Wherever possible, the preferred mode of reconciliation will be to correct the values in accordance with the differences in data definitions, collection procedures and/or error biases found. Where such causal reconciliation is not possible, the divergent values will be shown

along with statistical measures of central tendency and variance consistent with accepted statistical techniques.

Section II of this report discusses the data collection and dissemination problems of the Philippines.

Summary of Project Findings and Accomplishments

During the Summer of 1972, the PADCO-SGV-RP project team achieved the following:

1. A comprehensive model* of the manufacturing industry was developed encompassing a wide range of pertinent categories of information. The model was further expanded into a detailed data classification scheme which will form the basis for the Central Industry Data Bank (CIDB) informational structure. It also served as a critical tool in establishing user requirement priorities, investigating source data availability and evaluating information adequacy. (See Section IV.)

2. A priority ranking of user information requirements was established in terms of industrial sectors, the dimensions of time, space and aggregation, as well as specific information categories. It was found that market demand, production inputs and product supply, organized by time series and region, have the highest immediate priority for implementation in the CIDB. (See Section I.)

3. The range of available data in source agencies was found to be far greater than was originally anticipated, but timely accessibility to this information is a critical shortcoming. Therefore, a separate CIDB activity is required to expedite and stimulate dissemination of information from such sources. Inclusion of extractions from such important sources will represent a breakthrough in supporting the decision-making processes of the industrial planner. (See Sections II and III.)

4. A multi-level design for the CIDB was developed (Figure 1) covering user applications and services, automatic data processing capabilities, supporting computer services and administrative management. Three CIDB services were specified: a data directory indicating the availability and location of data sources,

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*The use of the word "model" is in its descriptive sense only. It does not refer to econometric models or other predictive models.

a statistical reference service providing selective retrieval from the data bank proper, and an analysis service offering standard mathematical-statistical-econometric processing. Finally, an organizational concept was established for internal support of the program's development and operation. (See Sections V, VI, VII and VIII.)

5. A system development plan has been conceived for the evolutionary implementation of data modules over a period of four years. A base core of data has been recommended for initial consideration which includes only available data, primarily from presently computerized sources, which can be implemented with the internal resources of the government. (See Section IX.)

6. A series of immediate action recommendations has been made for execution by the Inter-Agency Committee during the interim period between the completion of this project and initiation of full CIDB implementation. This includes organization, budgetary, project review, and data standards development activities. (See Section X.)

7. A concept and plan of action has been developed for the execution of a study to evaluate the industrial impact of flood calamities in the Philippines. This would constitute a major component of the Rehabilitation Plan currently under development by the government and would provide a general capability for responding to the economic effects of the climatic disasters which strike the Philippines with great regularity. (See Section X.)

Section I

USER AGENCY INFORMATION REQUIREMENTS

Section I

USER AGENCY INFORMATION REQUIREMENTS

Identification of User Agencies

Determination of CIDB support takes into consideration the varied tasks required of the agencies concerned with industrial planning and programming activities. The tasks performed include cooperative efforts in annual review of industrial performance, the development of future priorities, inter-agency activities on specific policies, evaluation of project proposals, specific industry studies, and the regular release of standard periodic reports. These tasks require a substantial data base catering to a very broad range of data requirements.

There are eight principle agencies concerned in planning industrial growth. In order to make the task of the CIDB project manageable, emphasis will be placed initially on three primary user agencies.

National Economic Council (NEC)

Presidential Economic Staff (PES)

Board of Investments (BOI)

These agencies are the primary policy-making bodies concerned with industrial development.

The remaining agencies have been considered to be ancillary users because they normally obtain supporting data from the three primary user agencies. These are: the Congressional Economic Planning Office (CEPO), the Financial and Fiscal Policy Committee (FFPC), and the Department of Commerce and Industry (DCI). The Central Bank (CB) and the Development Bank of the Philippines (DBP) since they are concerned with the financial aspects of industrial development have highly specialized data needs that can be supplemented by access to the CIDB.

This section will cover an analysis of the necessary tasks in planning industrial growth, the inter-links among government agencies, and a review of the cross section of agency functional

responsibilities. From this the data requirements of user agencies covering specific data categories and data dimensions will be developed.

Industrial Classification to Evaluate User Requirements

A schematic model depicting the various activities, aspects and phases of the manufacturing process was developed. Its role was to evaluate and develop the priority data requirements and to categorize and plan the phased expansion of the CIDB. To describe the wide range of information used by the agencies demands a coherent industrial model which will provide meaningful insights into the permutations and combinations of data requirements. An integral element of the model is the simultaneous development of an information classification technique to provide a basis for coding the derived or corresponding data requirements.

The model was used to aid in assessment of the specific categories of information required and to provide a benchmark against which to establish priorities for required data. The complete industrial model was discussed with user agencies to indicate the hierarchy of their informational requirements. The results of this survey were tabulated and individual priority schemes were derived to establish the most common denominators of the hierarchy of requirements.

Ten broad categories of information were identified:

Data on input requirements, "production inputs"

Data on intra-industry characteristics, "manufacturing industry"

Supply data, "product supply"

Data on "distribution channels"

Data on "costs and prices"

"Banking and finance" data

Data on "government regulations" affecting industry

Demand data, "market demand"

Data on "infrastructure" affecting industry activity

"Environment" data relevant for industry

The results of this tabulation are shown in Figure 4. A discussion of this industrial model is presented in Section IV below.

Tasks in Planning Industrial Growth

Annual Industrial Development Plan Review and Revision

The Philippine concept of the revolving development planning approach, as implemented, required that an inter-agency task force meet, review past performance, develop criteria for industrial priorities for the coming year, and set targets for the succeeding three years to complete the four-year planning cycle. This task is usually undertaken by an inter-agency team from the NEC, PES, BOI, DCI, DBP, and the private sector.

The inter-agency team requires a broad range of information covering most of the 20 industries under the manufacturing sector. The specific data categories needed refer to the production inputs, manufacturing industry, and market demand data categories. Once industrial priorities are established, the banking and finance data category would be required to develop the financial aspects of the plan.

Development of Annual Industrial Priorities Plans (IPP and EPP)

The development of annual IPPs and EPPs is the function of BOI. Their role in the planning system is such that almost all the government's activities in industrial development revolve around these programs including finance and implementation. The annual IPP and EPP form the core of the formal material used in the industrial plan.

The IPP is determined on the basis of a supply gap between domestic production and potential demand for strategic local industries. This analytical process needs information covering basically the manufacturing industry and market demand data categories. With the increasing concern for the dispersal of industrial activity to the other regions, the data dimension on geographic/regional data has become a high priority information requirement.

Project Proposal Evaluation

The implementation of industrial projects inclusive of requests by industries for government assistance either directly (through credit extensions or loan guarantees) or indirectly (through allocation of foreign exchange or the acquisition of incentives) involves assessment and review by any one or a combination of government agencies. To secure the economic benefits that accrue from registration with the BOI, the economic feasibility and commercial viability of a firm must be ascertained by this agency. The extension of government guarantees, the allocation of foreign exchange through the priority schemes, and the evaluation of industries to determine which are overcrowded, are tasks performed by the BOI, NEC, PES, FFPC and DBP. To be able to effectively perform these evaluative functions, the data requirements cover the production inputs, manufacturing industry, market demand, banking and finance, costs and prices, and possibly the government regulation data categories.

Interrelationships of Industrial Planning Agencies

Preparing the national industrial development plan through the cooperative efforts of an inter-agency team facilitates data requirements identification, the data location and collation system and to some extent the uniformity of the information base for policy formulation. Under this system, each agency contributes its data files to a common pool for use by the team. This annual effort benefits the participating agencies in synchronization of activities, and the acquisition of data, through information exchange. This by-product has to some extent eased the data gathering burden faced by these agencies.

However, despite this free but random pattern of information exchange, the existing accessibility and availability of data in support of the decision-making process remains a significant problem.

Standard Periodic Reports

Figure 2 presents a listing of the standard periodic reports prepared by the user agencies. A majority of these are statistical periodicals, publishing indices of current and historical industrial performance. A few provide policy positions and programs, information on industrial development, and derivative economic measures. Special reports, such as the input/output model, are from time to time released by selected agencies.

Figure 2

Standard Periodic Reports Published by User Agencies

User Agency	STANDARD REPORTS			
	Industrial Plans/ Programs	Industry Studies	Periodic Journals	Statistical Periodicals
National Economic Council	National Development Plans		Philippine Economy Bulletin	The Statistical Reporter
Presidential Economic Staff	National Development Plans	Industry Studies	Selected Monthly Current Economic Indicators	
			Monthly Industrial Trends	
Board of Investments	Annual Investment Priorities Plan	Philippine Progress	Investment Bulletin	
	Annual Exports Priorities Plan	Industry Profiles	Export Bulletin	
			Annual Report	
Development Bank of the Philippines			DBP Annual Report	
Congressional Economic Planning Office			The Annual Economic Report	
			The Monthly Congressional Economic Bulletin	
Central Bank		Weekly News Digest	Statistical Bulletin	
		Annual Report	Philippine Financial Statistics	

A function of the CIDB will be to support the preparation of these reports by facilitating access to timely data sets. This increased capacity of agencies to release their reports on schedule will enable them to undertake a broader range of research than is currently feasible. For example, with the development of the regional industrial files within the CIDB, special tabulations could be programmed to assist in the publication of the semestral national income accounts and might hasten the development of the quarterly series.

In the actual preparation of many of the standard periodic reports, timeliness has been a constant bottleneck. Some agencies have had to undertake special field surveys to complete their data bases.

Typical Intermediate Range Planning Activities

The user agencies require continuing timely data support for the evaluation aspects of their functions. These intermediate-range planning activities generally fall under three categories: industry status or profile review, evaluation of specific industrial project proposals and assessment of industry or firm level petitions for protective or concessionary governmental support. In addition to analysis on specific proposals, periodic assessments are undertaken to insure that conditions at the time of request are still operative or that the terms under which the project approval was granted are being observed.

The depth, scope and method of analysis applied in these studies have been to a large extent limited by the availability of the requisite information base. This is a common view expressed by both the primary and ancillary user agencies. Likewise, this apparent inadequacy of the statistical information base has limited the opportunities to apply higher-level mathematics or statistical analysis to specific industry questions.

Typical Ad Hoc Policy Issues Addressed by the User Agencies

Figure 3 presents a summary of the general types of ad hoc policy issues addressed by the agencies concerned with industrial development.

The common characteristics of these ad hoc studies are:

The usually singular nature and scope of the problems addressed.

The non-repetitive nature of the request.

Figure 3

Typical Policy Issues Addressed by User Agencies

User Agency	POLICY ISSUES				
	Industry Priorities	Specific Industrial Development Policy Determination	Industry Proposals Evaluation	Foreign Exchange Management	Other
National Economic Council	Priorities of National Industrial Development Plans Annual BOI Priorities Plans	Government and Private Sector Proposals and Programs for Specific Industries	Wage/Price Increases		Proposed Foreign Technical Assistance Packages
Presidential Economic Staff			Individual Industrial Projects Economic Review and Evaluation Various Industry Reviews and Studies	Foreign Exchange Requirements and Allocations for Specific Industries	Tariff Rates Evaluation and Recommendations Price Level Analysis
Board of Investments		Determination of preferred areas of investment and the respective measured capacities Establishment of guidelines for the development of strategic industries Review and recommendation of inclusion or delisting of industries from the list of overcrowded industries to the FFPC			Review of government policies and regulations affecting the industrial sector, e.g., tariffs, prices, etc. Trade agreements, treaties, foreign aid and loans affecting Philippine industrial development
Development Bank of the Philippines	Identification of particular industries for financial support to yield highest economic benefits	Determination of general direction and specific lending priorities	Evaluation of project loan proposal	Foreign loan guarantees	Programs to mobilize savings (both household and business) to fund DBP's lending operations
Congressional Economic Planning Office		Development of Export Industries Protection of Industries (Tariffs) Industrial Financing		Foreign exchange policy	Regional Development Free Trade Zones and Industrial Estates
Central Bank				Priorities in the allocation of foreign exchange Guidelines on foreign borrowings	Levels of money supply Tariffs

The short duration of the research time period allotted, usually from 24 to 72 hours.

These characteristics point up two aspects of user requirements for which a considerable improvement could be contributed by the CIDB. These are:

The need for very current data files.

The swiftness with which the agency must locate, collate, and organize the requisite information.

User Requirements Matrix

Figure 4 presents a summary of user agency priorities. For comprehensive industry studies, project evaluation reports and determination of preferred industrial development areas some information on each data category is essential. However, with the concept of a phased CIDB development, the information base for industrial development must be broken up into fundamentally independent data sets for gradual incorporation in the computerized data system.

The required information priorities were established by using four general principles:

1. Priorities determined by the sequential activities or evaluation steps employed by an agency. For example, the first stage of BOI's activities concerns the identification of preferred industries and the determination of the domestic productive capacity which can be provided with incentives. Data required to perform this operation are classified as first priority. The second stage of activities, which also correspond to the second priority, concerns the project evaluation functions. The third stage of activities, corresponding to the third priority, involves the assistance and monitoring of all BOI registered firms.

2. Priorities arising from the sequential evaluation of the economic feasibility and commercial viability of a proposed project. This scheme of priorities arises from the logical steps in evaluating the critical considerations that will spell the difference between success and failure for an enterprise. The primary consideration in this case is the relative position of demand and supply for the product. This becomes first priority data. If the market conditions for a project look promising,

Figure 4

Summary of Priority Requirements for
Data and Dimensions by User Agency

User Agency	FIRST PRIORITY		SECOND PRIORITY		THIRD PRIORITY	
	Data Categories	Data Dimensions	Data Categories	Data Dimensions	Data Categories	Data Dimensions
1. National Economic Council						
A. Office of National Planning	Production Inputs Production Supply Costs and Prices Market Demand	Regional/Geographic Time Series	Manufacturing Industry Banking and Finance Government Regulation	Level of Aggregation	Distribution Channels Infrastructure Environment	Derivative Measures
B. OSCAS (National Income)	Production Supply Market Demand	Level of Aggregation	Production Inputs Manufacturing Industry Costs and Prices	Regional/Geographic		Time Series Derivative Measures
C. OSCAS (I-O)	Manufacturing Industry Production Supply Costs and Prices Market Demand	Level of Aggregation	Production Inputs	Regional/Geographic		Time Series Derivative Measures
2. Presidential Economic Staff	Production Inputs Production Supply Banking and Finance Government Regulation Market Demand	Regional/Geographic Time Series	Manufacturing Industry Costs and Prices Banking and Finance Government Regulation	Level of Aggregation	Distribution Channels Government Regulation Infrastructure Environment	Derivative Measures
3. Board of Investments	Manufacturing Industry Production Supply Market Demand	Regional/Geographic Time Series	Production Inputs Manufacturing Industry Costs and Prices Government Regulation	Level of Aggregation	Distribution Channels Banking and Finance Infrastructure Environment	Derivative Measures
4. Development Bank of the Philippines	Production Supply Distribution Channels Costs and Prices Market Demand	Regional/Geographic Time Series	Production Inputs Manufacturing Industry Government Regulation	Level of Aggregation	Distribution Channels Infrastructure Environment	Derivative Measures

the second stage of the analysis is performed. Data on the availability of raw and intermediate product inputs in relation to the available technology is then required to establish the technical feasibility of the project. This is second priority data. Should the project still prove feasible, the third stage of evaluation, corresponding to third priority data, will be undertaken taking into consideration the balance of the factors which influence project viability.

3. Priorities relating to the relative difficulties in locating and collating the various types of information categories required by the agency.

4. Priorities based on the expressed preferences of the user agencies.

In the development of the matrix on user requirements, these four priority criteria were applied to establish the hierarchy of data requirements.

Of all data categories, market demand, product supply and production inputs rank the highest in the priority schemes of the user agencies, while the categories of costs and prices, manufacturing industry, government regulation, and banking and finance fall within the second priority. The environmental, infrastructure and distribution channel information categories rank third.

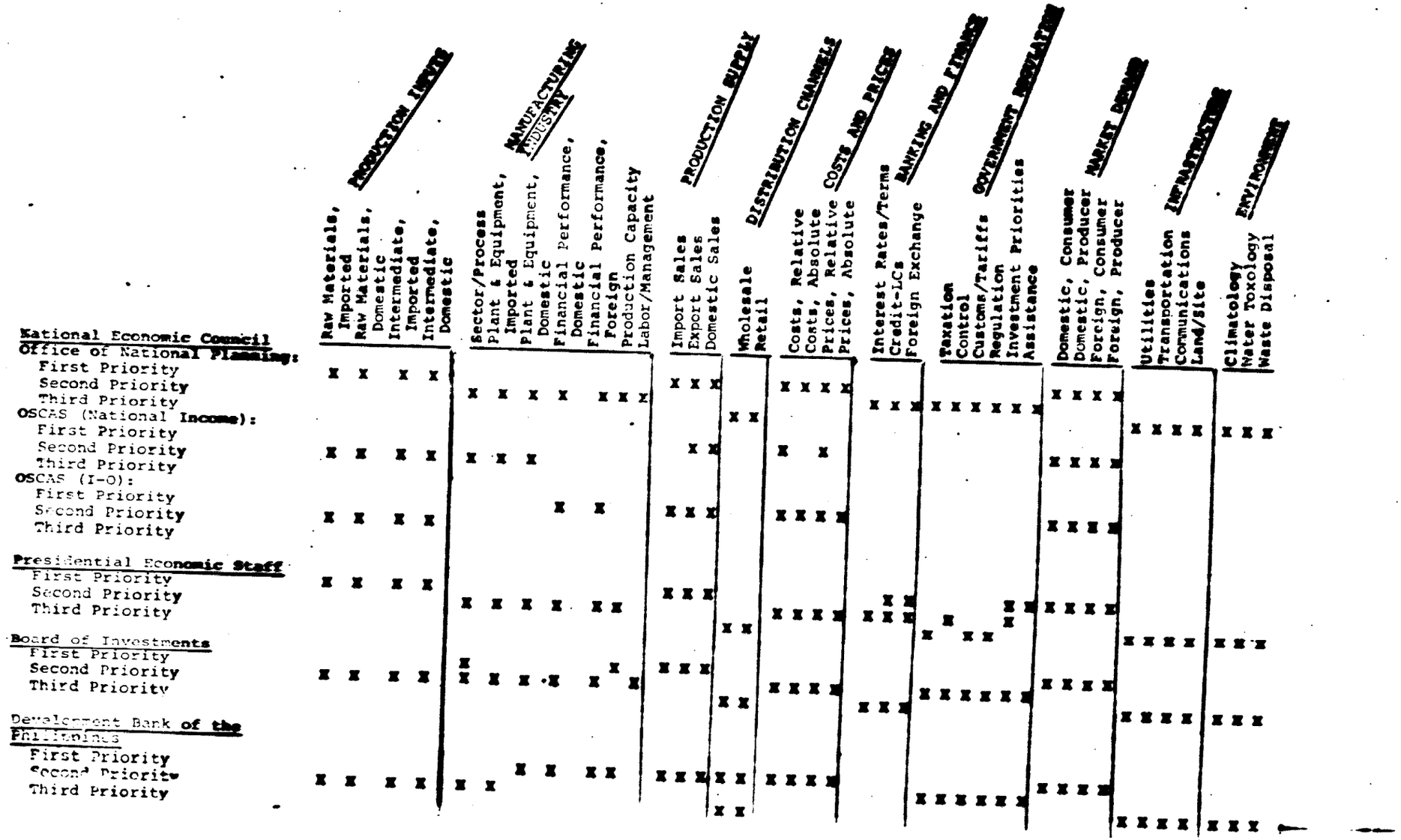
Apparently a major consideration of the user agency which weighed heavily in the selection of the first priority group is that these statistics are derived data, necessitating some arithmetical manipulation. For example, the data for potential market demand involve fairly complex statistical processes.

Of the four broad dimensions of the data categories, i.e., regional/geographical, level of aggregation, time series, and derivative measures, the most sought after is the regional/geographic dimension. This derives from the recent industrial development policy of spatial dispersal of the national manufacturing base. This data dimension is also one of the most difficult types to acquire because of difficulties in collection and accessibility.

As second priority, the level of aggregation of industrial data is a sought-after dimension for an increasing number of studies particularly those on inter-industry linkages.

Figure 5

Priority Data Requirements by Industrial Information Categories for Selected User Agencies



The time series, together with the derivative measure dimensions fall under the third priority, mainly because of their ready availability from published sources.

Information Requirements by Specific Industries

This review, while indicative of the trend of industrialisation policy, does not lend itself readily to a rigid analytical framework, for two reasons. One, there is no accurate way of establishing a pattern or frequency of occurrence of research work directed toward specific industries. This is particularly true with respect to the ad hoc policy issues which these agencies address (which are random in nature). Two, a hierarchy of industries would be an artificial guideline in the phased development of the CIDB.

In lieu of a formalistic approach to determine priority levels for specific industries, a tabulation by frequency of occurrence of specific industries in the IPP and the EPP of the BOI was carried out. Figure 6 shows the priority industries insofar as these can be established.

Figure 6

List of Manufacturing Industries Classified by Priority Requirements of User Agencies

FIRST PRIORITY		SECOND PRIORITY		THIRD PRIORITY	
PSIC	Industry	PSIC	Industry	PSIC	Industry
31	Manufacture of Chemicals and Chemical Products	37	Manufacture of electrical machinery, apparatus, appliances and supplies	38	Manufacture of transport equipment
34	Basic metal industries	23	Manufacture of textiles	24	Manufacture of footwear, other wearing apparel and made-up textile goods
33	Manufacture of non-metallic mineral products except products of petroleum and coal	25	Manufacture of wood, cane and cork, except manufacture of furniture	30	Manufacture of rubber products
35	Manufacture of metal products except machinery and transport equipment	36	Manufacture of machinery, except electrical machinery	29	Manufacture of leather and leather and fur products, except footwear and other wearing apparel
		27	Manufacture of paper and paper products	28	Printing, publishing and allied industries
		32	Manufacture of products of petroleum and coal	26	Manufacture of furniture and fixtures
		20	Food manufacturing industries except beverage industries	22	Tobacco manufactures
				39	Miscellaneous manufacturing industries

Section II

SOURCE DATA AVAILABILITY

Section II

SOURCE DATA AVAILABILITY

Description of Source Data Agencies

The industrial statistical data collecting system comprises the statistical offices in specific administrative departments, the statistical functions of local governments, the statistical coordinating office, and other official agencies. Within this system, four major statistical and research agencies form the core. These are: the Bureau of the Census and Statistics (BCS) of the Department of Commerce and Industry (DCI); the Department of Economic Research (DER) of the Central Bank (CB); the Labor Statistics Service (LSS); and the Bureau of Agricultural Economics (BAE). In addition to the core statistical agencies, other important source data agencies include the Securities and Exchange Commission and the Bureau of Internal Revenue.

For the CIDB to respond to the priority data requirements of the major user agencies, the primary sources of data to be tapped will be the BCS, the SEC, and the BIR.

In addition to the statistical data gathering agencies, several of the user agencies themselves represent significant sources of data. In the course of performing their tasks, user agencies (particularly those engaged in project proposal evaluation and application processing) have developed an expanding base of data across a wide range of industrial activities. These dual agencies then become both potential users as well as data sources for the CIDB.

Figure 7 presents a summary description of the statistical activities of both the primary and user source data agencies. For the most part, all industries are covered, with only a limited number of agencies devoting their entire effort toward single industries.

Figure 8 presents the industrial information categories collected by the source data agencies, while Figure 9 presents information on the data dimensions covered by these source agencies.

The most significant feature of the currently available statistical data base is the existence of a broad-based body of information heavily weighted in favor of the following information categories:

Figure 7

Summary Description of Source Data Agencies
by Function, Method of Data Collection
and by Industry Coverage

Source Data Agencies	Nature of Agency	Method of Data Collection	Specific Industries Covered
A. Bureau of the Census and Statistics	Statistical and research agency	Questionnaires; sample surveys and actual enumeration	All industries
B. Securities and Exchange Commission (SEC)	Administrative agency under the Department of Commerce and Industry (DCI)	Registration records, field surveys	All industries
C. Public Service Commission (PSC)			
D. Bureau of Internal Revenue (BIR)	Administrative agency under the Department of Finance	Collection agents; reports of firms concerned; taxpayers' reports	All industries
E. Bureau of Mines	Administrative agency under the Department of Agriculture and Natural Resources (DANR)	Reports from mining firms	Mining
F. Bureau of Forestry	Administrative agency under DANR	Reporting firms and fieldmen	Forestry
G. Bureau of Agricultural Economics	Major statistical and research agency under DANR	Sampling surveys; interviews; questionnaires	Crops and livestock
H. Philippine Lumber & Plywood Mfrs. Assn.	Trade association	Reports from member firms	Wood
I. Philippine Association of Flour Millers	"	"	Flour
J. Philippine Automotive Assn.	"	"	Automotive
K. Cement Assn. of the Philippines	"	"	Cement
L. American Chamber of Commerce	Chamber of Commerce	"	Most industries
M. Phil. Chamber of Wood Industries	"	"	Wood
N. Board of Investments	Administrative agency of the Office of the President	Aggregation of firm level statistics from files	All industries
O. National Economic Council	Administrative agency of the Office of the President	Questionnaires; personal inquiries; field surveys	All industries
P. Department of Commerce & Industry	Statistical and administrative agency	Field surveys; reports from agencies concerned	Rice and corn; sugar; transportation
Q. Central Bank of the Philippines (Department of Economic Research)	Major Statistical and research agency	Questionnaires; reports and statistics from banks, government agencies and industries concerned	All industries
R. Presidential Economic Staff (PES)	Administrative agency of the Office of the President	Questionnaires; field surveys; personal and telephone inquiries	All industries

Figure 8

Data Categories Collected and the Standard Periodic Reports Published

Data Source Agency	Data Categories	Analytical Studies	Title	Frequency of Publication	Age/Currency
A. Bureau of the Census and Statistics	Production Inputs Manufacturing Industry Production Supply Distribution Channels Infrastructure	Inter-Industry Relations Study of the Philippine Economy	Annual Survey of Manufactures Monthly Bulletin of Statistics Quarterly Journal of Philippine Statistics Foreign Trade Statistics Economic Census of the Philippines	Annually Monthly Quarterly Annually Every census year	1969 1971 1970 1969
B. Securities and Exchange Commission	Manufacturing Industry		Annual Report Securities and Exchange Commission Bulletin	Annually Monthly	
C. Public Service Commission	Infrastructure		Annual Report	Every fiscal year	1971
D. Bureau of Internal Revenue	Government Regulation		Annual Report	Annually	1970
E. Department of Agriculture and Natural Resources					
1. Bureau of Mines	Production Inputs Manufacturing Inputs Production Supply Costs and Prices	Special Studies on Minerals	Minerals News Service Annual Report	Every fiscal year Every fiscal year	Dec. 1971 1970-1971
2. Bureau of Forestry	Production Inputs Manufacturing Inputs Production Supply Distribution Channels Costs and Prices Infrastructure Market Demand		Annual Report	Every fiscal year	1970-1971
3. Bureau of Agricultural Economics	Production Inputs Costs and Prices Market Demand		Philippine Agricultural Situation Crop, Livestock and Natural Resources Statistics Daily Market Prices Report	Quarterly Every 4 years Daily	Jan-Mar 1971 1964 One week after
F. Trade Associations					
1. Philippine Lumber and Plywood Manufacturers Association	Production Inputs Production Supply		Annual Report	Annually	1971
2. Philippine Association of Flour Millers	Production Inputs Production Supply				
3. Philippine Automotive Association	Production Supply Market Demand				
4. Cement Association of the Philippines	Manufacturing Industry Production Supply				
G. Chambers of Commerce					
1. American Chamber of Commerce	Manufacturing Industry Production Supply Costs and Prices Banking and Finance Government Regulation		The Journal	Monthly	July 1968
2. Philippine Chamber of Wood Industries	Production Inputs Manufacturing Industry Production Supply Government Regulation		The Phil. Chamber of Wood Industries Yearbook	Yearly	1969
H. Board of Investments	Production Inputs Manufacturing Industry Production Supply Government Regulation Market Demand	Profitability Analysis Capital and Manpower Requirements and Problems of the Industry	Investment Priorities Plan Export Priorities Plan Investment Bulletin Philippine Progress Annual Report Industry Profiles	Annually Annually Annually	
I. National Economic Council	Manufacturing Industry Production Supply Costs and Prices Banking and Finance Government Regulation	Input-Output Tables Industrial Priority Studies National Income Accounts Key Economic Indicators	The Statistical Reporter Philippine Economy Bulletin National Development Plans	Quarterly	Oct-Dec 1971
J. Department of Commerce and Industry	Production Inputs Manufacturing Industry Production Supply		Annual Report Philippine Foreign Trade Record	Annually Annually	1971 1968
K. Central Bank of the Philippines	Production Inputs Manufacturing Industry Production Supply Distribution Channels Costs and Prices Banking and Finance Government Regulation Infrastructure	Economic Indicators	News Digest Statistical Bulletin Phil. Financial Statistics Annual Report	Weekly Annually Annually Annually	Aug. 20, 1971 1970 March 1971 1971
L. Presidential Economic Staff	Production Inputs Manufacturing Industry Production Supply Costs and Prices Banking and Finance Government Regulation Infrastructure	Industry Studies Provincial Profiles	National Development Plan Selected Monthly Current Economic Indicators	Annually Monthly	1971 July 1971

Production Inputs

Manufacturing Industry

Production Supply

Market Demand
(limited to realized demand)

The available information on the other data categories is generally spotty and limited to statistics on distribution channels, costs and prices, banking and finance, and infrastructure. This is a major limitation of the present statistical system, and it will be a significant consideration in the subsequent phases of implementation for the CIDB.

Private Agencies as Data Sources

By and large the major statistical sources in the country are government institutions. There is, however, a small group of private agencies which develop and publish information on specialized aspects of specific industries. These are the various trade associations and chambers of commerce and industries. Although rather limited, these groups provide valuable data sets which are being tapped by the industrial development planning agencies. Figure 10 presents information on the data available in the different source data agencies on a more detailed basis.

Computerized Data Files

Two other major sources of data are the BOI-CB foreign investment studies and annual reports on the top 1,000 corporations in the Philippines published in Business Day. The former provides information on the nature of external investments in the different manufacturing industries, while the latter presents firm-level financial operating results together with a brief profile of selected corporations. For additional discussions on computerized data sources, see Section VI.

Data Accessibility

The most accessible sources of information available are periodically published statistical journals and special reports. These are, in certain instances, limited in the number and variety of cross-classifications and tabulations of the available information sets. This information, normally kept in the agency's files, is usually made available upon request.

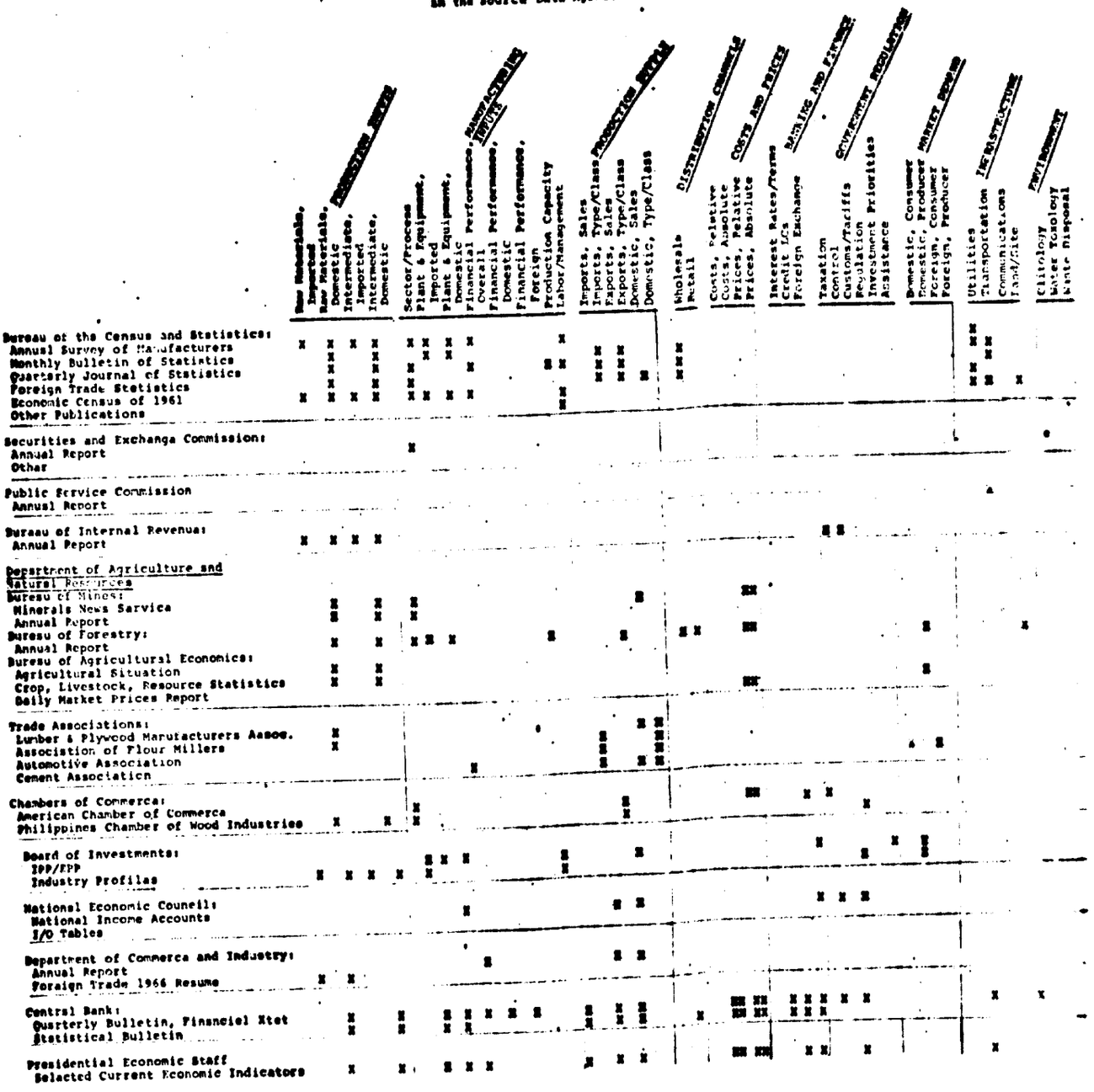
Figure 9

Data Dimensions of Information Collected
by the Source Data Agencies

Data Source Agency	Data Category	DATA DIMENSIONS: Geographic Areas/Regions	Time Series	Level of Aggregation
A. Bureau of the Census and Statistics	Production Inputs Manufacturing Industry Production Supply Distribution Channels Infrastructure	By country of origin/	1956-1969	By industry By nationality of vessel, importer/exporter and by port of entry/ emborkation
B. Securities and Exchange Commission	Manufacturing Industry			By business organization
C. Public Service Commission	Infrastructure	National	1961-1971	By end-users
D. Bureau of Internal Revenue	Government Regulation	By province, city or region		By industry
E. Department of Agriculture and Natural Resources				
1. Bureau of Mines	Production Inputs Manufacturing Inputs Production Supply Costs and Prices	By Province By Province By Province	1946-1971 1946-1971 1946-1971 1946-1971	By kind; firms; industry " By mineral groups By mineral commodity
2. Bureau of Forestry	Production Inputs Manufacturing Inputs Production Supply Distribution Channels Costs and Prices Infrastructure Market Demand	By region By countries By province	1963-1971 Fiscal years Fiscal years Fiscal years Fiscal years Fiscal years Fiscal Years	By types By milling corporation By countries By grade and size By species
3. Bureau of Agricultural Economics	Production Inputs Costs and Prices Market Demand	By Region By Region	Semi-annual (started 1957) 1963-1975 1946-1968	By crop All trading centers By commodity
F. Trade Associations				
1. Philippine Lumber and Plywood Manufacturers Assn.	Production Inputs Production Supply		1960-1970 1960-1970	By industry By industry
2. Philippine Association of Flour Millers	Production Inputs Production Supply		1962-1971 1962-1971	By industry By industry
3. Philippine Automotive Association	Production Supply Market Demand		1963-1971 1963-1971	By industry By industry
4. Cement Association of the Philippines	Manufacturing Industry Production Supply		1960-1971 1960-1971	By industry By industry
G. Chambers of Commerce				
1. American Chamber of Commerce	Manufacturing Industry Production Supply Costs and Prices Banking and Finance Government Regulation	National National National		By commodity
2. Philippine Chamber of Wood Industries	Production Inputs Manufacturing Industry Production Supply Government Regulation	By province National National	1960-1969 1960-1969	
H. Board of Investments	Production Inputs Manufacturing Industry Production Supply Government Regulations Market Demand			
I. National Economic Council	Manufacturing Industry Production Supply Costs and Prices Banking and Finance Government Regulation			
J. Department of Commerce and Industry	Production Inputs Manufacturing Industry Production Supply	By country of origin/ destination	1956-1971	By divisional commodity
K. Central Bank of the Philippines	Production Inputs Manufacturing Industry Production Supply Distribution Channels Costs and Prices Banking and Finance Government Regulation Infrastructure	National	1960-1971	By type of banks
L. Presidential Economic Staff	Production Inputs Manufacturing Industry Production Supply Costs and Prices Banking and Finance Government Regulation Infrastructure			

Figure 10

Information Categories Available
in the Source Data Agencies



An agency's data base usually includes source (survey) documents from which the published statistics are extracted. This detailed information is usually submitted by respondent firms under the mantle of confidentiality safeguards provided by the law. These types of information are usually not made available to user agencies in their original form and detail.

Dimensions of Data Available

Information available in published form is predominantly presented at the national level of aggregation and occasionally at the provincial level. In relation to the data categories previously defined, there is little production data at the provincial level, and even less for major urban centers. To a limited degree, however, regional or provincial data can be acquired from unpublished materials available from the agency concerned.

The availability of time series data is generally adequate from the mid-1950's to the present. However, there is usually a time lag in the publication of statistical information, which normally ranges from a few months to as much as three to five years. For those industrial statistics which are amenable to a semestral, quarterly or monthly presentation, an adequate base is generally available. In terms of the updating time frame, most of the data available are updated and published on an annual basis.

The currently available level of aggregation in terms of industrial sector data ranges from the two-digit to the four-digit PSIC code. Statistical publications generally limit their level of aggregation to the two-digit level, while at times presenting information at the three-digit level. Industry reports or status profiles are generally on the three to four-digit level, while industry financial and operating results are on a four-digit code. A significant aspect of the issue concerning levels of aggregation relates to the existence of non-confidential firm-level information for general usage. The company's name, location, industry, market prices and financial performance are generally not confidential and available from one or more source agencies.

A major factor in source data availability is the almost total absence of an updated directory of the statistical data elements available from each agency. To some extent, this situation will be alleviated by the efforts of a limited number of source data agencies in computerizing their data files. From this effort, it will be possible to develop an updated record of what data is available from these agencies. This will

also constitute an improvement in ability to use the source agency's published reports, by indicating underlying information not published, but available from the agency. Recent source data in the Philippines statistical system has become increasingly computerized.

The output of the statistical collection system is compromised by the inadequacy of data produced and the duplication of effort which often produces inconsistent results. Because of this situation, a number of the administrative agencies, such as the Central Bank and the Development Bank of the Philippines, have undertaken their own data collection efforts through field surveys to develop internal data bases to support various planning, evaluation and implementation functions.

Section III

EVALUATION OF THE ADEQUACY OF INDUSTRIAL INFORMATION

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EVALUATION OF THE ADEQUACY OF INDUSTRIAL INFORMATION

Comparative Review of Data Requirements and Availability

The purpose of this chapter will be to determine gaps and inadequacies in the current statistical information system supporting the industrial planning function. This will assist in deriving the necessary tasks required of the CIDB in the development of data standardization procedures and the reconciliation of different observations regarding the same data element.

The plan of this analysis is to compare the user requirements determined in Section I against the availability of corresponding data identified in Section II. Using the ten major industrial information categories, the data required and available will be matched in order to achieve this comparison. The need and availability of information will then be compared in terms of the data dimensions.

Diverse procedures are used to obtain relevant data for the solution of industrial development problems. Many users have had to locate the information needed, determine its composition and methods for access and acquisition. Data are usually so dispersed in various locations that a great effort is often necessary to locate and acquire relevant segments. This proliferation often results in conflicting and uncorrelated data.

Despite the tremendous volume of information generated, planners and decision-makers still complain of insufficient data on which to base their decisions. Decision-making based on incomplete statistics and uncertain information often results in sub-optimum choices. Much existing data does not readily lend themselves to analysis. Information often arrives too late to be useful, or in a form that does not meet user requirements. Remedial action is therefore essential if the statistical system is to be improved.

Figure 11 presents a comparative summary of data required for industrial planning and the availability of such statistics in the information system of the country.

The significant results of this comparison are:

> Two of the three first priority information category requirements (production inputs and product supply) are readily available in the source data agencies. The market demand category has relatively low availability.
>
> Two other data categories (manufacturing industry and government regulation) are also classified as readily available, where the user requirements are at the second priority level.
>
> The second priority user requirements for information on costs and prices and on banking and finance match the moderate availability levels in the data source agencies.
>
> Of the three remaining data categories, information on environment and distribution channels manifest third priority user requirements with corresponding low availability. Infrastructure data, a third priority user requirement, is moderately available.

The overall complementarity between data requirements and data availability leaves significant gaps in the system. These gaps refer to several situations:

> The absence of statistical information in relation to the demand from user agencies.
>
> Insufficiency, either in the quantity of data or inappropriate data dimensions.
>
> A reverse gap occurs when there is available data but no apparent user requirement for them.

These gaps become more critical when reviewed in terms of the levels of priority user requirements. The most glaring gap is seen in the negligible available information on market demand. This is probably because the market demand concept involves certain data transformations. The development of realized market

Figure 11

Comparative Evaluation of Data Requirements Versus Data Availability

	Data Category	Priority Requirement	Availability
1.	Production Inputs	First Priority	Readily available
2.	Manufacturing Industry	Second Priority	Readily available
3.	Production Supply	First Priority	Readily available
4.	Distribution Channels	Third Priority	Low availability
5.	Costs and Prices	Second Priority	Available
6.	Banking and Finance	Second Priority	Available
7.	Government Regulation	Second Priority	Readily available
8.	Market Demand	First Priority	Low availability
9.	Infrastructure	Third Priority	Available
10.	Environment	Third Priority	Low availability

demand figures requires derivation from other data sets through a transformation equation, a procedure not normally undertaken by the source data agencies. To arrive at potential market demand, which is usually a projection into the future, not only would a transformation equation be required, but also a growth model to extrapolate historical figures into the future.

Another conclusion of the comparative analysis is that a good level of availability exists for selected data categories for which the user requirements are of a low priority.

When priority scales for data dimensions are compared with the availability situation (see Figure 12), the most noticeable gap is in the lack of information on a regional basis. A significant finding, however, is that most detailed regional information exists in the base files of the source data agencies, but is inaccessible to user agencies. Information by region is not readily available from published sources due to limitations of time, budget or limited data processing capabilities, as well as confidentiality considerations and a reluctance to declassify the information available. A case in point is the base files of the BCS from the annual survey of manufactures in which data exist on a firm level as well as on a detailed geographic basis.

The SEC files, now in the process of computerization, also provide firm level data. However, they have a more limited range than those contained in the BCS records.

Overall, therefore, a significantly broader-based data collection effort is required to generate and bring to an adequate level of availability the statistical information required to support the industrial planning function. The data dimensions appear to be adequate but highly inaccessible at this time.

Problems with the Current Data Base

The gaps and inadequacies of the currently available data have two major ramifications. A limitation is imposed on the type and depth of analytical effort which can be undertaken by user agencies. To the extent that inadequate information is available, this can lead to sub-optimum policy decisions and therefore bears a heavy opportunity cost in the development effort of the country. On the other hand, the present data situation will provide the direction and impetus for the required effort to upgrade the statistical data collection system of the country.

Figure 12

Comparison of Priority Level Requirements and Availability for Data Dimensions

Data Dimensions	Priority Levels	Availability
Regions/Geographic	First Priority	Low availability
Time Series	First Priority	Readily available
Level of Aggregation	Second Priority	Available
Derivative Measures	Third Priority	Low availability

Additional problems of data adequacy include: 1) the currency of available data; 2) the apparent inconsistencies of published statistics; and 3) the duplication of effort in collecting the same type of information from respondents by several agencies.

In terms of user requirements, the fact that the primary data gathering agencies cannot generate their statistical reports within a reasonable time lapse has been a particularly sensitive issue. The delay in the release of statistical information is often the result of inadequacies in the data processing capabilities of the agencies concerned. Until remedial action is initiated, this problem will continue.

Inconsistencies in the published figures refering to the same data item are not uncommon in the data system. Figure 13 presents selected data from different source agencies which purport to describe the same data element. From the chart it will be noted that data among agencies do not agree with each other. In addition, statistics in different publications of one agency sometimes do not tally with each other. This condition is one of the more serious problems confronting the industrial planning mechanism and one to which the CIDB must address itself.

The cause of this situation can be traced to essentially three factors:

> The delay in release and the absence of current/updated reports from primary data collecting agencies has forced user agencies to undertake their own data collection through special surveys.
>
> The fact that a complete and up-to-date inventory of all existing statistics is not available leads some agencies to collect similar types of data, which when published may not coincide with those from other sources.
>
> The definitions and standards in data collection appear to differ from one agency to another.

Figure 14 presents a tabulation of characteristic inadequacies of currently collected industrial data. The analysis delves into the third or micro level information categories in order to define specific availability and/or reasons for unavailability.

Figure 13

Samples of Statistical Disparities in Data Published by Different Agencies Requiring Reconciliation

Data Elements	Unit of Measure	Period	SOURCE DATA AGENCY: Central Bank — Annual Report	Central Bank — Statistical Bulletin	Central Bank — Economic Indicators	Bureau of the Census and Statistics — Monthly Bulletin	Bureau of the Census and Statistics — Foreign Trade Statistics	Bureau of the Census and Statistics — Annual Survey of Manufactures	Presidential Economic Staff — Selected Economic Indicators	Bureau of Agricultural Economics — Philippine Agricultural Situation	National Economic Council — National Income Accounts
1. Total Exports	FOB Mil.$	1969	854.6	857.7	854.6	983.2	983.2		850.9		
2. Total Imports	FOB Mil.$	1969	1,131.5	1,131.5	1,131.5	1,181.9	1,181.8		1,131.6		
3. Electric Energy Production	Mil. Kwh	1970				6,413.5			6,522.0		
4. Agricultural Production (Food Crops)	Mil. Kgms. 000 m.t.	1970	11,984.5							10,670.0	
5. Value added by Manufacture (all industries)	Mil. P	1969						4,995.0			5,138.0
6. Exports and Imports of Goods and Services Account											
Exports	Mil. P	1970	6,953.0								7,961.0
Imports	Mil. P	1970	7,815.0								8,087.0

Figure 14 Continued

Data Categories	Not Collected	Inaccessible	Poor Format	Too Old	Confidential	2-Digit SIC	3-Digit SIC	4-Digit SIC	Reconciliation
BANKING AND FINANCE									
Interest Rates/Terms									
Type of Instruments									
Collateral Requirements									
Money Market									
Domestic Credit									
Amounts Allocated		X			X				
Availability		X			X				
Commercial Banks		X							
Government Financial Institutions		X							
Foreign Exchange									
Rates of Exchange									
Availability/Allocation(s)/ Usage									
Receipts, Disbursements (Firms/Industries)		X							
Balance of Trade/Payments									
GOVERNMENT REGULATION									
Taxation									
Corporate Income Taxes									
Value Added Taxes									
Excise/Commodity Taxes									
Withholding Taxes on Remittance									
Customs/Tariffs									
Tariff Rates									
Duties Collected									
Control									
Legislation									
MB Circulars									
Executive Circulars									
Investment Priorities									
IPP/IPP									
Overcrowded Industries									
Regulation									
Import Authorization									
Assistance									
Tax Benefits		X			X			X	
BOI Registered Corporations								X	
Direct Loans		X			X			X	
Guarantees		X			X			X	
MARKET DEMAND									
Domestic									
Foreign									
Tariff Structure									
Quota Limits									
Government Restrictions									
Consumer									
Apparent/Realized			X	X					
Actual Consumption			X	X					
Consumption Factors			X	X					
Value Added									X
Potential									
Demography									
Disposable Income									
Patterns of Spending				X					
Ownership/Registration									
Seasonal Variations	X								
Producer									
Production									
Plant/Equipment Requirements	X								
INFRASTRUCTURE									
Utilities									X
Electric Power			X	X					
Gas			X	X					
Water			X	X					
Fuels			X	X					
Transportation									
Shipping		X		X					
Railroads									
Highways	X								
Air Cargo		X		X					
Communications									
Telephone									
Telegraph									
Land/Site									
Availability									
Location									
Area	X								
Valuation	X								
ENVIRONMENT									
Climatology									
Flood Control									
Typhoon Impact									
Weather									
Water Typology									
Waste Disposal									

Figure 14

Characteristic Inadequacies of the Present Statistical Collection System

Data Categories	Not Collected	Inaccessible	Poor Format	Too Old	Confidential	2-Digit SIC	3-Digit SIC	4-Digit SIC	Reconciliation
PRODUCTION INPUTS									
Raw Materials and Intermediate Products									
Domestic									
Agricultural									
Mineral/Mining									
Forestry									
Fisheries									
Industrial									
Inventories									
Imported									
Commodity									
Source/Origin									
Inventories									
MANUFACTURING INDUSTRY									
Sector/Process									
Firm Name/Address									
Plant Location(s)									
SIC Code(s)									
Process/Technical									
Royalties									
Integration									
Technical/Assistance Contracts									
Plant and Equipment									
Book Value/Capital Investment									
Capital Expenditures (New)									
Sources of Capital									
Machinery									
Structure/Facilities									
Plant Layout									
Foreign Exchange									
Labor/Management									
Employment by Skills									
Payroll(s)/Earnings									
Labor Relations (Unions)									
Employee Benefits									
Wage Rates									
Manpower Utilization									
Organization									
Seasonal Peaks in Labor									
Production Capacity									
Rated Capacity									
Utilization Rate									
Actual Capacity									
Economic Size Plant									
Seasonal Variation									
Inventories									
BOI Registered Capacity									
Operational Status									
Financial Performance									
Balance Sheet									
Profit/Loss Statement									
Capitalization by Nation									
Market Share									
Export Dollar Earnings									
Remittance of Profits, Interests, Dividends									
PRODUCTION SUPPLY									
Imports, Exports, And Domestic Quantity									
Weight									
Volume									
Units/Prices									
Sales									
Gross Output									
Shipments									
Inventories									
Realized Sales									
Credit Terms									
Value Added									
Type/Class									
Consumer/Producer									
Durable/Nondurable									
Origin/Destination									
DISTRIBUTION CHANNELS									
Wholesale									
Vessel Clearances									
Carriers/Routes									
Freight Car Loadings									
Marketing Organization									
Distributions									
Number									
Locations									
Capacity									
Retail									
Type of Outlets									
Stores									
Number									
Locations									
Capacity									
COSTS AND PRICES									
Relative									
Base Year									
Absolute									

It can be seen that there are significant data sets at the micro level which are not collected as part of the normal activities of the source data agencies. For example, the following significant data sets are not generally collected but are important considerations -- though probably not critical -- in industrial planning:

Manufacturing Industry (PSIC code 2):

Structure/Facilities
Plant Layout
Employment by Skills
Employment Benefits
Operational Status

Production Supply (PSIC code 3):

Shipments
Credit Terms

Distribution Channels (PSIC code 4):

Marketing Organization

Market Demand (PSIC code 8):

Foreign Market Demand
Plant and Equipment Requirements

Another characteristic is the inaccessibility to users of already collected information. Data on foreign exchange transactions of firms is one of the typical information sets collected that is often inaccessible to most user agencies. This is due to confidentiality considerations and to inadequate tabulations, and is associated with the level of aggregation problem since the base data is usually on the four-digit level but is published on a two-digit basis.

Overall Conclusion

From the analysis, it appears that the data collection system at present is not fully oriented to user requirements. This is apparent from the high availability of second or even third priority user requirements and the concurrent poor availability of high priority data. The problems which arise indicate that matters other than direct and specific user requirements are being serviced by the data collection system.

The CIDB could be instrumental in the reorientation of the objectives of the information collection system toward more effectively supporting the activities of industrial and economic planners.

Section IV

MANUFACTURING INDUSTRY MODEL AND CLASSIFICATION TECHNIQUE

Section IV

MANUFACTURING INDUSTRY MODEL* AND CLASSIFICATION TECHNIQUE

The manufacturing industry represents a coherent and systematic process in which raw materials are transformed into products through technical processes and the application of monetary, physical and labor resources. The products of manufacturing industry, at values expressed in terms of costs and prices, are then distributed and consumed through the process of market demand. Banking and finance, government regulation, environment and infrastructure are external factors having a significant effect on the viability of industry.

Evaluation of user requirements, source data availability, and selection of information for the Central Industry Data Bank (CIDB) demands a comprehensive classification scheme for data pertaining to industrial development. Without a systematic technique for categorization, the wide range of pertinent economic information presents a confusing picture lacking cohesion and defying orderly analysis. Consequently, a manufacturing industry model has been developed to assist both users and systems analysts in decision-making concerning the design of the CIDB. Simultaneously, the model provides a parallel information classification technique organized at three hierarchical levels of detail. The resulting information categories are virtually self-defining, with each level being described by the detail of the next lower level.

Description of the Model

Figure 15 illustrates the first and second levels of detail, while Figure 16 adds the third level.

The model is divided broadly into four primary sectors representing economic INPUTS, the manufacturing PROCESS itself, production OUTPUTS or supply, and final CONSUMPTION of goods.

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*The use of the term "model" is descriptive only. It does not mean an econometric model or a predictive model of any sort.

Figure 15

Classification of Industrial Information
by Categories -- Levels I and II

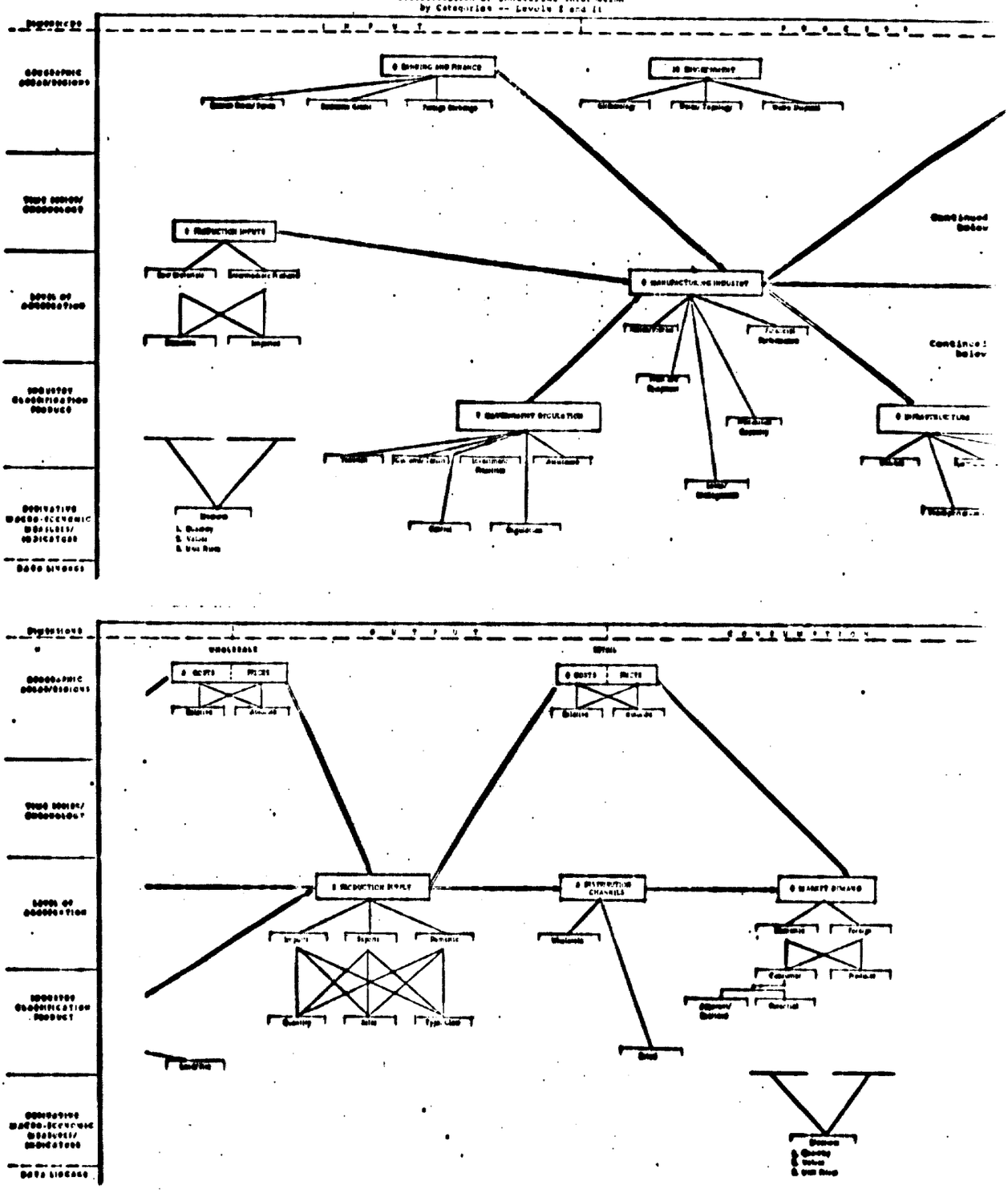
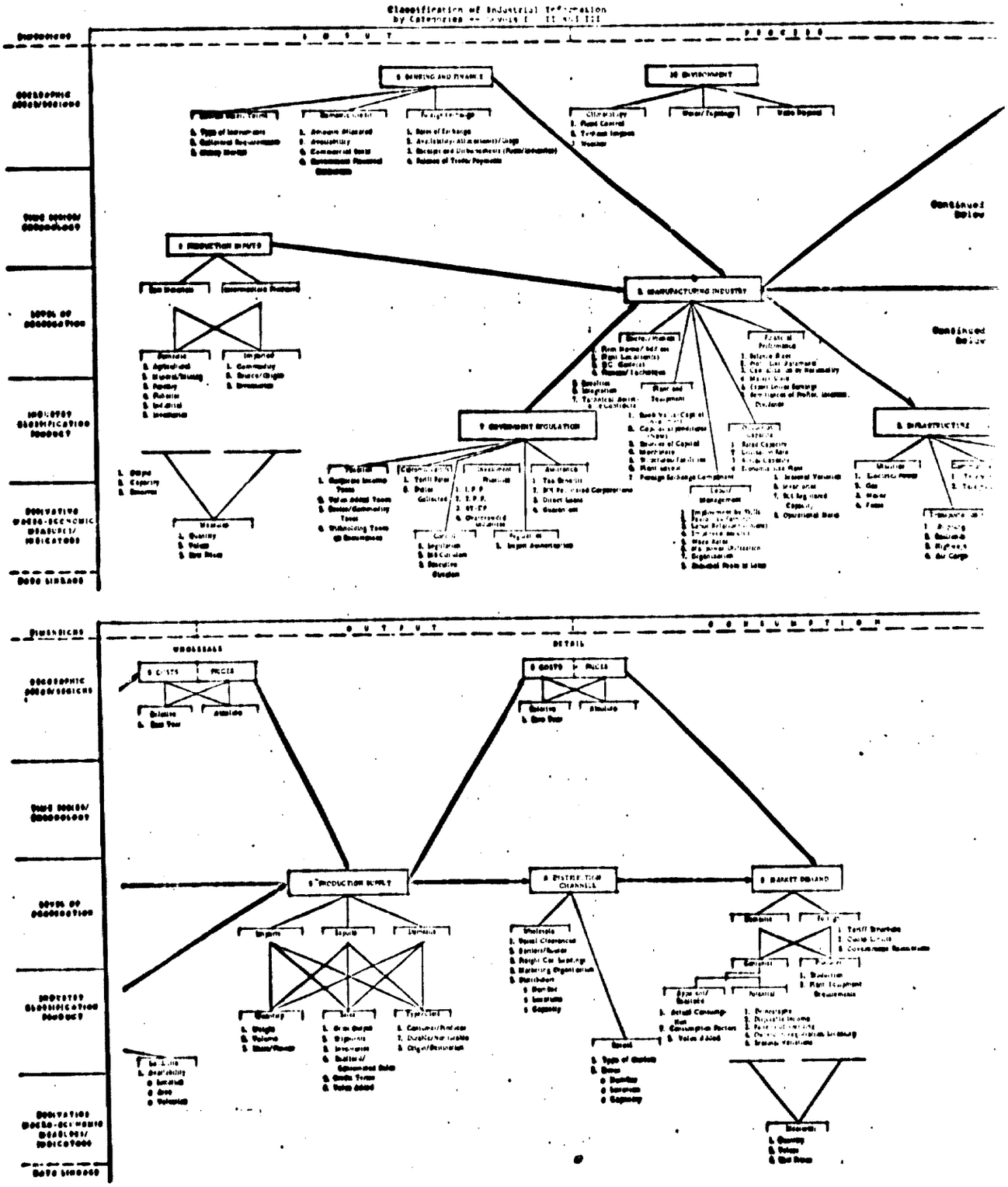


Figure 14

Classification of Industrial Information
by Categories -- Levels I, II and III



The first level shows the most general processes and corresponding information categories of the model. There are ten of these, beginning with production inputs (1), representing the raw materials and intermediate products used by industry to produce finished and semi-finished goods. At the second level, production inputs can be described by a two dimensional matrix showing stage of completion and origin:

STAGE OF COMPLETION

Origin of Inputs	Raw Materials (Unprocessed)	Intermediate Products (Processed)
Domestic		
Foreign or Imported		

The next stage is manufacturing industry (2), including production processes, associated resources and internal performance. In essence, this refers to the individual industrial firms or their aggregation to industrial sectors (SIC). The components of manufacturing industry at the second level, are sector/process, plant and equipment, labor/management, production capacity and corporate financial performance.

The output of manufacturing industry is represented by the next stage, product supply (3). At the second level, product supply is derived from three components related to origin/destination and three product characteristics through a 3 x 3 matrix:

PRODUCT ORIGIN DESTINATION

Product Character-istics	Imports (Foreign Origin)	Exports (Foreign Destination)	Domestic (Origin)
Quantity (Weight or Volume)			
Sales (Monetary Value)			
Type of Product (Consumer or Producer)			

Product supply is delivered to the market place for consumption through the distribution channels (4). At the second level, wholesale channels relate to physical distribution (transport), marketing organization, and distributors; retail channels provide the capability of distributing merchandise directly to consumers through stores and other sales facilities.

Unit costs and prices (5) are critical determinants of product valuation and actual consumption, generated both at the wholesale and retail stages. At the second level, they are expressed in either absolute (e.g., ₱ 2.40 per kilo) or relative (125 percent) terms. Relative indices are usually expressed as a percentage against a specified base year.

Product supply is finally consumed through the process of market demand (8). Market demand at the second level can be classified as to destination and stage of consumption in the following matrix:

MARKET DESTINATION

Stage of Consumption	Domestic	Foreign (Exports)
Producer (Intermediate Products)		
Consumer (Final)		

Consumer demand (whether domestic or final) is further distinguished as to method of derivation. Apparent or realized demand refers to actual consumption of goods, calculated as imported product supply plus domestic supply minus exported supply.

Potential demand, on the other hand, is a derived estimate based on desired consumption of goods independent of current price levels. Potential demand is normally derived from population statistics, patterns of spending, ownership of products requiring replacement parts and estimated consumption factors. Thus, to estimate the potential domestic demand for sugar, the total population of the Philippines (38 million) would be multiplied by a consumption factor such as 2.0 Picules per capita to yield a total potential demand of 76 million Picules (not based on actual data).

In addition to the six "main-line" processes described above, there are four major external categories that influence or provide resources to manufacturing industry. Banking and finance (6) represents the external source of capital and foreign exchange, the life-blood of any enterprise. Government regulation (7) imposes taxation, customs tariffs, regulation and control upon industry, while providing direct and indirect assistance to priority industries. The infrastructure (9) provides direct support to industry through utilities, transportation facilities, communications and land for industrial sites. Climatology, topology, water supply and sewerage place external limitations on the capacity of industry as characteristics of the environment (10).

The third level of the manufacturing industry model provides more detailed categories of information as shown in Figure 16. Further, the design of the classification technique is "open-ended" in that additional categories can be added at the third level, and the model can be extended to any number of more detailed levels that may be required for analysis.

Data Dimensions and Derivatives

The information categories described above represent substantive data concerning the manufacturing industry. Each of these categories can be further delineated in terms of the data dimensions shown on the left hand side of Figures 15 and 16. A primary characteristic of the dimensions is that they are applicable to all classes of information and levels of detail.

Geographic areas would include such subdivisions as region, province, city, country. Time series represent the chronology of events by year, semester, quarter, week, day, etc. The dimension of "level of aggregation" is usually represented by industry or product classifications (e.g., PSIC, ISIC).

Derivative measures represent mathematical combinations of simple information categories (e.g., value-added, index of dispersion). Macro-economic measures are usually derivatives which have been aggregated to major economic sectors, as in the national income accounts.

The data dimensions also represent common denominators, aiding in linkage between various elements in the manufacturing industry model. Thus a variety of information can be related at the level of a specific region, time period or industrial sector.

Utilization of the Model

The manufacturing industry model and classification technique represents the framework for presenting the user requirements analysis (Section I) and the source data investigation (Section II), as well as providing criteria for the evaluation of information adequacy (Section III).

The model has been used as the basis for establishing differential user agency priorities for the early acquisition of industrial information. It represents the basic design for substantive information to be contained in the CIDB and will be used as the primary user interface with the system. That is, the intermediary between user requests for CIDB services and their execution will always be the industry model, to which the economic planners can easily relate. The system will then translate the idiom of the model into the logical

and physical file structures of the CIDB, for retrieval, presentation and analysis of industrial information.

Section V

USER APPLICATION/FUNCTIONAL SYSTEM DESIGN

Section V

USER APPLICATION/FUNCTIONAL SYSTEM DESIGN

The system design of the CIDB has been developed in three stages through an inter-disciplinary technique that continuously emphasizes user requirements and adaptation of the CIDB to the needs of the economic planners. The first stage of the design describes all of the system characteristics pertaining to the user, as well as source data agencies. This will provide a complete set of user-oriented specifications with regard to:

User functions and services to be supported

Performance criteria and system capacity

Quality Control

Source data collection

Standards for data elements

The succeeding stages of the design will use these components as a base reference and point of departure in the definition of automatic data processing (ADP) capabilities (Section VI) and supporting computer system services (Section VII). This will provide assurance that all of the design components are geared toward meeting user requirements and maximizing the quality, timeliness and customization of retrieved information to fulfill the industrial planning process.

User Functions and Services to be Supported

In the development of industrial policy, the economic planner must first determine the sources of pertinent available data, directly acquire statistical information, and perform the appropriate analyses. The services to be provided by the Central Industry Data Bank correspond to these three stages of development.

Data Directory Service

The purpose of this service is to provide the user with references to the available published, computerized, unpublished and documentary sources of information related to the manufacturing

industry sector of the economy. The data directory service will only indicate what information is available and where it is located; it will not directly retrieve or present computerized statistical information. It will, however, include a library of documents, containing some of the source data to be made available at a central location.

At the present time, there is no single source directly indicating the kinds of statistical information processed, maintained and published by the various government agencies and private organizations. The data directory service will fill this need.

Directory services will be available for the following types of sources as illustrated in Figure 17.

> Published sources -- those officially published periodicals containing statistical tables (e.g., annual statistical appendix of the Central Bank, annual survey of manufactures of the Bureau of the Census and Statistics).
>
> Computerized sources -- those automated base files containing statistical data maintained by various agencies on punched cards, magnetic tape or disk storage (e.g., economic census, export-import statistics).
>
> Unpublished sources -- those records of statistical data maintained by various agencies which are not computerized nor formally published.
>
> Non-statistical document reference -- those studies, position papers and policy statements that are basically textual in nature and may contain a variety of industrial data from primary and secondary sources (e.g., industry studies, regional profiles, project evaluation papers).
>
> Finally, a fifth service will entail a physical library for acquisition of source documents as referred to by source types above. The library will be inaugurated by PADCO's contribution of all relevant source material collected in the Stage I investigation.

The physical library will be supplemented by periodic acquisition as the result of further source data exploration to develop references for the data directory service. Since the source documents must be physically obtained in order to extract the

Figure 17

Information to be Contained in the Data Directory Service

PUBLISHED SOURCES

[1]Originating Agency	[2]Information Categories	[3]Levels of Aggregation	[4]Title I.D.	[5]Time Series	[6]Age	[7]Units of Measure	[8]Production Frequency	[9]Cross Reference
[10]Formal/ Informal	[11]Computerized Source	[12]Sampling Technique	[13]Acq. No.	[14]	[15]	[16]	[17]Estimation Method	[18]Completion Stage

COMPUTERIZED SOURCES (BASE FILES)

[1]Originating Agency	[2]Information Categories	[3]Levels of Aggregation	[4]Title I.D.	[5]Time Series	[6]Age	[7]Units of Measure	[8]Production Frequency	[9]Cross Reference
[12]Sampling Techinque	[17]Estimation Method	[19]Inclusion in CIDB	[21]Confi-dential	[14]Media Mode	[15]Cod-ing	[16]File Layout	[20]Accessibil-ity Comments	[18]

UNPUBLISHED SOURCES (NOT COMPUTERIZED)

[1]Originating Agency	[2]Information Categories	[3]Levels of Aggregation	[4]Title I.D.	[5]Time Series	[6]Age	[7]Units of Measure	[8]Production Frequency	[9]Cross Reference
[12]Sampling Technique	[13]Acquisition Number	[17]Estimation Method	[18]Completion Stage		[20]Accessibility Comments		[21]Confiden-tiality	

NONSTATISTICAL DOCUMENT REFERENCE

[1]Originating Agency	[2]Information Categories	[4]Title I.D.	[22]Date of Publication	[23]Time Period Covered	[24]SIC Code	[25]Region/ Geog.

reference information (except for computerized sources), it should be relatively easy to then submit these to the CIDB reference library. It is anticipated that the library would initially make these documents available only at its physical location (without borrowing), but that reproduction services could be added in the future for distribution to requesting agencies.

In the reference details, published sources would only indicate those data items and level(s) of aggregation actually printed in the report. The details of the underlying surveys would be provided either under computerized sources or unpublished sources, if available. The computerized source references would, on the other hand, indicate all the details stored in the base record, as would the unpublished source references. The non-statistical document reference will include a key word in context (KWIC) index to aid in retrieval of the most relevant sources. Figure 17 indicates the general record format for each type of source reference.

The data directory service will also play a key role in providing an index and cross reference to the data actually stored in the CIDB proper. Whenever a report, table, or special tabulation is prepared by the CIDB, it will be indexed in the published sources for future reference and will be maintained in the library for further utilization. Data elements actually stored in the CIDB will be indexed through the computerized sources section of the data directory. This will provide an effective guide to the user as to what statistical information is available from the data bank without actually going through the effort and expense of a special tabulation.

Statistical Reference Service

The statistical reference service will comprise the repository of data in the CIDB along with retrieval mechanisms and report generation capabilities. The basic structure of the data elements in the bank will correspond to the manufacturing industry model design, this will constitute the primary interface between the user and the system. Thus, at all times the economic planner can relate to the system in familiar terms that are readily understandable and independent of computer concepts or jargon.

Once all of the information classes are fulfilled at the three designated levels, a complete description of manufacturing industry in the Philippines will have been achieved. The ability to analyze and aggregate this information according to the dimensions of the model -- geography, time series, industries and derivatives -- will provide the economic planner with appropriate information to address most policy issues regarding this sector of the economy.

Since it is clearly not realistic or feasible to implement CIDB information corresponding to all of the categories and dimensions, a priority scheme has been developed to indicate the most urgent needs of the users. This is shown in Figure 18 under three levels of decreasing priority by industries (two-digit PSIC code), dimensions and information categories.

The information categories are likely to provide the most useful basis for selecting data for inclusion in various stages of CIDB implementation. It can be seen that the internal input, output and consumption categories -- production inputs, product supply and market demand -- have the highest priority. This suggests a major emphasis on analysis in which input-output relationships are crucial, while the manufacturing process can be treated as simply a transformation mechanism. The second level of priority emphasizes the balance of the internal categories -- manufacturing industries, and costs and prices -- as well as the primary external influences of government regulation, and banking and finance. The broader, more indirect external factors -- environment and infrastructure -- are relegated to the lowest priority along with distribution channel.

In terms of data dimensions, the regional and time series analysis has the highest priority, followed by industries and derivative measures. User priorities have been discussed in greater detail in Section I.

In addition to its role in information classification, the manufacturing industry model provides the framework for developing transformations and interrelationships between data categories.

Since the model represents an interconnected cyclical process, it has the potential for development and management of explicit transformation such as:

> Generating "production input" requirements from "manufacturing process", and capacity.
>
> Generating costs and prices of "production supply" from "manufacturing process", fixed investment and labor force.
>
> Generating "plant and equipment" investment, labor and foreign exchange requirements from "manufacturing process" and capacity.
>
> Given "manufacturing process", location and rated capacity, generate utility, transportation, and land/site requirements, as well as building/construction costs.

Figure 18

Categories of Information to be Contained in the Statistical Reference Service by Priority

	Category		
	Industries (By PSIC Code)	Dimensions	Classes of Information
Priority I	31 - Chemicals manufacture 34 - Basic metals 33 - Nonmetallic minerals except petroleum and coal 35 - Metals except machinery and transport equipment	Regional/Geographic Time Series	Market Demand Product Supply Production Inputs
Priority II	37 - Electrical machinery 23 - Textiles 25 - Wood products except furniture 36 - Nonelectrical machinery 27 - Paper and paper products 32 - Products of petroleum and coal 20 - Food except beverages	**Level of Aggregation**	Costs and Prices Manufacturing Industry Government Regulation Banking and Finance
Priority III	38 - Transport equipment 24 - Footwear, wearing apparel and made-up textiles 30 - Rubber products 29 - Leather and leather/fur products, except footwear and other wearing apparel 28 - Printing and publishing 26 - Furniture and fixtures 22 - Tobacco 39 - Miscellaneous and other	**Derivative Measures**	Environment Infrastructure Distribution Channel
Priority IV Not called for	21 - Beverages		

Allocate final product costs/prices to each major stage and element in production:

Raw materials

Labor

Transport (Input and Output)

Utilities

Taxes and Tariffs

Distribution

The statistical reference service could provide a series of standard periodic reports, subject to coordination with source agencies to insure consistency and avoid any possible duplication. In fact, it may well be possible to eliminate a number of current statistical publications through consolidation within the context of the CIDB system. This would significantly reduce costs and the current reporting burden of source agencies.

The following standard periodic reports are suggested:

Key industrial indicators (Not currently available but potential output from the CIDB)

Compendium of regional industrial statistics

Directory of CIDB data standards

A wide variety of capabilities will be provided for tabulation of ad hoc reports in various formats. These are discussed in detail in Section VI below.

Data Analysis Service

The primary emphasis of the CIDB is upon improving the capabilities for storage, retrieval and presentation of industrial data to the economic planners in the form most appropriate for resolution of policy and program issues. Once the planner has obtained the required statistical tabulation in a timely and relevant manner, analysis can usually be readily accomplished by staff technicians using available electronic desk calculators. Nevertheless, due to the ready availability and low marginal cost, a package of analytical programs will be provided by the CIDB to be executed through the economic analysis unit.

The following general categories of analytical tools will be provided:

A standard mathematical-statistical package encompassing the more traditional techniques.

Econometric models to support the NEC in their programs in this area.

Input/output analysis with particular emphasis on matrix inversion routines.

Origin/destination studies protentially incorporating linear programming for optimization problems.

The data analysis service is envisioned as a growth path for the CIDB with acquisition of greater sophistication as the development of the system evolves. The specific capabilities are discussed in greater detail in Section VI.

Performance Criteria and System Capacity

This part of the functional design specifies the performance that can be expected of the system by the user in terms of:

Turnaround or Lead-Time

Minimum Available Level of Aggregation

Security and Confidentiality

User Locations and Geographic Dispersion

Maintenance of Historical Information

The specifications that follow have been derived from the analysis of user requirements described in Section I. They also represent a balanced and reasonable structure in terms of the technological capabilities available.

Turnaround or Lead-Time

This aspect of system performance is defined as the amount of time required for the system to respond once a formal request for a report has been made until it is delivered to the user. Boundary minimum and maximum turnaround times have been established for the following types of requests:

Standard Periodic Reports (Related to frequency of reports and complexity of processing): Minimum 30 days; Maximum 120 days

Intermediate Range Industry Studies and Policy Papers (Non-Recurring), (Pre-Planned but Non-Regular): Minimum 15 days; Maximum 30 days

Ad Hoc Studies and Data Directory Service: Minimum 24 hours; Maximum 72 hours

Thus, the minimum overall response time envisioned is 24 hours. Although this could most probably be reduced to between four and six hours within the capabilities of the NCC, there is no apparent requirement for immediate access to the CIDB through on-line remote terminals. In all cases, the actual response times will depend on the nature and complexity of the user request (e.g., whether it requires formal statistical analysis), but should not exceed the limits specified above.

Minimum Available Level of Aggregation

A major issue in the development of the CIDB concept has been the levels of aggregation that will be made available to the economic planners. This issue has been resolved by specifying the minimum and maximum levels to be available in the CIDB system as follows:

Geographic Areas/Regions:

Minimum	Province, Chartered City or Major Urban Area
Maximum	Country

Time Series Chronology:

Minimum	Quarterly
Maximum	Annual

Industrial Classification:

Minimum	Four-digit PSIC
Maximum	Two-digit PSIC

The Industrial Firm or Plant:

Directory of establishments by name, location and industry flagged as to BOI registration plus financial data for top 1,000 corporations from the Business Daily publication.

BOI Registered Firms: Registered Capacity; Integrated/Non-Integrated; Operation Status.

Security and Confidentiality

The need for security measures would be contingent upon the necessity for storing confidential information in the CIDB. However, processing confidential source data files to extract aggregates will be performed in support of the CIDB. This will require provision of adequate security measures to protect the confidentiality of the source agency files. As a design objective, the CIDB should not maintain confidential information internally.

User Locations/Geographic Dispersion

The major users -- BOI, NEC, PES -- and the supporting computer facility -- NCC -- are a maximum distance apart of 20 kilometers and one hour travel time (under normal conditions). This would appear to be a reasonable situation for the use of normal batch processing in providing computer services. However, during the rainy season, travel times can deteriorate seriously. Consequently, a facility for the transmission of data on telephone lines, such as teletype, would be desirable. This would not require on-line operation, but could utilize off-line transmission from paper-tape.

Maintenance of Historical Information

A minimum of ten years of history will be maintained in the system for those applicable data elements indexed by time series. If possible, historical data will be stored from 1950, when it is feasible and available.

Quality Control

In order to insure that the data maintained by and retrieved from the CIDB meets minimal quality control standards, design characteristics will be adopted to provide for reliability, reconciliation and imputation.

Reliability of data in terms of accurate transcription from sources will be controlled through the following techniques:

A series of logical edit routines will be specified to verify that each data field conforms to basic specifications in terms of size, range of values, alpha-numeric composition, coding definitions, etc.

Each data element will be cross-matched to a standard file to insure conformity.

Cross-checks and trial balances will be performed to establish numerical balancing of cross-accounts where such is feasible and indicated by the nature of the data elements under examination.

These procedures will help to insure the fidelity of CIDB data as to identity with the data obtained from source agencies. However, the CIDB will remain highly dependent on the integrity of data acquired by the sources both in terms of reliability and validity.

A crucial design objective of the CIDB, which has potential for improving upon the accuracy and precision of source data, is the reconciliation of different values for the same data element obtained from diverse sources. For example, several agencies tabulate export/import statistics from customs manifests, but the published data are often divergent. The approach of the CIDB will be twofold:

First, the different values will be listed with attribution of source. For example:

Value-Added in Manufacturing Sector, 1969	
Census	₱ 4,595 billion
NEC	5.158 billion
Average	₱ 4.876 billion

Second, an attempt will be made to combine the values into a composite measure using the mean, median, weighted average, variance, or through application of correction factors for differential measures.

Reconciliation through determination and correction for differential techniques of measurement will be the preferred procedure. Differential correction factors could include variations in sample characteristics, time-series, aggregate dimensions, estimated coefficients, data sources, etc. Where these differences can be made explicit, arithmetic correction factors will be derived, resulting in the most rational reconciliation of values. Where the source of divergence cannot be identified, a simple mean or median and measure of variance will be provided.

It is anticipated that one of the greatest contributions of the CIDB will be reconciliation of conflicting data obtained from multiple sources. This represents a major reason for the incidence of controversy over major industrial development issues. With the development of the CIDB, a single, more comprehensive value will be available for such critical data elements.

The policy of the data bank will not be to directly perform imputation or interpolation of values to substitute for missing data. Since this is a potentially hazardous and controversial practice, it has been deemed more appropriate to leave this function to the discretion of the user.

Source Data Collection

This section will present the approach and methodology of the CIDB in acquiring and digesting source data. Actual substantive selection of specific data elements for inclusion in the developmental modules is described in Section IX.

Data Conversion and Transcription (Non-Computerized Sources)

The CIDB will rely heavily upon the availability of base level data files from source agencies in computerized form. The usefulness and scope of the CIDB will be critically dependent on the progress of base level automation programs in source data agencies such as the SEC, CB, BOI, DBP, BIR, etc.

The CIDB itself will not undertake conversion and transcription of large-scale base files, exceeding 5,000 records, in user or source data agencies. Acting in an inter-agency cooperative service capacity, it would not be appropriate for the CIDB to directly execute base-level automation programs within major government agencies or to maintain massive files of detailed, confidential information for the source agencies. Nevertheless, the failure to pursue an active and vigorous base level computerization program in source agencies will severely handicap the development and utilization of the CIDB. Consequently, the CIDB staff will provide technical assistance in data conversion and appropriate techniques.

In contrast to the policy on conversion of massive detailed files, the CIDB will accept and actively develop summary aggregated extractions from manual base files, published sources and unpublished summaries. That is, the CIDB staff will work with source agencies to tabulate and probe non-computerized information sources to derive relevant data elements for inclusion in the CIDB. The basic policy will be to minimize the burden on source data agencies in making contribution to the data bank, while at the same time enlisting their active assistance. It should be emphasized that the above practices apply only to non-computerized sources.

Extraction of Data Sets from Computerized Sources

The CIDB will not directly maintain primary computerized base-level files (e.g., at the firm level) for or from source agencies. Rather, the CIDB will assume direct responsibility for periodic automated extraction of appropriate aggregate data from such base level files, while insuring adequate security measures. One-time extractions will be performed on the NCC computer system using programs developed for the CIDB to create the original CIDB data files. After such processing is completed, the base files will be returned intact to the source agencies. The CIDB will neither retain the detailed data elements from the base file nor will it internally maintain confidential information. The primary mechanism for avoidance of confidentiality will be aggregation to levels masking individual firm data in accordance with the specific guidelines and regulations provided by each source agency.

Acceptance and Processing of Updates

For extraction of aggregates from base-level files, the process will be repeated when new data is available. This will usually be on a relatively infrequent periodic basis -- annual, semestral or quarterly. Typical example would be the quinquiennial economic census or the annual survey of establishments (previously manufacturers) conducted by the Bureau of Census and Statistics. The past survey data for the previous time period will be retained in the CIDB in historical records. Thus, updating from new periodic surveys always preserves past historical data and never wipes out information on prior periods. As in the case of the original extraction, the burden of processing will be assumed by the CIDB and will not be imposed on the source agency.

Where it is appropriate to obtain direct updates from source agencies on an as-available basis, they will be accepted in the original form normally used by the source and translated by the CIDB staff for adaptation to the data bank conventions. Again, the burden of translation will not be imposed upon the source.

Adoption of Source Data for the CIDB

Implementation of the CIDB will begin with the establishment of a base core of data, obtained primarily from operational computerized base files. An evolutionary series of growth modules will be implemented in the following years using a similar approach.

Massive infusion of data into the CIDB is only feasible where computerized files have been established by the source agencies.

Selective fulfillment of information categories can also be readily achieved by the transcription and conversion of data from statistical publications, where the volume is relatively low.

This can be considered to be the "active" mode of data acquisition, in which the CIDB staff will take the initiative in finding potential sources and extracting appropriate aggregated summaries.

After this process is carried out, major information gaps in the CIDB will still remain to be filled. An innovative concept has been adopted to help achieve this objective by providing inducements to user/source agencies to contribute information to the bank.

The CIDB will establish a comprehensive file structure encompassing all the classes of information designated in the manufacturing industry model. Subsequent to establishment of the base of data, "deposits" will be accepted from user and source agencies to fill the "pigeon holes" or "cells" created by this file structure. Successful utilization of the base core will provide an incentive to users to deposit more information in order to make the results more comprehensive by expanding the range of available data elements.

A major advantage of this passive approach to data collection is that it will alleviate a major burden on the CIDB of investigating source data availability in sufficient depth and detail to warrant inclusion in the CIDB. Through this mode of data acquisition, the CIDB staff has only to check compliance with system standards, translate formats and coding, where required, and confirm the validity of the source.

Further, a "snowballing" effect can be anticipated in which the growth of the data bank will feed upon itself. Users can be expected to accelerate their contributions as the scope of available data increases, with a corresponding enhancement of the system's effectiveness in supporting economic policy making.

Identification of Data Availability Gaps

From time to time, the CIDB staff will find data availability gaps where no available source can be found to fulfill a particular class of information. Once it is firmly established that this information is not currently collected by a source agency, the staff will bring the matter before the CIDB Board of Governors for resolution. The board will first determine whether the data gap merits action for fulfillment in terms of user requirements and associated priorities. If the board decides to take corrective action, the standard procedure will be to request the appropriate source data agency(s) to conduct the required field survey(s) to fill such identified and prioritized data gaps.

Standards for CIDB Data

In order to achieve the compatibility required to consolidate industrial data from diverse sources into a coherent data bank, a standards development program must be carried out. All data items subsequently entered into the system must comply with these standards, whether implemented by the source agency directly or achieved by the CIDB through programmed translations from source to CIDB conventions. This will represent a major program to be carried out by the Inter-Agency Committee during the interim period between the end of Stage I and the initiation of Stage II implementation.

Standards should be developed for the following data characteristics:

Data Definitions -- dictionary (verbal) descriptions of each data element and its frame of reference, including data structure and indentification numbers for reference.

Coding Schemes -- to provide common, explicit codes for all qualitative data elements. Examples of some of the more crucial data elements requiring standard codes would include, but not be limited to:

- Government agencies and private organizations
- Geographic regions, provinces, urban areas and chartered cities
- Industry sectors (SIC)
- Products/commodities
- Time series

Units of Measurement -- to provide a common yardstick for quantitative data elements in terms of:

- Currency (money) values
- Quantity (weight) (bulk)
- Unit costs and prices
- Derivative measures (e.g., Value-Added)

Section X will describe the action program to be undertaken by the Inter-Agency Committee to execute compatibility and comparability studies in developing CIDB data standards.

Section VI

DATA PROCESSING CAPABILITIES SYSTEM DESIGN

PADCO

Section VI

DATA PROCESSING CAPABILITIES SYSTEM DESIGN

Introduction

The previous section described in detail the user services and functions which the CIDB will support. User services and functions are structured into six major subsystems that require ADP capabilities:

Data Directory Service

Statistical Reference Service

Analytical Tools

Quality Control

Source Data Collection

Standards

Each subsystem further divides into applications that require ADP support. The subsystems and applications appear in the left-hand column of Figure 20.

The purpose of the first half of this section is to consider ADP capabilities required by each subsystem and application. ADP capabilities are divided into four groups:

Storage and Retrieval

Computation

Communication

Source Data Collection

The capabilities that comprise each group determine the column headings of the matrix in Figure 20.

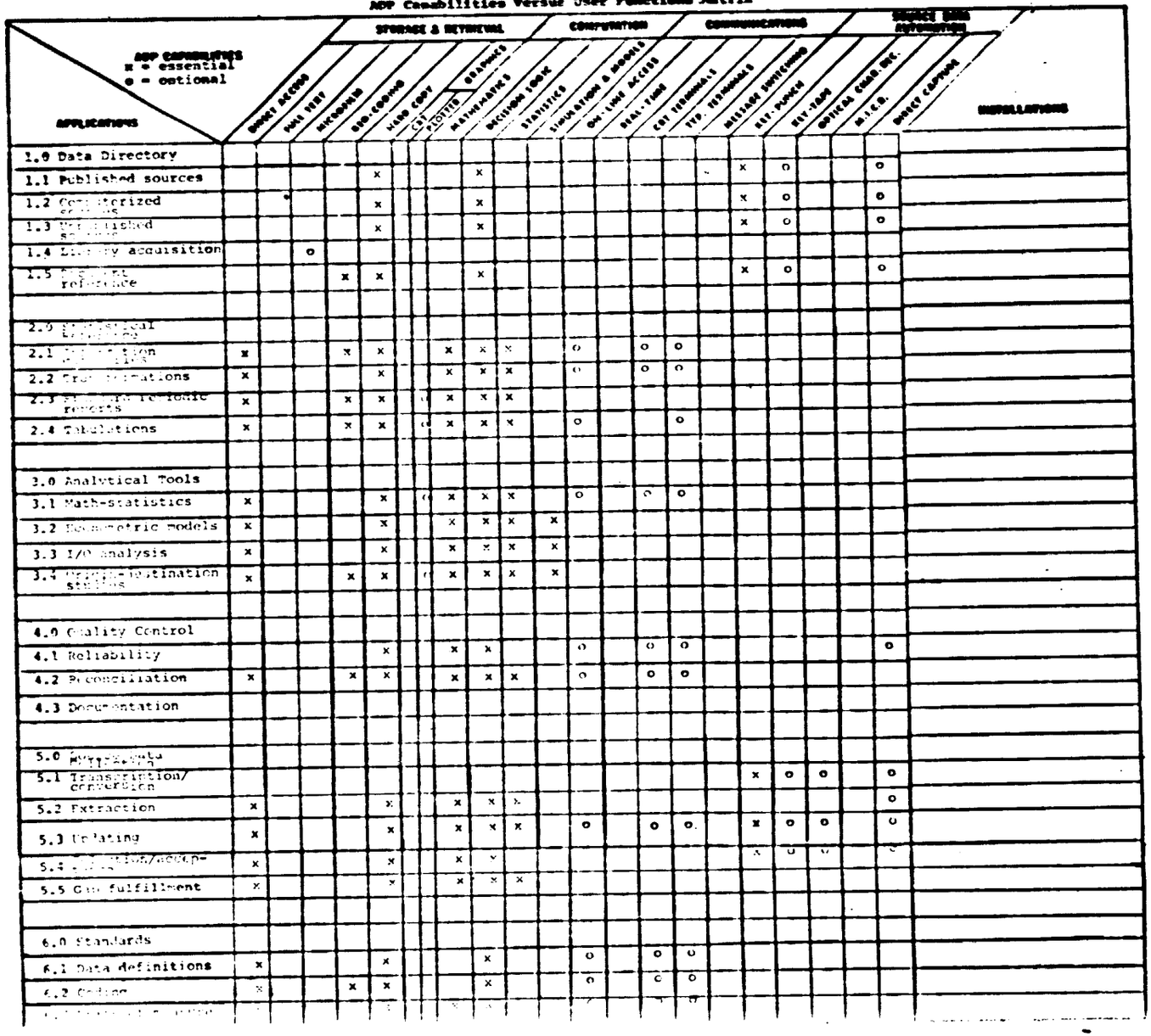
The remaining details are highly dependent on the entries in the matrix in Figure 20 and frequent reference will be made to it.

In the matrix an intersection of an ADP capability with a subsystem application is denoted as a cell. The intersections contain three types of entries:

"X" -- denotes an ADP capability that is essential to the application.

Figure 20

ADP Capabilities Versus User Functions Matrix



"O" -- denotes a desirable ADP capability for the application

Space or blank -- the ADP capability is not required in this case.

The second half of this section will construct the basic system elements that derive from the analysis of the first half.

ADP Capabilities Required for User Subsystems and Applications

Storage and Retrieval Capabilities for User Subsystems

The storage and retrieval group subdivides into six capabilities:

Direct access -- provides the quickest and most versatile access to data. Disc and drum devices are the hardware analogs to direct access storage. Sequential access method of storage and retrieval (usually magnetic tape) will be utilized where direct access is not achieved.

Full text -- uses the computer as a means to store and provide a complete reproduction of a document.

Microfilm -- implies the use of a microfilm reader and/or printer for document and data storage.

Geocoding -- the concept of coding different geograpnic regions.

Hardcopy -- means computer printout.

Graphics -- the capability of providing images and curves on a CRT screen or X-Y plotter.

Direct Access Capability for Data Directory Subsystem. Sequential access methods adequately meet the requirements of this subsystem. Specifically each directory to published sources (1.1), computerized sources (1.2), unpublished computerized sources (1.3), and document reference (1.5) will reside on magnetic tape. Updates to the directories and printings of them will be made from

tape. Library acquisition (1.5) does not require either of these ADP capabilities.

Direct Access Capabilities for the Statistical Reference Subsystem. Each application of the statistical reference subsystem will utilize direct access. Direct access will provide storage of the CIDB's data according to the information categories of the industrial model (see Section I) and affect their retrieval in terms of these categories. The categories of information require both hierarchical and associative file organizations which sequential access could not support efficiently. Execution of multikey retrievals could prove prohibitively expensive without this ADP feature. The data linkages, which transformations (2.2) necessitate, require multikey retrieval. Standard reports (2.3) and tabulations (2.4) require the direct access capability to perform data manipulation and linkage for order of presentation and tabulation purposes.

Direct Access Capability for Analytical Tools. Each of the applications of this subsystem requires direct access to data for rapid and versatile data manipulation and linkage. The tools will be sampling various combinations of data which require that data be "shuffled" in and out of the computer. The creation and compact storage of large multi-dimensional I/O and O/D tables necessitate the use of direct access.

Direct Access Capabilities for Performance Oriented Subsystems--Quality Control, Source Data Collection, Standards. In order to perform the reconciliation of different measures, the CIDB will require direct access to a limited extent. The usefulness of direct access to reconciliation is contained in its ability to easily restructure the elements of the different measurements of the same variable (for example, cost of living indexes). Direct access does not apply to reliability or documentation.

The subsystem, source data collection (5.0) requires direct access once data is past the stage of basic conversion and transcription. Conversion implies the use of sequential access devices such as magnetic tape units.

Data extraction requires manipulation and data linkage. Updating necessitates these also. In addition, updating requires this ADP capability as a means for the insertion and deletion of data in highly structured data files. Selection and acceptance of data, and identification and fulfillment of gaps require the ADP capability of direct access for the same reason.

Standards, the last of the performance-oriented subsystems, ensures the use of a data item in agreement with its definition,

its unit measure, and any encoding scheme that applies. Direct access will be effective for all three applications. The capability provides the necessary quick access to the data definition to ensure its use in the proper context. Similarly, the feature of direct access provides the means to store coding schemes and make them readily available.

Full Text and Microfilm Capability for User Subsystems. For the purposes of the CIDB, it is not anticipated that the full text capability will be required. For the majority of the user subsystems, microfilm is not applicable, with the possible exception of library acquisition in the data directory subsystem.

Geocoding for the Data Directory Subsystem. Due to the anticipated demand for analyses on a regional basis, geocoding is required to some extent by the majority of the subsystems. The document reference applications of the data directory subsystem will need geocoding to respond to requests for documents with information on a particular area or region.

Geocoding for the Statistical Reference Subsystems. Geocoding determines a means for organizing the data in the bank. "Geographic region" forms one of the dimensions to the information categories in the industrial model. The standard report and tabulation applications require the capability to organize the report format and generate tabulations on a geographic basis.

Geocoding Capability for Analytical Tools--Quality Control, Source Data Collection, and Standards. Origin-destination studies available through the analytical tools subsystem require geocoding to select and organize data.

Differences in statistics for the same variable have been found to reduce to differences in the methods of measurement in many cases. Reconciliation of differences in this sense will depend on the ADP capability of geocoding.

The standards subsystem requires a broad range of coding systems. One of these will be a geocoding system.

Hardcopy and Graphics Capability for User Subsystems and for Data Directory Subsystem. The hardcopy of each directory in this subsystem will be provided by computer printouts. Graphics capabilities will not be required by this subsystem.

Hardcopy and Graphics for the Statistical Reference and Analytical Tools Subsystems. Hardcopy capability is necessary for the CIDB to provide standard reports and tabulations in a variety of formats. Hardcopy will support the applications of the analytical tools subsystem in a similar manner, providing an efficient and effective means of communicating analysis results.

Graphics apply principally to those areas which require a more pictorial means to communicate the results of a computation. For example, a standard periodic report on population density becomes more informative and meaningful if presented in the form of a density map. Similarly, statistical distributions communicate trends in a more significant way, if they appear as curves generated by an X-Y plotter, rather than as tables on a hardcopy printout. However, it is not anticipated that the graphics packages will be as necessary to the functioning of the CIDB subsystems as hardcopy.

Hardcopy and Graphics for Performance Oriented Capabilities--Quality Control, Source Data Collection, and Standards. Graphics capabilities do not apply to these subsystems. A flexible and varied computer report format, furnished through the hardcopy capability, will be required for the reconciliation application. Hardcopy will provide reliability and backup reference by report forms which provide manual inspection of the content of the base data files which enter the data bank, and the data bank files themselves.

The hardcopy capability supports the extraction application by providing a printed record of both the extraction's results and the inputs to the extraction process. The updating application will require a transaction record which indicates the contents of a record both prior to and following updating.

The remaining applications in the source data collection subsystem and all applications in the standards subsystem require this ADP capability as a medium for distributing results (for example, data gap indication) and system reference material (for example, data definitions).

Computation Capabilities for User Subsystems

Computation covers four types:

Mathematical -- includes basic addition, subtraction, multiplication, and division; cost, logarithmic and exponentiation.

Decision logic -- includes those operations defined in boolean algebra (e.g., "and/or"

operations) and comparison (e.g., "greater than", "equal to", "less than").

Statistical -- includes calculation of means, medians, standard deviations and other statistical products.

Simulation -- implies the use of discrete and continuous simulators. Discrete simulators simulate the interaction of several largely independent variables at discrete intervals of time.

These capabilities are widely applicable to user services and functions as reflected in the concentration of "X's" opposite the user applications in this column of the matrix of Figure 20.

Computation Capabilities for the Data Directory Service. Only decision logic applies to this subsystem. The various directory applications will require the capability to categorize the data sources for presentation. It is not anticipated that the other capabilities will be required for this subsystem.

Computation Capabilities for the Statistical Reference Subsystem. The capabilities in this group, with the exception of simulation, form a battery of mechanisms that this subsystem requires to provide statistical reference services. Storage and retrieval of data within the information categories of the industrial model will depend on the mathematical and decision logic capabilities. Statistics serve to buttress these two by handling probabilistic situations.

The calculations involved in complex transformations or simple tabulations likewise require the computational capabilities of the first three elements of this group. Decision logic determines the selection of elements that enter into a transformation or tabulation. Calculations in an algebraic and statistical sense are handled by the next two capabilities. As mentioned directly above, simulations do not provide capabilities which support the applications of this subsystem.

Computation Capabilities for Analytical Tools. The services provided to the user by the analytical tools subsystem will be based in large part on the ADP computational capabilities that can be focused into a supporting role. Certain applications will enjoy an advantage because they will be performed by existing software. For example, the mathematical statistics under the analytical tool will

require the mathematics and statistics capabilities under ADP computation, and will often find computer subroutines that need only to be "plugged in" to the system. The same direct relation holds between user service or application such as econometric models, I/O and D/D models, and the ADP capability, simulation.

In order to provide a flexible system that is adaptable to a range of applications, computation capabilities will have to be available for use on an "as-needed" basis, freely usable in varied situations. For example, mathematical and statistical computer subroutines should be easily linkable to form a structure which can perform the analysis demanded by an econometric model.

Computation Capabilities for Performance Oriented Subsystems--Quality Control, Source Data Collection, and Standards. Guaranteeing the reliability of the data that enters the CIDB and maintaining it is a necessary extension to the basic process of storage and retrieval. It involves checks on the data as they enter the bank (e.g., no negative numbers for dates), and decisions on what to do with errors; in short, it requires the first three ADP capabilities of the computation group. Reconciliation, the second application in the computation subsystem, is analogous to reliability in this respect.

The ADP simulation capability does not apply to the reliability and reconciliation applications of the quality control subsystem nor to the performance oriented subsystems.

Conversion of raw data into a form that is compatible with the CIDB requires decision logic, but little if any mathematical or statistical computation. The conversions consist chiefly in passing keypunched cards to magnetic tape records that can enter the data bank after editing. Extraction, the process which integrates edited data into the CIDB, will utilize mathematical and statistical computations, and the features of decision logic. The extraction application will use these capabilities to rearrange the edited files so that aggregations or statistic operations on the input data can be done, prior to their entry into the data bank. The updating applications will likewise call upon these capabilities in order to perform simple to highly structured data additions and replacements to the central core data.

The first two capabilities of this group assist in determining what source data files or subfiles should be assimilated by the data bank. They also help determine the "filter" through which the data will pass to enter the data bank (i.e., the nature of extractions that can and/or should be performed on the file).

The data gap application requires decision logic capabilities. Statistical computation serves to indicate "the size of the gap"

(e.g., the validity of results of computations based upon limited data or sample size). Mathematical computation capabilities will be required for actual fulfillment of the gap with adequate data.

The application of standards throughout the data system ensures the use of a datum in agreement with its definition and unit of measure. The capability of decision logic will ensure exact and consistent data usage throughout the CIDB. This includes attempts at translating encoded data items to natural language or matching elements from two or more different coding schemes. Such operations will be requested by the coding applications of this subsystem. A problem such as currency conversion illustrates the involvement of all three standards applications in the functioning of the system and the ADP capabilities that can be brought to bear. A data definition service ensures the proper use of the item at the time of processing. A coding system which provides the different equivalent currency rates over long periods of time further assists proper usage. The application of proper units of measure through mathematical computation and decision logic capabilities further lessens the possibility of error in data item usage.

Communications Capabilities for User Subsystems

The entries in this group of ADP capabilities could prove useful to the functioning of the CIDB, but are not essential. On-line access during times of national emergency would facilitate processing when standard communication channels have been cut, as during the recent flood disaster. However, the determination of 24 hours as the minimum necessary turnaround time for handling user request (see Section V) does not necessitate the implementation of this relatively complex and expensive ADP feature for the CIDB.

During stages of system implementation and initial full-scale operation, the "torn tape" method could serve as an efficient compromise to on-line processing. The "torn tape" concept utilizes the teletype as a medium for user-requests and data transmission. The user feeds his request to the system via an off-line teletype. The request appears at the ADP center on a paper tape which is processed in the batch mode. The user would be limited to transmitting small volume reports.

Results can be punched on paper tape by the system and transmitted "off-line" back to the user, via teletype (or printed at the center and delivered at a later time). The method could be useful to a number of users under various situations, not limited to those deriving from national emergencies. For example, the method would provide speedy access to a user who had a teletype and who was familiar with CIDB's functioning and capabilities.

Source Data Collection Capabilities for User Subsystems

Keypunch is the standard and most available means of data entry for the majority of situations. Key-tape and optical character readers provide significant advantages to the keypunched card. However, they bring additional initial costs due to the sophistication of the equipment. It is anticipated that keypunch will be used to supply information to the system so that it can generate directories of data sources and files. Data conversion and updating will be done in large part through keypunched entries. If key-tape and OCR are available, they will be used instead because of their resulting faster and more efficient throughput.

Data captured and stored in computerized files by source agencies will be capitalized upon through automated extractions, thus requiring no further data conversion (keypunch). For example, data generated at the BCS to produce the annual survey of manufacturers will be used in the CIDB as information on manufacturing industry in the Philippines. Likewise, investment studies and government registration of corporations generate data that should be captured for the CIDB's purposes. At the same time that this ADP capability serves to augment the data bank's mathematical-statistical data supply, it should also include reference to data sources for the various directories that the CIDB will publish. (For example, government and private publications should be monitored and examined for possible inclusion in the directories as sources of industrial economic data.)

General Characteristics of the CIDB-ADP Capabilities

The first half of this section delineated the ADP capabilities required to support the user subsystems and functions. This subsection examines the patterns established by that analysis.

The data files that will be generated are described in terms of media, volume and organization. The method by which the user communicates with the CIDB system, and specific data computations and transformations will also be described.

Storage -- Media and Volume

The data files for the CIDB will reside on disc storage units to provide rapid access. Auxiliary files will reside on magnetic tape. One disc pack should contain the data files during the initial implementation period. One tape reel will contain information for the data directory service subsystem.

Direct Access Data Base Information Structure -- Methodology. The industrial model of Section IV and the user requirements of Section I have determined information categories which the data base of the CIDB should support. These categories in combination with the results of the source data survey lead to the following guidelines for establishing the structure of the data base:

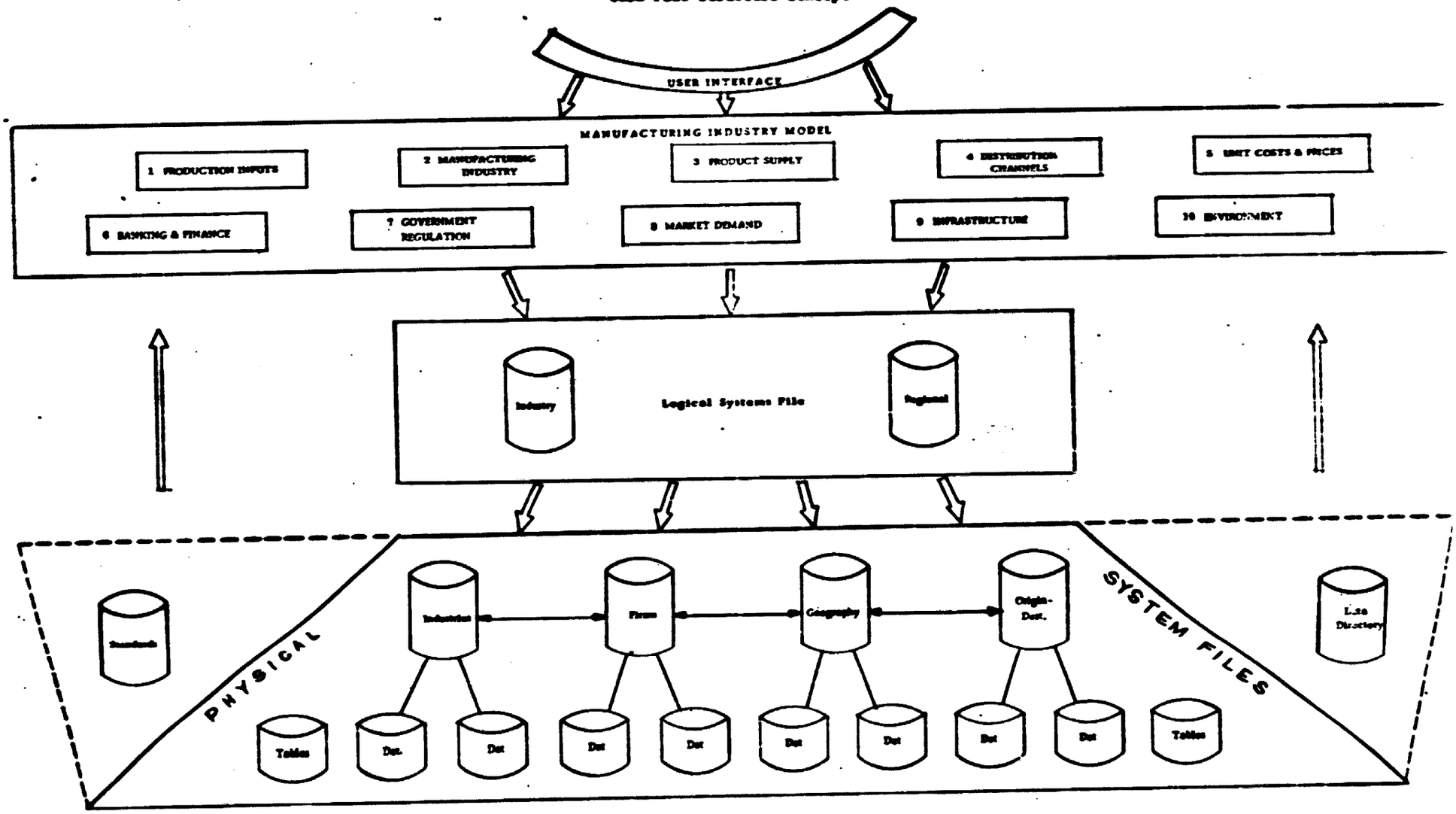
> The data base must provide a level of data aggregation that is consistent with confidentiality restrictions.
>
> The information structures should be limited to a number that is easily referenced, manipulated, and updated. At the same time they should be numerous enough to provide adequate information space for each of the categories of the industrial model.
>
> The entities or common denominators that determine the information structures must provide aggregations that will prove to be useful in the long term. At the same time they should be initially oriented to the data that is available for short term build up.
>
> The levels of aggregation must be low enough to enable flexible and detailed analysis on a geographic and/or industrial sector basis.
>
> For data to become a part of the CIDB system, it must be formatable or structureable into a statistical data set. For example, regional population figures meet this criterion. Manufacturing corporation addresses do also, as they have a definite maximum length. Documentary type data that is open-ended (e.g., actual legislative text) would not, however, meet this criterion. It could be structured to meet the criterion, if the text could be referred to by a code, such as an RA number.

CIDB File Structure. With these criteria as guidelines, a unique CIDB file structure has been developed as illustrated in Figure 21.

The CIDB file structure links the application-oriented analyst to the system without necessitating a detailed knowledge of the physical organization of the computer files. The information

Figure 21

CIDB File Structure Concept



categories of the industrial model form the portion of the interface which relate the data bank's information coverage and capabilities to the user on the highest and broadest level.

The next step in the interface between the user and the physical data consists of a logical file system. The logical systems file is composed of the industry file and the regional file. Both of these are conceptual conveniences which translate the information categories into a manageable number of physical data files. Each logical file provides a means to structure the data which pertain to the information categories into a small number of physical files.

The industry file corresponds to two primary physical files: 1) the industries file; and 2) the firms file. The industries file contains data about each industry in the Philippines, industry identification by four-digit SIC code. Identification of principal products and foreign exchange allocation are examples of entries in this file. The firms file will provide data on the manufacturers of the Philippines. Firm name and location and industrial identification, through a four-digit SIC code are examples of data in this physical file.

The regional file also corresponds to two primary physical files: the geography file and the origin-destination file. The former will contain industrial data on a province or chartered city level. Information on the province, such as population and climate, will also be included. The origin-destination file will contain data that describes the economic-industrial interchange between provinces, between regions and between the Philippines and other nations.

The data records are structured into two types of fields: 1) fixed; and 2) periodic. The fixed fields contain unique data sets, such as a province's name. Periodic data sets develop as a series of changing values, such as an employee's salary, seniority, grade and job title.

The physical file system includes supporting files which provide direct access directory information (this is described in retrieval), translation and correspondence tables, and standards information in terms of data definitions and format.

The organization of the firm's file differs distinctly from that of the other two. The firm's file should appear in sequential order according to a coding scheme for identifying the firms, or the alphabetical order according to name.

Both the geographic and industries files can be organized according to a coding scheme. Each file can use the coding scheme to translate to record addresses for direct access. A qualification

is made to this scheme in order to avoid wasted space. Many provinces may have little if any significant manufacturing. The allotment of an equal amount of data space to these provinces should be avoided.

A cellular partition storage method guarantees granting storage space on the basis of merit. Instead of an industry or province code translating to a particular record, it will translate to a cell of records. The cell will consist of either sequentially or threaded list-structured record storage. The records in the cell can be queried until the desired record is located or the cell is exhausted. This approach limits the storage management data directory problems to a minimum level. The method is simple enough to allow "normal" or ad hoc space management in the initial stages. Later, complicated space management routines can replace "normal" procedures.

Retrieval

The system will be capable of performing multikey logical and arithmetic function retrievals. The user will be able to retrieve data record(s) from multiple files by specifying desired ranges of value(s). The user can specify logical, arithmetic, or threshold operations that qualify the retrievals. For example, given keys A and B, such that A and B correspond to different attributes and take on value(s) such as a and b (respectively where either can represent a set or range), the user will be able to request the following types of retrieval:

Logical -- all records that contain:

A equal to a

B equal to b

A equal to a and B equal to b

A equal to a or B equal to b

A equal to a but B not equal to b etc.

Arithmetic -- all records that contain:

A such that the value of A is greater than a specified minimum, a (or less than a specified maximum, a).

A such that A's value is greater than (less than or equal to) the average A

Threshold -- all records that contain:

A equal to a and a appears in m out of n records

Weighted threshold

Figure 22

Examples of Data Item Dictionary Entries

Data Item	: Employment
Key Word Description	: Production Worker Employment
Textual Description	: Quarterly Measure in Thousands of Production Level Employment by Industry and by Province
Files Containing	: Ind File 1, Geo File 1
•	
•	
•	
Data Item Code	: Machinery
Key Word Description	: Manufacturing Machinery Value
Textual Description	: Peso Value of Manufacturing Machinery by Industry
Files Containing	: Ind File 1 (with table "Peso-Dollar 1")
•	
•	
•	

DATA ITEM DICTIONARY, SAMPLE ENTRY

Data File Code	: Firms File 1
Title	: Philippine Manufacturing Firms
Description	: Fixed and Periodic Data on Philippine Manufacturing Firms
Data Items	: Firm Code, Firm Name Address, Province Products, Raw Materials
Information Source	: Department of Commerce and Industry Registry, Securities and Exchange Commission Registry, BCS Annual Survey of Manufacturers

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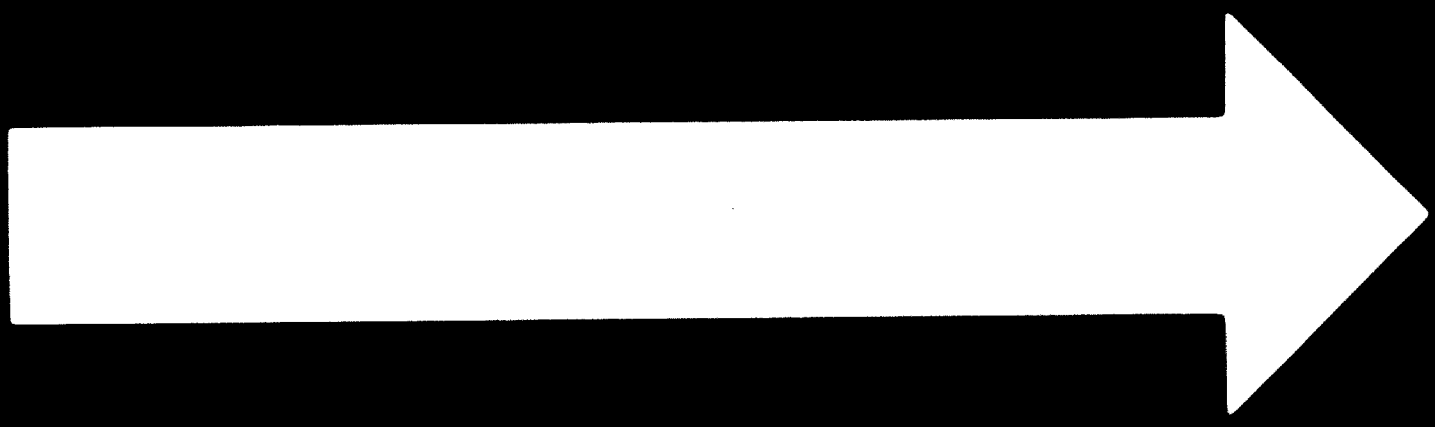
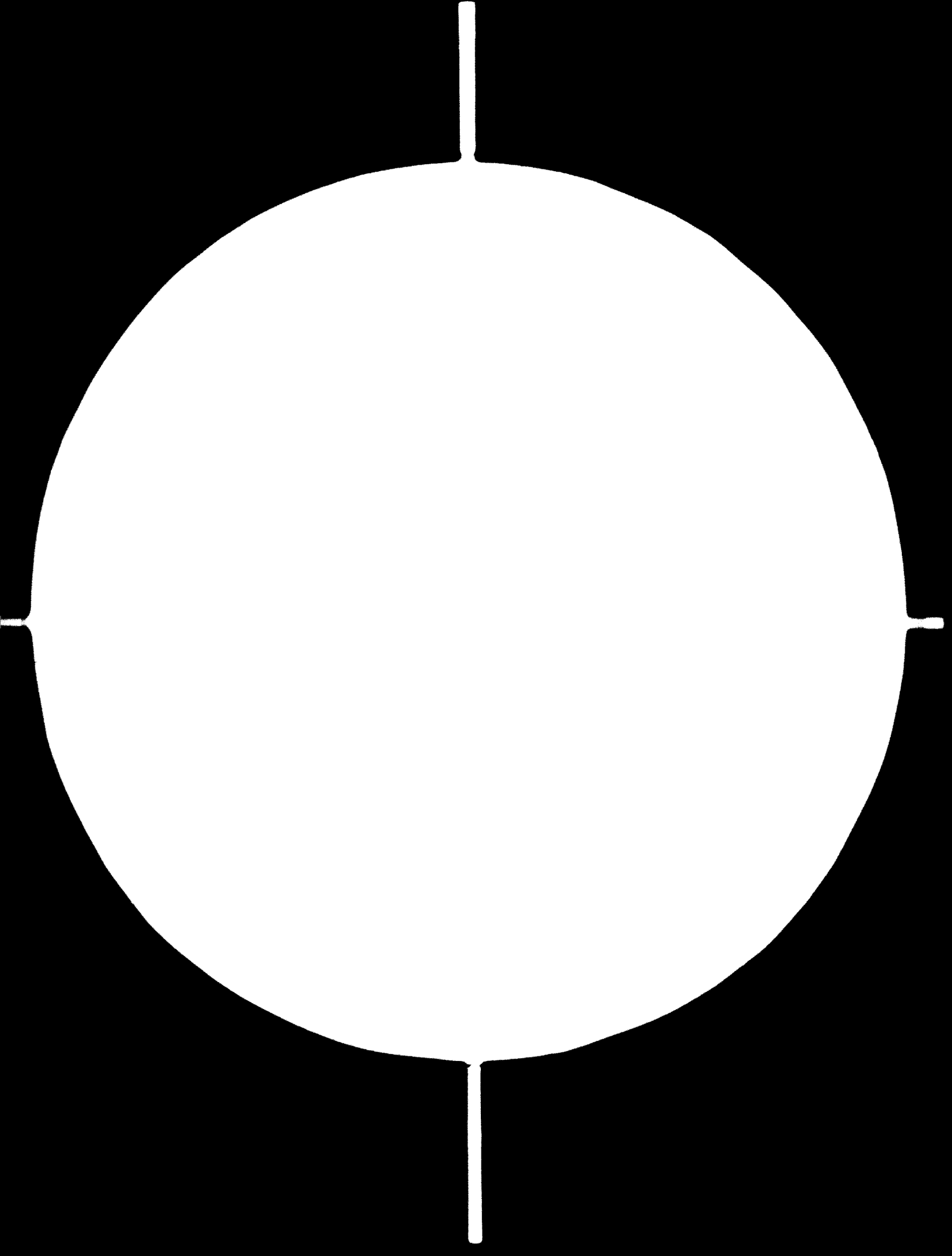
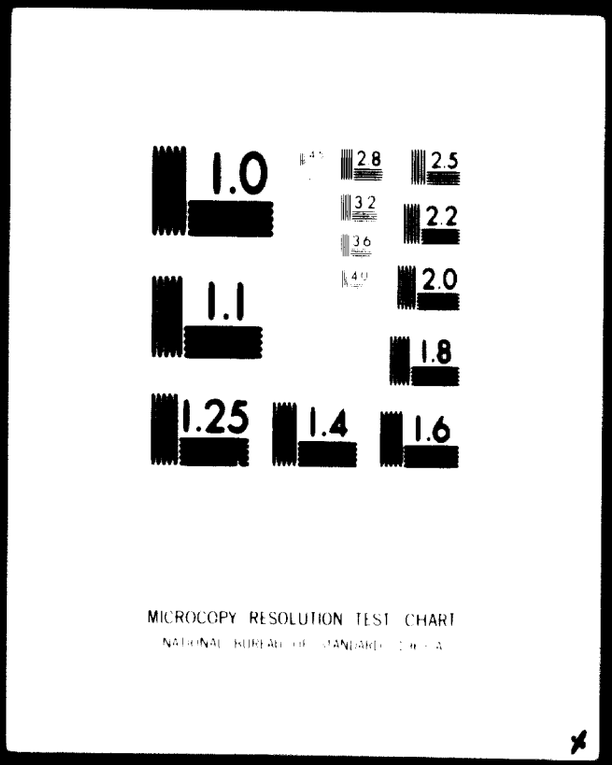


81.08.24





The retrieval request should be able to incorporate combinations from the three different groups. The last (threshold) defines implicitly a special service which the system will provide. This is pre-process retrieval statistics. Before a user decides to actually run a process, he should have before him the number of records that will contain the information he needs. Along these lines, the system will provide warnings under such circumstances as a retrieval request which contains all negated keys.

Method -- The Direct Access Data Directory. The direct access data directory consists of two parts. The first will be data item descriptive. The second will reference data files. The data item directory will describe all disc storage resident data items in the CIDB. The directory will contain the following information:

CIDB code for the data item.

Data item KWIC description.

Data item "free text" description.

List of subfiles in which the item appears.

Codes or translation tables which apply to the data item. (These tables decode the values of a data item to natural language equivalents.)

Correspondence tables for the item. These tables provide transformations from one coding system to another.

The data file directory will describe the direct access files in terms of:

CIDB code

Data file description in KWIC format

Each KWIC element serves as a key to the user-analyst in searching for data that is pertinent to his application. An example of a data item catalog appears in Figure 23.

Once the user has located data items and data files pertinent to his application and specifies its retrieval, the direct access data directory will assist in the retrieval of the data. Figure 24 illustrates the way in which the user request is expressed through a data retrieval form.

Figure 23

Example of a Data Item Catalog

Data Item Code	Data Item Description	Data File Code
.	.	.
.	.	.
.	.	.
Machinery	Machinery Value/Manufacturing	Ind File 1
.	.	.
.	.	.
.	.	.
Machinery	Manufacturing Machinery Value	Ind File 1
.	.	.
.	.	.
.	.	.
Machinery	Value/Manufacturing Machinery	Ind File 1
.	.	.
.	.	.
.	.	.

Standard User Form. Figure 24 illustrates the method that will be used to communicate requests to the CIDB system. The sections of the form provide a means to specify data retrieval, manipulation, computation, and report format. The capabilities of the CIDB will require that more complex forms be developed to handle applications involving complex analyses and customized reports.

Output

The variety of reports available through the use of the CIDB can be classified into three types:

> Tables -- consisting of a title and a matrix of two dimensions (column and row headings with corresponding values).
>
> Continuous graphs and bar charts (histograms) -- graphs appear in continuous line form as from X-Y plotters, or approximated -- continuous using the computer printer. Histograms show rank type data and are generated on the computer printer.
>
> Maps -- conformant and lowtone of practically any size can be generated on the computer printer.

Tables. The system should make a range of table types available to the user. The user should be able to specify a title of at least three printed lines with any desired content. Page numbering should be available on at least two levels (for section within division).

The user should be allowed to specify entities to which a report page can correspond, in addition to the title option. These entities may be time periods, a geographic region, or other variables of classification and aggregation. The user will be able to specify as many columns or rows as his report needs. This freedom should extend to the column and row heading title content, and the positions of these headings on the report page. At the same time that the system presents a broad spectrum of report options to the resourceful user, it should also provide good, standard "fall backs" for the user who needs a simple report quickly. For example, single level page numbering will be automatically provided unless otherwise specified.

Report generation should include the ability to generate summary statistics such as subtotals and totals (on various levels), frequency counts, standard deviations, and averages, in addition to the basic report data. It should also be capable of supressing the basic report data and producing reports consisting only of the summary statistics. Figure 25 contains two hypothetical table

Figure 24

Illustration of User-Oriented Form for Data Retrieval

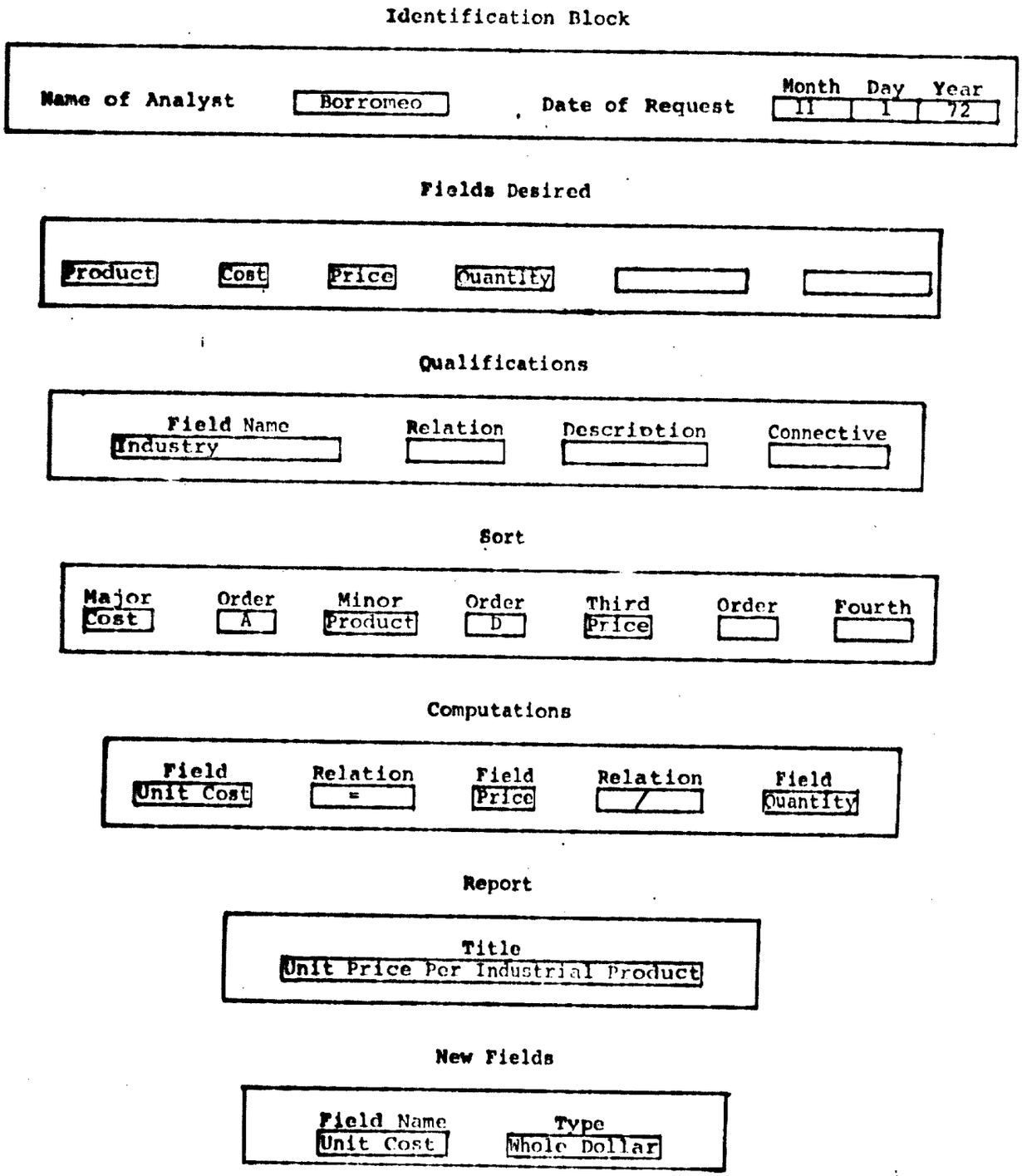
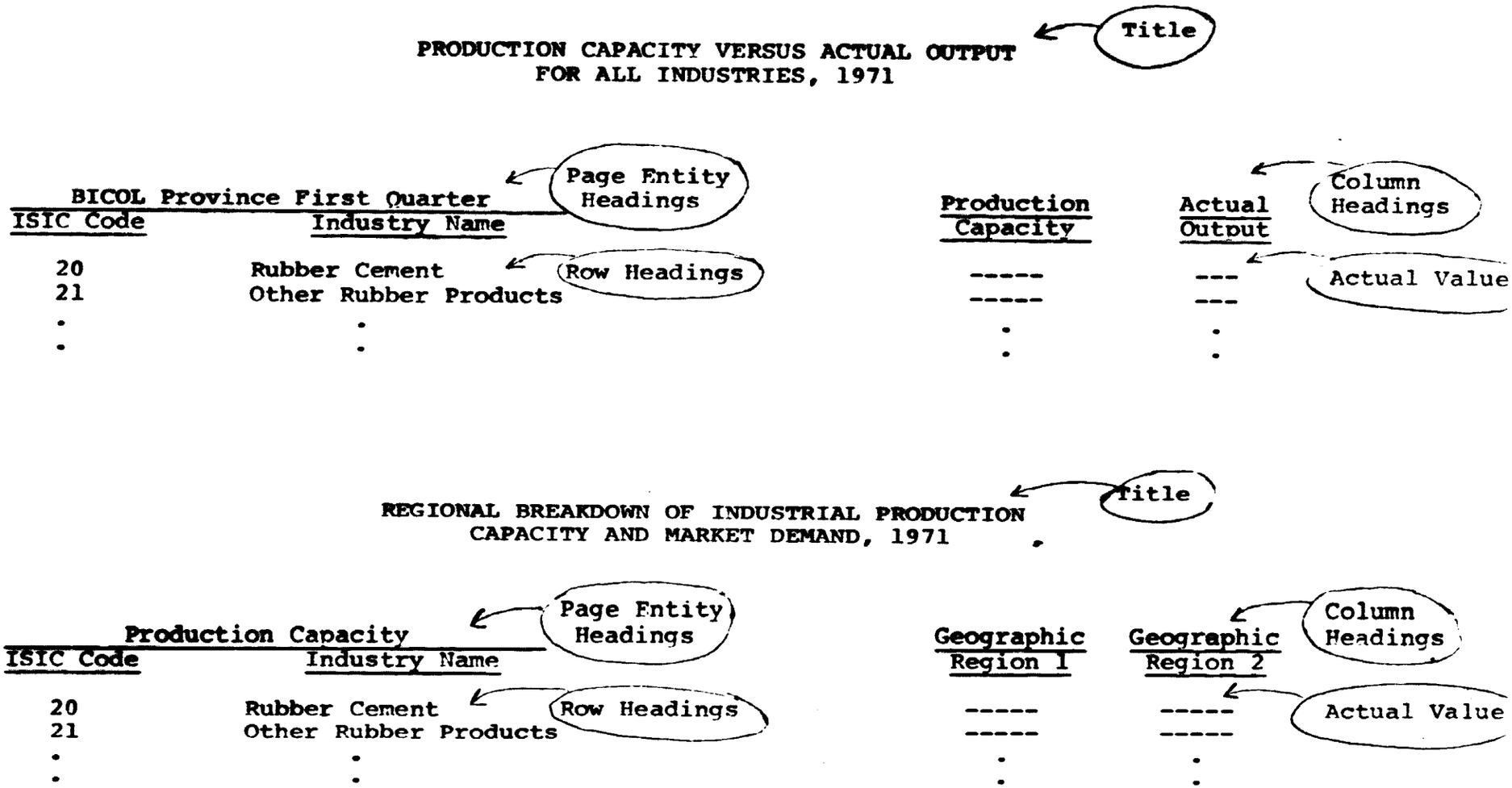


Figure 25

Sample Standard Reports



report examples which illustrate in pictorial form the capabilities that should be available.

Graphs and Bar-Charts (Histograms). The plotting of data using a continuous curve will appeal to a number of users, serving to supplement and elaborate table type data.

Histograms serve as an alternative to continuous plotting, especially when one is dealing with ranked order dimensions common to economic data. As in table type reports, the title, row and column headings should be flexible with automatic "fall back" values to aid the novice user. A hypothetical example of each of these report types appears in Figure 26.

Mapping. Conformant and contour mappings communicate results in pictorial from. The SYMAP package which was developed at Harvard University has been installed on a variety of computers (Univac, CDC, and IBM). It has been implemented as a functioning part of the CIDUL system in Rio de Janeiro, Brazil for the Ministry of the Interior. The package is in the FORTRAN language and requires approximately 200,000 bytes to run at an efficient rate. It requires a printing device which is equipped with the "overprint" feature (that is, the printer can print on one line a number of times before advancing to the next line).

Data Manipulation, Computation and Transformation

Data Manipulation. In addition to specifying simple retrieval of data, the system should provide a means to rearrange and combine the data elements. That is, the system should provide sort and merge capabilities.

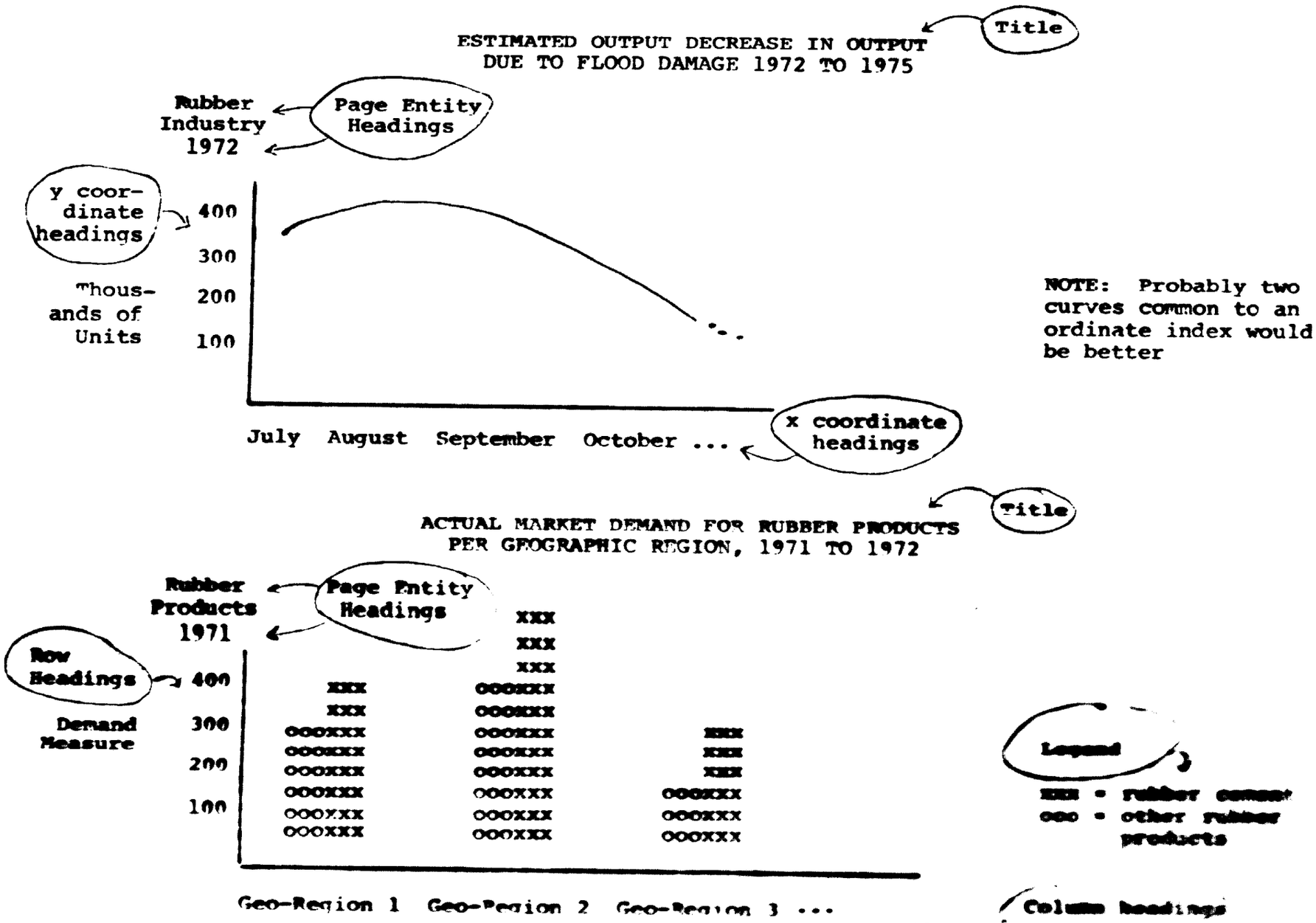
The suggested user request form would allow the user to make these sort-merge specifications. The form requires that the user supply identification of the files which are to be sorted or merged and the fields which determine the sort. An additional specification allows an ascending or descending sort order.

Data Computation and Transformation. A feature of the CIDB will be the capability to calculate new data items from existing data. A range of computational tools will allow the user to perform a variety of data transformations. The "computations" section of the standard form in Figure 24 provides for the specification of calculations.

The system will make available the following computational capabilities to the user:

Figure 26

Sample Graphic Outputs



Basic mathematics -- simple and cumulative addition, multiplication, subtraction, or division. Many-level parenthetical qualification or grouping should be supported.

Conditional logic -- a conditional logic system composed of elements such as "greater than", "less than", "equal to" comparisons, with "and/or" qualification in "if ...., then ...." type statements should be available.

Simple statistics -- these statistics should include summation, calculation of a mean and median, standard deviation, and frequency (or tally).

Mathematics -- this should include root calculations, logarithms, and exponentiations. Also matrix operations, simple transpositions and inversions should be available.

Statistics -- multiple regressions, calculation of least squares, correlations, trend analysis and forecasting, etc. should all be available.

Simulation and model building -- the range of tools in this area available at the CIDB should vary from multidimensional I/O table building to complex dynamic simulators. The user should be able to process his data according to economic models. Given the availability of I/O table generation and simulation software, these can be expected to precede the appearance of economic model processing where corresponding programming for the latter does not yet exist.

Communication

ADP capability considerations in the first part of this section matched with user needs and requirements led to the conclusion that on-line communication with the system will not be required in initial stages of system development. In addition, the position was taken that employment of the "torn-tape" concept would serve as a compromise in those situations where on-line processing appeared desirable. However, for the long term, and in light of improvements in available on-line software and hardware, the following qualifications are stated:

> It is not foreseen that CIDB processing could justify the installation of a terminal-type

(CRT, teletype) device for on-line access. However, given the existence of such a connection one could then justify the utilization of programmer, analyst and machine time to implement an on-line linkage to the user-analyst using the device.

The intent is to maximize utilization of the terminal and CIDB system.

Source Data Automation

Keypunch and key tape will be the means for source data automation in the early stages of system implementation. The level of source data automation directly maintained or supported by the CDIB will not be high. The policy stated in Section V limits it to transcription and conversion of 5,000 records. Further, the first four most available files already appear in magnetic tape medium.

The absence of any major obstacle on the near horizon should not obscure what appears as a very serious problem to the later stages of CIDB operation. Source data analysis revealed a number of "potentially computerizeable" files. Some of these are already being transcribed to computer media. However, the amount of transcription involved will delay their availability to the CIDB beyond a time when they could be most effectively used. Other "potentials" will stay in the non-computer state because a powerful source data automation method is lacking. Because of the importance and potential use of this data, it is urged that the possibility of using an optical character reader (OCR) for source data collection be considered.

If a number of data collection agencies were to agree upon the method of source data collection suggested by the employment of an OCR, it would substantially advance the time in which data could be included in the CIDB by as much as one to three years.

[redacted]

Section VII

[redacted] COMPUTER SYSTEM DESIGN

Section VII

SUPPORTING COMPUTER SYSTEM DESIGN

Statement of NCC Capacity

In the Fall of 1972 a FACOM 230 model 45 digital computer will be installed at the National Computer Center. The NCC system will consist of two central processors. Each processor contains 256,000 bytes of executable memory. Each processor is connected to an array of disk and magnetic tape units. Each disk pack has a capacity of approximately 29 million bytes. There are ten disk drives per disc unit. The new computer system will support seven and nine track magnetic tape units. Each disc and tape unit is connected to both central processing units (CPU).

The FACOM 230 model 45 computer will be equipped with card reader/punch units, consoles, printers, an X-Y plotter, a paper tape punch unit, and terminals such as teletypes and cathode ray tube (CRT) devices. An advanced operating system supports virtual memory through the "roll-in, roll-out" feature using magnetic drum storage.

The NCC's computer system can service the CIDB's requirements for computer processing without significantly affecting normal NCC processing. It is not anticipated that CIDB applications will require more than 256,000 bytes of core storage. The operating system of the FACOM will provide necessary scheduling of CIDB requests into the job stream on a priority basis. This will permit the CIDB to meet its 24-hour turnaround requirement and will minimize interruption to the normal computer job processing stream.

The NCC's new computer system supplies adequate storage space for CIDB programs and data. The FACOM system devotes one disc pack for the storage of the operating system, utility programs and problem programs. There will be adequate space on this disc for all NCC and CIDB programs.

Magnetic Storage and Peripheral Requirements

Disc Storage

The CIDB direct access data files will reside on one disc pack during the initial stages. During the implementation of module III,

the CIRB will require three disc packs. These packs will be mounted only during the execution of CIRB programs. Since each computer is connected to a total of 16 disc drives, it is not anticipated that these requirements will interfere with normal ADP processing.

Magnetic Tape Storage

The CIRB will require from one to three magnetic tape units to perform extractions from computerized base data files. Updating the file for the data directory service will require two tape units. Testing and execution of each of these functions will require a limited amount of work space on a disc device to perform sorts, merges and consolidations.

From 10 to 20 reels of computer tape should be available for storage and program testing for the initial period of implementation.

Peripheral Units

The CIRB computer programs will require the use of peripheral units (card reader punch, X-Y plotter, facsimile unit, printer, paper tape reader punch, terminal devices) for entering program control parameters and printing results. Several agencies and departments will require supporting terminals from the ADP computer system for general applications. The CIRB should take advantage of these to be links to provide services to these agencies through use of the "born tape" concept, which was explained in the previous section.

Software Requirements -- Subsystem Functions

In figure 27 the ADP capabilities selected in Section VI are shown grouped into computer subsystems. The following sequence of ADP groups is used in the figure to distinguish the general application area of each computer subsystem.

Storage

Retrieval

Computation

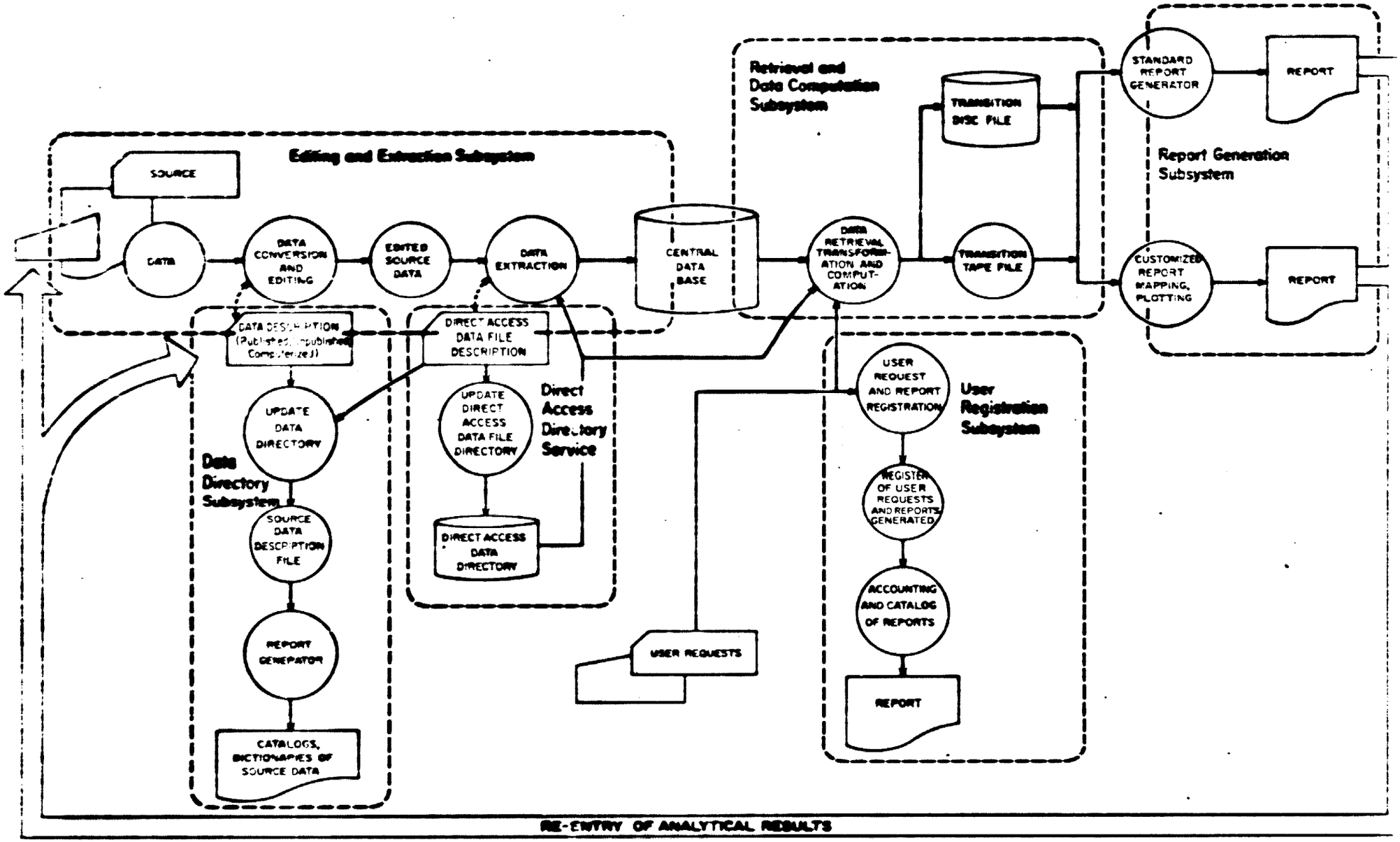
Output

Source data enter the computer system through a conversion, edit and correction process. At the same time that source data enter this subsystem, a reference to it enters the data directory subsystem. This subsystem is directly below the edit and correction subsystem in the figure.

PAGE

Figure 27

Required Software Computer Subsystem



The data that resides on direct access in the CIDB is documented in the direct access data directory. Any retrieval of data must use this directory. Retrieval and computation are combined into one subsystem. The cycle defined by the flow of the diagram ends (and begins again) with the report generation subsystem. The broad arrow of the figure connects the results of analysis to the input and data directory subsystems for further use in the CIDB computer system.

General Routines Applicable Throughout the System

The majority of computer subsystems just described contain many common requirements. For example, each subsystem requires a means of interpreting and passing parameters. These elements will be considered before treating the software requirements which are specific to the separate subsystems.

System Monitor

A central system executive will be required to govern the flow of any process involving the subsystems. The system monitor basically performs a task identification function. A similar process on a minor scale should appear in each subsystem as subsystem monitors. The system and subsystem monitors will enable and disable programs, attach them or disattach them to jobs. In general, they will maintain an orderly flow of processing. This programming should be done in a high-level language.

Search Routines

Various subsystems will search through data base and reference files for specific records. Specific routines that accept type-of-search, and search key values, perform the search and communicate the location of the desired record will be necessary.

One routine should determine the type of search, whether it is on a list structured file, on a sequential or randomized basis. Another routine locates the start of search area.

A third routine retrieves the record indicated by the key value submitted to the search routine package. This programming should be done with a combination of high-level/assembler-level languages. FORTRAN should be used for list searches. Randomizing translations that require bit extractions should be done in assembler.

Sort/Merge Routines

Sorting and merging of data records will enter into most application processing, given the expected number of aggregative functions that will be requested of the bank. Programs will connect the specific request to the sort-merge package. The process involves locating the files and communicating the file and intra-record field addresses to the sort-merge package. A sort package that is adequate to the file size will be called into core storage to perform the sort. After the sort, the routine communicates the location of the sorted and merged file.

Job Identification

A program should be acquired to identify applications (test or production runs). It should record the purpose of the job, the date, time, length of run, and identify who requested it. This should apply not only to CIDB user requests, but to the generation of standard reports, data reference catalogs, and extractions from data base files. The results of this registration will be used for accounting and to determine system performance.

File Safeguard and File Dump Routines

Safeguarding file integrity is used in a "static" sense here in contrast to a "dynamic" type of safeguarding routine, which will be discussed under data storage and retrieval in this section.

At the end of each week, a standard utility program should save the most recent data base and program files on tape. This should be done for at least three generations of data and programs. Should something go wrong (for example, a fault during compression of the stored program file), a utility program should be capable of immediately restoring the file to the previous week's status. The programmers would take over recovery procedures from that point. Utility programs which perform this function are usually available as part of the computer system repertoire.

Translation and Correspondence Routines

Since various data will be stored in a coded form, the system will need a translation device for decoding to natural language. A basic technique of "table look-up based on binary value" should be employed during initial program development. When this technique does not apply, the binary search of elements stored in monotonic increasing or decreasing order should be substituted. With increased processing loads and correspondent program sophistication,

translation table forms should take on multi-level tree structures for compact storage and quicker access to the translation.

If the option to provide correspondences between different coding systems is taken, basically the same programming as translation is needed. Translation usually involves a binary equivalence on a one-to-one basis. Correspondences often involve many different coding systems with many-to-one and one-to-many equivalences (for example, a code for one product in one coding system may correspond to a set of five in another).

The advantage of the correspondence table feature lies in making recoding unnecessary for files which do not use standard code. The disadvantage is an increased programming effort.

Data Directory and Storage Routines

Data Directory (or Reference)

Insertions should be done in batch mode, first checking for correctness of format of entries. A sort of the new entries to ease their insertion in the sequential file may or may not be justified. It may prove more economical, in terms of programming and process time, to demand that entries appear in proper order ready for insertion.

A routine will be needed to extract the key word description and rotate it until all the key words are given exposure. The output of this extraction and rotation process forms the input to a sort. A sort is performed on each rotated key. The output of the sort feeds to a print routine. The print routine is specific to this function of printing catalog data and will require a special program. An example of the end product, a data item catalog, is given in the last section.

This system should be programmed in a high level language for all phases, except for the key rotation. COBOL is called for in the print routines. The FACOM 230 model 20 at the NCC already maintains, as part of the available software, a limited version of a reference system that is oriented toward documents. A more powerful package was said to accompany the 230 model 45. If the package can be used, it should be implemented in lieu of developing software.

Editing, Extraction and Updating

Editing and extraction are characterized by "ad hoc" programming. The reason is that as many different input structures (and

errors) are possible as there are input files. Standard routines and techniques for handling and checking errors will be developed, but the programming can be expected to remain for the most part "file specific". One routine that will be standard to all extractions is that which loads the data physically onto the disc. It will use the description of the file which appears in the direct access data directory (DADD). The process of using the directory for this purpose is described in more detail and in the context of DADD functioning in the next subsection.

The safeguards that apply to updating relate to the capability of providing a "warm start" recovery from errors caused by system failure. The mechanism for accomplishing this involves keeping a complete record of the update as it occurs in the form of a transaction file. The transaction file is thrown out only after the update is complete. If anything goes wrong during the update, the file is used to restore the data file to its original state.

Retrieval and Data Transformation

Data Directory Subsystem

The arrow connecting this subsystem to the extraction processing in Figure 28 shows one of the supporting roles of the direct access data directory subsystem. The DADD helps ensure the proper insertion of the data directory subsystem. The last phase of extraction will be to put the data on disc using the format specification for the extracted file in the data directory. The file is inserted in positions also specified by the DADD.

No data are retrieved for transformation processing without the use of the data directory. Any update to a designated file is accomplished only through a reference to the DADD.

None of these connections involves programs of the data directory subsystem. Each connection comes from the requesting subsystem. The DADD subsystem programs accomplish updates to entries of the data item and data file descriptions within the DADD files. This update should be a two-step process: The first step edits the entries for errors such as improper order, etc; the second step performs the insertion or deletion of a data item and/or file description.

Retrieval

Utilization of generalized search routines form the body of retrieval routines. The connection of the routines to the DADD and subsequently the actual data files constitute the principal programming task. However, one special feature of retrieval needs

to be specified here. While data will be stored at the four-digit ISIC (or PSIC) code, facilities for retrieval at a three-digit, two-digit, or one-digit level will be furnished. This implies an "aggregated retrieval" feature. This could be relegated to transformation processing (as taking a sum over a set of values). However, in consideration of users' interest in the option, expressed by the frequent need for analysis at a two-digit or three-digit level, the feature should properly be a part of retrieval. The program to do this consists basically of a simple iterative summation. A high level language (FORTRAN or COBOL) should be used for programming this subsystem.

Data Transformation

This subsystem interprets commands that specify computation. It implies a set of programs to check the correctness of the commands and the specified data arguments. For example, taking the square root of a negative number will be considered illegal in most cases. These programs must also ensure that the commands form an executable sequence of operations.

The basic structure for this processing involves linking system subroutines to operate on retrieval data arguments.

Output

The final subsystem in the cycle of Figure 28 prints a report resulting from the retrieval and transformation processes. The production of a report should be considered as the printing of successive whole records.. Each report type essentially provides a distinct method for printing the whole record.

The programs that generate the title, column and row headings, and print the data, may have to be developed in order to provide a level of report generation acceptable to the analyst. If they are, COBOL should be used. The simple summary statistics that were specified are well within the capabilities of this language. Formatting problems are more easily solved in this language than others.

FACOM supplies plotting routine for the X-Y plotter. SYMAP, the mapping package, was discussed earlier. The main programming problem for these involves linking the plot or map data to the packages.

Existing Software

Throughout this section there appears the possibility of using available software packages. These reduce programming time by precluding "reinvention of the wheel". It is suggested that a study be conducted in the initial phase of implementation to search out and evaluate likely software modules that could be of use to the system on an immediate basis.

Computer Time Estimates

During the initial stages, four hours of block time per day between Monday and Friday should prove sufficient for program testing. This includes standard subsystem development as well as development and testing of "ad hoc" programs for edit, extraction, and computation.

An additional eight hours of weekend time should be available for data editing and extraction production runs.

These estimates must be tempered with qualifications. The amount of computer time that the implementation calls for may fluctuate close to deadline dates or production run dates. During these times a 50 percent error margin should be allowed.

Section VIII

ORGANIZATION, STAFFING AND ADMINISTRATION

PADCO

Section VIII

ORGANIZATION, STAFFING AND ADMINISTRATION

Organization

The descriptions of user requirements and system capabilities of the CIDB suggest an organization structured to service three major areas. These are:

Economic Analysis

System Implementation

Data Acquisition

Figure 28 shows how distinct and independent units corresponding to each area would be administered by an executive director and ADP coordinator. This structure will provide adequate coverage for all major aspects of implementation and operation of the CIDB.

During the initial period of implementation one person will fill the position of both the executive director and ADP coordinator. At a later stage another person will join the staff to function as ADP coordinator.

The executive director's principal duties center around administrative guidance of the working units in line with the development goals of the CIDB. He functions as the principle interface between the executive branch of the CIDB and the Board of Governors of the CIDB (to be described later in this section).

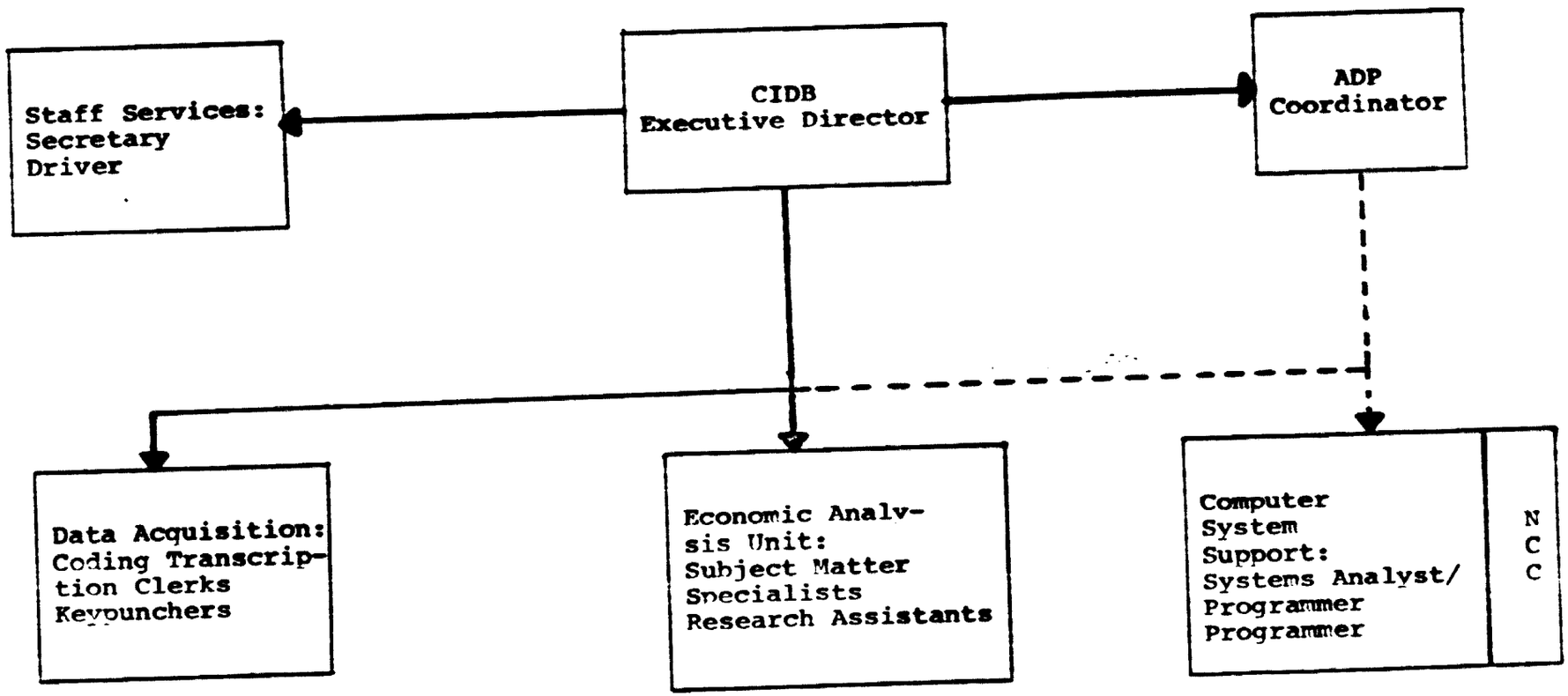
The ADP coordinator position insures the proper meshing of economic analysis, data acquisition and computer support to achieve the "goals" determined by the executive director and approved by the Board of Governors. His direct administrative capacity applies only to the computer system support group.

Subject matter specialists and research assistants compose the Economic Analysis Unit (EAU). The unit serves principally as an advisor both to the CIDB director and to users of the CIDB. The subject matter specialists suggest which data deserve a place in the bank.

Personnel of the EAU guide the users to the data that are most pertinent to their needs and assist them in making use of the CIDB's capabilities in obtaining meaningful analyses.

Figure 28

Recommended CIDB Organizational Structure



A necessary requirement for the economic analyst is that he have experience in the Philippine situation. A broad range of specialists, from regional economists to industrial analysts, should compose the group. The initial phase of implementation requires two specialists. Final staff level in this area will be six specialists.

The subject matter specialists will need research assistants to perform the more detailed tasks involved in economic analysis. In the CIDB, a research assistant performs specific tasks which are determined by the subject matter specialists. These range from gathering source literature on a specific subject to performing preliminary calculations for testing the validity of economic models, etc. The position demands an affinity to economic analysis and a working knowledge of its elements. Two personnel in this category will participate in the first stage of implementation. This number will grow to 10 or more duing full operation of the CIDB.

The systems analysts and programmers provide delivery of a well documented computer system that fulfills the economic analysis requirements. During initial stages, systems analysts will double as programmers in order to speed the implementation of a vital core network of programs.

As the system becomes progressively more complicated in structure, the duties of systems analyst and programmers will become more distinct. The system analyst deals with design problems; the programmer with implementation of the design according to a set of procedures determined by the analyst. The NCC is indicated in the organogram of Figure 28 as the location and source of computer systems support.

The CIDB will be serviced by the NCC, just as NCC now services many government agencies. The data acquisition (and economic analysis unit) are members of the CIDB staff.

Data acquisition personnel mainly transcribe data to "computerized" media. Once the director, the EAU and ADP staffs have agreed upon a selected set of source data, the transcription clerks supply the data in a from that can be keypunched. This involves coding the data on special forms. The keypuncher works from the form to punch the computer cards. Two transcription clerks will supply work for two keypunchers during the first phase of implementation.

At full operation the numbers will increase to 20 transcription clerks and six keypunchers. The increase is caused by a lack of systematic source data gathering mechanisms at the present time. The number may be cut to one-fourth this size if the recommendations of Section VI (source data automation) are followed.

Auxiliary staff consist of secretaries who serve the director, the EAU and the ADP group. A driver is needed for staff transportation and delivery of materials.

Administration -- the Governing Board

As mentioned in the previous subsection, the CIDB executive director reports to a Board of Governors. The board will be composed of members of the various user, source and supporting agencies:

PES	FFPC
BOI	DCI
NEC	CEPO
CB	BCS
DBP	NCC

Private Sector

The purpose of this superstructure is to ensure the equitable distribution and availability of CIDB resources. Thus the board will have final say on the data that enters the bank, and on to whom the services are to be made available. It will decide problems involving the relationship of the CIDB to agencies and government offices. Most importantly, it will determine the goals of the CIDB. It is suggested that members of the board come from positions in agencies that exercise some control over appropriation of funds for the agency. This will give added weight to the decisions made by the board. A parallel technical staff committe should be formed by the board to provide working level support and to represent the operating mechanisms of the participating agencies. The technical staff reviews the proposals of the CIDB staff and reports its findings to the policy making group which is composed of the board members themselves. The chairman of the board should be a top level economic industrial decision maker selected by the members.

Procedures for CIDB Staff Selection and Training

The National Computer Center has offered to select and train personnel in the categories of data transcription clerk, keypuncher, secretary, and programmer. Their facilities offer psychological and job competence testing. In addition they have courses in a working environment for each of these areas.

In the other areas the CIDB director will consult with the head of the particular unit involved for the selection of a trained professional.

User Manuals, Documentation and Newsletter

The CIDB will generate manuals written for the user. The EAU will be thoroughly versed in these, as they will describe the CIDB's range of capabilities. Corresponding manuals for computer systems personnel will describe the system from the perspective of the systems analyst.

All programs will be accompanied by a full documentation set, including latest program specification, flow chart, and pertinent file description.

A periodic newsletter (at first on a quarterly basis, then monthly) will inform the user of the latest available features in the CIDB. The newsletter will also indicate expected data acquisitions. Government agencies will compose most of the newsletter distribution list at the beginning. Later coverage will include private users and sources.

Section IX

SYSTEM DEVELOPMENT PLAN

PADCO

Section IX

SYSTEM DEVELOPMENT PLAN

Evolutionary Implementation of the CIDB

It is anticipated that the Central Industry Data Bank will be implemented in six major stages as illustrated in Figure 29.

Stage I: Feasibility Study and Conceptual Design (4 months)

This stage represents the present study conducted by PADCO in conjunction with the Government of the Republic of the Philippines and supported by UNIDO under a Special Industrial Services (SIS) grant.

Stage II: Disaster Impact Demonstration and Pilot Implementation (10 months)[1]

This stage includes the information system aspects of the economic impact study of the July-August 1972 flood disaster recently initiated by the government with UNIDO support. A highly detailed and relevant live demonstration of the effectiveness of the CIDB concept will result as well in pilot implementation of selected portions of the base core of data. The detailed approach to this project is presented in Section X below.

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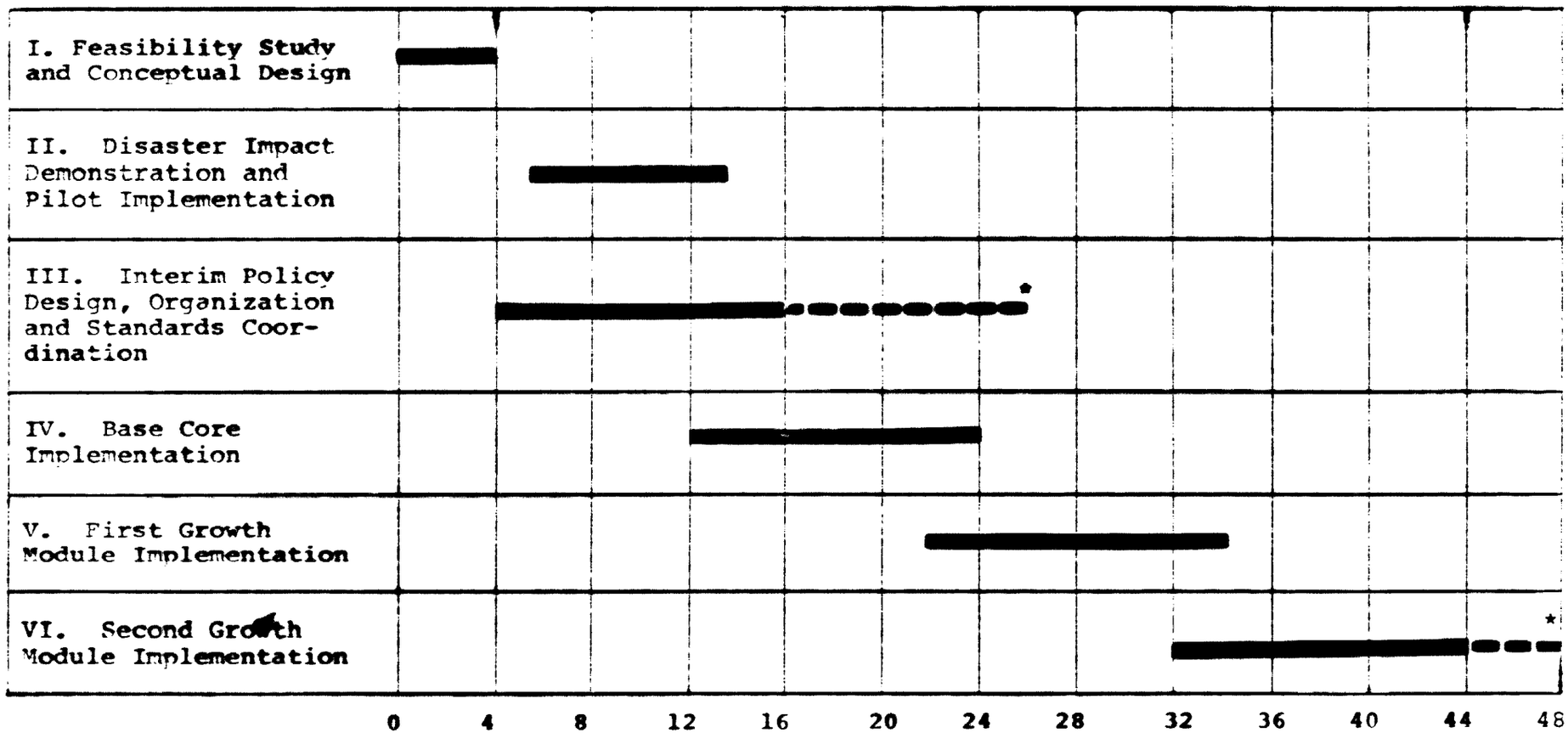
[1] The impact of deleting the Stage II disaster impact study would simply be to extend the time required for CIDB implementation and to retard the rate of development of CIDB capabilities as shown in Figure 30. Stage I and Stages III - VI are totally sufficient and self-contained for complete development of the CIDB over a somewhat longer period of time.

Figure 29

Evolutionary Implementation of the CIDB



*Environment and Infrastructure.

Stage III: Interim Policy, System Design, Organization and Standards Coordination Program (24 months)

This program will be carried out by the Inter-Agency Committee in the interim period between completion of the present study and initiation of formal implementation of the CIDB system under Stages IV to VI below. It will take place concurrently and in mutual support of the Stage II Disaster Impact Study. The scope of work will encompass formal establishment of the CIDB organization, resolution of critical policy issues, detailed system design and execution of the standards program described in Sections V and X. A significant technical project within this stage (months 12 to 24) should be development of data sources on environment and infrastructure as major information categories that cannot be readily fulfilled by available sources.

Stage IV: Base Core Implementation (12 months)

The base core of data for the CIDB (described below) will be implemented under this stage. Four currently operational computerized base files and two low-volume published sources will be included in the base core. This stage will also encompass preliminary implementation of the data directory service and limited retrieval/report generation capabilities associated with the statistical reference service. Inclusion of the analysis service is not anticipated at this stage. However, the magnitude of resulting capabilities will be highly contingent upon the success of the pilot implementation in Stage II and the nature of the associated analytical tools developed for disaster impact evaluation.

Stage V: First Growth Module Implementation (16 months)

This stage will encompass implementation of the first growth module of data as described below. Full development of the retrieval and reporting capabilities of the statistical reference service and the data directory service will be completed. Initiation of the analysis service will be included.

Stage VI: Second Growth Module Implementation (16 months)

The second growth module of data described below will be implemented under this stage of development. The development of the analysis service will be substantially completed. In addition,

development of information on the environment and infrastructure information classes will be emphasized during the last four months.

Figure 30 illustrates the growth of CIDB information, services and capabilities over the four-year period. The inclusion of substantive information and source data will begin at about the 6th month, primarily due to the Stage II Disaster Impact Study, and grow at a steady rate throughout the program. The data directory service will be initiated at about the 8th month, with a major impetus provided by references developed for the PADCO study, will accelerate during the second and third years, and be completed by about the 34th month. The statistical reference service capabilities will follow about the same path, with early implementation heavily dependent upon the disaster impact study. Finally, the analysis service will be initiated at about the 10th month, exclusively, to support Stage II and will remain constant for the second year, gradually accelerate and reach completion at the end of the 48th month.

It can be seen from Figure 30 that the early development of source data, statistical reference and analytical capabilities is highly dependent upon successful implementation of the Stage II Disaster Impact Study. This program will require rapid development of such services to effectively achieve its objectives.

Substantive Selection of Data for Base Core and Future Growth Modules

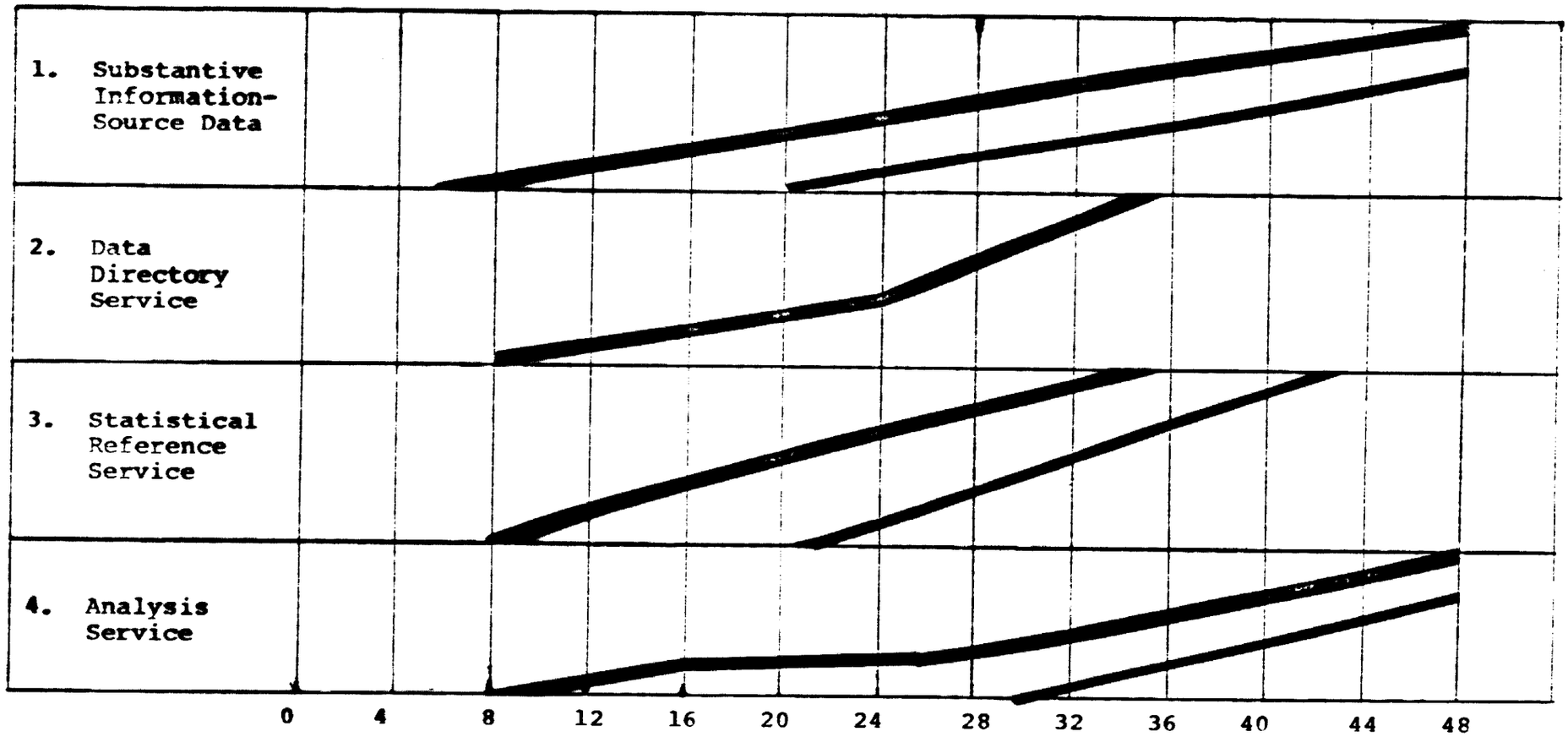
The vast range and depth of information related to manufacturing industry as exemplified by the categories and dimensions of the model demand a staged growth and implementation. Any attempt to incorporate the entire range of data would be unfeasible due both to sheer magnitude and marginal availability from source agencies. Therefore, a series of three data modules has been selected for phased implementation over a three-to-five-year period.

The criteria for selecting data elements for inclusion in the modules are:

- User requirements and stated priorities
- Source data availability
- Amenability to automation within a six-month to one-year time frame
- Synchronization with departmental base-level automation programs
- Small-scale transcription and conversion burden for non-computerized sources.

Figure 30

Anticipated Growth of CIDB
Information, Services and Capabilities



Base Core of Data for the CIDB

The base core of data has been selected for implementation over a period of six months to one year within the capabilities and resources[1] of the National Computer Center. Six primary data sources have been selected for the base core. They cover the three highest priority information categories, one from the first, one from the second, and one from the third priority group, as shown in Figure 31.

Four of the six base files are currently computerized and fully operational:

Annual Survey of Manufacturers (establishments as of 1970) -- BCS - IBM 360/30.

1967 Economic Census -- BCS - IBM 360/30.

Foreign Trade Statistics -- 1970 - BCS - IBM 360/30.

1,000 Top Corporation -- 1970 - Business Daily.

The two remaining sources are low-volume (non-computerized) published reports:

National Income Accounts -- NEC

Input/Output Table -- NEC

This is deemed to be the most feasible and viable basis for initiating the CIDB implementation. All of the computerized files are operational with a known structure and format.

Future Growth Modules

The two growth modules presented in Figures 31 and 32 have been designated for implementation in Stages V and VI. Each would require about one year for completion. The selection of base files is derived from anticipated completion of current and planned automation programs, inclusion of private sector sources and further conversion of low-volume published statistics.

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[1] Assumes allocation of these personnel resources to the CIDB project. However, they might not be available in this time frame due to assignment to other ongoing or priority projects. Availability of computer time and capacity is not deemed to be a problem once the new computer is operational.

Figure 31

Selection of Data for CIDB Base Core and Growth Modules

BASE CORE OF AUTOMATION

Information Class	BCS Survey of Manufacturers	BCS Economic Census	NEC National Income Accounts	BCS Foreign Trade	Business Daily 1,000 Top Corporations	NEC I/O Table
Priority I:						
Market Demand			X			X
Product Supply	X	X		X		
Production Inputs	X	X		X		X
Priority II:						
Manufacturing Industry	X	X	X		X	X
Priority III:						
Distribution Channel	X	X				

FUTURE GROWTH MODULE I

Information Class	SEC	BOI/CB Foreign Investments	BCS Household Survey	Trade Associations	BOI IPP/FPP
Priority I:					
Market Demand			X	X	X
Product Supply	X			X	X
Production Inputs				X	
Priority II:					
Manufacturing Industry	X	X		X	X
Government Regulation				X	X
Business & Finance	X	X			
Priority III:					
Environment					
Infrastructure					
Distribution Channel	X			X	

FUTURE GROWTH MODULE II

Information Class	PANR Primary Production Factors	DCI Business Directory	CB Statistical Bulletin	Chambers Commerce	Foreign Markets
Priority I:					
Market Demand				X	X
Product Supply			X	X	X
Production Inputs	X				
Priority II:					
Manufacturing Industry		X		X	X
Government Regulation			X		
Business & Finance			X		
Priority III:					
Environment					
Infrastructure					
Distribution Channel					X

The first growth module includes three computerized sources:

SEC corporations (currently under development at the NCC)

BOI/CB Foreign Investments Survey (operational at the NCC)

Household Survey of the BCS (operational on IBM 360/30)

In addition, two manual sources will be transcribed and converted for use in the CIDB.

Trade Association Data on Selected Industries (Private Sector)

BOI Statistical Appendix to the Investment and Export Priorities Plans

The second growth module will incorporate five major groups of source data of varying status and nature:

Primary Production Factors -- data primarily from DANR

DCI Business Directory -- automation program to be initiated by NCC for completion within 2 years

Central Bank Statistical Bulletin

Chambers of Commerce -- various source data from the private sector

Foreign Markets -- information on international (non-domestic) market demand from a variety of sources including United Nations and other country programs.

The selection of data sources for inclusion in the three modules described is, of course, somewhat arbitrary (except where it is dependent on uncompleted automation programs). Contingent upon CIDB progress, available resources and source data accessibility, the modules could be restructured, accelerated or modified to meet prevailing conditions. Certainly, the overall plan should be reviewed and brought up to date periodically as the development program proceeds.

Work Program for the Economic Analysis Unit

The functions of the Economic Analysis Unit (EAU) have been discussed in Section VIII. They are:

> Initial identification and periodic updating of the data base to be maintained in the CIDB (based on continuing analyses of users' requirements and data availability).
>
> Participation in work programming for the CIDB.
>
> Processing of user requests, issuing of CIDB reports to users and general assistance to users in their utilization of CIDB services -- this is the interface function of the EAU in which it provides a link between users and the data bank.
>
> Collaboration with information source agencies in identifying the types of information that need to be collected and maintained for industrial planning purposes. This is the interface function of the EAU through which it serves as a link between source agencies and the data bank. (The data acquisition unit also serves as an interface unit between resource agencies and the CIDB, but it is concerned with the forms in which data are maintained and procedures for bringing data into the CIDB, rather than with the substance of what is collected and maintained.)
>
> Execution of specialized types of economic analysis requiring the processing capacity of the CIDB.

It has been suggested that the EAU should have a staff of four, initially including two economists and two research assistants. The EAU has a key role to play in defining the types of information to be maintained in the data bank and in programming its work. Because of this, the unit should be established as part of the initial organization of the CIDB as soon as funding for its operations has been secured.

A work program for the EAU has been developed within the overall growth program suggested for the CIDB and is presented below. It can be broken into three parts:

Startup Tasks

Special Tasks

Recurring Tasks

Startup Tasks

Initial Staff Training (2 weeks). Under normal circumstances the initial staff group in the Economic Analysis Unit would undergo careful training in work programming and monitoring, preparation of user requests for machine processing, report design, preparation of analytical problems for machine processing, and documentation of user requests and report production. If the initial activities of the CIDB are to be focused on support for recovery from the 1972 disaster, the EAU group will have to undergo a "crash program" of intensive training specifically for the disaster work and receive more complete training after its completion.

It is therefore suggested that a program of about two weeks duration be focused on the analytical techniques to be used for impact analysis (since the EAU is likely to have to accept responsibility for this) and on a limited range of the procedures identified above -- just sufficient to enable the unit to operate effectively in the disaster work. The initial program should include a thorough review of the findings and recommendations of the present report so that EAU staff will be familiar with the overall concept of the CIDB before they focus their attention specifically on the disaster work program.

Initial Work Programming (1 week). The EAU will play a major role in work programming for the CIDB. The nature of the work programming to be regularly undertaken is discussed in the later section describing the recurring tasks of the unit. A preliminary work program with components similar to those discussed later should be prepared specifically for the disaster work on industrial impact analysis, rehabilitation and recovery.

Because of the importance of responding quickly to the need for an industrial rehabilitation and recovery program in the wake of the 1972 floods, the initial activities of the EAU, in common with the CIDB as a whole, should be focused on this. Assuming that the CIDB can be initiated in September 1972 (at least in the sense that organizational decisions are beginning to be made) and that the preoccupation with the 1972 disaster will extend at least through May of 1973, the "normal" work of the EAU will begin in mid-1973.

The experience gained in responding to the disaster should contribute greatly to the long-term capabilities of the EAU and the

initial files and processing capabilities developed would be integrated subsequently in the basic file structure. Because of their urgency and the fact that they would constitute the first activities of the EAU, the special tasks to be undertaken in response to the 1972 disaster are discussed before the recurring tasks. The sequence of special and recurring tasks suggested presumes that the actions necessary to provide funding and facilities for the EAU have been taken as part of the action required to initiate the CIDB.

Special Tasks -- Disaster Impact, Rehabilitation and Recovery Program

Toward the end of the present project there was under discussion a disaster impact study to be undertaken as part of the government's rehabilitation and recovery activites following the floods of 1972. An initial analysis of the disaster impact on all sectors has been undertaken by the Presidential Task Force on Rehabilitation, and additional analyses are being undertaken by the NEC and the Chamber of Industries. Because the Task Force study dealt with all sectors, it could not provide sufficient information for a rehabilitation and recovery program for the industrial sector specifically. It is essential now to estimate overall requirements for industrial rehabilitation and to establish an industrial rehabilitation and recovery program. It is important also to identify potential bottlenecks that may arise under future disaster conditions because of vulnerable components in the industrial structure or supporting infrastructure since similar, though generally less severe, conditions occur fairly frequently.

The purposes being discussed for the proposed impact study when the present report was being prepared include:

> Identification of the industrial rehabilitation measures necessary as a result of the recent flood calamity.
>
> Identification of potential future disaster damage bottlenecks in the industrial structure and supporting infrastructure.
>
> Formulation of an immediate action program for restoring and accelerating industrial production.
>
> The establishment of permanent technical capability for responding quickly to a similar crisis situations in the future.

An industrial rehabilitation and recovery program is needed urgently. The executive arm of the Presidential Task Force on Rehabilitation is proposing to have an initial assessment of the impact of the disaster completed by or before the end of October and this will provide part of the basis needed for a review and revision of the national Four-Year Plan for the period 1972-76. It will provide part of the basis for requesting urgently-needed external financing and technical assistance. A limited amount of immediate rehabilitative action is expected to be completed during October. This will be followed by additional impact analysis and remedial action extending into 1973.

At least a part of the industrial rehabilitation and recovery program should be finalized and ready for implementation before the end of 1972 -- as close as possible to the October target for other sectors. The work of the EAU should therefore be initiated as soon as possible, preferrably in September, even though this may mean obtaining staff for the unit on detail from other agencies. The impact, rehabilitation and recovery program for the industrial sector may be supported later in the year by outside technical assistance, but the EAU should begin its work as soon as a staff is established, beginning if necessary even before that technical assistance is available. The tasks to be undertaken should include:

Establishment of Analytical Framework (2-4 weeks). An analytical model of the industrial sector and its major links with other sectors should be established to assist in identifying not only the initial impact of the disaster, but also the likely repercussions of that impact through the sector. The model should be designed to assist in identifying likely future disaster-impact bottlenecks and their relative importance. This will facilitate the establishment of priorities for the preparation of programs for preventive action. It would be used also to identify the data essential for the impact analysis. To the extent that adequate data are available the model should be quantified, using established statistical and econometric techniques. Even if quantitative information is not available for some aspects that are believed to be important, a logical model of the industrial structure and key links between the industrial sector and other sectors should be constructed, perhaps using simple graph-theoretic techniques. At least a preliminary version of such a model should be identified as quickly as possible to guide the rest of the work; if outside technical assistance becomes available, the model could be refined subsequently.

To accelerate the development of preliminary recommendations for rehabilitation, a non-quantitative logical model might be developed in less than a month, perhaps in two weeks to facilitate the rapid organization of information already available and to assist in pinpointing the elements in the industrial sector which should have highest priority for rehabilitation.

Review of Existing Data and Preparation of Guidelines for the Assembly of Essential Additional Data. By the time the EAU is established, information on the disaster should be available from at least three sources -- the initial study of the Presidential Task Force on Rehabilitation, fieldwork undertaken by the National Economic Council, and a survey of its members undertaken by the Philippines Chamber of Industries. Data are also available on industrial structure and infrastructure which are prepared regularly by the basic source agencies that have been discussed earlier in the present report.

Using the analytical framework referred to above as a guide for determining which data are essential, the EAU should review and evaluate existing information and prepare guidelines for the immediate collection (through further field investigation) or assembly (from existing materials) of additional data. The data recommended would then be acquired by the data preparation unit of the CIDB. It may not be possible to acquire all of the necessary additional data quickly enough to use them in preparing the recommendations referred to below; the data acquisition schedule should reflect this. Data essential for decisions to be made by the end of October 1972 should be acquired first; the data acquired subsequently would be those needed for the more complete rehabilitation recommendations to be made, and for identification of potential future bottlenecks to be identified.

Estimation of Normal 1972 Levels of Industrial Activity (2-4 weeks). The EAU, in consultation with technical units in other agencies, including the NEC, the PES and the BOI, should estimate the levels of industrial activity that could have been expected in 1972 in the absence of the flood disaster. These estimates should include such things as levels of output, employment, wages and salaries, quantities, and values of raw and intermediate materials consumed, wholesale and retail values of end products, inter-industry and inter-area commodity flows (to the extent that data and analytical resources permit), new industrial investment, commodity exports and imports, foreign borrowing for industrial development, and taxes yielded. These estimates should be as disaggregated as possible within major industrial categories and broken down to the level of the municipality if available information permits this. These estimates will provide a base level from which the impact of the disaster can be identified.

Preliminary Estimation of Disaster Impact and Likely Repercussions (2-4 weeks). The EAU, in consultation with IPO and other technical units, should estimate as quickly as possible the immediate industrial impact of the disaster and its likely implications for future industrial activity over the next one to four years,

using data already available. This will probably be accomplished without outside technical assistance if the work of the EAU is started in September 1972. Revised and expanded estimates could be prepared later with outside technical assistance if such assistance is subsequently made available. The findings from this task could only be very preliminary; they would be used for the initial recommendations for rehabilitation. More sophisticated estimates will be made later. It is necessary for the preliminary estimates to be available before the end of 1972.

This is a task that would be ordinarily performed by other technical groups with support from the EAU for data processing purposes, rather than by the EAU itself.

Preliminary Recommendations for Immediate Industrial Rehabilitation (2-4 weeks). In consultation with IPO and other technical units, the EAU should prepare recommendations for immediate industrial rehabilitation. Because of the short time available, these can only be preliminary and incomplete; they can be elaborated later. They may have to be limited to recommendations for such things as emergency financing of industrial rehabilitation in specific industries and localities, immediate short-term changes in import controls, provision of urgently-needed materials for rehabilitation and (with other agencies) priorities for the re-establishment of damaged infrastructure that affects industrial activity.

Analysis of Additional Data and Preparation of Longer-Term Recommendations for Industrial Rehabilitation and Recovery (26 weeks). This task would produce recommendations periodically, beginning about six weeks after the initiation of this task. The recommendations prepared under earlier tasks would necessarily be very preliminary, and would be based almost entirely on data already available. They would be concerned with short-term action to be taken immediately. To prepare a sound, longer-term rehabilitation program, it will be necessary to have access to additional data. With these additional data as a basis, it should be possible to prepare longer-term recommendations for the sustained action needed to achieve industrial rehabilitation and recovery -- action that may have to extend longer than one year, and in some cases up to as much as five years. These longer-term recommendations might be concerned with such things as sustained financial assistance for the rehabilitation of industrial plants, changes in import controls that would be maintained over several years pending full recovery, changes in legislation to permit or encourage consolidation or inter-firm agreements that would accelerate recovery by consolidating private resources, and priorities

for the continuing rehabilitation of infrastructure vital to the industrial sector (following on the intitial priorities identified above).

Identification of Potential Future Disaster Bottlenecks and Priorities for Preventive Action (approximately 16 weeks). Because of the relatively high frequency with which disaster conditions are experienced in the Philippines, it is desirable to undertake a long-term program of preventive action to reduce the likely industrial impact of future crises. To initiate such action the most vulnerable and strategic components of the industrial structure and supporting infrastructure should be identified so that the first stages of a preventive program can be focused on them. In some cases these key components may consist of entire industries; in some cases they may be individual establishments or groups of establishments in particularly vulnerable locations; in other cases they may be strategic wholesaling or retailing facilities, which if disabled would slow down distribution dangerously; in some cases they may be essential transportation, power, water or waste disposal facilities.

The analytical framework developed would be used to identify the strategic and vulnerable facilities whose disruption would have the most serious consequences. The EAU would not be in a position to develop preventive programs, since many of these would require specialized engineering skills, but it would recommend priorities for the development and execution of such programs.

Under normal circumstances these tasks would be undertaken by the Industrial Planning Office in the PES or other technical staff groups in the government. After completion of this special study, the EAU would begin to assume its normal long-term role as an interface unit linking user groups with the CIDB, rather than a unit responsible for major substantive analysis. Its use in the disaster work is suggested primarily as a pragmatic response to a situation in which other technical units are likely to be under too much pressure in their own areas of specialization to permit them to undertake the additional burden of preparing an industrial rehabilitation and recovery program, and in which the EAU may well have easier access to essential data than other staff groups.

Recurring Tasks

The major tasks for which the EAU should be responsible on a continuing basis are discussed briefly below.

Analysis of User Needs. The EAU should be responsible for working with user groups to identify the types of data and processing capacity they will need from the CIDB and the key characteristics of these data -- including geographic coverage, the time periods for which data are required, the frequency with which data used repetitively should be updated, the levels of statistical reliability sought, the extent to which individual items of data need to be cross-referenced to other items, the types of analysis user groups are likely to want to perform, the report layouts needed for presenting particular types of data and the frequency with which individual users are likely to want to have access to particular types of information.

On the basis of this analysis the EAU should define the data base to be maintained in the CIDB; it should negotiate with source agencies to try to ensure that the necessary data are collected and maintained; it should specify for the systems analysis and programming staff the types of processing required; it should collaborate with user groups to standardize their requirement as fully as possible so that their needs can be met with as small and simple a data base as possible; it should design standard report formats to meet regular users' needs; and it should assist the executive director and ADP coordinator to schedule the work of the CIDB so that users' needs can be met effectively.

Source Analysis and Liaison with Source Agencies. The EAU should investigate regularly the source agencies that maintain data relevant for industrial analysis and planning. The purpose of this regular monitoring should be to determine the types of data likely to be available regularly or at particular times so that information on the likely supply of data can be related to the information obtained on the demand for data. The EAU should also negotiate with source agencies to try to ensure that the types of information needed by user groups are collected and maintained.

Data Base Definition. On the basis of its regular analysis of users' needs and data sources, the EAU should work with the other members of the CIDB staff to specify (and keep modifying as the need arises) an efficient CIDB data base from which all of the types of reports required can be generated.

Standardization. The importance of data standardization and the types of standardization likely to be important have been discussed in an earlier section of the present report. Within the CIDB it is the EAU that should be responsible for seeking and supporting standardization.

Data Directory Service. One of the principal functions of the CIDB is to provide in one easily-accessible location a directory identifying the types of industrial data available in various sources. Because the EAU is to be responsible for identifying users' needs and maintaining liaison with source agencies to identify the information they maintain, it should also be responsible for initiating and maintaining the data directory service of the CIDB. In addition, it should assist users in use of the directory.

Processing of Requests for Information. Before a user's request for information from the CIDB can be processed, it must be translated into a form that can be "read" by the computer. In some cases the computer's output will have to be translated into everyday language before it can be read by the user. Because the CIDB should be user oriented, the latter case should be the exception rather than the rule. The report generating routines used should present output in everyday or near everyday language, even though this may place an extra burden on the programming staff and call for relatively sophisticated programming. The burden should be on the CIDB to make the user's task as easy as possible, not on the user to make the task of the CIDB staff as easy as possible.

One of the major functions of the EAU is to serve as an interface unit linking the user with the processing, storage and retrieval capacities of the data bank. EAU staff will therefore be responsible for translating users' requests for information and/or analytical processing into machine-readable language. They will also be responsible for assisting the user to interpret computerized reports where necessary. To facilitate this the EAU should establish standard procedures and formats for submitting requests for data or processing.

Analysis. In general the substantive analysis for which users need data from the CIDB would be carried out by the users themselves. In some cases, however, the user may need types of analysis that can be executed much more efficiently by computer than by hand or he may need technical assistance in analysis with which he is relatively unfamiliar. It will be the function of the EAU to process requests for analysis so that the analysis can be executed by the CIDB; the unit will also provide technical assistance in analysis to a limited extent.

Documentation of Requests for Information and the Issuing of Reports. The CIDB must maintain an accurate record of the requests it receives and the reports it generates. It must do this

to facilitate monitoring and evaluation of its own performance (maintaining not only records of the requests received and reports generated but also an account of the time taken to respond to requests, the problems encountered by users in using its services, the cost of producing reports and other accounting and control information). It must do this also to provide users with an up-to-date account of information already available and to reduce the likelihood of wasteful duplications of effort in generating information. The EAU unit should this documentation function.

Work Programming for the CIDB. Since the EAU will be maintaining links with both users and sources, it will be in a good position to undertake or assist the executive director in undertaking the work programming necessary for the CIDB. The work program for the data bank would consist of manual and control charts identifying at least the following items: the tasks to be performed by the CIDB one year in advance; the manpower required for each task; the materials and facilities required; the points at which other agencies should participate; expected start and completion dates for each task; a budget for each task; and an identification of the ways in which tasks are related to one another. Critical path analysis or an alternative control method should be used to identify the tasks that are strategic to the timely completion of the work of the CIDB and to provide a basis for adjusting the scope of work, manpower facilities, or timing if actual performance differs from expected performance.

The work programming functions of the unit should include:

Identification of the times at which recurring and predictable data needs of major users should be fulfilled (e.g., the provision of data for annual Four-Year Plan reviews and for the preparation of annual investment priorities plans).

Identification of times at which particular types of regularly-available data will be available from source agencies.

Scheduling of recurring data acquisition, data input preparation, processing and report generation.

Scheduling of the data acquisition, preparation, processing and report generation needed for responses to special (i.e., non-recurring and relatively unpredictable) user requests.

Continuing analysis of the long-term growth path that the development of the CIDB should be following, including the future staffing and facilities likely to be required.

Assistance to the executive director in preparing the annual budget for the CIDB.

Assistance to the executive director in monitoring and evaluating the activities of the CIDB.

User Training. The EAU should be responsible for the training programs necessary to make it possible for users to utilize the services of the CIDB fully. These programs should include information on or training in the range of services offered by the CIDB, the preparation of requests for data, and the interpretation of computer output. Once the CIDB is well established, some users might also recieve training in computer programming to enable them to prepare their own programs for specific analytical problems.

Estimated Staffing Levels for System Implementation

Figure 33 shows the estimated staffing levels and associated salary costs for the internal government staffing of the CIDB, as well as fixed equipment costs. The staff positions correspond to those described in Section VIII above. The costs of facility rental are not included, but most other sources are. The estimates cover a period of only three years corresponding to implementation Stages IV, V and VI described above.

The total internal costs range from about ₱ 200,000 in the first year to ₱ 270,000 in the second and ₱ 530,000 in the third year of implementation. The total internal cost of the CIDB implementation program is estimated to be just under ₱ 1 million.

The corresponding staffing estimates, including clerical and transportation support, range from 13 the first year to 24 the second and 61 in the third year of operation. The heaviest burden by far is in the data acquisiton group for support of data transcription and conversion. Greater expansion and acceleration of the base-level automation programs in the operating department could potentially reduce these costs considerably, as would acquisition of more efficient data conversion devices by the NCC, in particular, optical character recognition (OCR) techniques.

Figure 33

Estimated Staffing Levels and Costs in Pesos for CIDB Implementation

(Pesos = 6.77 = US$ 1.00)

	Monthly Salary Rate, or Unit Price	Phase I		Phase II		Phase III	
		Number	Cost	Number	Cost	Number	Cost
Personnel							
Executive Director	2,500	-	-	1	2,500	1	2,500
ADP Coordinator	2,500	1	2,500	1	2,500	1	2,500
Subject Matter Specialist	1,500	2	3,000	3	4,500	6	9,000
Research Assistant	500	2	1,000	4	2,000	10	5,000
Systems Analyst/Programmer	1,000	3	3,000	3	3,000	3	3,000
Programmer	800	-	-	2	1,600	5	4,000
Transcription Clerk	450	2	900	5	2,250	20	9,000
Keypuncher	400	1	450	2	800	10	4,000
Secretary	400	1	400	2	800	4	1,600
Driver	350	1	350	1	350	1	350
Subtotal	874,200	13	11,600/mo. 139,200/yr.	24	20,300/mo. 243,600/yr.	61	40,950/mo. 491,400/yr.
Computer Oriented Supplies and Equipment							
Keypunch	500	1	500	2	1,000	10	5,000
Computer Cards (boxes)	18	30	540	60	1,080	300	5,400
Continuous Forms (boxes)	150	15	2,250	30	4,500	60	9,000
Miscellaneous Spplies	-	-	750	-	1,000	-	1,500
Office Equipment, Fixed Price One-Buy Items							
Desk and Chair	500	9	4,500	7	3,500	10	5,000
Typewriter	3,500	1	3,500	1	3,500	-	-
Calculator	4,000	2	8,000	1	4,000	1	4,000
Tape Reel	185	10	1,850	10	1,850	20	3,700
Disk Pack	2,000	1	2,000	2	4,000	1	4,000
Car	30,000	1	30,000	-	-	-	-
Subtotal	115,920		53,890		24,430		37,600
TOTAL	990,120		193,090		268,030		529,000

Section X

IMMEDIATE ACTION RECOMMENDATIONS

Section X

IMMEDIATE ACTION RECOMMENDATIONS

During the interim period between Stage I and initiation of CIDB implementation, it is recommended that the Inter-Agency Committee carry out the following programs. (See also Stage III in Section IX):

Organization, Staffing and Budget Preparation

It is recommended that the Inter-Agency Committee draw up the formal terms of reference for the CIDB Governing Board. Initially, the most practical mechanism will probably be a presidential order, which could be followed by future legislative establishment if the program continues to be successful.

A crucial decision will be to determine the organizational locus of the CIDB Establishment within the office of the Executive Secretary, PES, NEC or BOI could be potentially succesful, but this must ultimately be a decision of the government.

The next step will be for the committee (or board) to initiate budgetary requests through the annual government fiscal review process, under the General Appropriations Act. This would cover the required personnel, facility and equipment needs as specified in Section IX.

The committee should also initiate funding requests from external sources. Particular emphasis should be placed upon UNDP alternatives including the SIS and country programs.

Following approval and appropriation of internal funds, the board should begin recruitment to fill the designated staff positions. At this time, decisions can be made as to the sources of staff support: whether directly within the CIDB organization, provided by the NCC or through private sector contractors.

Finally, the committee (or board) should designate working subcommittees (or groups) to carry out the following programs:

Resolution of Policy Issues

Subsequent to review of PADCO's final report, it is recommended that the committee resolve any remaining policy decisions, such as:

Organizational reporting position for the CIDB staff

Physical location of facilities for the CIDB staff.

Designation of the Chairman of the CIDB Governing Board.

Methods for handling confidential source data.

Sources of funding and support services.

Standards Development and Coordination

The standards program described in Section V should be initiated by the committee. This will place particular emphasis on studies of data compatibility and comparability as well as the development of mutually acceptable standards. Implementation of the CIDB concept does not require that the base-level source files comply with these standards, but it does demand that all extracted information that eventually will end up in the data bank must be translated for compliance.

The specific standards to be developed include data definitions, coding of qualitative variables and units of measurement for quantitative variables. The result will be a standardized data dictionary setting the criteria for data formats to be entered into the CIDB.

Development of Data Sources on Environment and Infrastructure

Since environment and infrastructure are two major data categories which are not included in the three development modules described in Section IX due to availability shortcomings, it is recommended that the board initiate a program to develop better and more systematic data on these significant external factors. In many cases, the availability of adequate infrastructure, utilities, and site locations will be critical factors in the viability of industrial projects.

Disaster Impact Study

During performance of this study, the Philippines was struck by a flood disaster of major proportions. The resulting damage will have a major impact on manufacturing industry over the next two to three years. The availability of a CIDB system would greatly facilitate evaluation of the economic impact and ramifications of the calamity. It is therefore recommended that an industrial disaster impact study be undertaken which would include an initial implementation and pilot demonstration of the effectiveness of the CIDB concept.

Evaluation Techniques

The flood disaster which struck the Philippines in July has affected all economic activities -- from agriculture to manufacturing and the various forms of services -- in the disaster areas of Central Luzon, and parts of the Southern Tagalog region, including the Greater Manila area. Since these are key centers for agrarian and industrial activities, the economic dislocations resulting from the disaster will not only be confined to the flood areas but will affect the entire nation. Preliminary estimates of the disaster's direct damages are many and exhibit significant differences, from around ₱ 0.4 billion to over ₱ 3.0 billion, affecting the production of palay and corn (maize), fishponds, livestock and poultry, irrigation works, roads, bridges, buildings, machinery and transport equipment.

This assessment, however, covers only the immediate effects of the floods, primarily representing direct damage and the costs of foregone production. It states nothing regarding the indirect economic repercussions which transcend time, space and economic sectors. The complete economic evaluation of the recent flood disaster must build on estimates of direct damages and develop an assessment of all indirect effects through determination of inter-industry linkages.

Economic policy decisions on the appropriate nature and growth paths for industrial development, in light of this calamity, must rely on capabilities of the industrial planning mechanism to develop an accurate profile of its total impact on the economy over the medium term (between three to four years). The capabilities of the industrial planning mechanism of the Philippines are not yet geared to assess and evaluate on a timely basis damages caused by unexpected calamities of this nature, nor to simultaneously undertake the requisite effort to review and adjust the present development planning priorities.

The principal handicap of the industrial planning system is that information on characteristics of the affected regions' economic

base is not readily available in the form necessary for timely analysis. For example, the spatial distribution of actual industrial productive capacity, the industrial processing inter-industry linkages, and the areal product and commodity flows to consuming and from producing provinces or municipalities are not directly available to planners. The ability to estimate losses and assess future economic effects depends on the availability of such information, and its absence has greatly hampered the successful completion of the review, analysis and planning tasks of the industrial development planning agencies.

Linking data sources and data users is the primary task programmed for the Central Industry Data Bank (CIDB). With the CIDB, the tasks of assessing accurately and on a timely basis the damages wrought by the floods, establishing the medium-term economic effects and determining the appropriate revisions to industrial development plans, will be greatly facilitated.

It is therefore proposed that this evaluation of the potential readjustments in the industrial structure of the affected regions, together with the complementary realignment of national priorities, be undertaken simultaneously with the implementation of the CIDB. The approach, scope and methodology of the proposed research study are detailed below.

Evaluation Program

The national response to the recent flood disaster in the Philippines will follow three primary stages of sequential action programs:

> Rescue and Relief -- to alleviate human suffering. The first action program involves palliative measures to rescue persons from areas of physical danger, to provide food, clothing and shelter during critical periods, and to offer medical care while insuring satisfactory health conditions in the stricken area.
>
> Rehabilitation and Reconstruction -- to repair physical destruction to the environment. The second action program provides for rehabilitation of damaged roads, bridges, utilities, structures, homes and other elements of infrastructure. This program is usually initiated after the source of natural disaster has abated.

Restoration of Economic and Industrial Productivity -- the first step in this process is to evaluate the impact of the disaster on the industrial sector. In the Philippines at this time there is no readily available means of obtaining this information. Based on the measured impact, corrective actions are to be taken involving extension of financial credits for restoration, direct subsidies, solicitation of foreign loans, relaxation of government regulations and suspension of restrictive taxes and foreign trade controls.

The relative timing of these major action programs is approximated in Figure 34.

Economic and industrial restoration will lag substantially behind the more critical needs for relief and reconstruction, Evaluation of the economic and industrial impact of the disaster is, in itself, an extremely difficult task due to the following factors:

The impact of damage to one industry or firm is compounded by complex interactions between industrial sectors. This results in a multiplicity of forward and backward ramifications on other related industries or firms. For example, damage to an industrial plant results in reduced production, which results in reduced employment and lower levels of personal disposable income, which results in deterioration of retail trade.

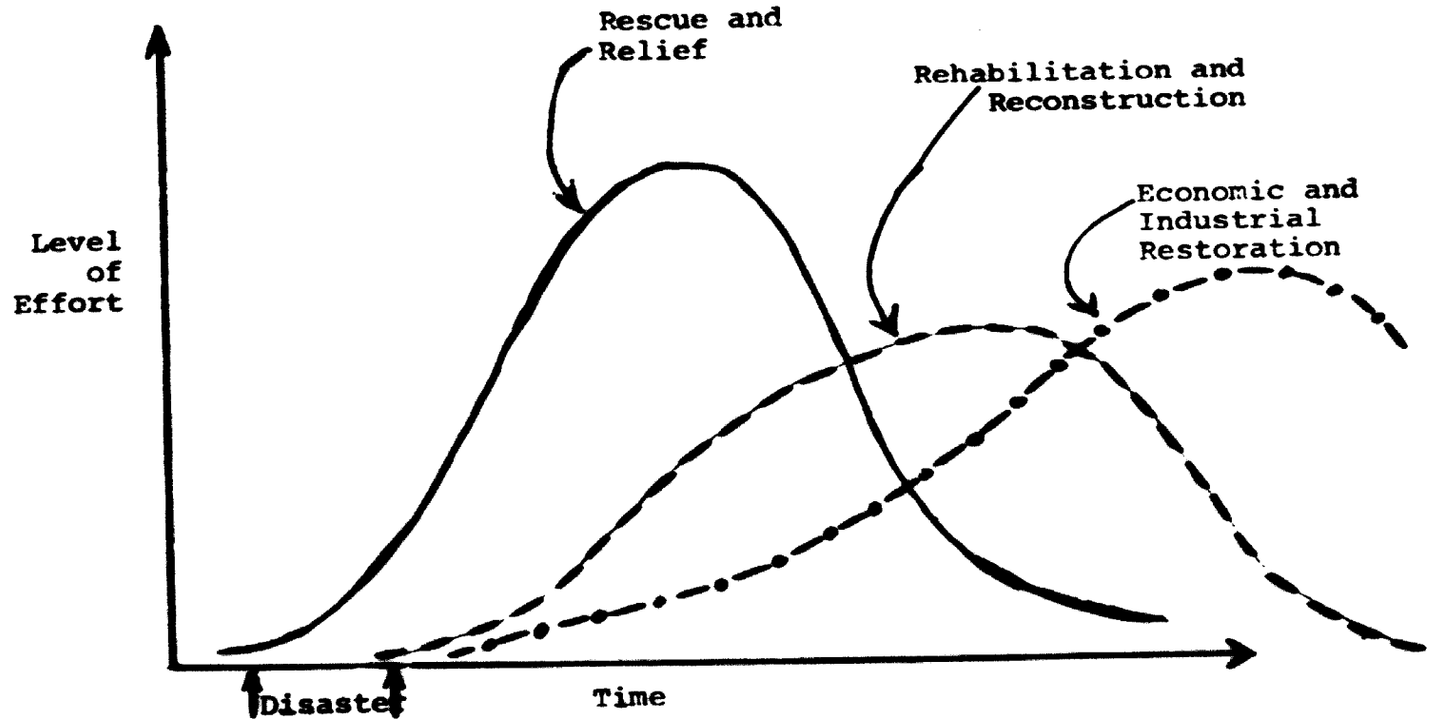
The unanticipated timing and nature of the disaster nullifies much of the careful economic planning previously undertaken. The situation is acute, of relatively short duration, and catches the planners unawares.

The economic planning process is not normally geared to coping with acute emergency situations or to responding rapidly with comprehensive analyses.

The ability of the economic planners to generate impact analysis is further hampered by the impact of the disaster on their own activities in terms of damage to transportation, communications and office facilities.

Figure 34

Relative Timing of Major Action Programs in Response to Natural Disaster



Information on the extent and nature of damages is usually sporadic, incomplete and conflicting until well after the disaster subsides.

Immediate Action Program. For the reasons stated above, a well-organized crash program of industrial impact analysis under UNIDO's Special Industry Studies (SIS) program with external expert assistance would be particularly appropriate and useful during the Fall of 1972. The objective would be to provide economic planners in the government with a detailed and accurate assessment of the flood disaster's impact on the industrial sector of the economy. The experience and familiarity with information resources gained through the Central Industry Data Bank (CIDB) project conducted by PADCO during the Summer of 1972 would be invaluable in facilitating the execution of the impact analysis. Further, this would represent an initial implementation and demonstration of the CIDB concept, which would truly be an acid test of its effectiveness.

1. The first step in the impact analysis will be to establish the normal productive capacity and output of industries located in the affected areas of Central Luzon for the most recent available base year. This involves a regional analysis of information pertaining to industrial sectors which is not readily available or accessible in the Philippines at this time. The basic form of this information would appear as illustrated in Figure 35.

2. The second step will be to obtain estimates of the reduction in productive capacity resulting from the disaster in each province and industrial sector. It is expected that the current field survey being conducted by the Office of National Planning (ONAP) of the NEC will provide accurate and current information on destruction to manufacturing industry as well as anticipated recovery in Central Luzon. This will provide a base line for the effect on each industrial sector from which the inter-sectoral impacts can be derived. Each table entry corresponding to Figure 35's entries would now appear as follows:

PSIC Code	Industry	PROVINCE	Bilal
20	Food Manufacturing	Normal	27,643,926
		Projected	15,750,000
		Impact	58% Residual Capacity

The disaster impact would be projected over a specified future period by quarters to reflect anticipated recovery until production returns to normal.

Figure 35

Illustration of Regional Analysis of Normal Productive Capacity

	Industry	PROVINCE					
		Rizal	Bulacan	Tarlac	Pampanga	Pangasinan	Nueva Ecija
20	Food, Manuf.						
21	Beverages						
22	Tobacco Prod.						
23	Textiles			/XXXX/			
24	Footwear						
25	Wood & Cork						
26	Furniture & Fixtures						
27	Paper Products						
28	Printing, Publishing						
29	Leather Prod.						
30	Rubber Prod.						
31	Chemicals						
32	Petroleum & Coal						
33	Minerals						
34	Basic Metals						
35	Metal Prod.						
36	Non-Elec. Machinery						
37	Elec. Machinery						
38	Transport Equip.						
39	Misc. Manufactures						

/XXXX/ - Each entry would represent productive capacity, actual output, employment, payrolls, etc.

3. The final stage of the analysis is to determine the backward and forward ramification of the disaster-related decrements on related industries and other sectors. This analysis has two significant aspects:

> To establish, where productive capacity remains intact, the impact of raw material losses, infrastructure damage, employee absenteeism, transportation slowdowns and other external factors on actual production over the recovery period.
>
> To determine the impact on other industries and sectors of direct destruction of productive capacity.

This will determine the forward and backward repercussions of change in industrial inputs and outputs resulting from the flood disaster. Since different manufacturing industries and economic sectors are intertwined in a complex series of interactions involving the mutual flow of goods and money, this step will constitute by far the most difficult aspect of the disaster impact study. There are four major approaches to solution of this problem that will be attempted:

> Determination of logical or "common sense" interactions that can readily be observed on an empirical basis. For example, a decrease of 50 percent in the capacity of a paper mill will result in a reduction of about 50 percent in the purchase of wood pulp as a raw material, with a corresponding financial impact on the normal suppliers.
>
> Approximation of a regional input/output table using the coefficients derived in the most recent national I/O table. Since approximately 60 to 70 percent of manufacturing industry in the Philippines is known to be located in the affected area (including Greater Manila), this should result in a rasonable estimate of inter-industry relations in Central Luzon. The major problem in this analysis will be how to handle interregional flows between Central Luzon and the rest of the country.
>
> The application of origin/destination studies to establish the magnitude of the transport problem created by the disaster and the resulting economic inefficiencies and bottlenecks in the flow of products and commodities.

Use of the index of dispersion and the index of sensitivity published by the BOI will provide a measure of the interdependence of various industrial sectors. Along with the "multipliers" developed by various past economic studies, this will represent another means of estimating interrelations between industries.

As the result of successful execution of this industrial impact evaluation, the nation will be in a far better position to execute critical decisions related to major restoration issues, including:

Allocation of rationed foreign exchange for the import of essential materials.

Allocation or reconstruction resources concentrated on those industries found to have the greatest adverse impact on the economy.

Pinpointing of problem areas on a regional basis by province.

Modification of the Four-Year Development Plan, the Investment Priorities Plan and Export Priorities Plan to reflect the impact of the disaster on the economy and corresponding remedial measures.

Finally, the impact study would be reiterated periodically to reflect changes associated with the recovery process and to obtain feedback on the effectiveness of government actions.

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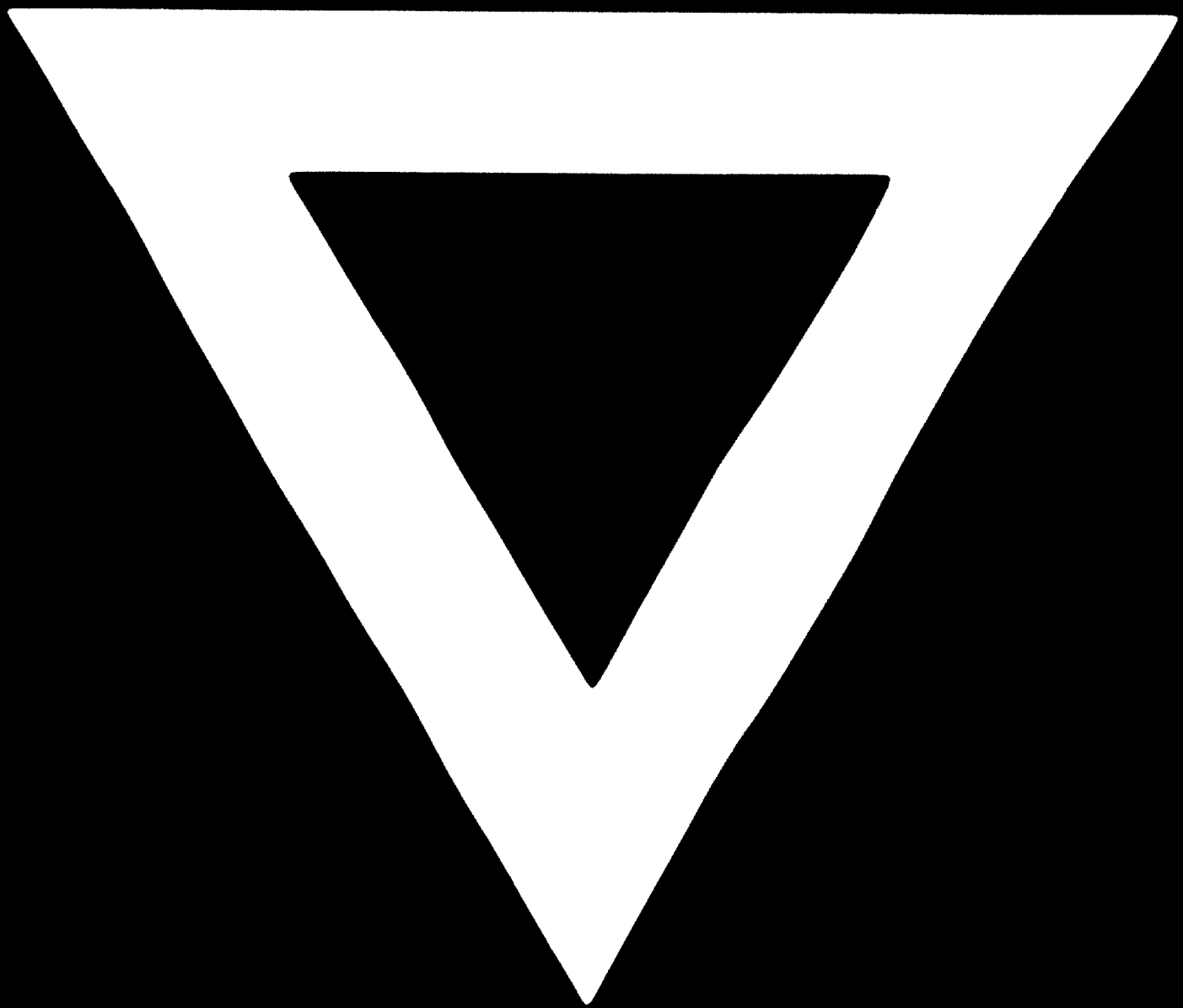

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