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Report

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UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

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THE ORGANIZATION OF INDUSTRIAL STATISTICS FOR RESEARCH PURPOSES
IN THE REGIONAL AND COUNTRY STUDIES SECTION

14.76-2947

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Summary of Main Points

The collection of relevant statistics for industrial studies within RCS now exceeds 40 million actual pieces of data (10 million computer records). In order for this body of information to be organized in a manner which is useful for both RCS and other sections in ICIS, general agreement on certain points will have to be reached in the near future. The following points are stressed in this note:

- A general consensus is needed among potential ICIS users of the statistical system regarding the types of data which will be pertinent to study activities and the types of data which may be excluded from the data bank.
- Industrial data, by its very nature, is often less reliable and accurate than data on other fields such as trade or employment.
- Comments and suggestions are solicited with regard to the RCS approach to data verification and tests for data consistency.
- The system will be geared to meet requests which require data reduction or data rearrangement on a large scale.
- A variety of computer programmes have been developed by RCS staff for research purposes. In addition, a number of subroutines for statistical analysis have been adopted to RCS research requirements.
- The primary consideration in the choice of computer facilities for the statistical system is the cost of computer time. Under the present circumstances, available information indicates that the IAEA installation is the lowest cost alternative.

Introduction: The following pages provide a detailed inventory of industrial statistics now stored by RCS on computer. A general outline for an approach to be followed in the development of a system serving the research needs of RCS and ICIS has been suggested.^{1/} UNIDO, unlike many other international organizations, has yet to organize its statistical services to meet study needs. At least 13 other international organizations have developed one or more systems to efficiently store and analyze statistics relevant to their fields. Over 40 such systems exist among these 13 organizations.^{2/} Should UNIDO become a specialized agency, it may take over many of the statistical responsibilities now handled by the UN Statistical Office in much the same manner as ILO or FAO. The approach outlined below could be a very modest forerunner of UNIDO's future activities.

Suggestions are primarily based on an examination of the approaches adopted by the IBRD, UNCTAD and ECE. Specific points have been discussed with individual colleagues. At this stage it would be helpful if all potential users have the opportunity to give their comments and/or suggestions.

In order to be effective, the statistical services should be geared to meet the needs of a diverse range of users. All the statistical activities described here are being undertaken by personnel in RCS while a number of study programmes of other sections might benefit. Thus, substantial co-operation and support from potential users outside RCS would be a necessary input for successful development of an effective industrial statistics system. Support by other sections will be an important element in assisting RCS to serve data requirements in ICIS.

Data Availability: An inventory of statistical data currently stored in machine readable form is contained in Appendix I. The major fields covered are as follows: (i) general industrial statistics, (ii) industrial commodity production, (iii) national accounts and (iv) trade. Of these four fields, trade data account for about 80 per cent of the total volume. This is due to the fact that trade data is recorded in a more detailed fashion (SITC) and is more complete than is the data on industry (ISIC) or national accounts.

In the short run (e.g. the next 2 - 3 years) this data would constitute the bulk of the information to be stored on computer. It would be supplemented by several time series on general indicators such

1/ The project described here is intended to serve only users inside UNIDO and is concerned only with statistical information. It is distinct in content and organization from other projects such as the industrial and technological data bank which will contain qualitative information and serve requests from outside UNIDO.

2/ UN, Directory of International Statistics (S/ESA/STAT/SER.V/56) 1975

as population, exchange rates, etc. Long run possibilities are discussed later in this paper.

The first step in organizing the data into a common system would require agreement among potential users on the types of available data to be included and the form in which it should be stored. Some of the data currently available may be redundant or irrelevant for ICIS study purposes. Annex I contains suggestions regarding the data which might be omitted from the bank. These suggestions are subject to the comments of the readers, however.

The various time series upon which agreement is reached would then be arranged into several "derived files" which would be used as the nucleus for development of a data bank.

Data Sources: The types of data discussed above are presently supplied to UNIDO by the UN Statistical Office and the IMF. In the short run we may restrict ourselves to these suppliers insofar as data in machine-readable form is concerned.^{1/} The underlying reasons for this recommendation involve questions of data compatibility and consistency and are discussed in the following section. In the long run, potential suppliers of information in machine readable form would include OECD, GATT, ECE, FAO, ILO, IBRD, ESCAP, etc.

The Limitations of Industrial Data: In the case of industrial data it is strongly recommended that a somewhat higher priority be attached to the problem of data consistency and accuracy than is the case with other types of data such as trade, employment, agriculture or education. In this instance UNIDO's treatment of statistics would depart somewhat from that of UNCTAD, ILO or FAO. It would be more in line with the type of approach adopted by the IBRD in developing their data bank for study of structural change.

^{1/} There is one exception to this recommendation which is the commodity series (production and trade) now being developed by UNCTAD for their Commodities Division. This is briefly described in the mission report of 11 - 14 May, 1976.

The following justifications for a relatively high priority to be attached to statistical verification of industrial data can be cited:

- (i) the inherent weaknesses of the ISIC relative to other classification schemes.

The ISIC is a classification of kinds of economic activity and not a classification of goods and services or occupations. Consequently, it tends to be more aggregated than other schemes. Trade classifications, SITC or BTN for example, are considerably more detailed. Furthermore, the import statistics of one country provide a consistency check on the export statistics of a trading partner after accounting for such differences as c.i.f./f.o.b. Other ^{classification} schemes dealing with employment, population or education are closely related to demographic characteristics, school enrollment, etc. which may usually be verified through independent sources (e.g. social security, birth rates, tax forms, etc.) or are subject to predictable trends. Both features contribute to the reliability of data.

- (ii) The reliance of industrial data on value figures rather than physical quantities.

Many key industrial indicators must be expressed in value terms. These include value added, gross output, gross investment, and wages and salaries. Relatively speaking, a larger portion of the data pertinent to employment issues, agricultural production or even trade can be expressed in physical units of measurement. The ability to work in physical units avoids many distortions introduced when incorporating price figures. This difficulty is, of course, magnified in the case of cross-country studies where national currencies are converted to a common value unit.

- (iii) The lack of statistical expertise in industry at the national level.

The collection of national industrial statistics usually followed the emergence of industry as a relatively important economic

branch. Few developing countries undertook industrial censuses before 1960. In contrast, national statistical activities in the fields of employment, agriculture or trade were conducted long before the industrialization process began. As a consequence, information gathering in fields other than industry is based on longer experience, better communication channels and often receives larger resources from the government.

Among the major statistical problems which result from shortcomings, the following might be noted:

- i) Industrial Coverage: The demarcation lines between manufacturing and other economic activities - particularly repairs and services - are vague, often arbitrary and inconsistent across countries. Furthermore, data derived from national income accounts are likely to include cottage industries and household establishments but that derived from manufacturing census/survey tend to exclude them.
- ii) Size of Establishments: The coverage by size of establishment, measured by persons engaged or employed in an establishment, differs considerably from country to country and year to year.
- iii) Strategic Considerations: Often an industrial census does not cover manufacturing in defense establishments or even omits the entire government sector. Government establishments are not covered in Greece, for example, while Iran excludes all establishments of the Iranian Oil Company.
- iv) Value Added: Countries may use the "census" value added concept which includes the cost of non-industrial services or the "national accounting" concept which excludes this element. Value added may also be derived on a "shipment" or an "output" basis.
- v) Industrial Classification: ISIC (Rev.2) was not introduced until 1969 which has resulted in a number of inconsistent time series where earlier data was not readjusted. Several countries (e.g. France, Italy, Tunisia and U.K.) have yet to adopt any version of the ISIC.

The consequence of these discrepancies can be substantial. For example, calculations of annual growth rates of manufacturing value added at constant prices were made for Chile, Guatemala, Tunisia and Turkey from different sources (UN, IBRD and Growth of World Industry). In relative terms, the growth rates were found to differ by more than ± 55 per cent. The range of divergence in types of industrial classifications appearing in the general industrial statistics is summarized in Table A-IX of Annex I. Only 21 of 98 countries employed ISIC (Rev. 1 or Rev. 2) as defined or subject to minor qualifications. The consequences of these national differences should be carefully considered by all users. Similarly, the inconsistencies noted in coverage by size of establishments in Table A-X demonstrate the need for a cautious approach to interpretation of the data.

Verification of Industrial Data - A Suggested Approach: Approaches to the problem of data consistency vary widely. The UN Statistical Office is oriented toward a statistical publication programme and concentrates much of its resources on "presentation problems" such as conversion to a common ISIC format. Few resources are devoted to investigating the economic consistency of reported statistics. UNCTAD and FAO often make the implicit assumption that the UN statistics are correct and proceed immediately to data processing and analysis.^{1/} IBRD subjects its research data to review and verification, comparing UN data with IBRD and AID country reports as well as national sources. Most of this work, however, must be done manually and is extremely labour-intensive.

UNIDO can not expect to have the available resources for detailed manual investigation such as conducted by IBRD in the foreseeable future. Consequently, we will have to rely heavily on computer operations to compensate for the lack of necessary personnel.

Any of several approaches might be adopted for computer checking of data. The following are two examples:

I. Computer verification utilizing accounting identities and inequalities

Computer routines could be developed to compare sets of time series for individual industrial sectors and indicate those observations which do not conform with pre-determined inequalities. For example,

^{1/} This assumption may be defended, perhaps, in the case of trade or commodity data but would be dubious for industrial statistics.

the inequality

$$\frac{\text{value added of sector}}{\text{gross output of sector}} < 1$$

could be checked for all countries and all ISIC sectors within the country. Another example is the relationship between number of employees and number of operatives. Numerous possibilities are available.

This approach would identify punching or printing errors or wide discrepancies resulting from differences in coverage, classification, or response rate. Where the inequalities are not satisfied, manual investigation would be required using UN data, national sources, IBRD data, etc.

II. Computer verification assuming short-run stability in structural relationships

This approach would be more ambitious than the preceding one and is founded on economic rather than purely statistical grounds. It owes much to the Chenery studies on structural change. For example, rather than testing for an accounting consistency between gross output and value added, we would assume that the relationship between the two would be constant over a limited period of time (say, 5 years).

If the validity of this assumption can be substantiated for an individual ISIC sector over time and for a large number of countries (maximum of 103), we would then use the characteristic as a benchmark to compare with individual observations. Observations that were seriously out of line with observed trends would be checked.

Several types of inferences might be gleaned from the results, for example:

- Countries where coverage of a particular sector seems to be consistently erratic in comparison with the same sector's performance in other countries at a similar stage of development.

- The direction of bias resulting from differences in coverage (e.g. census or a survey, inclusion of firms with more than 20 employees in some years and more than fifty in others).

- Biases which are due to a change in the ISIC classification (ISIC, ISIC, rev.1, ISIC, rev.2).

The latter approach seems superior whenever the assumption of structural stability is justifiable. This approach will provide greater insights into our data problems and allow us to identify a larger number of suspect observations of which there are many if one accepts the arguments in the preceding section.

As with the first alternative, individual observations which do not conform with structural assumptions would have to be investigated manually for accuracy and reliability. Top priority might be given to key sectors and countries, leaving the data for other sectors and countries to be "cleaned up" as resources and time permits. Upon completion of this phase of the project, RCS would have two sets of data on tape; the original, unadjusted data set and a second set consisting of some unadjusted and some data which has been manually checked and possibly revised.

The Development of Time Series for Country and Cross Country Studies

At this stage we would assume that the second set of data is "verified" and can be the basis for further work.^{1/} The verified data set would be sufficient to meet some research needs. Many key time series would still be unavailable and comparability across countries would remain a problem. Work which should receive a top priority would include:

- selected time series in constant prices (e.g. value added in key industrial sectors and countries)
- consistent time series at factor values rather than a mixture of factor values, producers' values, census concepts, national accounting concepts, etc.
- adjustments for observations which are not compatible with ISIC at the sectoral level.

^{1/} Obviously, a large portion of this data would not be verified by manual investigation. Any erroneous figures which happen to fall within an acceptable range would have been included in the verified data set. This circumstance can not be avoided, however, due to available staff resources.

Generation of these time series would be based on the verified data set. The information derived from testing several of the structural relationships (described on page 6) would be helpful at this stage. The work of OECD, IBRD, ECE, UNCTAD, FAO, national sources, etc. should also be utilized. This wider range of data inputs would provide us with additional information on areas not covered by the UN Statistical Office data and independent series which can be used to revise UN data in order to obtain the types of time series mentioned above. The work would be part of the long-run development of ICIS's data bank but should be initiated as soon as the verified data set is available.

Types of Statistical requests to be emphasized: The system will be designed primarily to satisfy research requests which necessitate data reduction or data rearrangement on a large scale. Usually, these would be jobs which are too large to be easily handled by manual calculations. Job requests requiring only a limited amount of data processing and/or statistical analysis may be dealt with manually where this is more convenient.

Two assumptions concerning usage of the statistical system have implications for the nature of the design and data storage for the near future. First, the acceptable turnaround time between submission of a job and provision of the results is assumed to be 24 - 48 hours. Economists involved in research projects of 6 months to 2 years in duration should not find this feature to be an inconvenience. Second, usage of the system would not exceed an average of once per day for the next several years.

These assumptions may all be translated into costs and manpower requirements. The basic premise is that our available resources can be best used by giving primary emphasis to (i) large scale jobs and (ii) development of reliable time series. Detailed information requests requiring immediate responses would have a low priority for the time being.

Published Industrial Statistics: The preceding discussion has been concerned only with data in machine readable form. It is equally important that ICIS obtain access to the large volume of published data by national sources. This step would be a necessary adjunct of the development of an industrial statistic system but could serve other needs as well.

In 1975 few industrial censuses were available in UNIDO. In an effort to obtain additional censuses a circular letter was mailed to 80 national statistical offices requesting censuses - specified by title and year. Those statistical offices were contacted where it was known that industrial censuses/surveys had been carried out in the last 10 years. Only about 15 positive replies were received.

Needless to say, the information contained in industrial censuses will be a necessary element in the process of data verification and adjustment (described on page 5) and the development of new time series (page 7). A summary of published industrial data from censuses/surveys is given in table C-I , p 32 of Annex III.

Computer Programming and Software: Over the past several years the staff of RCS (and the previous Survey Section) have written a number of computer programmes for use in economic research. A summary of these is provided in Appendix II. The RCS staff member responsible for our programming requirements also has several years of experience with a variety of packaged statistical routines, all of which are available through IAEA facilities and are summarized in Appendix II.

In view of the fact that RCS and ICIS programming needs require (i) a detailed knowledge of UN data classifications (particularly ISIC and SIC) and (ii) a good knowledge of econometrics and statistical methodology, ICIS should continue to develop the necessary computer programmes internally. Essentially this implies that in the short-run (i.e. the next 2 - 3 years) our preference should be on development of the statistics and methodology while gradually building on existing experience in the programming aspects. Short-run requirements in the fields of data bank design and analysis may be met through the judicious use of consultant funds. To date, we have relied heavily on the technical advice of UNIDO's programming section in the Administration Division as well as that of the IAEA. This practice will be continued although we can not expect these sections to assume responsibilities exceeding their present "consultive role".

Finally, the choice of computer facilities to be utilized by RCS should be mentioned. The issues of cost, available hardware and access to programme software are all relevant. To date, we have used IAEA computer facilities. This includes an IBM 370 with a total capacity of 750 K (= 750,000 bytes). Internal core accounts for approximately 250 K, leaving a maximum of 500 K available for an actual job. In addition, IAEA has "virtual storage" which provides for continuous access to data outside core when jobs exceed 500 K. Thus, the maximum capacity would be considerably larger than actual storage and no capacity problems have been encountered in previous jobs carried out on the RCS data base (which totals 10 million records).

With regard to cost, the following table gives the results of an experiment conducted at each of 4 installations. The job request in each case was identical, consisting of 6 compilations and one tape run.

Cost of Computer Time at various Installations

<u>Installation</u>	<u>Cost Ratio (IAEA = 1.00)</u>	<u>Cost Factors</u>
1. IAEA	1.00	Cost includes rental charges, such elements as disk access, C.P.U. time multiplied by storage required, tapes, cards, lines printed, etc.
2. International Computer Centre Geneva	0.49	Cost includes rentals. Permanent utilization would include an additional cost to UNIDO of \$ 4000/mo. for telephone hookup and \$ 1800/mo. for paper, cards, etc.
3. Central Sparkasse Vienna	1.78	Pricing procedure is similar to (1)
4. IBM	3.78	Pricing procedure is similar to (1)

In the short-run, RCS may continue to use IAEA facilities. In the long-run, ICC might be considered depending on UNIDO's overall computer requirements.

APPENDIX I

The following tables provide an inventory of the data stored on tape. Most of the existing data is pertinent to the type of research which ICIS is now conducting or will be conducting in the near future. In a few cases suggestions for the exclusion of certain time series are made.

With regard to the general industrial statistics (Table A-I), the length of the time series usually available for ISIC sectors (3 and/or 4-digit level) is indicated. More detailed definitions of the concepts are given in Growth of World Industry, Vol. I. A list of the countries covered is shown in Table A-II.

Specific tabulations have been done for commodity productions and summarized in Table A-III. The summary is at the 3-digit level but the actual data (in physical units) is at the 6-digit ISIC level of disaggregation. Food, beverages, textiles, chemicals, ferrous and non-ferrous metals generally have relatively good coverage.

Trade statistics are based upon the extract tapes and are described in Table A-IV. The total number of undivided groupings in the SITC is 1,312 (i.e. at the 5-digit level). Most 5-digit SITC's are given in the extract tapes, and coverage at the 1,2,3 and 4-digit levels is almost 100 per cent.

Tapes for the Growth of World Industry, Vol. I and II are received annually. IMF data is received monthly while commodity trade tapes are received as they are prepared. The national accounts information has been received on an irregular basis to date.

TABLE A-I General Industrial Statistics

	Usual Time Period covered for developing countries ^{a/}	Country Coverage ^{b/} Inclusion	Recommendation for and Comments
1. Number of establishments	generally 5 years	I. 26 II. 5 III. 103	<u>yes</u> coverage of some countries varies over time; e.g. establishments with 5 or more employees, 20 or more, etc.
2. Number of enterprises	generally 5 years	I. 1 II. 6 III. 2	<u>no</u> poor country coverage; enterprise is a legal concept and not an economic one
3. Number of persons engaged	1963-1971, most years	I. 27 II. 11 III. 103	<u>yes</u> figures include unpaid workers, working proprietors
4. Number of employees	5-7 years, 1963-1973	I. 27 II. 11 III. 103	<u>yes</u> figures exclude unpaid workers, working proprietors. Combination of 3 and 4 provides for possible adjustment for a longer time series
5. Wages and salaries of employees	most years.	I. 27 II. 11 III. 103	<u>yes</u> coverage is subject to the same variability as (1) above
6. supplements to wages and salaries	-	I. 26 II. 7 III. -	<u>no</u>
7. number of operatives	5-7 years for most countries	I. 27 II. 11 III. 103	<u>yes</u> operatives include employees engaged in activities ancillary to the main activity
8. wages and salaries of operatives	5-7 years for most countries	I. 27 II. 11 III. 103	<u>yes</u> include to develop an adjusted time series for wages and salaries over a longer time period
9. man hours worked by operatives	2-5 years	I. 26 II. 11 III. 103	<u>yes</u> coverage is subject to the same limitations as (1) above
10. man-days worked by operatives	-	I. 1 II. - III. -	<u>no</u>
11. quantity of electricity consumed	usually 5 years	I. 27 II. 11 III. 103	<u>yes</u> coverage is subject to same limitations as (1) above

	Usual Time Period covered for developing countries ^{a/}	Country Coverage ^{b/}	Inclusion	Recommendation for and Comments
12. Gross output in factor values	5 - 6 years	I. 14 II. - III. 18	<u>yes</u>	excludes indirect taxes and includes current subsidies
13. Gross output in producers' values	5-6 years or more	I. 8 II. - III. 27	<u>yes</u>	includes indirect taxes and excludes current subsidies
14. Gross output	5- 6 years or more	I. 6 II. 11 III. 64	<u>yes</u>	compiled on a production basis while (12) and (13) are on a shipment basis which includes net change in stocks of finished goods. These series should eventually be converted into one consistent series
15. Cost of goods and services consumed	-	I. 26 II. 7 III. -	<u>yes</u>	
16. Cost of materials and supplies consumed	-	I. 26 II. 7 III. -	<u>yes</u>	
17. Cost of purchased fuel and electricity consumed	-	I. 25 II. 7 III.-	<u>yes</u>	
18. Value added, approximate factor values	4-5 years, time series are frequently broken	I. 18 II. - III. 20	<u>yes</u>	see comment on (2)
19. value added, producers values	same as (18)	I. 6 II. 23 III. -	<u>yes</u>	see comment on (13)
20. value added	same as (18)	I. 4 II. 11 III. 65	<u>yes</u>	figures are calculated on somewhat a different basis than (13) or (19) depending on the availability of data on current costs of inputs, depreciation, etc.
21. total, gross fixed capital formation	5 years generally	I. 27 II. 11 III. 103	<u>yes</u>	
22. Gross fixed capital formation (machinery and equipment)	-	I. 27 II. 7 III. -	<u>no</u>	
23. Total, value of stocks at end of period	-	I. 27 II. 7 III. -	<u>nc</u>	
24. value of stocks at end of period (materials, fuels, supplies)	-	I. 27 II. 7 III. -	<u>no</u>	

	Usual Time Period covered for developing countries ^{a/}	Country Coverage ^{b/}	Inclusion	Recommendation for and Comments
25. stocks, work-in progress	-	I. 27 II. 7 III. -	<u>no</u>	
26. stocks, finished goods	-	I. 27 II. 7 III. -	<u>no</u>	
27. index numbers of industrial production	1963-1973	I. 27 II. 7 III. 60	<u>yes</u>	

^{a/} Coverage for developed market economies and centrally planned countries is usually 1963-1973. Coverage of individual ISIC sectors at 3 or 4-digit level is generally good.

^{b/} Developed market economies are indicated by I; centrally planned economies with a II and developing countries identified by III.

TABLE A.II

Countries, published in The Growth of World Industry, 1973 Edition,

Vol. I : 61 (published)

Argentina
Australia
Austria
Belgium
Brazil
Bulgaria
Canada
Chile
Colombia
Cyprus
Czechoslovakia
Denmark
Dominican Rep.
Ecuador
Egypt
El Salvador
Finland
France
Germany, Dem.Rep.
Germany, Fed.Rep.
Greece
Guatemala
Honduras
Hungary
India
Iran
Iraq
Ireland
Israel
Italy
Japan
Kenya
Korea, Rep. of
Luxembourg
Malta
Mexico
Morocco
Netherlands
New Zealand
Norway
Panama
Peru
Philippines
Poland
Portugal
Romania
Singapore
South Africa
Southern Rhodesia
Spain
Sri Lanka
Sweden
Switzerland
Syrian Arab Rep.
Turkey
USSR

United Kingdom
United States
Venezuela
Yugoslavia
Zambia

Other countries : 42 (unpublished)

Algeria
Angola
Bolivia
Burma
Khmer Rep.
Cameroon
Central African Rep.
Congo
Zaire
Costa Rica
Cuba
Ghana
Guyana
Haiti
Hong Kong
Indonesia
Ivory Coast
Jamaica
Kuwait
Lebanon
Madagascar
Malawi
Mauritius
Mozambique
Netherland Antilles
Nicaragua
Nigeria
Pakistan
Paraguay
Puerto Rico
Saudi Arabia
Senegal
Southern Yemen
Sudan
Surinam
Thailand
Trinidad and Tobago
Tunisia
Uganda
Tanzania
Uruguay
Viet-Nam, Rep.

TABLE A-IV

COMMODITY TRADE STATISTICS

TAPES

Years

1968
Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK
Greece, Ireland, Spain, Yugoslavia, Australia, New Zealand, Fiji, Western Samoa
Libyan Arab Rep., Sudan, Tunisia, Egypt, Malawi, Mauritania

1969

Canada, US, Argentina, Brazil, Ecuador, Mexico, Paraguay, Peru, Venezuela, Guatemala,
El Salvador, Guatemala, Honduras, Nicaragua, Cuba, Haiti, Philippines, Singapore, Thailand,
Malaysia (West), Sabah, Sarawak, Pakistan, Philippines, Singapore, Thailand,
Belgium, France, Germany (Fed. Rep.), Italy, Netherlands
Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK
Greece, Ireland, Spain, Yugoslavia, Australia, New Zealand, Fiji, Western Samoa
Libyan Arab Rep., Sudan, Tunisia, Egypt, Malawi, Mauritania

1970
Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK
Greece, Ireland, Spain, Yugoslavia, Hungary, Australia, New Zealand, Fiji, Western Samoa
Libyan Arab Rep., Sudan, Tunisia, Egypt, Cameroon, Central African Rep., Chad,
Congo, Ivory Coast, Madagascar, Malawi, Niger, Reunion,
Senegal, Togo, Upper Volta

1971

Israel, Japan, Iran, Lebanon, Saudi Arabia, Turkey, Afghanistan, Brunei, Burma, Cambodia,
Sri Lanka, Hong Kong, India, Indonesia, Korea (Rep. of), Laos, Pakistan, Philippines,
Singapore, Thailand, Vietnam (Rep. of)
Belgium, France, Germany (Fed. Rep.), Italy, Netherlands
Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK
Greece, Ireland, Spain, Yugoslavia, Hungary, Australia, New Zealand, Fiji, Western Samoa

1972

Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK
Libyan Arab Rep., Sudan, Tunisia, Egypt, Cameroon, Central African Rep., Chad, Congo,
Gabon, Zaire, Dahomey, Ghana, Ivory Coast, Madagascar, Malawi, Mali, Mauritania,
Niger, Reunion, Senegal, Togo, Upper Volta, Zambia

Years

Countries on tape

1970
 Canada, US, Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Venezuela, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Barbados, Guadeloupe, Martinique, Netherl. Antilles, Trinidad and Tobago, French Guiana, Panama (excl. Canal Zone)
 Israel, Japan, Iran, Jordan, Kuwait, Lebanon, Turkey, Afghanistan, Burma, Hongkong, India, Indonesia, Korea (Rep. of), Laos, Malaysia (West), Pakistan, Philippines, Singapore, Thailand, Viet-Nam (Rep. of)
 Belgium, France, Germany (Fed. Rep.), Italy, Netherlands
 Greece, Ireland, Spain, Yugoslavia, Hungary, Australia, New Zealand, Fiji, Western Sam

1971
 Greece, Ireland, Spain, Yugoslavia, Hungary, Australia, New Zealand, Fiji
 Libyan Arab Rep., Sudan, Tunisia, Egypt, Cameroon, Central African Rep., Chad, Congo, Gabon, Dahomey, Ghana, Ivory Coast, Madagascar, Malawi, Mali, Mauritania, Niger, Reunion, Senegal, Somalia, Togo, Upper Volta, Zambia
 Canada, US, Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Barbados, Guadeloupe, Martinique, Netherl. Antilles, Trinidad and Tobago, French Guiana, Panama (excl. Canal Zone)
 Israel, Japan, Iran, Jordan, Kuwait, Lebanon, Turkey, Afghanistan, Hong kong, India, Indonesia, Korea (Rep. of), Laos, Pakistan, Philippines, Singapore, Thailand
 Belgium, France, Germany (Fed. Rep.), Italy, Netherlands
 Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK

1972
 Canada, US, Argentina, Brazil, Chile, Colombia, Mexico, Venezuela, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Barbados, Guadeloupe, Martinique, Netherl. Antilles, Trinidad and Tobago, French Guiana, Panama (excl. Canal Zone)
 Libyan Arab Rep., Morocco, Sudan, Tunisia, Egypt, Ethiopia, Ghana, Malawi, Reunion, Senegal, Uganda, Zambia
 Israel, Japan, Iran, Iraq, Jordan, Kuwait, Lebanon, Turkey, Hong kong, India, Indonesia, Korea (Rep. of), Laos, Pakistan, Singapore, Thailand
 Greece, Ireland, Spain, Yugoslavia, Czechoslovakia, Hungary, Australia, New Zealand, Fiji

Countries on tape

Year

1972
Belgium, France, Germany (Fed. Rep.), Italy, Netherlands

Netherlands

Austria, Denmark, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, UK

Canada, US, Argentina, Brazil, Mexico, Guadeloupe, Martinique, Netherl. Antilles, French Guiana

Belgium, Denmark, France, Germany (Fed. Rep.)

Germany (Fed. Rep.), Ireland, Italy, Netherlands, UK

Israel, Japan, Jordan, Kuwait, Lebanon, Turkey, Hong Kong, Indonesia, Korea (Rep. of), Laos, Pakistan, Singapore, Thailand

Libyan Arab Rep., Morocco, Tunisia, Egypt, Ghana, Kenya, Malawi, Reunion, Uganda, Un. Rep. of Tanzania, Zambia

Austria, Finland, Iceland, Norway, Portugal, Sweden, Switzerland

Greece, Spain, Yugoslavia, Czechoslovakia, Hungary, Australia, New Zealand, Western Samoa

Austria, Finland, Iceland, Norway, Portugal, Sweden, Switzerland

Spain

Canada, US

New Zealand, Turkey

Denmark, France, Germany (Fed. Rep.), Italy

Japan, Singapore

1974

Type of Data ^{c/}	Summary of Component Breakdown	Recommendations and Comments
IX. Private Final Consumption by object	similar to V but also includes education, recreation, etc.	<u>yes</u>
X. Composition of Gross Capital Formation	Buildings, other construction Transport Machinery, Equipment, etc.	<u>yes</u> ; by type of capital goods
XI. Distribution of Income	Employee compensation net property and entrepreneurial income (public, private, households, etc.) current transfers	<u>no</u> ; breakdown according to property, net entrepreneurial income, other current transfer is partially redundant, and does not seem relevant
XII. External Transactions	Merchanize exports merchanize imports insurance service charges entrepreneurial income capital transfers, etc.	<u>yes</u>
XIII. GDP, National Income and Disposable Income	Total and per capita figures	<u>yes</u> ; estimates are official or adjusted; in US dollars; index numbers in constant prices
XIV. Expenditure on GDP	Gov. Final Consumption Private Final Consumption Gross Fixed Capital Formation, etc.	<u>yes</u> ; figures in national currencies; also includes growth rates for 5 and 10 year periods in constant prices
XV. GDP by kind of economic activity	Agriculture Industry Construction Wholesale, retail transport, etc.	<u>yes</u> ; figures in national currencies; growth rates in constant prices
XVI. Saving, consumption of fixed capital and net capital transfer		<u>yes</u>
XVII. Principal aggregates and their inter-relationships	Domestic factor income, derivation of national income, consumption of fixed capital, etc.	<u>yes</u> ; some overlap with earlier tables although additional estimations are included here; former SNA in most cases

a/ The following tables were not summarized: income and outlay of non-financial corporate and quasi-corporate enterprises; income and outlay transactions of general government and of central, state and local governments. These tables appear infrequently and are not closely related to ICIS study interests.

b/ The classification for centrally planned economies differs from that described here and is based on material product balances.

c/ For developed market economies and centrally planned economies, the time series are for the period 1960-1973. For developing countries, the time series is usually 5 - 6 years, ending in 1971, 1972 or 1973.

TABLE A-VII

FINANCIAL STATISTICS^{a/}

	Description	Unit of Measurement	Time period
I. Export Prices	Coverage by country, total exports	indices in US dollars	1951-1975; generally 1951-75 for developing countries
II. Import Prices	same as I	same as I	coverage is less complete than I
III. Exchange Rates	market rate/ par or central rate	units of national currency/dollar	end of period and period average
IV. International Transactions	major commodity exports imports c.i.f. and f.o.b.	national currency	maximum time series is 1951- 1975, by country
V. National Accounts ^{b/}	GDP, gross fixed capital formation, GNP, etc.	national currency	same as above
VI. Population	-	-	same as above
VII. Internal Prices	wholesale, consumer prices, industrial production	indices	same as above

^{a/} The time series included here are all recommended for inclusion in the data bank. The IMF tapes are identical with the publication, Financial Statistics. The reader should refer to this document for a complete list of the data provided.

^{b/} This time series overlaps with UNSO figures. Initially, it might be included as a check on the UN figures.

A-V TRADE STATISTICS^{2/}

	Type of Data	Unit of Measure	Recommendation for Inclusion and Comments	
1.	Direction of trade flow and SITC classification	Imports, exports or re-exports	SITC identification number	Yes, SITC identification is at the 1, 2,3,4 and 5 digit levels.
2.	Trade flow	value of trade, expressed in US dollars and national currency	thousands of units	Value in US dollars should be retained while value in national currency should be omitted. Countries report in US\$ and UNSO converts these values at UN exchange rates.
3.	Volume of trade flow	expressed in standard units	metric tons, number, etc.	Yes
4.	Origin and destination	reporting country and partner country	-	Yes, partner countries are identified for all trade flows exceeding US\$ 10,000
5.	Recording practice	c.i.f. or f.o.b.	-	Yes

^{2/}Data currently covers the years 1968-1974

TABLE A-VI National Accounts^{a/ b/}

Type of Data ^{c/}	Summary of Component Breakdown	Recommendations and Comments
I. GDP and expenditure	Government final consump. Private final consumption increase in stocks gross fixed capital formation exports imports GDP in purchasers' values	<u>yes</u>
II. National Income and Disposable Income	employee compensation foreign employee compensation foreign property and entrepreneurial income indirect taxes subsidies national income national disposable income	<u>yes</u> ; overlap with XVIII but provide data on present (and former) SNA
III. GDP by kind of economic activity	agriculture mining manufacturing construction, etc.	<u>yes</u>
IV. Capital transactions	savings fixed capital consumption net capital transfers net lending position etc.	<u>yes</u>
V. Contributions to GDP by kind of economic activity	mining, quarrying ISIC 311,312,313 ISIC 321,322,323 ISIC 331,332, etc.	<u>yes</u> Producers' values, in constant prices; not always available for developing countries
VI. Domestic Factor Incomes	breakdown usually the same as V; covers domestic factor income and employee compensation	<u>yes</u>
VII. Supply and Composition of Commodities	Gross output, imports, trade and transport margins for major economic sectors of the economy	<u>yes</u>
VIII Government Final Consumption	Cost compositions (wages, intermediate consumption, final consumption) and purchasers values for nine general groups (defense, education, health, etc.)	<u>no</u>

TABLE A-VIII
BALANCE OF PAYMENTS^{a/}

Time Series

I. Investment Income	Direct investment and other	US dollars	1966-1971
II. Direct Investment	Inflows and outflows for each country	US dollars	same
III. Capital Movements	Private, long-term and short-term	US dollars	same
IV. Development Aid	Grants, loans, repayments	US dollars	same

^{a/} Our data on tape is identical with IMF, Balance of Payments Yearbook. The reader should refer to that publication for a complete list of the data obtained from the original tapes.

TABLE A-IX

Groupings of Countries by Type of Industrial Classification used in General Industrial Statistics

- A. The original data were in ISIC (Rev. 1 or Rev. 2)

Austria, China (Rep. of)^{1/}, Ghana, Haiti, Hong Kong, India
Western Samoa

- B. The original data were in ISIC (Rev. 1 or Rev.2) subject to some minor qualifications

Bolivia, Costa Rica, Ecuador, Guatemala, Jamaica, Korea (Republic of), Malawi, Malta, Panama, Swaziland, Syria, Tanzania, Uganda, Venezuela

- C. The original data were in national industrial classification which is comparable with ISIC (Rev. 1 or Rev.2)

Brazil, Canada, Chile*, Colombia, Cyprus*, Denmark, Dominican Republic, Egypt, El Salvador, Ethiopia, Fiji, Finland, Greece, Honduras*, Iran *, Israel, Jordan*, Kenya, Libyan Arab Republic **, Luxembourg, Malagasi Republic*, Malaysia East (Sabah), Malaysia East (Sarawak)*, Malaysia West, Mauritius, Morocco, Mozambique*, Netherlands*, New Zealand, Nigeria*, Norway*, Pakistan*, Peru, Philippines, Rhodesia, Singapore, Somalia, South Africa*, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Trinidad and Tobago ***, Turkey, United States, Uruguay*, Yemen Democratic Republic, Zaire, Zambia.

- C'. The original data were in national industrial classification which is not strictly comparable to ISIC (Rev. 1 or Rev.2), but is adjusted to represent ISIC (Rev.1 or Rev.2)

Algeria, Australia, Belgium ***, Bulgaria, Czechoslovakia***, German Democratic Republic, Hungary, Iraq*, Ireland*, Japan, Kuwait, Papua New Guinea, Poland, Portugal, Puerto Rico, Romania, Tunisia, U.S.S.R.

- D. The original data were in national industrial classification which can hardly be reconciled with ISIC (Rev. 1 or Rev. 2).

Argentina, France**, Germany (Federal Republic of)***, Italy, Mexico, Sudan, U.K., Yugoslavia.

1/ Discontinued after 1970 edition of the source.

* Possibly overestimates the aggregate manufacturing sector.

** Possibly underestimates the aggregate manufacturing sector.

*** The nature of error resulting from incomparable classification is not known.

TABLE A-X

Classification of Countries by Employment Coverage in
General Industrial Statistics

1. Covers all establishments. 1/

Argentina, Austria, Bolivia, Brazil, Canada, China (Taiwan only), Egypt, Fiji, Germany - Dem. Rep., Greece, Haiti, Hungary, Iran, Ireland, Japan, Kuwait, Luxembourg, Malagasy Rep., Malaysia East (Sarawak), Malta, Mauritius, Mozambique, Netherlands, New Zealand, Norway, Poland, Portugal, Puerto Rico, Rhodesia, South Africa, Spain, Sri Lanka, Syria, Tunisia, USA, USA, Uruguay, Western Samoa, Zambia.

2. Covers establishments with 5 or more persons engaged. 2/

Algeria, Australia, Colombia, Costa Rica, Cyprus, Denmark, Dominican Republic, Ecuador, El Salvador, Ethiopia, Finland, Guatemala, Honduras, Israel, Korea - Rep of, Malaysia East (Sabah), Panama, Papua New Guinea, Peru, Philippines, Somalia, Sweden, Switzerland, Yemen Democratic Republic.

3. Covers establishments with 10 or more persons engaged. 3/

Chile, Germany - Fed. Rep., India, Iraq, Jamaica, Jordan, Morocco, Nigeria, Pakistan, Singapore, Swaziland, Tanzania, Thailand, Trinidad and Tobago, Turkey, Uganda.

4. Covers establishments with 20 or more persons engaged. 4/

Ghana, Hong Kong, Kenya, Libyan Arab Rep., Italy, Malawi, Sudan.

5. Almost no information on the number of persons engaged is available.

Belgium, Bulgaria, Czechoslovakia, France, Malaysia (west), Mexico, Romania, USSR, Yugoslavia, Zaire.

1/ Ireland covers establishments with 3 or more persons engaged. New Zealand, and Norway cover establishments with 2 or more persons engaged. Egypt, covers establishments with 10 or more persons engaged in the private sector. Greece covers establishments with 10 or more persons for 1958-61 and 1965; and 30 or more persons for 1963-64. South Africa covers only private establishments. Luxembourg covers establishments with 20 or more for 1970.

2/ Ecuador covers establishments with 7 or more persons.

3/ Jordan covers establishment 8 with 5 or more for 1963. Morocco covers all establishments with 50 or more persons and 50% of those with 10-50 persons.

4/ Kenya covers establishments with 50 or more persons (for 1963 and 1967 establishments with 5 or more persons). Ghana covers establishments with 30 or more persons

APPENDIX III

Computer Programmes developed in RCS and available
commercial sub-routines

I. Ad-hoc programmes written within RCS

1. A number of programming routines have been written for rearrangement of data classified according to ISIC to meet a variety of criteria.

Additional routines can be written to meet any pre-specified criterion expressed in terms of ISIC. Examples are the division of industry into light and heavy, the division of industry into stage of industrial processing, etc.

2. A number of programmes for data rearrangements according to SITC are available and again new programmes can be written according to any predetermined criteria expressed in terms of SITC. Examples include the breakdown of trade into broad economic categories, the classification of trade adopted from UNCTAD according to primary, semi-manufactures and manufactures, etc. A major programming exercise has been the development of a concordance matching programme which pairs SITC with ISIC and with the Brussels Tariff Nomenclature. The concordance is based on the official UN definitions and each of the three codes can be matched pairwise at any specified level of aggregation (for example, 1,2,3,4 or 5-digit levels).

3. A Variety of statistical routines have been developed including the regression of index numbers (physical units of production) over time, employment indices, extrapolation of data for future years, aggregation from 3-digit ISIC to total manufactures, percentage distribution and compound growth rates, tests for best fit, productivity estimates, etc. Special routines have also been written for regressions in log-log form, semi-log form, log-inverse and log-log inverse as well as the calculation of elasticities including growth and size elasticities. Finally, various programmes have been developed to deal with inconsistencies in the ISIC classification at the country level.

II. Statistical sub-routines which are available in package form include the following which may be relevant to study purposes in ICIS: correlation and regression analyses, analysis of variance, non-parametric statistics, stepwise multiple regression, matrix inversion, factor analysis, etc.

In each case the main programme for utilising these sub-routines has been written by staff in RCS. In addition, we have written a few specific sub-routines for the calculation of statistics such as the Durbin-Watson ratio.

Product Name	Quantity of Original Product	Quantity of Recycled Product	Quantity of Mixed Product	Quantity of Original Product	Quantity of Recycled Product	Quantity of Mixed Product	Quantity of Original Product	Quantity of Recycled Product	Quantity of Mixed Product
Aluminum
Steel
...

Notes: A - The original data were in 1950 (Ser. 1 or Ser. 2) subject to some other qualifications.
 B - The original data were in 1950 (Ser. 1 or Ser. 2) subject to some other qualifications.
 C - The original data were in national industrial classification which is comparable with 1950 (Ser. 1 or Ser. 2).
 D - The original data were in national industrial classification which is not strictly comparable to 1950 (Ser. 1 or Ser. 2).
 E - The original data were in national industrial classification which are usually to be corrected with 1950 (Ser. 1 or Ser. 2).

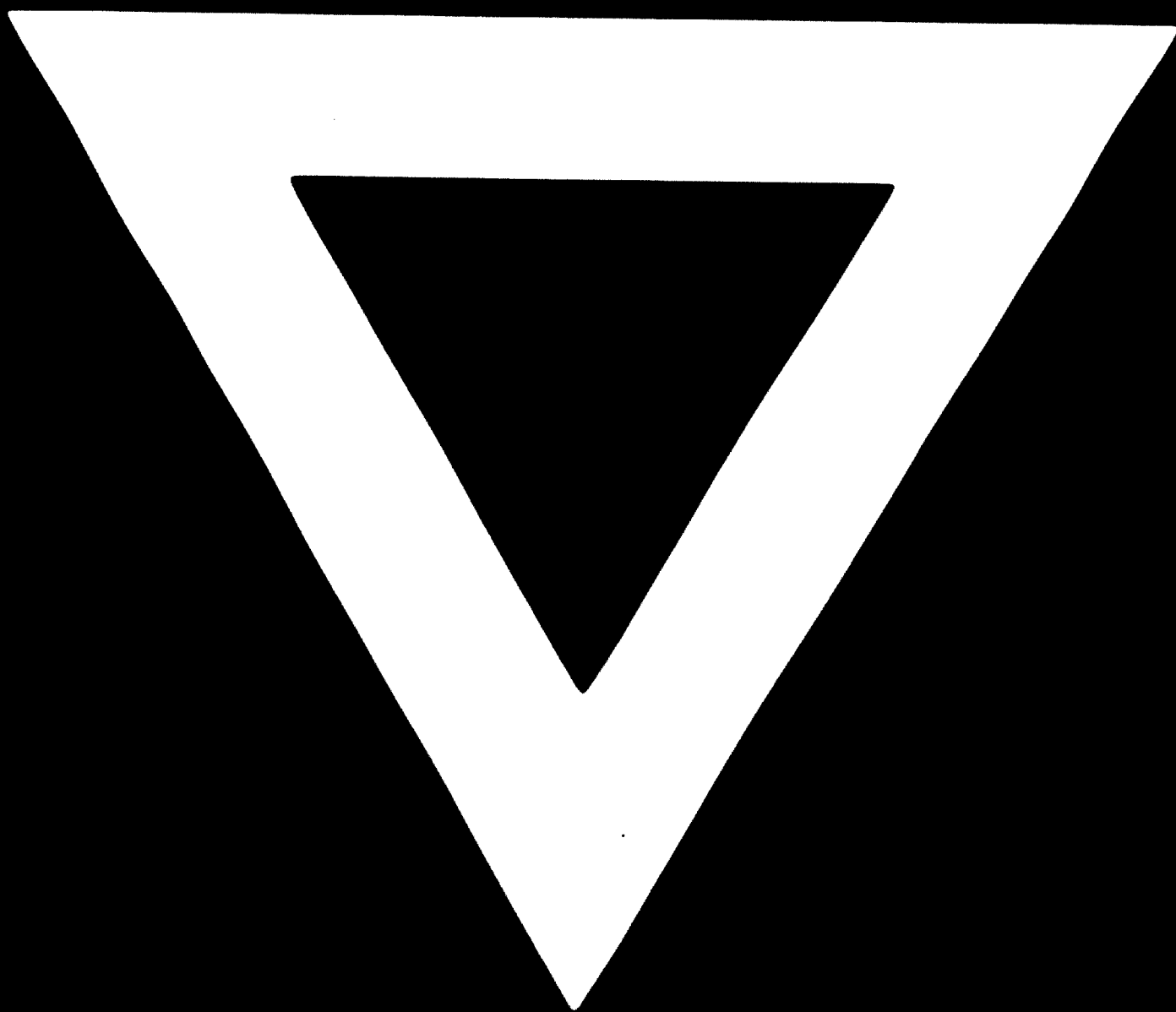
1950 - Iron and Steel Industry
 1950 - National Industrial Classification
 1950 - National Industrial Classification

1950 - Iron and Steel Industry
 1950 - National Industrial Classification
 1950 - National Industrial Classification

1950 - Iron and Steel Industry
 1950 - National Industrial Classification
 1950 - National Industrial Classification

Source: U.S. Bureau of Economic Analysis, Vol. 1, 1971 and earlier editions.

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