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THE INTEGRATED SYSTEM OF INDUSTRIAL STATISTICS

Prepared by the Statistical Office of the United Nations

1.   This paper deals with the possibilities, purposes and methodology
of an integrated system of industrial statistics.

2.   An integrated system of industrial statistics is recommended as
the most efficient means to secure comprehensive data on industrial
activity of the maximum reliability, comparability and continuity. The
practical experience of national agencies has borne out that separate
inquiries should be related to one another with regard to objectives and
methods. It is clear that the elements of each inquiry that should be
considered in relating the inquiries to one another consist of the kind
of industrial units to be covered, the data to be sought and compiled,
and the methods and organizational arrangements to be utilized for these
purposes.

A. The possibilities of the integrated system

3.1 The inter-dependency of the different inquiries in a full statistical
system offers the following:

The more comprehensive (census) inquiries may serve as a base or
frame for the current or ad hoc inquiries. To serve the current and
ad hoc inquiries the comprehensive inquiry should yield the following,
among others.

(a) The information on the identity and characteristics of
industrial establishments that are necessary to establish a definitive
directory;

(b) Sufficient information on the activities of the industrial
establihhments to make it possible to classify them to the different
branches of industry. Detailed data on the products produced or
services rendered helps this considerably.

(c) The data on the employment, output and other aspects of the
activities of these units that are required for the separation of large
and small establishments or for selection of industries and establishments
for other surveys;

(d) The data for establishing a frame for the taking of sample
surveys;

/(e) The

(e) The data for the establishment of weights for index numbers
of production, employment, producer prices;

(f) The data that are necessary for the establishment of a list
of selected commodities for which industrial data should be collected
and a list of selected materials for which consumption data might be
collected in current inquiries;

(g) The data which help to estimate the proportion of establishments
which are included in the more frequent inquiries. These estimates
might be based on employment or on output data.

3.2 The annual inquiries may help to up-date the data of the comprehensive
inquiries and at the same time help the organization of the monthly
or quarterly inquiries. Some such uses are:

(a) To up-date census data of value added by the help of annual
data on value added and the index number of industrial production. This
might help the calculations of national accounts.

(b) To up-date the industrial coefficients of an input-output
table by the help of the enumeration of the consumption of the most
important materials in the different branches of industry.

(c) To obtain data for checking and revising classification of
establishments into the different branches of industry.

(d) To provide an up-to-date frame for the selection of establishments
for the montly and quarterly inquiries, which would help to identify
the new factories and those which are gone out of business.

(e) To provide an up-to-date estimation of the share covered by
the more frequent inquiries.

Summing up the relation to the more frequent inquiries the annual
surveys provide the basis for designing monthly or quarterly surveys
and for adjusting the coverage and results of the current survey to more
complete and reliable information.

3.3 The monthly and/or quarterly inquiries are necessary for constant
evaluation of the economic development. Governments require data on at
least selected activities of the important industrial units of their
economies more frequently than once every year. The level of industrial
activity, especially of larger establishments, may vary substantially in
the short run. Figures, at least on production and employment, are wanted.
All this means that the monthly or quarterly data are helping to:

/(a) Up-date

(a) Up-date the production and employment data of the annual inquiries;

(b) Supply provisional, preliminary but quick annual data;

(c) Yield data for provisional or final indexes of production and employment.

The finalization of the provisional annual figures yielded by the monthly and quarterly inquiries, with the help of the annual inquiries, needs a well-planned co-ordination between the annual and the more frequent than annual inquiries.

3.4 The more frequent than annual inquiries are the monthly and quarterly surveys. The question arises as to which one is preferable, the monthly or the quarterly survey. This question can be decided only in the light of the national circumstances. The monthly surveys yield more current data and show the movement of industrial development in a more continuous way, as well as having several other advantages. Since the agency collecting the surveys is in constant communication with the establishments, the statisticians supervising the operation acquire a close knowledge of the industry. On the other hand, a quarterly survey requires a smaller number of skilled statisticians, costs less in every respect, and might be more acceptable to the establishments submitting the reports.

3.5 The ad hoc (occasional) inquiries may help to give complementary information on certain aspects of the industry. This kind of inquiry may cover such topics as fixed capital, total capital, at a certain date, details of installed equipment including capacity, use of capacity, distribution of labour force according to skill, man-hours worked per unit of selected product, use of up-to-date technology, etc. Since it would not be feasible to burden the comprehensive or annual inquiries with this kind of investigation, these and similar subjects may be treated in the ad hoc inquiries. (For more on these indicators, see Statistical Commission paper E/CN.3/316 "Major Statistical Indicators of Industrial Activity".)

3.6 The two kinds of inquiries, census and current, are complementary to each other in several aspects.

(a) Census inquiries generally have much more detailed data than current or ad hoc inquiries. The former yield every kind of structural data. The size structure, the area structure, the kind of activity structure are among the characteristics generally available only from the comprehensive inquiries. It is clear, however, that to compile time series from the comprehensive inquiries will not be adequate and surely not sufficient for economic analysis. These data will serve as benchmark data only and should be connected with the time series obtained from annual and more frequent inquiries.

(b) Monthly or quarterly inquiries supply data which yield the series for the calculation of the time series and index numbers. The most important of these are: quantity and value series of selected products produced, index numbers of industrial production, employment and prices.

(c) Annual inquiries usually may yield both structural data and time series, and may be the only inquiries to give time series on derived figures (e.g., productivity, input-output ratios).

3.7 It should be borne in mind that the inter-dependency will not always mean that one inquiry is complementary to the other. It has to be taken into account that an item of data derived from one inquiry may not necessarily be complementary to other data of a different inquiry because of differences in scope, coverage, reference period, etc. There are many examples of this in the countries of Latin America. One of the best known is the difference between the coverage, frequency, reference period, statistical unit, etc., of production data and employment data. The use of these data, therefore, for the estimation of changes in labour productivity may be very misleading.

3.8 The setting up of a completely integrated system of industrial statistics makes it possible and necessary to ensure the continuous, planned work of an industrial organization and in other agencies dealing with industrial statistics. The constant work on industrial statistics should help the staff to acquire the necessary skill, experience and knowledge to conduct successfully current and basic industrial inquiries. The same

personnel supervising the same sectors of industry should accumulate a
considerable knowledge of the problems and development of the industry.
They will become experts on the methods and standards of industrial
statistics, and they can be kept informed on the development of
industrial statistical methods and standards in other countries.

3.9   An integrated system of industrial statistics using the same methods,
standards, etc., will serve continually to educate respondents and increase
their understanding of the whole operation and result, most likely, in
their improved co-operation. They will also learn that the published
statistical data may prove useful in their own business activities
provided it is published in time.

3.10 An integrated system of industrial statistics will ensure the
necessary co-operation and co-ordination of all the agencies which collect,
compile and publish industrial statistics. In many countries of Latin
America, several separate organizations are dealing with industrial
statistics. For example, in some countries the industrial census is
carried out by the Statistical Office, while the annual and more frequent
industrial inquiries are carried out by some of the Ministries (the
Ministry of Industry, or the Ministry of Development, etc.) and the
index numbers of industrial production are compiled by the Central Bank.
In these cases, an integrated system means to co-ordinate not only the
standards used, the items of data to be gathered, and the statistical
unit, but also all organizational arrangements of these different offices.
For instance, these offices should co-operate closely in communicating
with the establishment, should co-ordinate the training of their staff, etc.

3.11 Such an integrated system of industrial statistics is much more
likely to avoid the duplication of inquiries by different offices. It is
well known that any duplication of inquiries involves a considerable
amount of waste of man-power and cost and also might endanger the whole
operation by creating confusion in the reporting units. With an integrated
system of industrial statistics the different offices, working in close
co-ordination, will eliminate all duplication from their respective
inquiries and will use the same terminology. Of course it is necessary
again to ensure strict co-ordination on all matters relating to industrial
statistics, such as the frequency of enumerations, the statistical units
the standards, etc.

/B. Purposes

B. Purposes

4.1   The most important purpose of the collection and compilation of industrial statistics is the formulation and implementation of industrial development plans. In most countries of Latin America the industrial sector still accounts for a relatively small proportion of the gross domestic product in total employment. Nevertheless, in all countries, the need for industrial programming and development has been increasing and economic development has involved the expansion of industrial activities. Many countries have found it important that the industrial development programme be formulated and implemented with an eye to inter-relation and balance among the various industries as well as between the industrial sector as a whole and other sectors. An industrial development programme generally requires demand projections, analyses of costs, imports, inter-industry co-ordination, estimation of requirements in labour, materials, capital and foreign exchange. The analyses of cost-price structure and competitive strength are made on the basis of cost, capacity, employment, wages, price, etc., data. Industrial statistics are even more needed at the stage of implementing industrial programmes, so as to permit a watch to be kept on the actual progress of individual industries and of the industrial sector as a whole as compared with the progress planned, as well as to detect lags and bottlenecks and to be able to formulate remedial measures.

4.2   In order to formulate realistic and consistent programmes for industrial expansion, to follow developments in the course of carrying out these programmes and to compile national accounts, data are required on the following aspects of the industrial sector:

(a)   The structure and capacity of the industrial sector, including the distribution of productive units (e.g., establishments), fixed assets and labour employed according to kind of activity, size distribution, etc.

(b)   The level and trend of industrial activities, including the quantity of commodities produced and consumed as raw materials, fuels, etc., and index numbers of production.

(c)   The relationship between value of output and costs, including value of output, value added, and its distribution among wages and salaries, proprietors' earnings, profits, etc., cost-breakdowns, prices of products and materials, fixed assets, value and quantity of stocks, etc.

C. Methodology

Scope, coverage and reference period

5.1 To establish a basis for the whole industrial statistical system
and yield the detailed structural data for economic planning, it is
necessary that the comprehensive inquiry should cover all statistical
units within the geographic boundaries of the country, in mining,
manufacturing, electricity, gas and steam. The annual inquiries, as far
as feasible, should cover the large (selected or sampled) statistical
units of the same scope - mining, manufacturing, electricity, gas and
steam. The more current than annual inquiries may have a more limited
scope and coverage - selected statistical units in selected industries.
It is clear that because the comprehensive inquiry will yield the base
for all other inquiries, what is omitted from this inquiry will be
omitted from the others. This should be borne in mind because, despite
all this, it may be necessary to omit very small (e.g. household)
statistical units, usually those which are difficult to identify. Thus
all the decisions on the scope and coverage of the comprehensive inquiries
will have determining effects on all other inquiries.

5.2 In making decisions on the scope of an inquiry, it is necessary to
take into account that even in cases where the national industrial
classification is the best possible, there are always units which might
be classified to two different branches (e.g., butcheries or bakeries can
be classified either to the food industry or to retail trade). It is
therefore necessary that these activities be classified consistently in
all the inquiries (i.e., if bakeries are classified to the food industry
in an annual inquiry, they should also be classified to the food industry
in the basic inquiries).

5.3 Taking into account that the annual inquiry has to yield data for
helping and watching the implementation of the development plan, including
the provision of basic data for the compilation of several series, these
inquiries should cover all industries which are important in the country
with reasonably large coverage. At the same time, the annual inquiries

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should be sufficiently limited in coverage and scope that they are
practicable to carry out. In most Latin American countries the annual
inquiries are limited to the large establishments (large being defined
usually as above some cut-off point).

5.4   In order to follow developments in the economy as well as to
detect significant changes in the level of industrial activity, data are
needed more frequently than annually on some of the activities of important
industrial establishments. The Statistical Commission recommended that
governments compile monthly or quarterly indexes of production. As the
study "Systems of Industrial Statistics in Developing Countries" (E/CN.3/309)
states: "...The limitation upon monthly data, both in terms of the speed
necessary and the cost which is bearable, are quite severe. It is necessary
to restrict in some way the number of statistical units to be enumerated.
The techniques by which the restriction is accomplished necessarily differ
according to the characteristics of the particular industry". (See more on
this in the paper "Annual and More Frequent Industrial Statistics in Latin
America", para. 37.) Thus, generally speaking, the scope and coverage
should be much less than in the annual inquiry.

5.5   The reference periods for census, annual and more frequent inquiries
should be chosen in a away that one may be compared and checked against
the other. For example, if the calendar year is used for the annual
inquiry, then the calendar year should also be used for the censuses. Or,
if monthly or quarterly data are asked, these should be for calendar
month or quarter and should allow a link to be established with the annual
figures. Procedures such as these could serve to help the supervising
of data, and to make one inquiry complementary to the other.

The statistical unit

5.6   In order to provide information on industrial activity for the purposes
outlined above, the data resulting from each kind of industrial inquiry
should be tabulated at least according to comparable categories of kind
of industrial activity that are as homogenous as possible. Furthermore,

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in the infrequent comprehensive inquiries and in some countries in the
annual inquiries classification of the results according to sub-divisions
of the country and meaningful categories of size, tabulating units are
needed. The kind of activity classification calls for as homogeneous a
unit as possible, the area classification calls for a unit which is at
one location, the size classification calls for a unit which is stable,
not easily changeable by change of organization, ownership, etc. Despite
the fact that perhaps the best answer to all this is the establishment
type unit (see International Recommendations in Basic Industrial
Statistics) – and this was found suitable by most Latin American countries
for their industrial inquiries – another solution may be preferable in
annual and more frequent inquiries. If classification of annual industrial
data according to geographic area is not desired, it is possible to
utilize in annual and more frequent inquiries a broader statistical unit
(kind of activity unit, enterprise). There are, however, some operational
advantages to utilizing the same statistical unit in annual and more
frequent industrial surveys as in the less frequent comprehensive
inquiries – namely, the establishment. Employing the same statistical
unit in each of these kinds of industrial inquiry considerably facilitates
the use of industrial directories and other data derived from comprehensive
inquiries in designing and carrying out the more frequent surveys and in
estimating the results of these surveys.

5.7   The practice also simplifies comparison of data yielded by the
different types of industrial inquiries. On the other hand, it may be
easier and quicker to gather annual and more frequent data for broader
statistical units than for establishments. This may be the case
especially for annual and more current data on inventories and expenditures
on fixed assets, etc. Unless the use of a broader statistical unit
materially facilitates the gathering of data, it would be desirable to
utilize the same statistical unit in all inquiries.

5.8   It is necessary to mention the question of the treatment of selected
ancillary activities. The Statistical Commission's recommendations provide
that the statistical unit utilized in industrial inquiries should embrace
the activities and resources involved in those activities which are

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ancillary to or in support of the production of goods and services by
the statistical unit. This approach avoids the difficulties of sub-
dividing resources and costs between direct and overhead activities.
On the other hand, non-industrial activities (transport, eating places,
etc.) carried on in support of one or more industrial establishments
should not be included as an integral part of the statistical unit if
the non-industrial activities are so organized and managed that separate
data are available on these activities and the related resources.
Some relatively large ancillary units such as central offices, warehouses
or power plants, may serve more than one industrial establishment of the
same enterprise. In order to avoid distortion and omissions in the data
gathered and compiled in industrial inquiries, special attention must be
paid to the collection of data for the central or large, separately-
located ancillary units. It is possible to add the data for these units
to that for the individual industrial statistical units served. In this
approach the data relating to the central ancillary units would be
allocated among the industrial establishments served. Or, steps may be
taken to treat each central or large, separately-located ancillary unit
as a distinct statistical unit for which data are gathered separately.
In this approach the data for the ancillary unit would be classified
according to the main industrial activity of the statistical units served.
In an integrated system of industrial statistics, it is necessary to
deal with this question of ancillary units in such a way that either
they are treated consistently in all inquiries, or that any differences
in their treatment, from one inquiry to another, are clearly stated on
questionnaires and in publications.

The statistics to be compiled and items of data to be gathered

5.9   Taking account of the present state of industrial statistics in
most countries of Latin America, the guiding principle of developing the
set of data which should be gathered in the census, annual and more
frequent industrial statistics should be more the feasibility of the
gathering than that of the requirements. This is a very important point
to be understood and acknowledged by the responsible authorities. It is

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quite clear that for development planning etc., as many data may be
required as in a developed country but in most cases it is not feasible
in a developing country to gather all the data required without
endangering the whole operation. The development of an integrated
industrial statistical system is a slow process and should be very
carefully planned. Taking into account that most Latin American countries
recently carried out an industrial census, the planning based on this
may start with items to be included in the annual and more frequent
inquiries. These questions are discussed in detail in the paper entitled
"Annual and More Frequent Industrial Statistics in Latin America".
5.10 What is necessary to discuss here is the connexion that should be
established between the data of the different inquiries at the planning
stage. The importance of this lies in the problem of establishing a
clear-cut picture of the kind of data which are regarded in one inquiry
as complementary to the other and are enumerated as such. The most
important items are discussed below.

(a) Characteristics of the Statistical and Tabulating Unit.
5.11 Among the basic purposes of an infrequent, comprehensive inquiry
is to describe the structure and character of the industrial sector of
the economy and to provide the basis for a definitive industrial directory.
Information is therefore required from this inquiry on the kind of major
activity and size of the establishments covered. For the same purposes,
it is also desirable to gather information on the location of
establishments and their type of legal organization (e.g., whether the
parent legal entity is an individual proprietorship, corporation,
co-operative, etc.) and type of economic organization (e.g., whether part
of a single or multi-unit enterprise). Data on location would provide
information on the geographic distribution of establishments and data
on type of legal and economic organization would furnish information
on the socio-economic characteristics of the industrial sector. For
purposes of the industrial directory, information is also wanted on
the name and address of the office reporting data for the establishment,
which, especially in the case of multi-unit organizations, may differ
from that of the establishment.

5.12 In annual inquiries and more frequent surveys it is not necessary to gather or compile information on a number of the above characteristics. Kind of activity and location are important in tabulating the results of annual inquiries, and only the former characteristic is usually needed in compiling monthly or quarterly data. Moreover, it is not practical to gather, in monthly or quarterly surveys, the information required to ascertain the kind-of-activity code. This code is best derived from the results of the annual inquiry or from the industrial directory.

(b) Employment and Wages and Salaries Paid.

5.13 Employment is one of the most important data used as an indicator of the level of industrial activity, and shows the contribution of the industrial sector to the opportunities for, and the conditions of, labour, and is usually used for measuring the size of statistical units, the structure of industry, etc. The importance of the employment figures thus justifies the inclusion of some employment data in every industrial inquiry. In comprehensive inquiries the employment data will help to evaluate the structure of industry and to determine the size of the units in annual inquiries. The employment data may be used in relation to output; in the monthly or quarterly inquiries it is used as one indicator of industrial activity. Two points should be emphasized here: (i) the data to be enumerated on employment should be much more detailed in the comprehensive inquiry than in the annual, more detailed in the annual than in the more frequent. In the last, usually one figure (all engaged or operatives only) will be sufficient; (ii) the data collected in one inquiry usually may not be usable or should be used carefully as complementary to other data, because of differences in scope, coverage, etc.

5.14 The usefulness of data on employees in measuring the productivity of labour and in approximating average wage and salary payments, as well as in describing the structure of industrial employment, is enhanced by dividing employees into different categories (according to status, function, occupation, skill, etc.). Some of these classifications might be sought in the census or in the annual inquiries and others may be enumerated with the help of ad hoc - sample - inquiries.

5.15 Man-hours worked by operatives during the period of inquiry is a better statistic than average number of operatives during the period for purposes of measuring amount of employment, approximate average wage rates, or labour productivity. The collection of these data may be annual in all those countries where records on this are available. It should be noted, however, that where contract labour is in common use (for instance, in mining), it will not be feasible to gather data on man-hours worked by operatives.

5.16 The collection and compilation of total wages and salaries paid are usually covered in the comprehensive and annual inquiries. This item is wanted for a number or purposes (e.g., to evaluate the contribution to labour income and the labour costs of different kinds of industrial activity). Where the number of employees is divided according to functional status, wages and salary payments should be sub-divided in the same fashion in order to obtain better approximations to average wages and salaries paid per employee.

(c) The Capacity of Installed Power Equipment.

5.17 A count of the installed power capacity of installed units provides an indication of the level of mechanization attained by the various industrial branches. The capacity of installed power equipment per operative or per man-hour usually has a strong correlation with labour productivity. It would therefore be very useful to have these data if available annually and, of course, they should be enumerated in the comprehensive inquiries.

(d) The Capacity of Other Types of Machinery.

5.18 The compilation of data on the capacity of selected kinds of machinery may be of value. Because of their more restricted uses, as well as the great difficulties in collecting these figures, it is not advisable in Latin American countries to include these items in the comprehensive inquiries. But the collection of these data may be carried out in ad hoc inquiries.

(e) Expenditure on Fixed Assets.

5.19 Measures of the expenditures on fixed assets by industrial units
are in considerable demand. Usually figures are obtained not only on
expenditures for new fixed assets, including the construction and
alteration of such assets on own account, but also on expenditure for
used fixed assets and sales on such assets. However, for the economy
as a whole, expenditures on new fixed assets are of particular
interest on an annual basis. These are the expenditures which become
part of gross capital formation and the data are needed for national
account purposes. From this it follows that the data on expenditure
for new and used fixed assets and for sales of such assets should be
enumerated annually and in the comprehensive inquiries. While the
annual inquiry will yield data for the estimation of gross capital
formation, the comprehensive inquiries will yield data of better coverage.
5.20 The difficulties of gathering consistent and meaningful figures
for the depreciation and stocks of fixed assets make it necessary to
omit these data from all the regular inquiries.

(f) Inventories.

5.21 The data on inventories are used as an important economic indicator.
They are also necessary for the calculation of gross output, value added
and consumption data in case only data on shipments and purchases are
available. These reasons make it necessary to collect the data on stocks
in the annual and in the comprehensive inquiries. It may be necessary
and feasible in some countries to have data on the stocks of some
selected important products and industrial raw materials - in quantity
and value - at the end of the year, or, for a few selected commodities,
at more frequent intervals. But the data on stocks of commodities may
require, even for the large industrial units, excessive amounts of work
and difficulty. In most countries, therefore, these data should be
excluded from the regular inquiries.

(g) Input and Output of Goods and Services.

5.22 The most important data of industrial inquiries are the data on
the character and value and quantities for inputs and outputs of the
industrial units. These data are basic to assessing the role of
industrial units in the economy and their contribution to the level of
production. These data may help to delineate the whole economy through
input-output tables. They are also needed for many kinds of economic
analysis and statistical calculation.

Input

5.23 The total cost of raw materials, fuels and supplies, electrical
energy and work sub-contracted out, is needed annually for the estimation
of value added, and, of course, it is needed in the comprehensive
inquiries. In most countries, these data may be requested annually.
If this presents difficulties, it may be sufficient to enumerate these
data in the comprehensive inquiries, and use some up-dating procedure
to make the annual estimate. Statistics on selected individual raw
materials, fuels, and electrical energy consumed are also wanted in
constructing commodity and energy balance sheets and input-output
accounts and in evaluating quantities consumed and unit values for
materials and fuels relative to quantities produced and unit values for
output. The enumeration of individual raw materials and fuels may or
may not be feasible in the annual inquiries; the decision on this
depends on the possibilities of the respondents to bear this burden
and overcome the difficulties. These data should certainly be
enumerated in the comprehensive inquiries. On the other hand, the
enumeration of the consumption of electrical energy will not generally
cause any difficulties. This very important indicator may therefore
be enumerated in all industrial inquiries. It should be noted, however,
that in the cases of some kinds of industrial activity, current figures
of the quantity of selected raw materials consumed are more easily
gathered than current figures of the quantity of selected commodities
produced. This may be the case for industrial units making a considerable
range of products but consuming a limited number of raw materials.

Output

5.24   The requirements for data on the components of the gross output
and the individual products of industrial units are similar in character
to those for data on the industrial costs of these units. However,
usually figures of gross output and individual commodities are needed
more than figures of industrial inputs, in part because of the use of
some of the former items as indicators of the level of activity of
industrial units. This is the reason that output data have a higher
priority in the international recommendations than those of input.

5.25   The data on gross output are needed for the calculation of index
numbers of industrial production. In these latter cases the gross
output may be needed more frequently than in the annual inquiries, but
in most cases it will be sufficient to enumerate these data annually.

5.26   Since the most important use of the data on the production of
selected individual commodities is for the compilation of index numbers
of industrial production, it is necessary to collect these in the more
frequent than annual inquiries. In the annual inquiries it might be
necessary to add to the number of the commodities which are covered in
the more frequent inquiries while still enumerating the same commodities
again because of the better coverage. In the comprehensive inquiries,
it might be necessary and feasible to enumerate all the commodities,
which may then serve as benchmark data for all other inquiries. The
gross value of the total output of industrial units includes, of course,
considerable duplication between those units, as well as between them
and other sectors of the economy. Value added is net of much of this
duplication. Value added might be calculated from the input and output
statistics. It might therefore be derived when the necessary components
- discussed above - are enumerated.