PREFACE

One of the mandates of the Central Statistical Organisation (CSO) is laying down norms and standards and evolving concepts, definitions, methodology and classification in relation to statistics. Even though the CSO has been performing these mandates in many fields of statistics, the absence of proper documentation in this regard led to a decision to prepare statistical manuals in respect of 24 subjects detailing concepts, definitions, classification procedures, compilation of data, estimation procedures, dissemination and other relevant explanatory notes, including methodological framework in the statistical indicators/statistics to make the manuals comprehensive reference books comparable to the manuals being produced by the UNSD from time to time.

This manual on Index of Industrial Production (IIP) is one of series of 24 manuals on statistical indicators proposed to be brought out by the CSO. The basic purpose of this manual, like those of all others in the series, is to provide the users of IIP with a ready-to-use reference guide on methodological aspects of data (metadata) on IIP based on harmonised concepts and methodologies that facilitate international comparison and help in aggregation of sub-regional and regional level statistics to derive meaningful conclusions. The other purpose of this manual is to provide the statistical offices both at the national and state levels with guide lines in the compilation of IIP.

The current version of the manual on Index of Industrial Production (IIP) was brought out by the United Nations in the year 1950, which is under revision at present. The guidelines and format for writing of the manual were decided by the United Nations Statistics Division in July 2007 and the revised manual is scheduled to be completed by end of 2008. In the mean time, the CSO has brought out this manual on IIP adopting the broad framework of the International Manual on IIP. Most of the materials included in the manual have been adopted from the different international publications on IIP, ISP and other compilations on statistical methodology.

The materials included in this manual are expected to bring in harmonization in concepts, definitions and methodology of compilation of all India IIP and the comparable IIPs at State/ UT levels. The adoption of the methodology suggested in this manual will go a long way in facilitating data aggregation and data comparison both at intra-regional and inter-regional levels, including international levels.

This manual has been prepared by the Economic Statistical Division (ESD) of the CSO under the guidance of a Steering Committee on Preparation of Manuals on Statistical Indicators headed by the Director General, CSO. I am thankful to the team of officers from the ESD comprising Shri Vijay Kumar (ADG), Shri D. Sahoo (DDG), Shri N.K. Ghosh (Director) and Ms. Malti Devi Negi (Director) for their hard work in preparing this manual.

I hope that the manual will serve as a useful reference document on the subject. Any suggestion to further improve the contents of the manual is welcome.

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New Delhi,

Dated ….

Manual on Index of Industrial Production (IIP)

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SECTION-1: INTRODUCTION

1.1 Object and uses of Index

1. This document being a manual on Index of Industrial Production (IIP), the general object and purpose of Index Numbers will be discussed with reference to IIP. It is well known that several economic/statistical indicators (estimates of some parameters or characteristics) are suggested and used by the economists/statisticians for measuring the performance of various sectors of the economy or the entire economy. Considering the industrial sector, it may be noted that there are several products and each product is measured in a definite unit. For example, while production of clothes is expressed in meters (thousand meters or lakh meters), the production of coal is expressed in tonnes (Million tonnes, billion tonnes, etc.), the production of natural gas is expressed in cubic meters and the production of oil in litres (gallons, barrels, etc.). Individual indicators of production are expressed in different units and tell about that particular product of the economy. For an overall assessment of all the activities of the industrial sector or the entire economy, it is essential to combine the various individual indicators into a summary or composite measure, which is free of the units of measurement. An Index Number, including the IIP, is such a composite or summary measure. It is generally computed as a weighted average (either arithmetic or geometric or some function) of the relatives (price relatives or product relatives) of the characteristic under study. A price (product) relative is the ratio of the price (product) in the current period to the reference period, which is called the base period. The item relatives are appropriately weighted according to the relative importance of the items in the economy.

2. Index numbers are averages that measure the short-term changes in a variable or a group of variables during a particular period with reference to a chosen base period. The first and foremost use of an index number lies in its ability to summarize the performance of a large number of sectors or segments of the economy in a single figure. Although index numbers are short-term measures, these are often used for long-term economic analysis, viz. for summarizing past developments, forecasting future trends and making decisions on policy issues. Index numbers are very useful for both microeconomic and macroeconomic analysis. For example, the index numbers of industrial production shown with an industrial grouping enables comparisons to be made of changes in the output of different industries, between themselves and in relation to such other data on separate industries as employment, wages and earnings. A specific example is the analysis of relative changes in productivity measured statistically as output per man-shift. In macroeconomics, the index serves to assess the significance for the economy as a whole of changes in the volume of

industrial output, in relation to corresponding changes in population, national income, foreign trade, prices, etc. Whole-sale Price Index (WPI) and the Consumer Price Index (CPI) are generally used to measure the inflation in the economy and take appropriate financial policy decisions for price stabilization. The IIP, when computed over broad industrial groupings such as consumer goods, capital goods, intermediate goods, etc., throws light on the structure, composition and performance of these sectors of the economy.

1.2 Historical Background in India

3. The official compilation of IIP in India started in the pre-independence era .The first official series of IIP with base year 1937 was compiled and released by the Office of the Economic Advisor, Ministry of Commerce and Industry, covering 15 important industries, accounting for more than 90% of the total industrial production. This was much earlier than even the recommendations on the subject at the international level. With the establishment of the Central Statistical Organization (CSO) in 1951, the responsibility for compilation and publication of IIP was vested with CSO. Since then the all India IIP is being released by the CSO as monthly series. The CSO released the IIP series with base year 1946 commencing from 1950.

4. The structure and composition of industry are very dynamic, particularly under the technological changes and economic reforms. The tastes, habits and consumption patterns of the people undergo change over time with the improvements in the economy. To capture these changes over time in the industrial sector, it is necessary to revise the IIP periodically by changing its base to a realistically representative period, which should be a normal period, close to the comparison period and for which all the relevant information are available. The United Nations Statistical Office (UNSO) has recommended in May 1950 for quinquennial base revision of IIP. The CSO has made such periodical revisions of the IIP that have improved the scope and coverage and compilation methodology, as far as practicable, by shifting the comparison base to a recent period, with a view to reflecting adequately the industrial growth and structure. When the index was commenced in India, the base year adopted was 1937 and this was revised successively to 1946, 1951, 1956, 1960, 1970, 1980-81 and 1993-94.

5. A brief history of the IIP base revision, with salient features, is given in the Table-1, which indicates that attempts have been made in each base revision to make the revised series of IIP more representative. For example, the current IIP with base 1993-94 is based on 538 individual items clubbed into 283 item-groups. The distribution of these items among the three sectors covered by the index is Mining : 64, Manufacturing : 473, and Electricity : 1.

Table-1: Brief history of Base revision of IIP

Base year	Sectors, No. of items and weights (in%)	No. of items covered	Basis of allotment of weights	Weighting method
1937	Mining, (1) - 4.0 Manufacturing (13)- 92.0 Electricity (1)- 4.0	15*	Proportion to total value of output	Weighted arithmetic mean
1946	Mining (1)- 11.95 Manufacturing (19)- 88.05 Electricity$	20*	Value added by manufacture	Weighted arithmetic mean
1951	Mining (2) - 7.16 Manufacturing (85) - 90.68 Electricity (1) – 2.16	88 [ISIC-1948]	Net Value added	Weighted arithmetic mean
1956	Mining (2) - 7.47 Manufacturing (198) –88.85 Electricity(1) – 3.68	201 [ISIC-1948)	Net Value added	Weighted arithmetic mean
1960	Mining (37) – 9.72 Manufacturing. – 84.91 Electricity – 5.37	312 (CII)#	Net Value added	Weighted arithmetic mean
1970	Mining (61)- 7.47 Manufacturing(290) -88.85 Electricity (1) – 3.68	352 (CII)#	Net Value added	Weighted arithmetic mean
1980-81	Mig&quarrying (61) - 11.5 Manufacturing(290) - 77.1 Electricity(1) – 11.4	352 [NIC-1970]	Gross Value Added	Weighted arithmetic mean

1993-94	Mining (64) - 10.5 Manufa. (473) - 79.4 Electricity (1) - 10.1	538 [NIC-1987]	Gross Value added	Weighted arithmetic mean
1999-2000**	Mining (60) - 15.2 Regd. Mang. (806) - 71.0 Electricity ((1) - 13.8	867 [ISIC-1998]	Net Value added	Weighted arithmetic mean

*Number of Industries

$ Electricity not covered

CII : stands for Classification of Indian Industries

ISIC – International Standard Industrial Classification of all economic activities

NIC - National Industrial Classification

** Yet to be released.

1.3 Purpose and Use of the Manual

6. The main purpose of the manual on IIP is to serve as a handy reference guide to IIP professionals and qualified users. With a view to achieving this objective the following aspects have been considered. Firstly, the manual contains the description of relevant definitions, concepts and methodology for the compilation of IIP, which, it is hoped, will help the state-level IIP professionals in their compilations at regional and sub-regional levels. Non-professional users will find these descriptions useful in comprehending, analyzing and interpreting the data on IIP. Secondly, as far as possible, harmonized, universally acceptable and internationally comparable concepts and methods have been adopted. This will help in comparing the all India IIP with the state-level IIP and the IIP data generated by various countries. Further, this will facilitate aggregation of index numbers compiled at various regional and sub-regional levels and, thereby, help in analysis of the economies at these levels. Thirdly, the interrelationship of IIP with other macroeconomic indicators viz. Gross Domestic Product (GDP), Whole-sale Price Index (WPI), Index of

Exports, etc. have been discussed to provide the reader with a holistic appreciation of the behavior of the economy.

1.4 Scope of this Manual for CSO & States.

7. The CSO is responsible for compilation and dissemination of the IIP at the all India level. It carries out the base revision of IIP from time to time to make it more realistic of the contemporary economic situation. This manual will help in carrying out this exercise. It will also help the other divisions of CSO in the preparation of analytical reports for other publications. It will be particularly useful for the National Accounts Division of CSO in using the IIP data for estimating national income and other aggregates.

8. For comparison of the industrial performance at the state/UT levels, it has recently been decided to compile and publish the IIP pertaining to the states/UTs.. In compilation of state-level IIP, it has been recommended to follow, as far as practicable, the same concepts, definitions and methodology as followed for all-India IIP. It is an accepted fact that regional variations exist and it is important to bring uniformity in the scope and methodology of compilation of IIP in various states. Further, it is essential that the difference among the states should be minimized to the maximum extent. It is hoped that the guidelines provided in this manual, if sincerely followed, will bring uniformity to a great extent.

1.5 Organization of this Manual

9. This manual is divided into Five Sections including this section on introduction. The Section-2 describes the fundamental concepts relevant to IIP such as industrial production, current and constant, index numbers, industrial classification, activity classification. Section-3 on Sources and Methods deals with types of variables to be measured, sources of data, methods of aggregation, deflation method, etc. Section-4 delineates in some detail compilation of IIP. It deals with various types of index numbers, criteria for selecting a base year, methods of weighting and quality assessment of index numbers including IIP. Section-5, the last section, deals with presentation and dissemination of IIP data. It contains the key presentation and dissemination principles of Standard Data Dissemination System and the progress of IIP data dissemination in India.

SECTION 2: FUNDAMENTAL CONCEPTS

2.1 What is industrial production?

10. Industrial production, as it is used in the IIP, refers to the results or outputs of all industrial activities, which form part of the International Standard Industrial Classification (ISIC, Rev.4.1). The ISIC classifies all the economic activities of the economy and uses the term 'industry' in a very broad sense to mean any economic activity. However, in the compilation of IIP the scope is limited. The term 'industry' is used in a restricted sense of production of commodities, excluding agriculture and services. Hence, the products/outputs of industrial 'establishments' (to be defined subsequently) constitute the components from which IIP is constructed. In the case of India, National Industrial Classification (NIC), which is developed in harmony with the ISIC, is the basis for classification of all economic activities within the boundary of the country. Appropriate classes/ divisions/sub-divisions of NIC available at the particular time are included in the compilation of IIP.

11. The concept of 'production' in the IIP is same as 'national product', but in volume/quantum terms and not in value. It refers to the quantum output produced by the various sectors of industry. A distinction has to be made of this production from those of 'inputs', 'deliveries' and 'consumption'. It differs from 'input' because it refers not to activity as such but to the results of activity. It differs from deliveries because it comprises work done at all stages of production, including work done on products not yet completed. It differs from consumption also because it does not take into account the terms on which exports are traded for imports.

2.2 Current and constant measures of production

12. It has already been mentioned in the above paragraph that 'industrial product' in IIP is a quantum/volume concept. Further, in the case of 'national product', which is the total money value of all the commodities produced within the boundary of the economy during a year, there corresponds an implicit 'real' or 'volume' concept with price changes eliminated that can be approximated by a valuation at constant prices. The production as used in IIP relates to national product at constant prices. Further, national product can be measured at factor cost or at market prices and it is the former which is relevant here, for IIP should not be influenced by the levels of taxation and subsidies. Further, national product can be taken as gross or net i.e. including or excluding depreciation and similar allowances.

2.3 Presenting industrial production volume measures as index numbers

2.3.1 What is an Index ?

13. An index is a composite/summary indicator, an absolute number free of units of measurement and expressed, generally, as a percentage with reference to a chosen point. It is a number that shows the percentage change(s) in a variable or group of variables during a particular period with respect to a chosen reference period, called the base period. Index of Industrial Production (IIP) is defined as a summary measure that measures the changes in the volume of industrial production of a representative basket of industrial products during a particular period with respect to a chosen base period. The IIP for the base period is taken as 100 and that for the study period shows the percentage increase or decrease over the base period. The definition of base period and its characteristics are discussed in Section 4, sub-section 4.1.2.

2.3.2 Why use indices in an industrial production context?

14. Industrial production refers to the totality of the outputs of several economic activities, which are expressed or measured in different units. For example, steel, copper, cement, etc. are measured in Kg. or multiples of it, whereas clothes are measured in meter or its multiples. Direct addition of these quantities requires a common denominator or unit. The common denominator used for this aggregation in computing the national product is the 'money value'. In case of IIP the interest is to find a common unit that can be used to measure all the industrial outputs in quantitative or volumetric terms, and no such common unit is available. The only alternative is to make all the quantity measurements free of their units. This is easily achieved by computing the production relatives, which are the ratios of the productions of a particular product during the current period and the base period. These production relatives show the relative changes in the volume of the production over the periods under comparison and tell about the performance of the sectors. Further, the relative importance of various economic activities is different and these differentials need to be reflected while measuring the performance of the entire industrial sector. With a view to achieving this, the production relatives are attached appropriate weights, which are the net output or the gross value added from that industrial activity. These weighted production relatives are aggregated by applying an appropriate mathematical formula to obtain a composite or summary measure of industrial production, the IIP.

2.4 Statistical unit

15. Identification of a statistical unit is important for measuring the industrial production. The measurement is facilitated by grouping together similar economic activities that produce homogeneous categories of goods and services following the application of homogeneous production technologies. Economic activities undertaken

by statistical units are determined with reference to the specific categories of International Standard Industrial Classification of All Economic Activities (ISIC). In case of IIP compilation in India, the extant National Industrial Classification (NIC) is used for determination of these activities. In the following paragraphs of this sub-section, the definition of 'statistical unit' and some useful related terms are delineated, which have been adopted from International Recommendations for Industrial Statistics-Draft 1, June 2007, pages 23-32.

I. Definition of Statistical unit

16. A ***statistical unit*** is an entity about which information is sought and for which statistics are ultimately compiled. It is the unit at the basis of statistical aggregates and to which tabulated data refer. These units can be divided into two categories.

(a) ***observation units*** – identifiable legal/organizational or physical entities which are able, actually or potentially, to report data about their activities;

(b) ***analytical units*** – entities created by statisticians (also referred to as *statistical constructs*), often by splitting or combining observation units in order to compile more detailed and more homogeneous statistics than it is possible by using data on observation units. Analytical units are not able to report data themselves about their activities, but there exist indirect methods of statistical estimation including imputation of such data. Examples of analytical units are unit of homogeneous production and local unit of homogenous production.

17. For operational purposes, a distinction is made between statistical, collection and reporting units. A *collection unit* is the unit *from which* data are obtained and by which questionnaire survey forms are completed. In fact, it is more a contact address than a unit. Sometimes the questionnaire is filled in by a central administrative office or an accountancy firm who provides this service to its client. Such information providing entities are collection units.

18. A *reporting unit* is the unit *about which* data are reported. Reporting units are those entities for which information is collected by means of questionnaires or interviews. Reporting units will, in most cases, coincide with the units for which statistics are compiled, like in the case of single-establishment enterprises where the enterprise and the establishment are identical. The reporting unit may or may not be the establishment. In the case of multi-establishment enterprises, however, the enterprise may make a separate return for each establishment, or each establishment may make a return for itself.

II. Legal entities

19. Most societies provide for the legal recognition of economic entities, under laws that enable them to define and register themselves as legal entities. Legal entities are recognized by law or society, independently of the persons or institutions that own them. The characteristics of a legal entity are that: they own assets, they incur liabilities, and they enter into transactions with other entities. The legal unit always forms, either by itself or sometimes in combination with other legal units, the basis for the statistical unit.

20. An example of a legal entity is a corporation that owns or manages the assets of the organisation, incurs liability on its own behalf, enters into transactions with other entities, receives and disposes of its income, and maintains complete set of accounts of its transactions.

III. Types of statistical units

1. Institutional units

21. Institutional units are the core unit of the System of National Accounts. All subsequent definitions embody the definition of this basic unit. An institutional unit may be defined as an economic entity that is capable, in its own right, of owning assets, incurring liabilities and engaging in economic activities and in transactions with other entities.

22. The main attributes of institutional units are: (a) An institutional unit is entitled to own goods or assets in its own right; it is therefore able to exchange the ownership of goods or assets in transactions with other institutional units; (b) It is able to take economic decisions and engage in economic activities for which it itself is held to be directly responsible and accountable at law; (c) It is able to incur liabilities on its own behalf, to take on other obligations or future commitments and to enter into contracts; and (d) Either it has a complete set of accounts, including a balance sheet of assets and liabilities, or it would be possible and meaningful, from both an economic and legal viewpoint, to compile for it a complete set of accounts, if required.

23. There are two main types of units in the real world that may qualify as institutional units. First type of units are persons or groups of persons in the form of households. The second type of units are legal or social entities whose existence is recognized by law or society independently of the persons, or other entities, which may own or control them such as a corporation, non-profit institution (NPI) or government unit. Such units are responsible and accountable for the economic decisions or actions they take, although their autonomy may be constrained to some extent by other institutional units; for example, corporations are ultimately controlled by their shareholders. Some unincorporated enterprises belonging to households or government

units may behave in much the same way as corporations, and such units are treated as quasi-corporations when they have complete sets of accounts.

24. Households are defined as a small group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food.

25. The individual members of multi-person households are not treated as separate institutional units. Many assets are owned, or liabilities incurred, jointly by two or more members of the same household while some or all of the income received by individual members of the same household may be pooled for the benefit of all members. Moreover, many expenditure decisions, especially those relating to the consumption of food, or housing, may be made collectively for the household as a whole. It may be impossible, therefore, to draw up meaningful balance sheets or other accounts for members of the household on an individual basis. For these reasons, the household, as a whole, must be treated as the institutional unit rather than the individual persons in it. An unincorporated enterprise that is entirely owned by one or more members of the same household is treated as an integral part of that household and not as a separate institutional unit, except when it has a complete set of accounts, in which case the enterprise is treated as a quasi-corporation.

26. The domestic economy is made up of the entire set of institutional units resident in the economy which are grouped into five mutually exclusive institutional sectors. The underlying criterion for grouping of units to sectors is the homogeneity of units as regards to economic objectives, principal functions and behaviour.

27. The following entities are deemed to be institutional units for the non- financial sector and relevant to this publication:

(1) Legal entities which have a complete set of accounts and autonomy of decision taking:

(i) **Corporations** – legal entities that are incorporated for the purpose of producing goods and services for the market, that may be a source of profit or other financial gain to its owner(s) and are collectively owned by shareowners that have the authority to appoint directors responsible for their general management.

(ii) **Other incorporated entities** - these are legal entities incorporated in other forms such as cooperatives, limited liability partnerships and non-profit institutions. These are all treated as corporations in the 1993 System of National Accounts.

(a) Cooperatives: entities in which each owner has an equal share of ownership.

(b) Limited liability partnerships - partners in these enterprises are both owners and managers and have legally limited liability.

(c) Non-profit institutions - legal entities that are set up for the purpose of producing goods and services, but their profits cannot be the source of income for the units that own them.

(iii) **Quasi-corporations** - legal entities set up by households or government units for the production of market goods and services. They may include public agencies which are part of general government or sole proprietorships and partnerships owned by households. These are unincorporated but function in all (or almost all) respects as if they were incorporated, therefore they are termed quasi-corporations. Such units either keep complete set of accounts of their transactions, or it would be possible and meaningful to compile a complete set of accounts if they were to be required. In the 1993 System of National Accounts they are included together with corporations.

(2) *Production units which do not necessarily keep a complete set of accounts, but which by convention are deemed to have autonomy of decision:* These units are unincorporated household enterprises that engage in the production of goods and services for own final use or for sale that are not legally separate from the households owning the unit.

28. In the majority of cases, an institutional unit will be a single legal entity. However, some corporations may be composed of legal entities set up for convenience as tax shelters or for other administrative reasons. In such cases, for statistical purposes it is inappropriate and unnecessary to regard each legal entity as a separate institutional unit.

29. If a an enterprise has a principal activity supported by units engaged in purely ancillary activities that are registered as separate legal entities, these should not be treated as separate establishments except when (a) such units are statistically observable (separate accounts of their production activities are readily available), or (b) these are located at geographically different locations from the enterprise they serve.

30. Because the institutional sector classification distinguishes separate non-financial and financial sectors, it is necessary to define two separate institutional units, for an entity engaged in non-financial and financial activities as long as the necessary financial accounts and balance sheets are available for each of them. The creation of a financial and non- financial unit is warranted even if the two together have all the other attributes of an institutional unit and consolidated accounts are compiled for them as a single unit.

IV. Enterprise group

31. Enterprises (defined under V) under the control of the same owner form a group to achieve economic advantages such as, to reap economies of scale, to control of a wider market, to increase in the domestic productivity through more effective business management. Integration economies lead to formation of vertical groups, where an enterprise takes control over another enterprise either producing raw material or semi manufactured products (backward integration) or distributing and selling its final product (forward integration).

32. An enterprise group is a set of enterprises controlled by the group head. The group head is a parent legal unit which is not controlled either directly or indirectly by any other legal unit. It can have more than one decision- making centre, especially for the policy on production, sales and profits or may centralize certain aspects of financial management and taxation. It constitutes an economic entity which is empowered to make choices, particularly concerning the units which it comprises.

33. For certain observations and analyses it is sometimes useful and necessary to study the links between certain enterprises and to group together those which have strong ties with each other. It is also useful to recognize all (majority and minority) links between the group head and the controlled enterprise via the network of subsidiaries and sub-subsidiaries. This allows the group's entire organisation to be depicted.

34. The enterprise group unit is particularly useful for financial analyses and for studying company strategies, but it is too varied in nature and unstable to be adopted as the central unit for observation and analysis which it comprises.

V. Enterprise

35. An institutional unit in its capacity as a producer of goods and services is known as an enterprise. An enterprise is an economic transactor with autonomy in respect of financial and investment decision-making, as well as authority and responsibility for allocating resources for the production of goods and services. It may be engaged in one or more economic activities at one or more locations. An enterprise may be a sole legal unit.

36. The enterprise is the smallest legal unit that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise may, therefore, be a corporation (or quasi-corporation), a non-profit institution, or an unincorporated enterprise. Corporate enterprises and non-profit institutions are complete institutional units. On the other hand, the term “unincorporated enterprise”

refers to an institutional unit - a household or government unit - only in its capacity as a producer of goods and services.

37. The enterprise is the basic statistical unit at which all information relating to its production activities and transactions including financial and balance sheet accounts are maintained and from which international transactions, an international investment position (when applicable), consolidated financial position and the net worth can be derived. It is also used for institutional sector classification of the 1993 System of National Accounts.

38. For institutional sector sequence of accounts, the enterprise is the basic statistical unit. However for production accounts, though the enterprise can serve as the basic statistical unit, the use of the establishment is preferable for two reasons:

(a) The identification of more detailed and therefore more homogeneous categories of economic activities, and

(b) The preparation of regional statistics.

VI. Establishment

39. The establishment is defined as an enterprise or part of an enterprise that is situated in a single location and in which only a single productive activity is carried out or in which the principal productive activity accounts for most of the value added. In other words, an establishment can be defined, ideally, as an economic unit that engages, under a single ownership or control - that is, under a single legal entity – in one, or predominantly one, kind of economic activity at a single physical location – for example, a mine, factory or workshop. This ideal concept of the establishment is applicable in many of the situations encountered in industrial inquiries, particularly in manufacturing.

40. Although the definition of an establishment allows for the possibility that there may be one or more secondary activities carried out in it but these should be small in magnitude compared with the principal activity. If a secondary activity within an establishment is almost equally important as the principal activity, then the unit is more like a local unit. It should be subdivided so that the secondary activity is treated as taking place within an establishment separate from that establishment in which the principal activity takes place.

41. In the case of most small and medium-sized businesses, the enterprise and the establishment will be identical. Some enterprises are large and complex with different kinds of economic activities undertaken at different locations. Such enterprises should be broken into one or more establishments provided that smaller and more

homogeneous production units can be identified for which production data can be meaningfully compiled. Because the establishments of a multi-establishment enterprise are part of the same legal entity, financial transactions and positions cannot always be attributed to a particular location or activity, so the enterprise is more suitable for compilation of financial statistics.

42. The establishment is particularly useful as a statistical unit for compilation and dissemination of information related to its production activities which include the following:

(a) Production of goods and services, revenues from sales of goods and services, all associated costs including employee remuneration, taxes on production and imports, subsidies, depreciation and a meaningful operating surplus;

(b) Employment information such as number of employees, types of employees and hours worked;

(c) Stock of non-financial capital used;

(d) Changes in inventories and gross fixed capital formation undertaken.

VII. Other statistical units

43. The concept of the establishment combines both a kind-of activity dimension and a locality dimension. It is based on the assumption that the aim of the statistical program is to compile data classified both by activity and by geographical region. In circumstances in which precision in either the geographic or the activity dimension is not required, there are other units that may be used as statistical units for the compilation of production or production related statistics.

(a) *Kind-of-activity unit*

44. Although the way the enterprise unit is constructed and defined it may already have a certain degree of homogeneity with respect to its economic activities, some statistics such as production statistics in general and input output transactions tables in particular, may require a higher degree of homogeneity. For this purpose kind-of-activity unit is created. It allows statisticians to compile statistics that are as homogeneous as possible with regard to economic activities without restrictions in respect of geographic distribution. In order to obtain such homogeneous units, the enterprise must be partitioned into narrower and more homogeneous parts.

45. Kind-of-activity unit is an enterprise or part of an enterprise, which engages in only one kind of productive activity or in which the principal productive activity accounts

for most of the value added. As compared to the establishment, in the case of such a unit, there is no restriction on the geographic area in which the activity is carried out.

46. The aim of creating the kind-of-activity units is to meet, as much as possible, the homogeneity requirement. The other two requirements, namely, data availability and organisational structure, should however not be disregarded. Splitting enterprises into kind-of-activity units must be a trade-off between homogeneity of economic activities on the one hand and the data availability and organisational structure on the other. The three requirements in most cases are interrelated: the more homogeneous one defines the unit, the fewer data would be available, and less it will be perceived as a separate entity in the organisation. It is difficult to indicate how far splitting should go. It should certainly not go beyond a point where the entities obtained cease to be transactors in the economy.

47. Kind-of-activity unit is useful as the statistical unit for compiling production statistics where no geographic breakdown of the activities of enterprises is required. It has the required activity homogeneity. Each enterprise must, by definition consist of one or more kind-of-activity units. When partitioned into two or more kind-of-activity units, the resulting units must be more homogeneous with respect to output cost structure and technology of production than the enterprise as a whole. The enterprise's information system must be capable of indicating or calculating for each kind-of-activity unit at least the value of production, intermediate consumption, labour costs, the operating surplus and employment and gross fixed capital formation.

48. The kind-of-activity unit falling within a particular heading in the ISIC Rev.4 classification system can produce products outside the homogeneous group, on account of secondary activities connected with them, which cannot be separately identified from available accounting records. Conversely, the kind-of-activity units classified under a particular heading in the classification system on the basis of a principal activity do not produce the entire output of homogeneous groups of specific products because the same products can be produced in secondary activities kind-of-activity units falling under some other classification heading. The kind-of-activity unit may or may not be a reporting unit depending on the organisation of the enterprise accounts of which it is a part.

(b) *Local unit*

49. An enterprise often engages in productive activity at more than one location, and for some purposes it may be useful to partition it accordingly. Thus, a local unit is defined as an enterprise, or a part of an enterprise (for example, a workshop, factory,

warehouse, office, mine or depot), which engages in productive activity at or from one location.

50. The expression “location” as it appears in the definition of the local unit and the establishment, can be interpreted in two different ways.

(a) First, there is the pure location in the narrow sense of the word, i.e. a specific site like an individual address or even a room in a multi storey office building. It may happen that two or more non-contiguous sites around the corner of the same block or just across the street are treated as one location when no separate records are maintained for each site. In general, the distance between two sites has to be quite large in order to justify a separate location, especially when the sites fall within different most detailed geographical area for which series of data are to be compiled.

(b) Second, the location may be the combination of all locations belonging to an enterprise within the geographical area. The identification of such a statistical unit allows for the distinction between provinces, states, countries, municipalities, townships or even smaller entities like mesh blocks. Therefore, if activities are exercised at two or more locations, e.g. in the same municipality, township or similar restricted geographic areas, covering all of these locations in one single local unit is acceptable from the point of view of the concept of the local unit.

51. Which of the two interpretations is to be used depends on the statistics in question. If, for instance, they are counting the number of factories or schools in a certain area, or if production processes are analysed, the location as an individual site is the appropriate unit; if, on the other hand, employment is the subject of statistics, all locations of an enterprise within the smallest geographic area could as well be taken together in one local unit. However, the decision on the definition of the location should be such that all related data may be collected to be analysed in an integrated manner.

(c) *Local kind-of-activity unit*

52. The local kind-of-activity unit is the part of a kind-of-activity unit which corresponds to a local unit. Each kind-of-activity unit must have at least one local kind-of activity unit; however, the kind-of-activity unit can be made up of a grouping of parts of one or more local units. On the other hand, a local unit may in certain circumstances comprise solely a group of ancillary activities. In this instance, the 1993 SNA, Rev. 1 recommends that these ancillary units be treated as establishments. The local kind-of activity unit corresponds to the establishment.

53. The relationships between concepts of activity and location are illustrated in the table 2.1 and diagram 2.1 depicts relationship between different types of statistical units.

(d) *Ancillary unit*

54. A productive activity undertaken with the sole purpose of producing one or more common type of services for intermediate consumption within the same enterprise is defined as an ancillary activity. These are supporting activities undertaken within an enterprise in order to create conditions within which the principal or secondary activities can be carried out. Examples of ancillary activities are: keeping records, communication, purchasing of materials and equipment, personnel management, warehousing etc. These are typically services that are likely to be needed, to some extent, in most enterprises, whatever the nature of their principal activities.

55. The main objective of the economic statistics collected using statistical units is that it should depict the economic phenomenon as close to reality as possible. This would require that the ancillary activity is treated as an integral part of the establishments or enterprise it serves, because an ancillary activity is not undertaken for its own sake, but in support of the principal or secondary activity it is associated with. It means that neither the inputs into, nor the outputs from, ancillary activities are recorded separately from others consumed or produced by the principal or secondary productive activities. This way of recording the ancillary activity has the advantage of recording production processes in the way producers perform them, respecting their choices as to whether to perform ancillary activities themselves or to outsource them. Besides this approach focuses on the description of production processes as they are organized in reality, ignoring legal structures put in place for various reasons. The advantage of integrating the ancillary activities with the establishments/enterprise they support is that it allows depicting the actual structure of an economy in respect of specialization or integration of production processes.

56. This approach though depicts the production process as it is performed by the producers but it has the following disadvantages:

- Firstly, as the ancillary activity is consolidated with the economic activity of the establishment it serves, it is not recognized by its own activity classification, and as a result its production is not recognized and recorded independently. This treatment does not allow an assessment of the contribution and role of ancillary activities in the economy to be made, and so the structural decomposition of gross domestic product (GDP) by economic activity will not be disclosed correctly, and

- Secondly, the regional GDP can not be compiled accurately when the unit undertaking ancillary activities and the establishments it serves are located in different regions.

57. To overcome the disadvantages mentioned above, it may be desirable and useful to recognize a unit undertaking ancillary activities as a separate establishment – an ancillary establishment - in the following cases: namely,

(i) When an establishment undertaking ancillary activities is statistically observable, in that separate accounts for the production it undertakes are readily available, and

(ii) When the ancillary units are in a geographical location different from the establishments they serve. Such an establishment should be allocated to the industrial classification corresponding to its own principal activity.

58. Units undertaking ancillary activities should be recognized as separate establishments, in cases mentioned above, only when enterprise information system is capable of indicating at least the value of intermediate consumption, compensation of employees, gross fixed capital formation and employment. Statisticians should not make extraordinary efforts to create separate establishments for these activities artificially in the absence of suitable basic data being available.

59. With these ideas in the background, it has to be mentioned that the statistical unit as used in the Annual Survey of Industries (ASI) that forms the detailed survey for developing the item basket and the weighting diagram of IIP, is an establishment. It is a registered factory in case of a manufacturing industry or a registered workshop in the case of a servicing industry the detailed qualification of which is as follows:

VIII. Factory

60. Factory is one, which is registered under Sections 2m(i) and 2m(ii) of the Factories Act, 1948. The Sections 2m(i) and 2m(ii) refer to any premises including the precinct thereof (i) wherein ten or more workers are working, or were working on any day of the preceding twelve months, and in any part of which a manufacturing process is being carried on with the aid of power, or is ordinarily so carried on, or (ii) wherein twenty or more workers are working, or were working on any day of the preceding twelve months and in any part of which a manufacturing process is being carried on without the aid of power, or is ordinarily so carried on. Closed factories with fixed assets on site are also considered as registered factories till they are de-registered and removed from the live-register maintained by the Chief Inspector of Factories (CIF) in the State.

IX. Manufacturing Process

61. Manufacturing process as per Section 2(k) of the Factories Act, 1948, means any process for :

i) Making, altering, repairing, ornamenting, finishing, packing, oiling, washing, cleaning, breaking up, demolishing, or otherwise treating or adopting any article or substance with a view to its use, sale, transport, delivery or disposal, or

ii) Pumping oil, water, sewage, or

iii) Generating, transforming or transmitting power, or

iv) Composing types for printing, printing by letter press, lithography, photogravure or other similar process, or book-binding, or

v) Constructing, re-constructing, repairing, finishing, breaking up ships or vessels or

vi) Preserving or storing any article in Cold Storage.

2.5 Classifications: Activity, Use and Product Based

62. The industrial sector comprises several economic activities, each activity in turn produces a single homogeneous product or a number of products and employs several types of professionals. For systematic identification, quantification and measurement of all industrial products, a standard industrial classification of all economic activities is essential for every country. Besides helping in measurement of industrial products, this classification is useful in classifying the economically active population and generating different types of labour statistics, compilation of sector-wise national income estimates, etc. Adoption of a standard industrial classification also facilitates comparison of statistics available from various sources on different aspects of the economy and helps in making meaningful economic analysis and drawing useful conclusions.

63. Several types of classifications related to industrial sector have been developed at the international level and corresponding classifications have also been developed by various countries to suit the country-specific requirements, but without violating the basic structure or principles of the international classifications. The important classifications at the international level are:

(i) International Standard Industrial Classification (ISIC) of all Economic Activities. (The latest one is ISIC Rev.4.1)

(ii) Central Product Classification (CPC). (The latest one is CPC Ver. 2.0)

(iii) International Standard Classification of Occupations (ISCO).

64. The corresponding classifications for India are

(i) National Industrial Classification (NIC). The NIC-2004 version is in use at present. Preparation of NIC-2008 is in progress.

(ii) Annual Survey of Industries Commodity Classification (ASICC) developed by CSO

(iii) National Classification of Occupations (NCO-2004) developed by the Ministry of Labour

65. In the field of economics all the three classifications, both at international and national levels, are used for various purposes. While the ISIC (the NIC at national level) provides the framework for capturing the data of the producers of goods and services, the CPC is used for recording data on the output of economic activities. The ASICC developed by CSO is used for recording the output of different industries covered in the Annual Survey of Industries (ASI). A National Product Classification (NPC) is under progress in the CSO.

66. For the purpose of IIP, the NIC and the ASICC are important. A list of various economic activities at 2-digit level of NIC-1987 codes and their weights included in the scope of the present series of IIP (base 1993-94) are given in the Table 2.1. The products covered under the ASI, which form the weight base for the IIP are classified by using the ASICC and then assigned to the appropriate classes of the NIC. The NIC is revised from time to time to take into account the changes taking place in the structure and composition of the industry. Presently NIC-2004 is in use. It has been used for Economic Census-2005 and the on-going survey rounds on ASI and base revision of IIP from 1993-94 to 2004-05.

Table 2.1

List of activities at 2-digit level of NIC-1987 with their codes and weights in IIP series (Base: 1993-94=100).

Industry Code	Description	Weight
20-21	Food Products	90.8
22	Beverages, Tobacco and Related Products	23.8
23	Cotton Textiles	55.2
24	Wool, Silk and man-made fibre textiles	22.6
25	Jute and other vegetable fibre Textiles (except cotton)	5.9
26	Textile Products (including Wearing Apparel)	25.4
27	Wood and Wood Products; Furniture and Fixtures	27.0
28	Paper & Paper Products and Printing, Publishing & Allied Industries	26.5
29	Leather and Leather & Fur Products	11.4
30	Basic Chemicals & Chemical Products (except products of Petroleum & Coal)	140.0
31	Rubber, Plastic, Petroleum and Coal Products	57.3
32	Non-Metallic Mineral Products	44.0
33	Basic Metal and Alloy Industries	74.5
34	Metal Products and Parts, except Machinery and Equipment	28.1
35-36	Machinery and Equipment other than Transport equipment	95.7
37	Transport Equipment and Parts	39.8
38	Other Manufacturing Industries	25.6

2.6 Use of IIP in National Accounts

67. Before discussing the use of IIP in national accounts, it is worthwhile to delve into the relationship between industrial product and the three national aggregates: national income, national expenditure and national product. It is to be noted that whatever the national aggregate, it is essentially a money valuation at current prices and to each aggregate there corresponds a 'real' or volume concept with price changes eliminated, which can be approximated by a valuation at constant prices. An index of production relates to the volume concept, national income, national expenditure or national product at constant prices. Further each of these three totals can be measured at factor cost or at market prices and it is the former which is relevant here since the index of production should not be influenced by indirect taxes and subsidies. Further each total can be taken gross or net i.e. including or excluding depreciation and similar allowances. Gross and net concepts have their uses in national accounts and the choice between the two need to be made on practical grounds.

68. National income is the total of incomes earned by factors of production, which approaches the total from the side of inputs. It is , therefore, not suitable for the basis of an index of production viz.IIP. National expenditure is the totality of expenditures on goods and services by consumers, by government and in capital formation. It approaches the total from the side of consumption rather than production, and, therefore, not suitable for IIP compilation. National product is the totality of product in the sense of value added, or value of work done in the various sectors of the economy. It is derived from the side of production, a direct approach to the problem of defining an index of production. The index of production can then be regarded as extending the value of national product over time in volume terms i.e. as a valuation of national product at constant prices. Similarly, the IIP can be regarded as extending to the value of industrial National Domestic Product (NDP) at constant prices. In the weighted average form, the IIP would combine series of volume of work done in the various industries with their net outputs as weights. The IIP then relates to outputs of industrial establishments, which can be grouped according to NIC.

69. Two different sets of IIP can be compiled depending upon the weights taken as gross or net. However, both have their uses, merits and demerits and the choice between the two is to be made on practical grounds. Taking into account the difficulty in handling depreciation, which is often a book adjustment to bring in balance rather than an actual flow, the gross concept with weights equal to net output or Gross Value Added (GVA) is generally recommended.

70. In India the contribution of the registered manufacturing sector to Gross National Product (GNP) is computed from the data generated through the ASI. Since there is some delay in the publication of ASI results, the estimates of GNP for this sector is often computed indirectly by using the IIP, which is released by the CSO every month. The estimate of GNP for the registered industrial sector in the base year of the IIP is appropriately multiplied by the IIP of the current year to arrive at the required GNP in the current year.

SECTION-3: SOURCES AND METHODS

3.1 Deflation methods

71. As already defined, the IIP is a quantitative index and it is a weighted average of output of industries, where the weights are based on their shares in the value added of the industrial sector. The objective of the IIP is to measure short-term changes over time in the volume of output of industrial sector and it should not reflect any changes in the price The price changes are different over different time periods and over different places. It is therefore, important to remove from the IIP the effects of changes in price to allow for a realistic comparison in the change in output.

72. It has been mentioned while discussing the need for use of index numbers for measuring industrial production that industrial outputs are expressed in different units. Accordingly, the unit of reporting in respect of certain items like Machinery, Machine Tools, Ship Building, etc. is in value terms. The monthly figures of production value, in such cases are to be deflated to remove the effects of prices. Deflation is a process that removes the impact of price changes from an estimate of nominal value or 'current price' output (e.g. turnover). This is normally effected by dividing the current price estimate of output, by an appropriate price index, referred to as the deflator. It may be mentioned that if the deflator is chosen with care, it will give a good approximation of the price movements that have affected the current price series and allow for the calculation of an accurate constant price series, which is the volume index, In case of the all India IIP, the value figures of output are deflated by the Wholesale Price Index (WPI) of the concerned categories, to obtain the production figures in volume terms. The method involves dividing the series of value figures of production by the appropriate WPI and multiplying by 100.

73. There is a debate about what should be the ideal deflator in case of IIP. While some argue that Producers Price Index (PPI) is the appropriate deflator, others recommend WPI. However, in the compilation of IIP most countries including India use the WPI as deflator due to non-availability of PPI.

74. The change in value of output of industrial sector is a combined result of both changes in the quantity and quality. It is, therefore, important to take into account the effects of the quality changes. The SNA 1993 emphasizes this and treats differences in quality as difference in volume; the different quality reflect different use values (and in the case of goods and services, different resource costs). Different qualities are, therefore, economically different from each other. (European Commission et al 1993, para 12.20) However, very few countries have been able to take account of the effects

of quality changes in case of IIP. In India in the compilation of all-India IIP the quality changes in the Industrial Production are not considered. So, these aspects are not discussed in this Manual.

3.2 Types of variables to measure industrial production

75. To arrive at the measure of industrial production, a large number of accounting, economic and other variables related to the transactions and production of Establishments/factories are required to be measured. It may be mentioned that the ASI data are the basis for deriving the weights and the item basket of IIP. Therefore, the variables required to be measured for industrial production for IIP are the same as those considered in ASI. The important variables as applicable for compilation of IIP are defined below, in alphabetical order.

ACCOUNTING YEAR

76. For the purpose of ASI, the accounting year is the period on which the factory closes its books of account. With the enactment of Income Tax Act, by and large, the accounting year of all factories is same as the financial year i.e. from April to March.

BASIC MATERIALS

77. Basic materials are the materials which are important and of key nature to the industry on which the manufacturing process is based, vig. metal for machine, leather for shoe. Such material is not lost through the process of production but only changes its forms.

BONUS

78. Profit sharing bonus, festival bonus, year-end bonus, and all other bonuses and ex-gratia payments paid at less frequent intervals are covered by this term.

COMPENSATION OF EMPLOYEES

79. Compensation of employees is the total of emoluments and supplement to emoluments.

CONSUMABLE STORES

80. All such materials which assist the manufacturing process and loose their identity without entering the products are called consumable stores, e.g., cotton waste.

CONTRACT WORKER

81. All persons who are not employed directly by an employer but through the third agency, i.e. contractor, are termed as contract workers. Those workers may be employed with or without the knowledge of the principal employer.

DEPRECIATION

82. Depreciation is consumption of fixed capital by the factory due to wear and tear and obsolescence during the accounting year and is taken as provided by the factory owner, or if not provided by the factory this is estimated on the basis of cost of installation and working life of the fixed assets.

EMPLOYEES

83. Employees relate to all persons engaged by the factory whether for wages or not, in work connected directly or indirectly with the manufacturing process and include all administrative, technical and clerical staff as also labour in production of capital assets for factory's own use. This is inclusive of persons holding position of supervision or management or engaged in administrative office, store-keeping section and welfare section, watch and ward staff, sales department as also those engaged in the purchase of raw materials etc. and production of fixed assets for the factory. It also includes all working proprietors and their family members who are actively engaged in the work of the factory even without any pay and the unpaid members of the co-operative societies who work in or for the factory in any direct and productive capacity. Persons in the head office connected with the manufacturing activity of the factory are also included in this item.

EMOLUMENTS

84. These are defined in the same way as wages but paid to all employees plus imputed value of benefits in kind i.e. the net cost to the employers on those goods and services provided to employees free of charge or at markedly reduced cost which are clearly and primarily of benefit to the employees as consumers. It includes profit sharing, festival and other bonuses and ex-gratia payments paid at less frequent intervals (i.e. other than bonus paid more or less regularly for each period). Benefits in kind include supplies or services rendered such as housing, medical, education and recreation facilities. Personal insurance, income tax, house rent allowance, conveyance etc. for payment by the factory also is included in the emoluments.

FINISHED GOODS

85. Finished Goods are those, which are manufactured by the factory for sale. Finished goods should conform to a prescribed standard.

FIXED CAPITAL

86. Fixed Capital represents the depreciated value of fixed assets owned by the factory as on the closing day of the accounting year. Fixed assets are those, which have normal productive life of more than one year. Fixed capital covers all type of assets, new or used or own constructed, deployed for production, transportation, living or recreational facilities, hospitals, schools, etc. for factory personnel. It would include land, building, plant and machinery, transport equipment etc. It includes the fixed assets of the head office allocable to the factory and also the full value of assets taken on hire-purchase basis (Whether fully paid or not) excluding interest element. It excludes intangible assets and assets solely used for post-manufacturing activities such as, sale, storage, distribution, etc.

FUEL CONSUMED

87. Fuel Consumed represent total purchase value of all items of fuels, lubricants, electricity, water (purchased to make steam) etc. consumed by the factory during the accounting year except those which directly enter into products as materials consumed. It excludes that part of fuels, which is produced and consumed by the factory in manufacture i.e., all intermediate products and also fuels consumed by employees as part of amenities. It includes quantities acquired and consumed from allied concerns, their book value being taken as their purchase value and also the quantities consumed in production of machinery or other capital items for factory's own use.

GROSS OUTPUT

88. Gross output is defined to include the ex-factory value, (i.e., exclusive of taxes, duties, etc. on sale and inclusive of subsidies etc., if any) of products and by-products manufactured during the accounting year, and the net value of the semi-finished goods, work-in-process, (represents the excess/deficit of value of semi-finished goods or work-in-process at the end of the accounting year over that of the beginning of the year plus net balance of semi-finished fixed assets on factory’s capital account) and also the receipts for industrial and non-industrial services rendered to others, value of semi-finished goods of last year sold in the current year and sale value of goods sold in the same condition as purchased. Value of gross output and total output has been used in the text inter-changeably to mean the same thing.

GROSS VALUE OF PLANT AND MACHINERY

89. Gross value of plant and machinery represents the total original (undepreciated) value of installed plant and machinery as at the end of the accounting year. It includes the book value of own constructed plant and machinery, if installed, and the approximate value of rented-in plant and machinery as at the time of renting in but

excludes the value of rented-out plant and machinery. Total value of all the plant and machinery acquired on hire-purchase basis is also included. Thus it represents the gross value of plant and machinery engaged in production process.

INDUSTRIAL SERVICES

90. Any services taken or rendered from one to another unit resulting in increase in the value of material during the manufacturing process are industrial services.

INTERMEDIATE PRODUCT

91. Intermediate Product is a product which is obtained during a manufacturing process, which may or may not be saleable and is not the intended final product.

INVESTED CAPITAL

92. Invested capital is the total of fixed capital and physical working capital.

LABOUR TURNOVER

93. Labour turnover measures the extent of change in the working force due to accession and separation during a given period. The term 'accession' was defined as the total number of workers added to employment during the period, whether new or re-employed or transferred from other establishments or units under the same management. Inter-departmental transfers within the same establishment are, however ignored. The term 'separation' implies termination of employment at the instance of worker or employer. It includes termination of services due to death or retirement. As in the case of accession, transfers to other establishments are included but transfers within the same establishment are ignored. Retrenchment as a result of rationalisation or modernisation or any other cause, is also treated as separation.

MANDAYS WORKED

94. These are obtained by summing up the number of mandays worked by persons working in each shift over all the shifts on all days, i.e. both manufacturing and non-manufacturing days. This figure excludes persons who are paid but remain on leave, strike, etc.

MANDAYS PAID FOR

95. The number of mandays paid for is arrived at by summing up the number of employees paid for in each shift. This also includes mandays on weekly schedule holidays if paid for and those absences with pay as also mandays lost through lay off/ strike for which compensation was payable.

MATERIALS CONSUMED

96. Materials consumed represent the total delivered value of all items of raw materials, components, chemicals, packing materials and stores which actually entered into the production process of the factory during the accounting year. It also includes the cost of all the materials used in the production of fixed assets, including construction work for factory's own use. Components and accessories fitted as purchased with the finished product during the accounting year are also to be included. It excludes intermediate products. Intermediate products in the above context mean all those products which are produced by the factory and consumed for further manufacturing process.

NET VALUE ADDED

97. This is the increment to the value of goods and services that is contributed by the factory and is obtained by deducting the value of total inputs and depreciation from gross value of output.

NET VALUE OF SEMI-FINISHED GOODS

98. It represents the excess/deficit of value of semi-finished goods and/or goods-in-process at the end of the accounting year over that at the beginning of year.

NON-INDUSTRIAL SERVICES

99. All such services which do not have a direct bearing on the manufacturing process but are needed by any manufacturing unit are called non-industrial services, say, transport.

NON WORKING DAY

100. Apart from manufacturing day and repair and maintenance days there may be some non-working days. Non working days are those days on which the workers give their attendance but due to non-availability of raw materials, power etc. no effective work is done. As the workers are paid for these days such days are also taken into account for the purpose of labour statistics.

OUTSTANDING LOANS

101. Outstanding loans represent all loans, whether short-term or long-term, whether interest bearing or not, outstanding according to the books of the factory as on the closing day of accounting year.

PHYSICAL WORKING CAPITAL

102. This is defined to include all physical inventories owned, held or controlled by the factory as on the closing day of the accounting year such as the materials, fuels and

lubricants, stores, etc. that enter into products manufactured by the factory itself or supplied by the factory to others for processing. Physical working capital also includes the value of stock of materials, fuels and stores etc. purchased expressly for re-sale, semi-finished goods and goods-in-process on account of others and goods made by the factory which are ready for sale at the end of the accounting year. However, it does not include the stock of the materials, fuels, stores, etc. supplied by others to the factory for processing. Finished goods processed by others from raw materials supplied by the factory and held by them are included and finished goods processed by the factory from raw materials supplied by others, are excluded.

3.3 Sources of data

103. Two types of production data are required for the compilation of IIP. Firstly, data for preparation of the weighting diagram, which are secured from the ASI of the relevant base year that are collected by National Sample Survey Organisation (NSSO) and compiled and disseminated by the CSO. The Gross Value Added (GVA) figures for the sectors (Mining & quarrying, Manufacturing and Electricity) as available from the national accounts statistics are used for computation of the sector-wise weights. These sector-wise weights are then distributed among the constituent 2-digit industry groups in proportion to their respective GVAs. Each 2-digit level weight is further distributed among the constituent 3-digit industries in proportion to their GVAs. Again, each 3-digit level weight is distributed among the 4-digit level industries in proportion to their GVAs or GVOs (Gross Value of Output) where the GVA figures are not readily available. In preparing the final index basket and the weighting diagram, the overriding consideration is the availability of monthly production data on regular basis, rather than the representativeness of the item basket. Secondly, the monthly production data are required for the current period. The Central Statistical Organization gets monthly production data from various source agencies, which collect data from the production units. For example, for the current series with base 1993-94, 15 source agencies supply the monthly production data. In terms of number of items covered, the largest source is the Department of Industrial Policy & Promotion (DIP&P), which supplies data on as many as 213 out of 285 group of items in the manufacturing sector, constituting more than 52% in terms of weight of all-India IIP. The index relating to Mining and Quarrying sector is being supplied by the Indian Bureau of Mines, Nagpur which is dovetailed with manufacturing and electricity indices compiled by the CSO to arrive at the General Index of Industrial Production. The data on Electricity sector is furnished by the Central Electricity Authority. The details of source agencies, the no. of items for which they are supplying data and the weights of these source agencies in the current IIP series(Base;1993-94) is given in Table-3.1 below.

Table 3.1

Distribution of items, item-groups and weights according to source agencies providing monthly production data for compilation of IIP

S.No.	Source Agency	No. of Items	No. of Items groups	Weights
1.	Indian Bureau of Mines	64	1	104.73
2.	Directorate of Sugar	1	1	22.43
3.	Salt Commissioner	1	1	0.52
4.	Directorate of Vanaspati	12	11	16.97
5.	Tea Board	1	1	7.63
6.	Coffee Board	1	1	1.00
7.	Textile Commissioner	50	9	123.28
8.	Jute Commissioner	7	5	5.90
9.	Coal Controller	3	3	1.22
10.	M/o Petroleum	16	14	23.87
11.	Joint Plant Committee (JPC)	43	20	20
12.	Railway Board	4	4	5.56
13.	D/O Industrial Policy & Promotion	332	209	519.59
14.	Development Commissioner, Small Scale Industries (SSI)	18*	18*	6.51
15.	Central Electricity Authority	1	1	101.69
16	Total	538	283	1000.00

* 15 out of 18 are common with those of DIP&P & 1 with Joint Plant Committee

3.4 Aggregation of data

104. Summarization of the raw data for deriving meaningful analysis and inference is one of the important aspects of statistics. The summary statistics derived from sample data by means of some mathematical functions are called the estimators. The desirable

properties of an estimator viz. Consistency, unbiasedness, efficiency and sufficiency are well documented in the statistical literature. However, our purpose here is to identify the possible link between these properties and the quality dimensions of official statistics, which are discussed in Section 5 (sub-section 5.4) of this manual. A close analysis reveals that the sufficiency property of an estimator is closely related to the adequacy. In simple terms both these aspects require that the summary statistics, here the index number including the IIP, should contain as much relevant information as available from the sample data. This can be ensured in the case of Laspeyer's type of IIP by securing and utilizing the production data of all the establishments of various index items and thoroughly adjusting these data for possible price effects and seasonal and cyclical fluctuations.

105. Data aggregation in the case of IIP takes place at two different levels. First aggregation is carried out at the data source agencies and the second type of aggregation at the compilation stage in the statistical office. The aggregations and the associated problems at these two stages are described in the following paragraphs.

(i) Data aggregation at the source agency:

106 The quality of any statistical indicator depends on the quality of data used in deriving it. As already discussed, the data for the compilation of IIP are obtained form various source agencies, which collect the data from the establishments the lists of which are derived from the ASI conducted in the weight base year. It is to be mentioned that some source agencies collect the production data for the items under their jurisdiction in accordance with some statutory provisions. For example, the DIPP, the largest data source agency for compilation of the IIP, collects the monthly industrial production data under the provisions of Industrial Development and Regulation Act. There is no such statutory backing in case of some source agencies, which collect the data by persuasion from the establishments under their jurisdiction.

107. All the establishments of an item as per the ASI frame are supposed to provide the current production data to their respective agencies. The data agency then summarizes or totals these production figures to arrive at the item-wise totals, which are supplied to the statistical office for compilation of the IIP by using the appropriate index formula. The item-wise production data suffer from several problems. Important ones are (a) non-reporting by the establishments and (b) reporting of incorrect figures by the establishments.

108. Non-reporting may arise due to deliberate hiding of facts with ulterior motives, due to exit of some establishments from the production and due to production of an item in a new name with further value addition that need not be classed as the earlier item. Whatever the reason for non-reporting, the missing production figures are to be

estimated by applying proper estimation techniques and the item-wise production figures compiled. This is a must for a fixed weight base IIP of Laspeyer's type, which requires that the item basket and the establishment frame for each item must remain fixed as those of the weight base period. The estimation methods and techniques may vary from agency to agency and from situation to situation.

109. In the case of non-response arising from the exit of some establishments from the production, the fact should be notified and, ideally, the item basket and the weighting diagram be appropriately reconstructed to capture the real dynamics of the industrial sector. Also, frequently new units or establishments enter the production of an item and the source agency responsible for collection of data for this item gets production data of these units. The Laspeyer's type of IIP requires that the production figure of these new units need not be included in the item frame. Their inclusion should be taken care of during the next base revision. Another way to deal with the exit and entry of units and new items in the production is to use the chain-linked index numbers. For this type of indices, reference is invited to Sub-section 4.2.

110. In the case of deliberate reporting of incorrect production data, the data source agency must take recourse to thorough scrutiny and consistency checking and take the legal and other methods to ensure that correct data are collected.

(ii) Data aggregation at the compilation stage;

111. At the compilation stage the aggregation problems relate to the index formula to be used. There is enough discussion on the various types of index formula in the literature. In the sub-section 4.2 in this manual a detailed discussion has been provided about this and the Laspeyer's method has been recommended for the compilation of IIP by the national and state statistical offices. Once the index formula is decided, there is not much scope for manipulation in aggregation of data in the index compilation stage. The aggregation of data by the statistical office for determination of weights that follows a top-to-bottom approach and the computation of indices that takes a bottom-to-top approach have been described in the Sub-section 4.5(a step by step method of compilation of IIP).

112. While compiling the index for the current month, the statistical office must see for the consistency of the item-wise production data and correct the inconsistencies before using these in the index compilation. Further, if the production data for some items during the current month are not available, these are to be estimated from the past data while compiling the quick estimates. Sincere efforts should be made to get these item-wise data at the time of releasing the revised estimates. In case the data are also not available at the time of compiling the revised estimates, the reasons behind the non-availability must be thoroughly explored. If it is found that the items have gone out of

production, these items should be removed out of the item basket and the weights of the out-going items be redistributed among the weights of the remaining items in the corresponding class in proportion to their contributions in that class.

3.5 Evaluating the suitability of data sources and methods.

113. Availability of suitable data sources is very vital for the compilation of any statistics including the IIP. The IIP is an important macroeconomic indicator and is often considered as the barometer of the industrial sector of the economy. The data sources for IIP, therefore, should be highly professional, skilled and trained so that these are capable to generate quality data for the compilation of IIP. The quality dimensions viz. accuracy, adequacy, timeliness, reliability, relevance, cost efficiency, confidentiality, accessibility, etc. which are discussed in the Sub-section 4.5, should be ensured. Failure to do this would dilute the quality of the IIP in capturing the real dynamics of the industrial sector.

114. As already discussed in Sub-section 3.2, there are about 15 source agencies that provide the monthly production data for the IIP. Further the data generated through the ASI are used for preparing the index basket and the weighting diagram and the CSO is responsible for compilation and dissemination of the final data on IIP. The professional quality of these agencies and the methodology adopted by them in respect of IIP, can be evaluated under the following heads.

(a) Source agency generating data for weighting diagram

(b) Source agencies responsible for monthly production data

(c) Agency responsible for compilation and dissemination of IIP.

(a) Source agency generating data for weighting diagram

115. The index basket and the weighting diagram of IIP are prepared on the basis of the data generated through ASI. The ASI is conducted through the FOD (NSSO) and the data are processed and disseminated by the CSO, which are professional organizations and having experience of more than five decades. The data collection and processing are carried out applying sound statistical methodology. Except for some sampling and non-sampling errors that are inevitable in case of any large scale sample survey like the ASI, the data source for the weights is quite reliable and sound. The processing error is also minimized by applying data checking and validation at various stages through highly skilled, trained and qualified data processing personnel. The data processing is also supervised by trained and qualified statisticians. The ASI is quite exhaustive and can be compared to census of industries. As it is conducted every year, it can provide the much needed data for compiling annual chain-linked indices.

(b) Source agencies responsible for monthly production data

116. The quality of data sources providing the regular monthly production data is also important to maintain the quality of the IIP. The data sources and the methods in this respect are not so good as the sources that provide the data for the weighting diagram. Often the source agencies lack the professionalism. They have no well equipped statistical units/cells for compilation of the time series production data for compilation of IIP. The data sources, besides their limitations in maintaining the various other quality dimensions, very often fail in maintaining timeliness. The government should take adequate steps to provide the much needed statistical resources for compiling the monthly production data to improve the quality of IIP. National and state statistical offices must provide the requisite guidance to the data source agencies for improving their suitability for providing the data.

(c) Agency responsible for compilation and dissemination of IIP

117. The compilation of all India IIP takes place in the CSO and that of the State IIPs at State Statistical offices, which are, mostly, well-equipped with trained and qualified statisticians and modern computing equipment like computers. In case of some less statistically developed states, the necessary professional support are to be provided by the CSO. The States should follow the guidelines and methodology set out in this manual so that uniformity of compilation is maintained for facilitating inter-state comparability of IIPs. For ensuring this the CSO provides technical support to the states in preparation of item basket, weighting diagram and supplying the state- specific monthly production data in case of centrally produced items viz. electricity. It also provides training to the state statistical officials on IIP.

SECTION 4: INDEX COMPILATION

4.1 Types of Indices

118. This section deals with the various issues that need to be considered in the compilation of the IIP. The important practical issues include: the type of indices, the selection of base period and its desirable characteristics, the methods of weighting, the type of production data available and their transformation/ treatment, the methods aggregation of data for compilation of IIP and the desirable properties of a preferred index number.

119. Out of the several index numbers available for economic time series, the Laspeyres index, the Paasche index are most commonly used indices by national statistical offices. The Fisher index, which is considered the ideal index on theoretical grounds, is very rarely used for official economic time series because of its technical difficulties and resource constraints. The purpose here is to consider the practical advantages and disadvantages of these three indices and suggest the most preferred index for the compilation of IIP both at the all India and state/UT levels for facilitating data aggregation and comparisons.

120. All the production data available are not always readily amenable for integration in an IIP or its sub-groups. IIP being a volume measure, all the production data must be expressed in quantitative or volumetric terms. Frequently, some data are available in value terms and these value data are to be transformed to volume/quantity figures by applying the 'Method of deflation', which is discussed separately. Other issues relate to unexpected values and heterogeneities viz. missing data, break in a series, differences in measurements, non-response, etc.. Adoption of different methods in dealing with these problems shall lead to generation of indices, which may not be comparable. In this section a set of standard and viable methods for compilation of IIP is suggested.

121. While compiling the IIP, the aggregation methods, the weighting pattern, etc. need to be considered to ensure the 'quality' of the IIP series that are essential considerations in case of any official statistics series, viz. national accounts, WPI, CPI, etc. Some such issues are also considered in this section.

4.1.1 Selecting a base year

122. A distinction need to be noted between 'weight base' and 'comparison base'. The **weight base** of an index number is the period to which the weights relate. The comparison base of an index number is the year or period taken as 100 in the series of the index. The choice of these two base periods of an index has to be guided by some

considerations. The criteria include: (i) normality (ii) availability of complete and detailed data set (iii) year of economic significance (iv) proximity to the study period, and, sometimes (v) synchronization with the base year of other important indices viz. Whole Sale Price Index, Service Price Index, Service Production Index, etc.. It is to be noted that while the first four have economic and statistical implications, the last one is for the sake of comparability and for drawing more meaningful conclusions.

123. The length of the weight base should be such that it takes into consideration the seasonal factors and eliminates the influence of these fluctuations from the weights. For this reason, a period less than a year (e.g. a month or a quarter) is not generally suitable. On the contrary, an average of a series of years is not often possible as the weight base period of IIP, when data for weights are available only for single years and at intervals. However, from different considerations a single year seems ideal for weight base. For a country like India where Annual Survey of Industries (ASI) is conducted regularly every year and comprehensive production data are available, a better method might be to use a three-year weight base centered on the selected year. A periodic and regular review of weight base and change of weights is desirable. A five-yearly regular review and revision in this regard is recommended. For facilitating aggregation and comparison, it is recommended that the weight bases of the all India IIP and those of states/UTs should be synchronized.

124. For the index of an individual country viz. the all India IIP, it is preferable to keep the weight base and the reference base same for avoiding the confusion or misunderstanding about the weight base. However, if so desired and not inconvenient a comparison base different from weight base can be selected. This involves proportional adjustment of the index series after putting the reference base as 100 and without any change in the weight base and the weights.

4.1.2 Laspeyres, Paasche and Fisher indices.

125. It has been said in the section on need for index numbers that, IIP is generally computed as the weighted average of production relatives of all the industrial activities, where the weights are the net values of output of these activities. By changing the weight base and the corresponding weights, different formulae have been suggested by economists and statisticians. In some of these formulae, weight base is fixed and the resulting index is called the fixed-weight base index. In some cases, the weight base goes on changing from year to year and these formulae are called variable-weight base index numbers. The Laspeyres and Paasche index numbers described below are examples of fixed-weight base index numbers.

126. For a fixed-weight base year *0* and time *t* a Laspeyres –type index can be expressed mathematically as follows:

$$L_t = \frac{\sum (W_{i\,0} R_i)}{\sum W_{i0}} * 100 \qquad (1)$$

where

$W_{i\,0}$ = Weight of the item *i in the weight base year 0*

R_i = Production relative of the item *i*

$R_i = P_{it} / P_{i0}$

P_{it} = Production of item *i* for period *t*

P_{i0}= Production of item *i* for period the weight base period *0*

A Paasche –type series where the weight base is the current period *t* can be written as:

$$P_t = \frac{\sum (W_{i\,t} R_i)}{\sum W_{it}} * 100 \qquad (2)$$

where

$W_{i\,t}$ = Weight of the item *i* in the current year *t*

R_i = Production relative of the item *i*

$R_i = P_{it} / P_{i0}$

P_{it} = Production of item *i* for period *t*

P_{i0}= Production of item *i* for period the reference base period *0*

127. A Fisher – type series is obtained for each period by taking a geometric mean of the values for the same period of the Laspeyres type index and Paashe- type index. Thus it is expressed mathematically as follows:

$F_t = [L_t P_t]^{1/2}$ (3)

128. In the literature on index numbers a great deal of attention has been devoted to the definition of an ideal index number and a number of tests have been suggested for an index number to satisfy to qualify as an ideal index. It has been claimed, on theoretical grounds, that the Fisher index defined by equation (3) is the ideal index. Compilation of ideal index numbers may be pursued when the index numbers are to be compiled at intervals (e.g. annually) with the help of detailed and exhaustive data. However, compilation of IIP, which is released every month, using the Fisher-type ideal index formula with the readily available monthly production data is not at all a practically feasible proposition. Therefore, in almost all the countries including India, the Laspeyres–type index formula (which has some desirable properties as given in Table 4.2) is used for official compilation of IIP. It is suggested that this simple and single formula be uniformly used by all the states and UTs in compiling their IIPs.

4.1.3 Fixed base and Chain-linked Approach

129. The index numbers considered above are of the fixed base type; i.e., the base period with which we compare the other time periods remain fixed with the progress of time. It may further be noted that with the passage of time new commodities enter the market and old ones disappear; besides the quality of the commodities may undergo a change. Also the relative importance of various commodities being dependent on the tastes and habits of consumers changes. If an index number is needed for comparing successive time periods –say 0,1,2,….., n, it is not necessary to use a fixed reference base *0*. One can use the previous period as reference base for comparing any time period and construct what are called ***link-indices***. There is no change in the method of calculation; only the reference base period changes for each comparison and in each it is the previous period. The symbol used for such an index for comparing the Laspeyres IIP of period *k* with those of period *(k-1)* is $\boldsymbol{L_{k-1,\,k.}}$ Thus one can construct *n* link indices – $L_{01;}\ L_{12;}\ L_{22;}\ldots L_{n-1,n.}$ By multiplying successive links, i.e. by chaining , one can obtain the chain indices as shown below;

L_{01},

$L^{c}_{02}=L_{01}*L_{12}$

$L^{c}_{03}=L_{01}*L_{12}*L_{23}$

.....

.....

$L^{c}_{0n*}=L_{01}*L_{12}*.....*L_{n-1,n}$ (4)

130. These chain indices will not in general be equal to the corresponding fixed reference base indices unless the formula used meets the circular test. Stated symbolically, the test is

$L_{01}*L_{12}.....*L_{n-1,n}*L_{n0}=1.$ (5)

131. The time reversal test $L_{01}*L_{10}=1$ is a particular case of (5) above. Thus if a formula satisfies the circular test, then

$L_{01}*L_{12}.....*L_{n-1,n}=1/L_{n0}=L_{0n}$

132. The base period can be shifted to any convenient subsequent period, if the formula satisfies the circular test, since L_{kn} can be calculated from the following relation, which follows from the circular test –

$L_{kn}=L_{on}/L_{0k}$.

133. The practical advantage of a chain index is that the sample of commodities and /or the set of weights may be kept quite up-to-date in any index number. However, any change in the set of commodities or in the set of weights will upset the circular test.

134. It may be noted that the fixed base index numbers become more and more inaccurate as the distance between the base period and the current period increases. As the chain base index numbers are based on a number of link relatives, each of which is expected to be quite accurate, it is claimed that the chain base index numbers are more accurate than the fixed based ones, so far as long term comparison is concerned. Also a chain index fully utilizes the information regarding prices and quantities of all the intervening periods between the base period and the current period, whereas a fixed base index requires data concerning the base period and current period only.

135. Some authorities, on the other hand, hold that since a chain index is obtained by multiplying a number of link relatives, it may involve a cumulative error, although none has put forward any convincing proof for the existence of such error.

136. Fixed base index numbers are generally easier to calculate and are more easily understood by users of index numbers than chain base index numbers.

137. When changing the base year and the index weights, if the index series is recompiled for all the periods using weights from the new base period, it is called **fixed-base index**. Laspeyres index is a fixed-base index. In case of base revision using fixed-base index, the entire historical series will be revised as the weight of the whole series are expressed in terms of the economic situation in the base year. One demerit of fixed-base Laspeyres index is that it is prone to less frequent updating and as the series gets longer the data become less relevant. This calls for frequent base revision to capture the reality of the economic situation, particularly for fast changing economies. But frequent base revision requires lot of resources in terms of time, money and manpower, which the fast changing and resource-poor developing countries can hardly afford. It is generally suggested that a fixed-base index should be revised every 5 years based on the data from censuses or structural surveys available on periodic basis. In case of India, the IIP, which is fixed-base Laspeyres index, should be revised every 5 years based on data from the Annual Survey of Industries (ASI).

4.1.4 A recommended approach

138. The approach to follow in the compilation of IIP should satisfy some desirable criteria. The frequently considered ones in official statistics are given in Table-4.1 below

Table-4.1

Criteria	Definition
Symmetry	The index formula assigns equal weights to the two situations being compared; i.e. the situation during the current period and the situation during the base period.
Time reversal	The index for period *t* using period *0* as base is the reciprocal of the index for period *0* using period *t* as base
Factor reversal	Multiplying a price index and a volume index of the same type is equal to the proportionate change in the current value(SNA,1993, para. 16.24)
Additivity	According to the 1993 SNA (para. 16.55), “Additivity is a property pertaining to a set of independent index numbers related by

	definition or by accounting constraints under which an aggregate is defined as the sum of its components; additivity requires this identity to be preserved when the values of both an aggregate and its components in some base period are extrapolated over time using a set of volume index numbers".
Identity	If the volumes in the base and reporting periods are identical, then the index does not show any change.
Monotony	On the assumption of two similarly defined [IIPs] during the base period, the indices are equal. If, during the reporting period, the volume index for just one economic sector is higher(lower) for the first [IIP] than for the second, the first [IIP] is higher (lower) than the second.
Linear homogeneity in volume	When all the volumes in the reporting period are multiplied by a standard [non-zero] factor *x*, the [IIP] shows *x*-times higher value.
Homogeneity of degree zero in prices	The [IIP] depends only on the price structure , not on the absolute level of prices
'Real' volume comparison over any period	Changes to the index result only from a change in volumes (and not from changes in weights)
Up-to-date weighting structure*	The index formula ensures that the weighting structure is up-to date, not out of date.
Interpretability for users and cost of maintenance	Represent the more practical issues to be taken into consideration.
Timeliness	The speed of the dissemination of the data is reasonable, i.e. the lapse of the time between the end of a reference period (reference date) and dissemination of the data

*Weights should reflect the relative prices and shares of the intermediate consumption on the output

Source: 'Compilation Manual for an Index of Services Production, OECD 2007', page-40

139. An evaluation of the three commonly discussed index numbers is summarized in the table-4.2 below. It is evident from this table that Laspeyres index fulfills the maximum number of desirable properties and, perhaps due to this, it is the most widely used index formula for compilation of IIP.

Table-4.2

Criteria	Laspeyres	Paasche	Fisher
Symmetry			X
Time reversal			X
Factor reversal			
Additivity			
Identity			
Monotony	X	X	X
Linear homogeneity in volumes	X	X	X
Homogeneity of degree zero in prices	X	X	X
'real' comparison of volumes	X		
Up-to date weighting structure	X	X	X
Interpretability	X		
Cost efficiency	X		
Timeliness	X		

Note: ' X' indicates that the index meets the criteria.
Source: 'Compilation Manual for an Index of Services Production, OECD 2007', page-41

4.2 Weighting

4.2.1 The role of weights in an index

140. The first step in the construction of an index, including the IIP, is to select the item basket. Because data for some activities may not be readily and economically available and some economic activities may not warrant inclusion due to their insignificant contribution, it is generally not practicable to include all the economic activities that contribute to industrial production. Generally, a representative basket of items is selected by applying judgment and on the basis of their relative importance. The relative importance of various economic activities is different and these differentials need to be reflected while measuring the performance of the entire industrial sector. With a view to achieving this, each item included in the index basket is given appropriate weight. An item weight is generally determined on the basis of the net output or gross value added (GVA) from that industrial activity. These are computed in proportion to their contribution to the Gross Value Added (GVA) in the particular class/group. Individual items are included in the index basket according to some minimum contribution of individual item to national product. The basket is so selected that the contribution to national product of all the items in the basket is, say, about 80 percent. The overriding criterion for the selection of item basket is the regular availability of production data from the various data source agencies.

4.2.2. Data needed to construct weights

141. As already discussed in the above paragraph on role of weights in the index and that on the preparation of weighting diagram, the basic data required for construction of weights are the net output of individual items in the index basket in the weight base period. Generally, in the construction of weights, the broad sectors (Mining & quarrying, Manufacturing, Electricity) are first identified and their net outputs or GVAs are required for deriving their weights. Similarly, for activities at the lower levels (divisions, groups, sub-groups) net output or GVA are the preferred data set for computing the weights. In this top-down procedure of weight assignment, when the data on net output or GVA are not available, the gross value of output (GVO) may be used for determining the weights without losing much in the quality of the index. While computing the GVA, which is the difference between value of output and the value of inputs, it is sometimes observed that the GVA comes out to be negative, which is economically and commercially absurd, because if the value of output is less than the value of inputs there will be no production at all. This absurd result may arise due to bulk purchase of raw material inputs at reduced costs and not using all of them in the production process but accounting the whole cost of the inputs in the computation of GVA. In such cases the appropriate data should be the ‘census value added’, which is the value of output minus the value of the actual portion of inputs consumed in the production of the output, not the value of all inputs purchased and maintained in stock. The ‘census value added’ figures cannot be negative and these are required data set for weight calculation.

4.2.3. Revising the weights

142. Weight revision arises under the following situations.

(i) **During revision of weight base of the index**: when an entirely new series of weights are computed in the light of new data generated through a census or detailed survey. All the steps required in the preparation of weighting diagram as outlined earlier are to be followed. This type of weight revision is required to take into account the changes in the structure and composition of the industry due to entry of new items and exit of unimportant and obsolete items. The main purpose in this case is to make the index basket representative of the actual industrial scenario.

(ii) **During non-availability of production data:** when the data for some items (item-groups) are not available, the correct method should be to redistribute the weights of these items (item-groups) among the other items (item-groups) in the next higher class and in proportion to the weights of the remaining items (item-groups) and revise the weighting diagram. However, while doing this exercise, the total weight of the class to which the missing item belongs is kept constant so that the fixed-weight property of the index is not violated.

4.3 Examination of data system

143. This sub-section is devoted to examining the data system for IIP. Generally, data system comprises the institutional frame work for data generation, the legal and intellectual set up supporting it and the manpower running it. The inputs and the outputs of the system are raw data and finished/processed data respectively. In the case of IIP, the raw data are those collected and supplied by the source agencies, whereas the processed data are the estimates of IIP published by the CSO. Assessment or examination of the data system is necessary for improving the data system and the quality of data. The suitability of data sources and the quality dimensions of data are discussed in other sub-sections (Sections). Some of the problems faced during data collection stage viz. non-availability of production data, entry and exit of new units in the production, etc. are also discussed elsewhere in the manual. Here the discussion is confined to the problems associated with the compilation of IIP on the basis monthly production data.

144. The first problem relates to the unequal length of calendar months and number of week-ends. It may be mentioned that a week, quarter or year are equally convenient for measuring production and also it is easy to translate one measuring unit to the other with some minor adjustments. The calendar month is not a period, which fits into the pattern. Further weights of the IIP are generally obtained as values translated into

weekly or quarterly, but not into monthly rates because of varying lengths of calendar months and unequal number of week-ends. It is, therefore, recommended that the primary IIP should be constructed on the basis of production per week data. This is done by multiplying the series representing the production per week by the weights, which are relative values of net outputs, generally equal per week or per year. The index can be compiled twelve times a year and shall refer to the calendar months.

145. The per week production data can be computed from the monthly production data in the following manners and in accordance with the normal work-week in each industry. For example, if an industry has a 6-day week with no production on Sundays and other days counting equal, then the number of working days is computed for each month by omitting all Sundays; the figure in the series for the month is divided by the number of days in the month and multiplied by 6 to give the rate per working week. Similarly, for an industry with a 5 1/2 day week (five full days, half Saturday, no Sunday production), each month's figure is divided by the number of working days, omitting Sundays and counting Saturdays as halves, and multiplied by 5 1/2. If the data are given weekly throughout the year, then the output of weeks that fall partly in one month and partly in the next can be allocated between the two months in proportion to the number of working days that fall in each month. The average output per working day is then calculated and multiplied by the number of working days per week to give the average rate per week. Alternatively, each week can be assigned to the month in which it falls, in entirety or in major part; the data are then aggregated for the weeks in the month and divided by 4 or 5 according to the number of weeks. (As a further variant an arbitrary pattern can be set in advance, e.g. 4,4,5, weeks in the three months of each quarter.) Finally if the data are given only quarterly, some interpolation is needed; this is best done on a weekly basis and the weeks assigned to months as indicated above.

146. The above adjustments in the monthly production data to arrive at the per week production data considers only the variations due to week-ends (Saturdays and Sundays) in the calendar months. It does not consider seasonal factors like public and annual holidays, strikes and lockouts by employees resulting in closure of production and effects of weather, as they occur over the year and the changes in the length of the working week; if, for example the working week was reduced from 6 to 5 days, which requires a proportional reduction in production, the index should reflect this fall. Also it does not attempt to isolate the trend of production over time. The other point is that, when the basic data are for calendar months, the adjustment will differ as between countries, and, within one country, as between different industries, because of variations in the normal work-week. It follows that the adjustment is not one to be applied to the total index or to its main components. The choice is between applying it to the individual series or to convenient groups of series. The former is more accurate but also more laborious. The latter can usually be adopted in practice, if most establishments in each industry have the same normal work-week and if industries with the same normal work-week are grouped together. However, for comparisons involving the trend of production from month to month, it is important to have one or more secondary index numbers from which seasonal influences have been removed. A distinction can be drawn between the incidence of holidays, some of which are fixed

while others fall in different months in different years, and the effect of other seasonal factors. The primary index may be first adjusted for holidays, and then a further secondary index obtained by eliminating other seasonal influences. The second adjustment can be made according to one or other of the standard statistical techniques for isolating seasonal variations. The first adjustment, however, needs special treatment. The aim should be to fix estimates of the effective number of working days lost because of holidays each month; in any one country, this may well vary from one region to another and from one industry to another. The decision will be made on general information on what holidays are taken in different industries and regions, supplemented by data on the effect of these holidays on production. For example, the Easter weekend may have the effect of 1 1/2 days of lost production in some industries in England, and 2 or 2 1/2 days in other industries; while in the United States the incidence may be generally equivalent to only 1 day.

147. The secondary index computed by elimination of the effect of public and annual holidays and allowing for changes in the length of the working week may be described as an index of production per working day. It should be noted, however, that this index is derived from the primary index per working week and hence that the weights of different industries are still relative values of net output per week or per year. A different index of production per working day, more consistent if the working day basis is to be taken, could be calculated by re-weighting with relative importance of different industries and hence the course of the index. For example, an industry with a 6-day week may have 290 working days in the year (allowing for all holidays) while an industry with a 5-day week may have only 240 working days. The weight of the first industry would be reduced relative to that of the second when switched from a per week (or per year) basis to a per working day basis. The decision to adopt these adjustments need to be taken on practical grounds.

4.4 Compilation procedure

4.4.1. A step by step guide to compiling the index

148. The purpose here is to provide a sequence of steps that are to be followed in the compilation of an index, including the IIP. The steps will just be indicated and the details of the steps are to be referred in the appropriate sections.

(i) **Determination of the weight base and the reference base:** For doing this the desirable characteristics of these base periods must be considered. In the case of IIP, since the used for deriving the weights are readily available from the ASI, other desirable properties must be taken into account in deciding the weight base.

(ii) **Fixation of a representative item basket:** This involves finding the net output or GVA of all the items covered in the ASI and fixing a minimum cut off (bench mark) GVA and selecting all the items that have GVAs more than or equal to the bench mark. There is always a trade-off between the size of the item basket to make it representative and the surety of production data availability. As already mentioned earlier, the practical guide line is to limit the index basket to those items for which regular periodic production data can be ensured. In the case of IIP this is finalized in consultation with the various data users and the data source agencies. The data source agencies provide the monthly production data in a prescribed format, which is given at Annexure-I.

(iii) **Preparation of weighting diagram:** The assignment of weights, as already discussed, is from top to bottom. The GVAs of items (item-groups) are used as weights. For example, the weight of manufacturing sector is computed as the ratio of GVA from manufacturing sector to total GVA in the whole industrial sector. Similarly the weights of other sectors, groups, sub-groups, etc. are calculated. The details are given earlier. However, to give the users of the manual a comprehensive idea about the item basket and the weighting diagram, a list containing the item-groups at 4-digit level of NIC-1987 and their constituents for the manufacturing sector in the current series of IIP (base 1993-94) is given at Annexure-II, Also, a list of items/ item-groups as per use-based classification at 4-digit level and their weights are given in Annexure-III. It needs to be mentioned here that each of Mining & Quarrying and Electricity is treated as a single item-group.

(iv) **Computation of the index:** the index compilation follows a bottom-up approach. First the item-wise indices are compiled by using the Laspeyres' formula. To do this the production relative of item *I* is multiplied by the relative weight of item *I.* The higher order indices are then calculated in succession by repeated application of this formula and using the appropriate weights. The Sector-wise, 2-digit group-wise, source

agency-wise, used base category-wise indices are compiled by the same procedure.

(v) **Computation of cumulative indices:** The cumulative indices from the beginning of the year up to a particular month are computed as the average of the indices for the period i.e. sum of the indices of the months considered divided by the number of months. The Average Annual Index is obtained by dividing the sum of the twelve monthly indices by twelve. Quarterly and half-yearly indices are obtained in the similar way.

(vi) **Computation of growth rates:** The growth rates are computed by the standard formula. Percentage Growth rate = [(Index for the current month – index for the previous month)/ Index for the previous month] x 100.

(vii) Seasonal adjustments: For some specific purposes the index series needs adjustment for seasonality. An appropriate method of adjustment should be applied, if need be. The all India series is generally published in raw form. This provides flexibility to the professional and analytical users to use their own analytical techniques to derive their inferences.

4.5 Overall quality assessment of the index

4.5.1 Dimensions of quality

149. This sub-section deals with the overall quality of the resulting IIP. Most statistical institutions at national and international levels attempt to systematically evaluate the quality of their own statistical output using various tools and processes. Notable examples at the international level are the IMF quality framework, *i.e.* the General Data Dissemination System (GDDS) and Special Data Dissemination Standards (SDDS) and the OECD's quality framework 24, which is adopted in this Manual as a basis for discussing ways to ensure the overall quality for an IIP.

150. Before setting out a desirable quality frame work and the quality dimensions, it is pertinent to discuss the meaning of the term 'quality'.

151. In general terms 'quality' is defined as "fitness for use" in terms of user needs. This definition is broader than has been generally used in the past when quality was equated with accuracy. It is now generally recognised that there are other important dimensions of quality. Even if data are accurate, these can not be said to be of good quality, if these are produced too late to be useful or cannot be easily accessed or appear in conflict with other data. Thus, quality is viewed as a multi-faceted concept.

152. In the OECD's quality framework, the quality of a statistical product is assessed via the following seven dimensions:

- Relevance;
- Accuracy;
- Credibility;
- Timeliness;
- Accessibility;
- Interpretability; and
- Coherence.

153. In addition to the seven criteria mentioned above, the OECD also considers cost-efficiency as an indispensable dimension of quality in respect of short-term statistics like the IIP. The exact meanings of the seven dimensions are discussed in detail in the remainder of this sub-section.

Descriptions of quality dimensions

- **Relevance**: The IIP data have to carter to the diverse demands and uses of analysts, planners, policy makers, etc. According to the OECD quality framework, "Relevance depends upon both the coverage of the required topics and the use of appropriate concepts." Relevance is proportional to the number of sub-sectors covered in the index. Relevance is also positively correlated to the number of "preferred" methods adopted in comparison to the number of alternative or other methods.

- **Accuracy***:* As mentioned in the earlier sub-section, the IIP is compiled by a bottom-up approach and, therefore, the accuracy of the index is strongly dependent on the accuracy of the individual components. The OECD explains that "Accuracy refers to the closeness between the values provided and the (unknown) true values" and that "Accuracy has many attributes, and in practical terms there is no single aggregate or overall measure of it." The framework then advises assessment of accuracy via "the closeness between the initially released value(s) and the subsequent value(s) of estimates" in practice. It, however, also notes that "The absence of revisions does not necessarily mean that the data are accurate". According to the Eurostat's *Methodology of Short-term Business Statistics: Interpretation and Guidelines*, "Accuracy can be measured using several indicators: random sampling errors, non-random sampling errors, statistical frame errors, measuring errors, process errors, non-response errors, model errors".

- **Credibility***:* According to the OECD "the credibility of data products refers to the confidence that users place in those products based simply on their image of the data producer, i.e., the brand image."

- **Timeliness:** Timeliness refers to the punctuality and regularity in the dissemination of statistics. It requires that the data should be released with the least possible time lag and with perfect regularity. Monthly IIP should preferably be released within six weeks after the reference period, which is meticulously followed in India. The quick estimates of IIP are released every month on 12th or on the previous working day in case 12th is a closed holiday with a time lag of six weeks.

- **Accessibility**: In the OECD quality framework, the accessibility of data products is described as "how readily the data can be located and accessed by users". Further "Accessibility includes the suitability of the form in which the data are available, the media of dissemination, and the availability of metadata and user support services. It also includes the affordability of the data to users in relation to their value to them and whether the user has reasonable opportunity to know that the data are available and how to access them." In addition, the Eurostat's *Methodology of Short-term Business Statistics: Interpretation andGuidelines* states that there is a "need for a catalogue system to allow users to find what information is available, and where to find it" and that "the SDDS therefore requires advance dissemination of release calendars and simultaneous release to all interested parties". Accessibility is discussed further below in Section 5 covering dissemination.

- **Interpretability***:* The interpretability of data is closely related to the users' understanding of the data for their use. Thus the degree of interpretability depends on all aspects of information on the data such as adequacy of the definitions or concepts, target populations, variables and terminology, limitations of the data, etc. Thus the quality of metadata provided along with the IIP is indeed crucial to improve interpretability. Such metadata should, in particular, inform the user on how close to the target variable (*i.e.* the change in value added) the input variables used in the IIP are. When there is a significant difference, it should be explained to what extent this may cause a bias in the measure of the industrial production for particular economic activities or the index as a whole.

- **Coherence***:* The OECD states that "the coherence of data products reflects the degree to which they are logically connected and mutually consistent." The OECD distinguishes four important sub-dimensions for coherence:
    - Coherence within a dataset;
    - Coherence across datasets;
    - Coherence over time; and
    - Coherence across countries.

The IIP can be *coherent within a dataset* if all individual sub-indices that are components of an overall IIP are compiled based on the methodologies proposed in this Manual. C*oherence across datasets* for the IIP cannot be ensured until its coherence

with corresponding datasets is properly checked. As the IIP and GDP are often alternatively used in assessing the performance of the industrial sector of the economy, coherence between these two will have to be examined by ensuring consistency in classifications, concepts and definitions. Comparability between the IIP and GDP is also an important consideration. *Coherence over time* and *coherence across states* are in theory achieved using the methodology recommended in this Manual. However, in practice, there are many reasons for these properties not to be respected for all industry sub-sectors. When this is the case, it is advisable to clearly note the differences from the recommendations. Coherency across states and amongst various sub-sectors of industrial activities may be dependent upon the degree of adoption of recommended methodologies presented in this Manual.

- **Cost-efficiency:** The OECD describes cost-efficiency as "A measure of the costs and provider burden relative to the output. Provider burden is a cost that happens to be born by the provider, but is a cost nevertheless." As mentioned earlier, the OECD does not include cost-efficiency as a dimension of the quality framework. However, the OECD views cost-efficiency as a factor that must be taken into account in any analysis of quality as it can affect quality in all dimensions.

154. It needs to be noted that the assessment of the quality of an IIP based on the criteria outlined above is a challenging task. It is not a simple task to assemble the seven criteria into an index through which the overall level of quality of an IIP can be evaluated. The main problems arise from the difficulties in quantifying the level of individual dimensions and in aggregating the levels of all dimensions. Any resulting score can be arbitrary as it depends, to a large extent, on the data compilers choice of quality measurement variables and weights used for their aggregation. No attempt has, therefore, been made in this Manual to outline a method for deriving a single quantitative quality measure for an IIP. In the absence of such a single measure, it is sufficient that qualitative statements be made with respect to each quality dimension adopted by the statistical agency compiling the IIP. This would enable subsequent determination of priorities on the basis of an understanding of user needs. Further it is recommended that a quality review of the IIP be undertaken every four or five years, or more frequently, if significant new data sources become available.

SECTION 5: DATA PRESENTATION AND DISSEMINATION

155. This Section deals with some of the important issues relating to presentation and dissemination of IIP compiled by the national statistical agencies, including the CSO in India. The issues considered include: the form of presentation of the IIP, their dissemination to users and the related desirable benchmarks or principles that need to be adhered to by the national statistical office. In the first few paragraphs of this section data dissemination, the benchmarks for dissemination and the need for and procedures of data revision are described. Then format for data presentation and dissemination are discussed.

5.1 Key presentation and dissemination principles

156. Data dissemination is the last stage of any survey, census or data compilation, including that of IIP. It consists of distribution or transmission of statistical data to policy makers, business community and other users. It is one of the important activities of the national statistical office. Statistical authorities collect data using the legal authority derived from the national statistical acts and regulations. These regulations require that the data provided by the respondents should be kept confidential. The dissemination strategy of the national statistical office should obviously meet the requirements of the legal/administrative regulations and also confirm to the international data dissemination standards to the maximum extent possible.

157. According to Eurostat 1998 the dissemination of statistical information by the statistical offices should fulfill three benchmarks; confidentiality, equality and objectivity, which are discussed in the following paragraphs.

1. Statistical Confidentiality

158. The data furnished by statistical units relating to their businesses is considered to be confidential and should not be used for any other than the statistical purposes. The disseminated data are considered confidential when they allow reporting units to be identified either directly or indirectly and thereby disclosing individual information. Breaching the borderline of confidentiality bears the risk of a disturbed relationship between the national statistical office, respondents and users. Respondents would become suspicious with respect to protection of their privacy and may not cooperate with the national statistical office for supply of information in future. The users on the other hand would become suspicious regarding the independence of the national

statistical office and casting doubts on the objectiveness and reliability of data. The United Nations Fundamental Principle of Official Statistics describes statistical confidentiality as follows (box 5.1)

Box 5.1: United Nations Fundamental Principle of Official Statistics on statistical confidentiality “Individual data collected by statistical agencies for statistical compilation, whether or not they refer to natural or legal persons, are to be strictly confidential and used exclusively for statistical purposes.” (UNSC 1994)

159. The results of industrial survey are usually published in the form of tables which do not contain information from individual respondents but aggregated information referring to a number of respondents. Some times it is possible to deduce the information about an individual respondent from the total especially when contribution of one respondent dominates this total.

160. To protect the disclosure of information of an individual enterprise statistical disclosure control of tabular data should be put into place. Statistical disclosure control techniques are defined as the set of methods to reduce the risk of disclosing information on individual reporting units. While such methods manifest themselves at the dissemination stage, they are pertinent to all stages of the statistical process.

161. As the first step in the statistical disclosure control of tabular data, the sensitive cells need to be identified. The sensitive cells are those that tend to reveal too much information about an individual reporting unit and these are identified using a dominance rule. This rule states that if the sum of the contributions of a specified number of units account for more than a specified proportion of the total cell value then this cell value can not be published.

162. The logic of the dominance rule is that if the value of one respondent dominates a cell value then it is possible to deduce its contribution fairly accurately. In particular, if there is only one respondent then his contribution will be disclosed exactly. If a cell total comprises values from only two respondents, each one of them can disclose the contribution of the other exactly by subtracting its own contribution from the total cell value. If the value of a cell is dominated by the contribution of two respondents, each of these respondents is able to estimate the value of the contribution of the other.

163. The national statistical office should never publish data that may lead to disclosure of information regarding individuals, institutions or businesses. In business statistics, a commonly accepted rule is that a tabulation cell should comprise at least 3 units. For cells with largest numbers, the three units with the largest values should together do not dominate, i.e. account for less than 70 per cent of the cell value.

164. Another statistical disclosure control to safeguard the confidentiality is the modification of classification schemes. It is possible that a table contains more than one sensitive cell; in that case it is recommended that spanning variables in the rows/columns should be aggregated to eliminate the sensitive cells.

165. The issue of confidentiality has not only a national dimension, it is also becoming an international issue for the following reasons (i) increase of data dissemination over the internet; (ii) internationalisation of users of statistical data (including international organisations); and (iii) high interest in cross-country comparisons. As a result, there is a growing demand for countries' data at very detailed level, even in some cases – demand of countries' micro-data.

166. In the case of IIP the item basket is selected and the item-wise weights are prepared on the basis of the detailed ASI data, which are collected under the Collection of Statistics Act, 1953 and the Rules framed there-under from time to time. Confidentiality of individual data are provided under the Act. The Act prohibits disclosure of data relating to individual factories. Therefore, if the number of factories under any industry (3-digit level of NIC) in a state is less than three, the data have been combined to a similar industry in order to conceal the identity of all such units belonging to the concerned stratum. Similarly, if number of units under any 4-digit level of NIC at All-India level is less than three, the industry has been merged to a similar industry under the same broad industry group.

2. Equality

167. Statistics compiled by national statistical offices are collective goods which imply that no users are privileged and every citizen can take note of statistical data under equal terms. It is important to ensure that no new data are supplied to anyone before these are officially released. In most cases press release is the first publication. The press release serves dual purpose in that apart from making the data officially public it also sends a signal to the data users that additional data on the subject can be obtained from the national statistical office.

168. To ensure the dissemination of industrial statistics to all users at the same time, the national statistical offices should develop and announce an advance release calendar. The advance release calendar should be given sufficient publicity and should also be posted at the national statistical office website in beginning of each year.

169. The IIP data are released to the press according to the Standard Data Dissemination System of IMF. The data are released by the CSO to the press on 12th of every month with a time lag of six weeks. Immediately after the press release, the data are put in the website of CSO for use by the public. More detailed data are made available to users in accordance with the National Data Dissemination Policy of the

Government of India. According to this policy, while government departments, universities and research institutions are provided the data free of cost, private users are charged a nominal fee, that is decided on the basis of data volume and the stationery and postage costs, if any.

3. Objectivity

170. Released data should not be accompanied by judgments or recommendations. The independent and objective position of the national statistical office does not permit subjective interpretations. To conform to this principle, the IIP data are released to the press and put in the website without any analytical notes to influence the users in the interpretation of the data. However, the press and other analysts are free to give their own interpretations and draw their own conclusions.

Data revisions

171. The revision of data released earlier is an essential part of countries practices on compilation of any industrial statistics including IIP. The revision in the estimates is an inescapable statistical activity in all countries both developed and developing. It is inherent basically in the way estimates are compiled and released by the national statistical offices – from 'preliminary' (based mainly on trends in indicators and statistical techniques), to 'provisional' (based on limited amount of data) to 'final' (based on comprehensive data or as a result of benchmarking). Revisions occur as a consequence of the trade-off between the timeliness of published data and their reliability, accuracy and comprehensiveness. To meet the user needs timely national statistical offices compile preliminary estimates that are revised later when new and more accurate information become available. Although, in general, repeated revisions may be perceived as reflecting negatively on the reliability of official industrial statistics, the attempt to avoid them by producing accurate but rather outdated data will result in failing to satisfy the users' needs. The revisions affect both annual and short term statistics but they are more significant for the short term data.

1. Reasons for revisions of data

172. In general, there are two reasons for revisions - (i) revisions due to "normal" statistical procedures (for instance new information available, change in the methodology, change in data source, change of base year); and (ii) revisions due to the correction of errors that may occur in source data or in processing. In addition, changes in presentation of statistics should be mentioned. They do not, strictly speaking, fit the definition of revision as a change in value of a statistic. However, they often take place at the same time as revisions, especially revisions caused by changes in concept, definition, and classifications.

173. It is recommended that corrections of errors (statistical or data processing errors) are done in a transparent manner as soon as they are detected. The revisions should be explained to the users in a way that that gives assurance that mistakes were not politically motivated. For normal statistical data revisions countries should develop revision policy. The development of a revision policy should not aim at impeding revisions but rather it should aim at providing users with the necessary information to cope with revisions in a more systematic manner. Essential features of a well-established revision policy are its predetermine schedule, reasonably stable from year to year; openness;

174. Advance notice of reasons and effects; easy access of users to sufficiently long time series of revised data as well as adequate documentation of revisions included in the statistical publications and databases. Users will be reassured if they see that revisions take place within the framework of an overall policy and according to predetermined schedule.

2. Recommended practices for data revisions

175. There is a need for the good practices with regard to the data revisions to be followed by countries as it will not only help the national users of the data but also promote international consistency. It is recommended that the following revision practices should be followed by countries:

(i) it is important to consult main users of official statistics to identify needs and priorities specific to individual countries;

(ii) a statement by the national statistics office about the reasons and scheduled revisions should be made public and readily accessible to users;

(iii) the revision cycle should be relatively stable from year to year. Users place great importance to a revision schedule that is regular;

(iv) major conceptual and methodological revisions should usually be introduced every four to six years, balancing need for change and users' concerns;

(v) revisions should be carried back several years to give consistent time series;

(vi) Details of revisions should be documented and made available to users. The basic documentation should include identifying in the statistical publications data that are preliminary (or provisional) and revised data, explaining the sources of revisions, and explaining breaks in series when consistent series can not be constructed.

(vii) Users should be reminded of the size of the likely revisions based on past history;

176. The IIP is first released in the form of quick estimates with a time lag of six weeks. These quick estimates are revised twice, the first revision taking place after one month of the release of the quick estimates and the second and the final revision taking place after three months of the release. The base of the IIP has undergone several periodic revisions, though not with fixed periodicity. The details of these revisions are given in the Section 1 on brief history of IIP in India.

Presentation of IIP

177. The main issues touching on the presentation and reporting of IIPs relate to their type and form of presentation. Various publications provide guidelines and recommendations about dissemination of statistics to users via various media. Much emphasis has been given to the publication of appropriate methodological information (or metadata) describing key concepts and terminology and practices used in the collection of basic data, etc. Important recommendations can be found in the *Data and Metadata Reporting and Presentation Handbook* (OECD 2006) published by the OECD in 2006 and the Statistics Canada Policy on Informing Users of Data Quality and Methodology (Statistics Canada 2000, p. 11). The latter states that the provision of an adequate description of characteristics and methodologies specific to indices is as important to users as quality assessments of the data. The Canadian recommendation as to the range of information (or metadata) that should be provided are also relevant to IIPs. Such information comprises:

• precise definitions of the underlying economic concepts the indices are intended to measure. Specific mention should be given to any limitations in the use or application of the index; and

• descriptions of the methodologies used in the compilation of the index, with particular reference to the:

- index calculation methods entailing the choice of index formula (*e.g.* Laspeyres, Paasche, Fisher) and the strategy for constructing the index series (*i.e.* as either fixed base or chain indices);

- weighting system used, weight revision practices and frequency of weight revision;

- computation at various aggregation levels;

- selection of base year;

- frequency of re-basing;

- procedures for linking indices;

- treatment of changes in the composition of commodities in the market as well as changes in quality.

178. Further, as much of the above information is of specific interest to specialised users, consideration should be given to having differing levels of detail of information targeted to different kinds of users. The OECD data and metadata presentation Handbook emphasizes the need to structure metadata appropriately for users with differing degrees of expertise and need. In this context the distinction is often made between the general public who require only a layperson's explanation of key aspects relating to index compilation and informed / analytical users who require more detailed technical information.

Form of presentation

179. The question of the most appropriate form of IIP presentation is however less clear-cut, with a range of possible options. It needs to be noted that a variety of forms of IIP are required by various users depending on their need for economic analyses, the most requested forms being raw, working day adjusted and seasonally adjusted series. The *OECD Handbook on data and metadata presentation* (OECD 2006, Section 4.2) outlines a set of terminology covering concepts related to time series analysis, working day adjustment and seasonal adjustment to which readers of the IIP Manual are referred.

180. It should be emphasized that working day and seasonally adjusted estimates represent an analytical massaging of the raw or original time series and are intended to complement the original data and can never replace them. The original series shows the actual changes that have taken place (subject to the impact of sampling and non-sampling errors) and the other forms of presentation represent an analytical elaboration of the data to show underlying movements.

181. There is continuing debate among statisticians on which is the most appropriate form for the presentation of a time series to users – raw, seasonally adjusted or trend-cycle? The outcome of the discussion is that there is generally no absolute ideal, and the final choice depends on the media for the dissemination of data and the main focus or intent of the series. Dissemination of detailed data via an on-line database could imply the availability of original series which affords maximum flexibility to users,

whereas dissemination of more aggregated and headline series in a press release would involve the presentation of seasonally adjusted, perhaps in addition to original series. In the case of IIP in India the original index series without any seasonal or periodic adjustments is released to the press and put in the website to provide the flexibility to the users to apply their own analysis.

182. The estimates of IIP are presented according to the Sectors (Mining & quarrying, Manufacturing and Electricity), 2-digit divisions of NIC, source agencies and the use-based categories. The presentation according to use-base categories was required to capture the large-scale diversification and change in structure and composition of the Indian economy by the beginning of 1990s. The Industrial Production Basket comprised significant proportion of capital goods and consumer durables, which required close monitoring for their development. Accordingly it was felt necessary to compile the all-India IIP according to used based categories. The important use based categories include basic goods, capital goods, intermediate goods, consumer durables and consumer non-durables. Items pertaining to these use based categories are identified and provided specific identification codes for facilitating assignment of weights and computation of weighting diagram and the compilation of Indices.

183. Besides the monthly indices, the average cumulative indices, the average annual indices and the corresponding growth rates are also presented for facilitating long term dynamic analysis of the industrial sector.

Dissemination to users

184. The dissemination of IIPs are to be undertaken by statistical agencies in accordance with existing dissemination strategies and practices involving the release of statistics in a variety of media. These range from the release of key aggregates in press releases and summary tables on websites, the use of paper publications, CD-ROMs and finally, providing user access to more detailed data through on-line databases.

185. As mentioned above in the introduction in Section 1, the main aim of this Manual on IIP is to provide economic analysts with information on short-term movements in the industrial sector. There is, therefore, a need to devise strategies for placing the IIP with key short-term indicators (such as price indices, employment and unemployment indicators, external trade, etc.) for comparing the short-term movements in the industrial sector those of other sectors such as agriculture.

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Annexure-I

FORMAT FOR MONTHLY PRODUCTION DATA
FOR COMPILATION OF ALL-INDIA INDEX OF INDUSTRIAL PRODUCTION

REPORT FOR THE MONTH OF :

S.No	Item	Unit of production	Total no. of Units currently functioning	Current month			
				Number of Reporting Units	Prodution of responding Units	Estimated Prodution of non-responding units	Total prodution
1	2	3	4	5	6	7	8

S.No	Item	Unit of production	Total no. of Units currently functioning	Previous month			
				Number of Reporting Units	Prodution of responding Units	Estimated Prodution of non-responding units	Total prodution
1	2	3	4	9	10	11	12

S.No	Item	Unit of production	Total no. of Units currently functioning	Previous 3rd month			
				Number of Reporting Units	Prodution of responding Units	Estimated Prodution of non-responding units	Total prodution
1	2	3	4	13	14	15	16

Note : The production of non-responding units have been estimated on the basis of_____