

Tentative Plan for the Vocational Education of Non-Professional Statisticians

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I Characteristics and tasks associated with present statistical work

Nowadays, industrialized society has become more heavily reliant on information, we thus should strengthen our research, administration and application of information. Meanwhile, the present society is highly qualified and all trades and professions, esp. Social economic phenomena, use more quantification than ever to describe and seek the nature of their study objects. Therefore we should attach importance as well to statistics and various relevant statistical works which study the quantities of social economic phenomena, we should also study statistical methodology and its scientific nature, strengthen the authoritiveness of statistical figures.

1. Present statistical tasks

(1) Statistics is an important tool to understand and forecast economic development. In the enterprises, economic entities or government institutions, statistics is a very important means to know society, its major aim is to find out the present conditions of layers of social and national economy, developing process and future trend on the basis of research into quantities of social economic phenomena, thus to help the accomplishment of policies. Statistics has become a major tool to analyze quantities for the administrations of enterprises, to forecast economic trend and to make important decisions of the enterprises.

(2) Age of information puts forwards higher requirements for statistical works:

Statistics is the main part of the quantitative analysis of information. With the fast economic speed of our country that has gone along with world trends to the age of information, the totality of knowledge and information expends so quickly that the torrents of information appear whereas their appearance is bound to the company of kinds of statistical data. The torrents consisted of data require objectively to enhance the quality of analyzing measuring and examining these data and the dependence on analytical means is increasing day by day.

(3) For the sake of the enforcement of administration of economy and enterprises and the trends towards scientification, complexity and comprehensiveness, statistical data are required to enhance the density of quantities and the quality. Those who administer or make decisions should study the general situation and trend of social economic development precisely, promptly, systematically from different layers and angles and should master them with considerations of macro- and micro-viewpoints and sense of quality so as to study the development more scientifically and the economy structure more reasonably.

(4) It is helpful for the design of indexes and for the execution of economic plans and tasks at various layers or of various kinds to study kinds of economic indexes and the overall, the focal, the typical and group collection, analysis of factors, sampling deduction, et. So it is required that statistics should have the powerful function to deal with indexes and marks.

Data measurement results from collection from the bottom to the top or from the top to the bottom, from points to the scale, that is, from the deduction on the basis of samples taken from numerous basic data. In this way, the overall is mastered through its parts, the collective through the individual. Therefore the sound quality and quantity of the basic data collection is required.

2. Characteristics of statistics

The four characteristics of social economic statistics accord with the above statement of statistical tasks .

(1) Quantitativeness

It is be principal characteristics of statistics. Apart from statistical accounting, there are fiscal and business accountings that explain social phenomena with quantities. But the characteristics of statistics are that plenty of numbers are used to give a comprehensive explanation for social phenomena, scales, levels, structure, proportion, development and changes. Without the comprehensive study of plenty of numbers, statistical research thus lack foundations for real mastery of social economic phenomena and exposure of laws of their changes.

(2) Sociality

It is an obvious characteristic for social economic statistics and statistical practice because of two reasons. On one hand, all human activities are mutually related, affected and conditioned; on the other hand, human activities are done consciously and permeated by relationships among human beings. The nature of economic activities is invariably a reflection of interests of some social layer or organization or individual and statistical work which reflect the general economic scale and nature of the society is undoubtedly influenced by them. So a good social economic order and foundation precede statistical works.

(3) Extensiveness

Statistics is inseparable as long as data are required to reflect nature and regularity of things, statistical work therefore is of a many-sided and mass character. So statistics is a whole set of analyzing system to deal with data rather than the job of statisticians. The good quality of basic data and the efficiency of those people who are so closely related to statistics precede statistical work.

(4) Instrumentality

Statistics itself is not the aim but a tool or means used by people to understand and administer the world. Therefore, in China which is working for the perfection of market-oriented economy, it is the task of statistics to put forwards comprehensive systematic, precise and prompt data, it is its value as a to systematic, precise and prompt data, it is its value as a tool of research as well.

II Present conditions of the unprofessional statisticians and the existing problems in statistical work

1 . Poorly-educated statisticians with little professional capability

At present time, the educational level of those unprofessional statisticians is in most cases between junior and senior middle school education. Roughly speaking, they are hardly trained with basic professional knowledge, furthermore, since for most of them, statistical work is not their full-time job, they do not devote enough time and energy into treating the data and enhancing their quality.

2. Common fault among enterprises insufficient attention to statistics

In most enterprises, the job and status of statistics is normally less important than that of accounting and in some enterprises, the accountants take the place of statisticians. Undoubtedly, there are something in common and the co-operation between them is very different subjects with rather different study objects, means, tasks and functions.

Accounting is used in collecting data, doing business reckoning through the data and making analysis and judgement of economic and fiscal conditions of enterprises in the line with its particular systematic indexes. Statistics is used in expounding and reflecting the numbers concerning economic phenomena and their nature in the line with its indexes. The differences are therefore rather obvious. But in recent years, statistical work is often ignored, its network and grass-touted organizations are far from perfection, even the role of professional statisticians are little realized, let alone the unprofessional.

3 . Backward statistical means and partial understanding of it

The statisticians and relevant enterprises have maintained the viewpoint that statistics simply addition of numbers ever since long ago. They totally ignore the fact that statistics, being a subject and basic work, includes many important means such as grouping, sampling, investigation and

deduction, the establishment, calculation and analysis of indexes. The input of the instruments for statistics is particularly ignored so the capability to deal with data is rather limited and only the most common calculation concerned with a small number of data that can be manage. Statistics nowadays is far short of preciseness and effectiveness.

In a word, the improvement of statistics is restricted by the problems of present statistical work and conditions of unprofessional statisticians.

III The top priority task to do a good statistical work and training is the enhancement of the quality of the unprofessional.

On the basis of the above expression of characteristics, tasks and problems of the key step to do statistics well is to enhance the quality of unprofessional statisticians in the grass-rooted branches. Statistical data are characterized by the gathering from bottom to top, deducing, analyzing and examining, and the mass of unprofessional statisticians provide directly with the resources of these data, therefore it is from the basic level that we should enhance statistical quality.

In accordance with the present conditions of unprofessional statisticians and their work in China, the statisticians must be required from the following aspects so as to enhance their quality to meet the need of statistical work.

IV Requirements for unprofessional statisticians

In detail, the following items of education and practice must be paid attention to.

Requirements of capability, knowledge and training for unprofessional statisticians:

Requirements of knowledge and professional capability can be grouped in two:

1 . Required basic knowledge, contents of capability and structure for micro-statistical work

(1) Filling and collecting statistical reports and the account books at group level

To collect data according to the requirements of standard forms designed by the professional statisticians and of statistical data so as to lay a foundation for the professional’s further treatment of data.

(2) Grouping and collating of statistical data:

Grouping is to classify the data according to the features of different economic units. So the unprofessional statisticians must learn to know well the basic means of grouping according to quantity and quality of data.

(3) Several simple ways to calculate the mean index number and the degree of index changes:

Mean index number is an important tool to study the data of present economy, so the unprofessional statisticians must learn to know well the basic calculating means to work out arithmetic mean that includes simple arithmetic mean:

$$\bar{X} = \frac{\sum Xi}{N} \quad \begin{matrix} \sum Xi---totality of general indexes \\ N---totality of general units \end{matrix}$$

Weighted average:

$$\bar{X} = \frac{\sum Xif}{\sum f} = \sum Xi \cdot \frac{f}{\sum f} \quad \text{f--flexible index}$$

Simple calculation and judgement when index changes:

Calculation and analysis of standard difference:
$$\delta = \sqrt{\frac{\sum (X - \bar{X})^2}{n}}$$

And calculation of average ratio of variance:
$$\frac{\sum |X - \bar{X}|^2}{n}$$

(4) Simple calculation and judgement of dynamic sequence, average developing increasing

speeds.

Average developing speed includes the calculation of definite ratio and environment ratio, mutual relationship between average developing and increasing speed.

(5) to know well how to prepare data for sampling inference and for general inference.

Unprofessional statisticians, though do not participating the calculation and analysis of sampling inference directly, must get to know how to collect and treat data, that is, to work out its working process of the statistical totality of data with the help of partial sampling data to support the statisticians' basic sampling investigation and deduction.

2. Macro-statistical work requires the unprofessional statisticians of the meaning of common indexes of national economy.

(1) Gross output value of national economy($c+v+m$) is the currency display of total social product in some period.

This index enables the unprofessional statisticians to understand the indexes of general social economic scales and the relevant significance.

(2) Gross national product is a comprehensive index to illustrate economic developing level of a country.

It can be the reflection of development of material product, increasing of labor services, general scale of national economy, general level of social development and exporting products, input level of labor services and so on.

(3) National income ($v+m$) is boundary radio of the overall contribution of domestic products.

(4) Retail price index of social products

It is important for the understanding of general scale of circulation of social products and of price level.

These above macro-economic indexes are necessary for unprofessional statisticians to expend insight and to understand some common sense in statistics.

V training focal points for unprofessional statisticians and strengthening basic statistical works

1. Professional statisticians should be the backbone of the professional education in their system and department. They know well the statistical contents and requirement of their system, and necessary professional knowledge and skills, so they are in an advantageous position to guide and teach the unprofessional ones.

2. To train statisticians with the aids of social strength. Relevant teachers of universities or secondary technical schools and personals in statistical department can be asked to teach basic statistical theories and means. Alternatively, at the basic level statisticians with professional knowledge should be fostered so as to give guidance to the unprofessional ones.

3. To define clearly the regulations of statistical position and working capability. Statisticians are required to be equipped with properly sufficient educational level and professional skills. They should be administered according to the Law of Statistics and their works should be checked according to statistical requirement.

4. To strengthen the training of practical working capability of the unprofessional statisticians rather than the written examining of their theoretical knowledge. On the basis of their basic professional knowledge and means, they should be given reinforced training of practical capability to guide them for their development resulted both from their practical work and theoretical study.

5. To perfect basic statistical regulations. Administration of basic statistical data should be strengthened, basic system of account items designed by group or department should be practiced strictly and carefully, and the basic works to fill in the account items and handle statistical data should be fulfilled.

6. To establish a statistical network of data from top to bottom and if possible, to establish system of statistical data base to make the production, collection. Treatment and utilization of statistical data interconnected and intellectualized and to make the statistical works well done.

To summarize all above, the characteristics and tasks of statistical work decides the precision of data at all levels which is affected by the professional level of statisticians whose ability should be emphatically developed whereas a set of scientific vocational requirements for statisticians' working capability and a set of relevant training and administering ways to guarantee the completeness and precision of statistical data and to ensure statistical data can serve the economic activities much better.

PROPOSITION SUR LA FORMATION DES STATISTICIENS NON PROFESSIONNELS

Etant donnée les traits particuliers de la statistique et les tâches à assumer dans ce domaine, la statistique constitue un moyen très important d'approfondir la connaissance sur la société. Les études quantitatives sur l'économie et la société permettront de se rendre compte avec lucidité de la réalité de l'économie nationale dans ses divers aspects et de son processus de développement, de prévoir la tendance de son évolution dans le futur, ceci en vue de faciliter la prise de décision.

Cependant, les statisticiens non professionnels ne sont pas à la hauteur de ce travail, du fait de l'insuffisance de leur aptitude professionnelle et de leur compétence, ainsi que de la faiblesse de leur niveau d'insstruction. Pour cette raison, c'est un impératif que de procéder à la formation des statisticiens non professionnels dans la discipline statistique .