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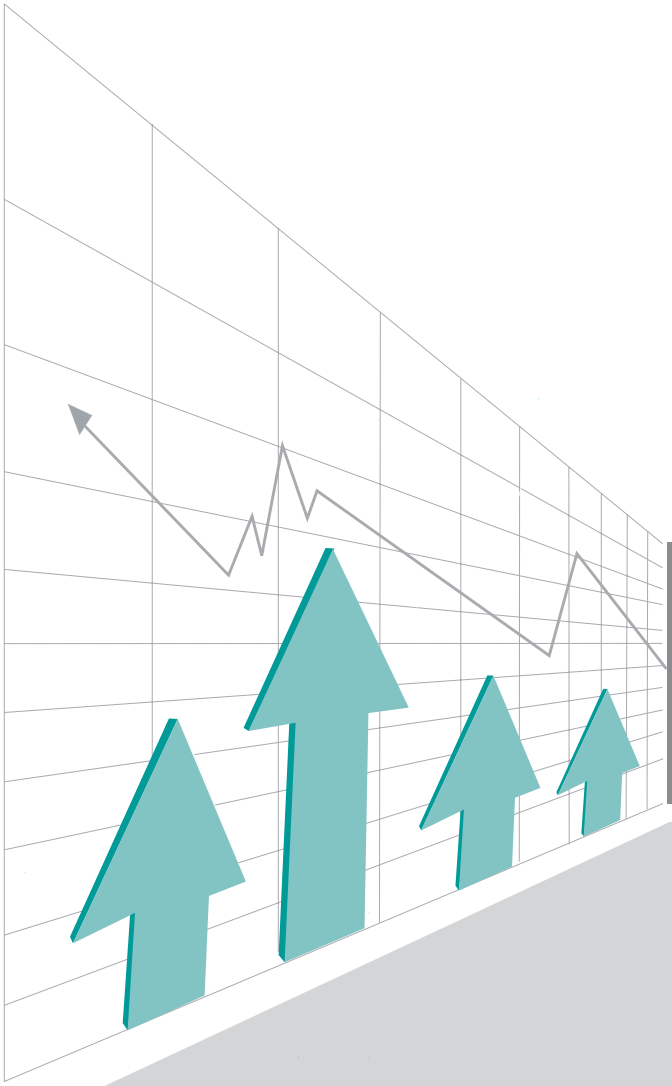

Statistics Quality Management Handbook

Statistics Quality Management Handbook

1. About this handbook

This handbook is designed to enhance the statistics quality by accurately figuring out the quality status of statistics. Also, it aims to be utilized as a guide which helps produce high quality statistics in the statistics production process. In short, this handbook focuses on helping users understand the work of statistics quality management and then improve statistics quality.

2. What does this handbook contain?

This handbook explains the concept, contents and procedures of statistics quality management. In addition, it contains how to assess statistics quality.
Also, this handbook includes the Q&A section concerning statistics quality assessment. It is recommended that this handbook be used as a tool for producing high quality statistics.

3. Use this handbook in the following ways for your convenience

Who

· People in charge of producing statistics and assessing their quality

When

· Planning high quality statistics
  - ➲ Making a detailed plan by using this handbook

· Assessing statistics
  - ➲ The use of this handbook makes it easy to do quality assessment

· Managing statistics after they are produced
  - ➲ Making a plan to enhance statistics quality by referring to this handbook

Take advantage of this handbook in the following ways

Expected Effects

· Recognizing the importance of statistics quality management in the statistics production process

· Improving statistics quality based on systematic quality management

· Assessing statistics quality ➲ Devising a plan to enhance statistics quality and implement it
  - ➲ Producing high quality statistics

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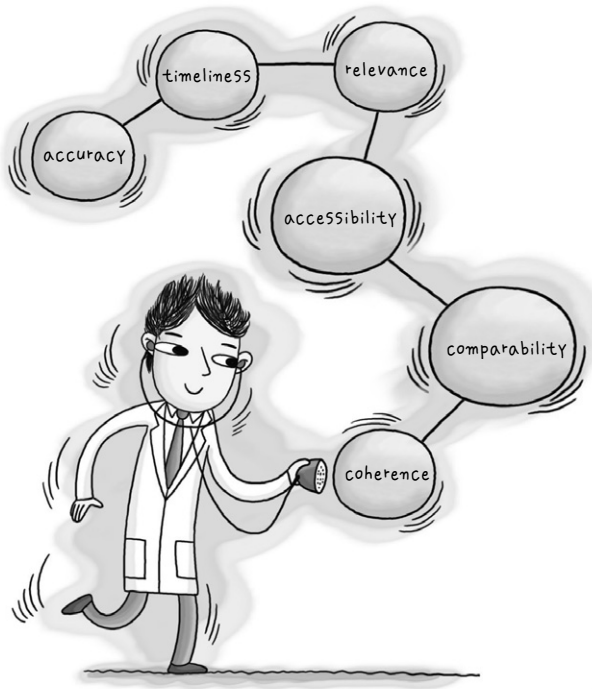

Statistics Quality
Management Handbook

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Statistics Quality Management

Handbook

I Statistical services require quality management.

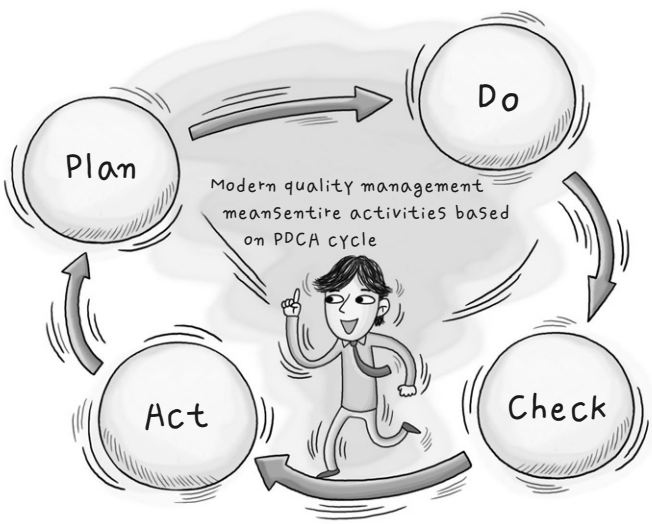
1. The standard of statistics quality has changed
2. Statistical services should meet user's needs
3. How can we tell the quality of statistics?
4. What is the statistics quality management system?

1

The standard of statistics quality has changed

In the past, high quality goods meant cheap and durable ones. These days, however, it should be easy to use and feature a good design. In short, the standard of quality assessment has shifted from the objective and physical value of products (from the viewpoint of producers) to the subjective satisfaction of customers (from the viewpoint of users).

Nowadays, quality management means all activities that are done according to the cycle of "Plan Do Check Act (PDCA)". To be specific, a goal is set and implemented in a reasonable and economical way in order to provide a certain quality that customers want and maintain it. When you look at the PDCA cycle, you will realize that quality management should be done in the whole process from planning to production and distribution.

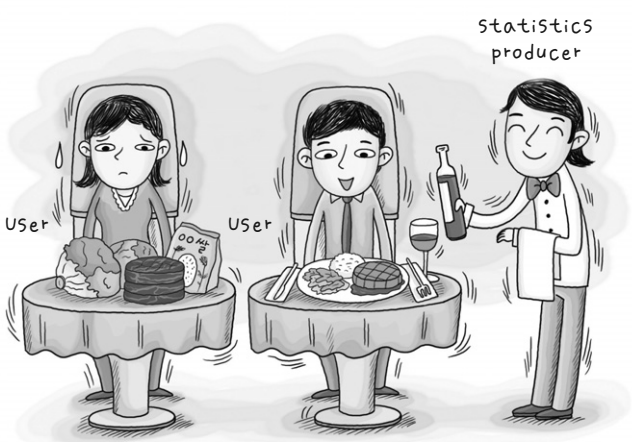


2

Statistical services should meet user's needs

From the traditional viewpoint, high quality statistics should be accurate and be quickly produced. However, as the element of customer satisfaction is introduced to the concept of quality, the meaning of statistics quality is newly interpreted based on the following premise: 'Are statistics produced and provided which are fit for users?' Let's put statistics this way. Past statistics are ingredients while statistics today should be a meal that is served on a beautiful plate at the table.

It is necessary to introduce a new concept of statistics quality assessment in order to provide a certain quality that customers want and maintain it.



How can we tell the quality of statistics?

The product quality depends on how much the demands of consumers are met concerning performance, design, and price.

In this way, statistics quality is determined by "fitness for use" which indicates that how much the needs of statistics users are fulfilled. Fitness for use is a multi-dimensional concept, not a single dimensional one. The dimension of statistics quality is different, depending on scholars. International organizations, which deal with statistics, have not yet offered the standardized dimension of statistics quality. Regarding this, "Statistics Korea" defines six different dimensions. Statistics quality assessment ultimately measures how high the quality of these six dimensions is, and then suggests the direction of how statistics should be produced to enhance the quality of each dimension

1 Relevance

"Relevance" focuses on the viewpoint of users. This means that how much statistical data meet the demands of users in terms of comprehensive scope, concept, and contents. In short, relevance is associated with the concept that statistics are produced and provided to relevant statistics users. The point is that how much meaningful and useful they are.

In the process of producing statistics, it is necessary to set a clear goal, figure out the needs of users by forming an expert advisory panel and conducting a user satisfaction survey, and reflecting them. This is a way of enhancing the relevance of statistics.

2 Accuracy

"Accuracy" means how closely the features or size of a population are measured. Most statistics estimate unknown true

value. Accuracy is the concept that shows how close the unknown true value and estimated value are. Therefore, the lower the error between true value and estimated value is, the more accurate statistics are.

In the case of survey statistics, error occurs from comprehensive scope, sample drawing, survey response and non-response, and statistics production process. In the case of processed statistics like national accounts, error may take place due to the inaccuracy of sample survey or total survey and mismatch among comprehensive scope, survey timing, and assessment method. Accuracy can be measured by examining the size of sampling or non-sampling error, and the difference between the estimated and final value.

3 Timeliness / Punctuality

"Timeliness" is the concept, which is associated with the reflection degree of statistics that shows the difference between data production time and data dissemination time. "Punctuality" is the concept, which shows whether statistics are disseminated on schedule. If the time lag between production and dissemination time is short, timeliness is high. Some key statistics' dissemination schedule are announced in advance to let statistics users know the one earlier. If this preliminary dissemination schedule is met, punctuality is high.

4 Comparability

"Comparability" means whether statistical data, which are aggregated based on the same concept, classification, measurement tool, measurement process and basic data, can be compared with each other even though the statistical data were prepared in different time or space. Regarding a particular statistics, comparability is used to check whether they are compared with the statistical data of other countries or cities, or other years. In order to increase international comparability, it is necessary to apply international standards, international classifications and assessment methods. Also, if the cycle of producing statistics is irregular or long, time comparability could be low because concepts, survey items and methods may be different from the past. In this case, therefore, special attention is required.

5 Coherence

"Coherence" means how similar statistical data are about the same economic and social issues. These data are produced based on different basic data or production methods. For example, it is possible that preliminary and final data, annual and quarterly (monthly) data, statistics surveys and national accounts may be produced based on different data resources and production methods. But, if these data show similar results, coherence is high.

※ Both comparability and coherence make a comparison of data sets, but the standard of judging the coherence between two data sets is whether real data sets are matched. Comparability is assessed usually based on meta-data. Why? Comparability is the comparison among different population-based statistics, while coherence is the comparison among the same or similar populations.

6 Accessibility / Clarity

"Accessibility" means how easy users are able to access statistical data. "Clarity" means the quality of information about how statistics were produced. There are various ways which make it possible for users to easily access statistical data. One method is providing various statistical data by creating the database of statistical data, posting periodicals and news releases on the homepage, and delivering prompt reports via SMS. The other method adding a search function to the website to ensure that users easily search for statistical data. To help users understand these data, providing meta-data is the surest way to increase clarity of statistics. The meta-data include the process of producing statistics, the way of making better use of data and micro data, and the advice on using statistics.

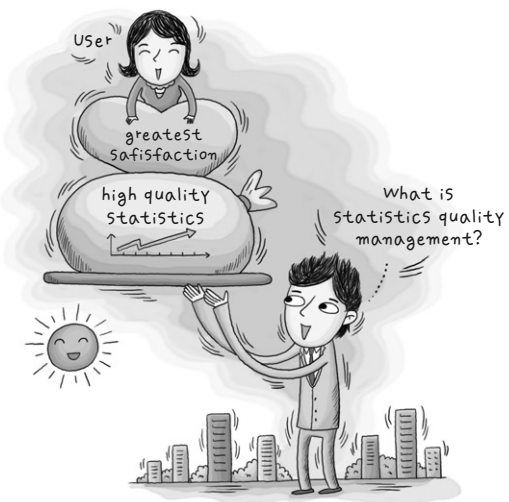
4

What is the statistics quality management system?

The statistics quality management system provides the maximum satisfaction for users and integrates all means necessary to produce the best statistics possible with a minimum amount of budget. Statistics Korea takes advantage of this system in order to enhance the overall quality of statistics.

Statistics quality assessment is an integral part of the statistics quality management system. Statistics Korea has developed the statistics quality assessment system which can assess "Fitness for Use" in an objective and systematic way.

Statistics quality assessment is the process of comprehensively evaluating the quality of statistics from statistics production until dissemination. This process includes basis for quality management, user satisfaction and the reflection degree of user demands, detailed process of statistics production, accuracy of collected data, statistical data services, and so on.



The statistics quality management method of Statistics Korea is ISO certified. According to the『Quality Management Manual』, all works regarding quality management should be arranged or recorded in documents. Documents or recorded data are the basis for managing and assessing overall activities in a continuous and relevant way which affect statistics quality and customer satisfaction. This documentation strategy improves the efficiency of quality management because it helps users to exactly figure out who, when, where, and how to do quality management.

According to the ISO manual, the aim of statistics quality management is to satisfy customers by figuring out the needs of users, setting a goal of accomplishing quality improvement, assessing and managing statistics quality, finding problems and solving them. To meet this end, the organization and resources should be efficiently managed. In short, statistics quality assessment is the process of understanding the needs of users, assessing how the organization and resources are managed, analyzing results, and making up for weak points.

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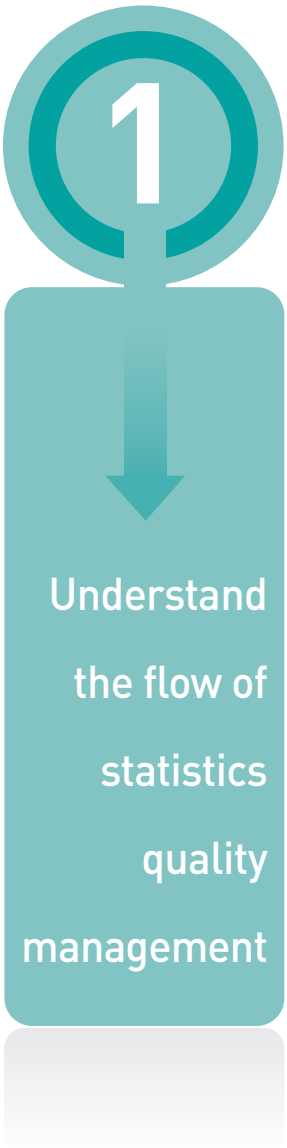
II How to manage statistics quality?

1. Understand the flow of statistics quality management
2. Pave the way for statistics quality management
3. Carry out statistics quality assessment
4. Improve statistics quality



High quality statistics are produced if statistics quality is properly managed at every stage. All people involved, who participate in producing statistics, should exactly understand statistics quality management to ensure that the statistics quality management system is efficiently operated.

To do so, it is necessary to check whether the whole process meets the standard of statistical quality elements. For this reason, 『Statistics Quality Management Handbook』, which will be distributed this time, should be used to objectively measure the quality of statistics and record it. By doing so, statistics quality should be improved continuously.

Everybody is responsible for quality management

Statistics quality management is not the additional work. Therefore, it does not increase workload, but is essential to produce statistics which meet the demands of users. If the quality of statistics is managed at the planning stage, it will enhance the completeness of work. Therefore, all interested parties should understand quality management and carry it out.

Receive education and job training

The staff who are in charge of producing statistics should properly recognize and understand how their work activities affect statistics quality. Also, they should know what to do, if any quality problem occurs. Statistical data should be properly collected on the site. To meet this end, field surveyors or even supervisors should be managed according to the statistics quality management system.

All interested parties should receive quality management education and job training for continuous quality improvement. This program is also run by the statistics quality management system.

Think from the perspective of users

The statistics quality management system is operated to ensure that users easily access statistical data whenever the need arises. Therefore, it is necessary to check both whether the statistics quality management system fulfills the needs of users and how much users are satisfied with the statistics through telephone, internet, FAX, questionnaire surveys. It is important to understand what users think about the system. Why? This is a key to producing high quality statistics.

Outsourcing is the subject of quality management

Due to a lack of budget or human resources, it is sometimes necessary to outsource the job of producing statistics in part or total. Thus, outsourcing is the subject of quality management. Why? High quality statistics, which fulfill the needs of users, are produced only if quality management is properly done. Therefore, quality management should be meticulously done from planned order release to delivery, which includes selecting and managing an outsourcing company, checking the progress of the outsourcing project, and assessing the final statistics.

The person, who is responsible for producing statistics, needs to examine the quality of statistics. To do so, he or she should assess and analyze elements that may affect the quality of statistics by relying on assessment methods and procedures. Why? Quality assessment is a useful tool which provides a solution to the problems of statistics quality. As the statistics production environment is rapidly changing, the demands of users increase. Viewed in this light, quality assessment is growing in importance. Statistics users want improved or new statistics. They also want statistics to be quickly produced. In addition, they demand more detailed statistical data to understand social and economic changes properly. Statistics quality assessment is conducted in the areas of basis for quality management, user satisfaction, the reflection degree of user demands, detailed process of producing statistics, accuracy of collected data, and statistical data services. Assessment methods and procedures will be introduced in detail in Chapter Ⅲ.

4

Improve statistics quality

Statistics quality management is designed to produce high quality statistics. Therefore, the aim of quality management is to improve the quality of statistics. To meet this end, it is essential that quality assessment results are used to enhance the quality of statistics. This is called the "feedback" process. Through statistics quality assessment, high quality statistics which are selected as best practices need to be shared with statistics users. In the case of low quality statistics, meanwhile, they should be improved after problems are checked. It is necessary to enhance the quality while operating the statistics quality management system. To do so, the scope of improvement should be clearly defined by accurately assessing the quality of all items at each stage of statistics production.

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Statistics Quality Management

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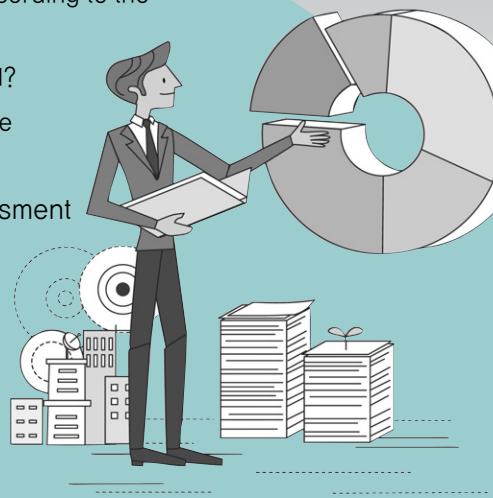
III How to assess the quality of statistics?

1. The introduction of statistics quality assessment
2. Assessment Procedure
   1. How is the basis for quality management?
   2. Are users satisfied with statistics?
   3. Are statistics produced according to the appropriate procedures?
   4. Are data properly collected?
   5. Are statistical data accurate and various?
3. Putting together the assessment results and reporting
   1. Comprehensive report of the results
   2. Quality report

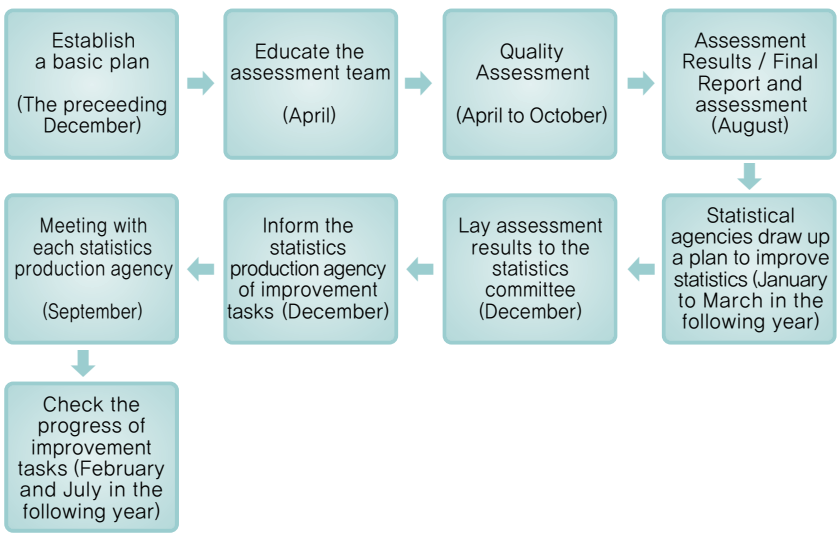


1 The introduction of statistics quality assessment

In order to assess how useful statistics are to users, we need to look at how statistics are now produced in a fair and systematic way. It is important to know whether people who are responsible for producing statistics recognize which aspects could affect the quality of statistics and reflect these aspects when they produce statistics. Also, it is crucial to enhance the quality of statistics by considering a changing statistics production environment. Statistics quality assessment is designed to gauge the accuracy, timeliness, and usefulness of statistical data. Also, it is conducted to figure out whether users are able to easily access, analyze, and capitalize on the statistical data.

The first step of quality assessment is set a basic plan, carry out quality assessment, and then implement improvement tasks of the statistics. Here is the flow chart.

The flow chart of a regular statistics quality assessment project

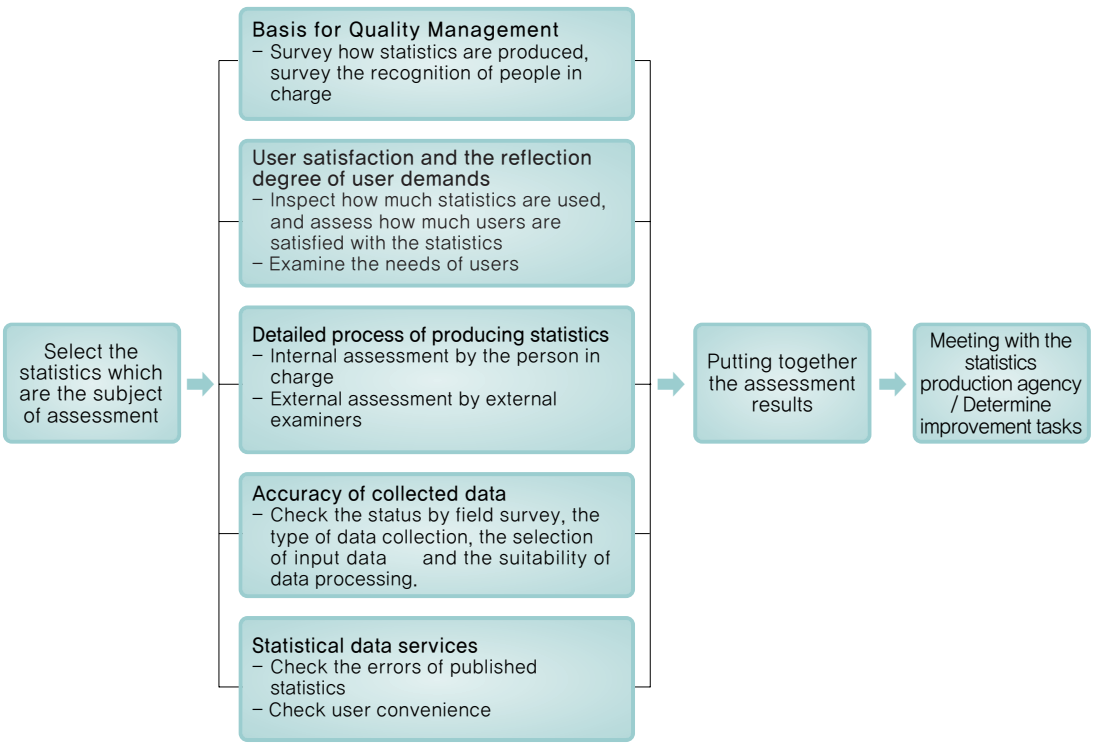


1 Quality assessment methods by procedure and background

If statistics, which are the subject of assessment, are finally chosen, the assessment will be done in the following five areas, such as basis for quality management, user satisfaction and the reflection degree of user demands, detailed process of producing statistics, accuracy of collected data, and statistical data services. Once the assessment by area is finished, the assessment result report is produced and submitted to the statistical production agency after improvement tasks are determined.

The assessment by area does not need to be carried out in order. After basis for quality management is assessed, the assessment of other areas should be done until the deadline. Also, after the assessment by area is completed, the result report is submitted to the statistics production agency. The copy of the report has to be presented to "Statistics Korea" as well.

The regular statistics quality assessment process



Quality assessment methods and background by procedure

	Quality assessment methods	Background
1. Basis for quality management	– Assess the statistics production environment and the recognition of people who are responsible for statistics by using the present condition report of basis for quality management	– Figure out basis for quality management for producing high quality statistics
2. User satisfaction and the reflection degree of user demands	– Carry out surveys and focus group interviews in order to inspect how much statistics are used, and assess how much users are satisfied with the statistics	– Users assess the statistics based on "Fitness for Use"
3. Detailed process of producing statistics	– Quality indicators affect the quality of statistics. Make a checklist of quality assessment in the form of questionnaire, and then let internal and external researchers assess it.	– Based on the "Process–Oriented" quality definition, which tells that "the quality of production process determines the quality of products."
4. Accuracy of collected data	– Examine the statistics production background by interviewing field surveyors and respondents – Check the selection of input data and the suitability of data processing	– Carry out a field survey to enhance the quality of data collection
5. Statistical Date Services	– Check any error of published data, such as news releases, reports, and the database, and user convenience	– Figure out the reliability and serviceability of statistical data services based on "Fitness for Use"

2 Produce a report

After the assessment of the five areas is finished, researchers putting together the assessment results and collected data, and then produce a report. The report should contain the analysis of assessment results by area, offer improvement tasks, and provide concrete methods for improving statistics. Assessment by area should be thoroughly planned in advance to ensure that concrete and realistic methods which can improve statistics are developed.

If best practices are found, they should be included in the report to ensure that other agencies share them.

Also, after assessment results are analyzed, the quality report should be produced, which shows clearly the quality of statistics by dimension.

2

Assessment Procedure

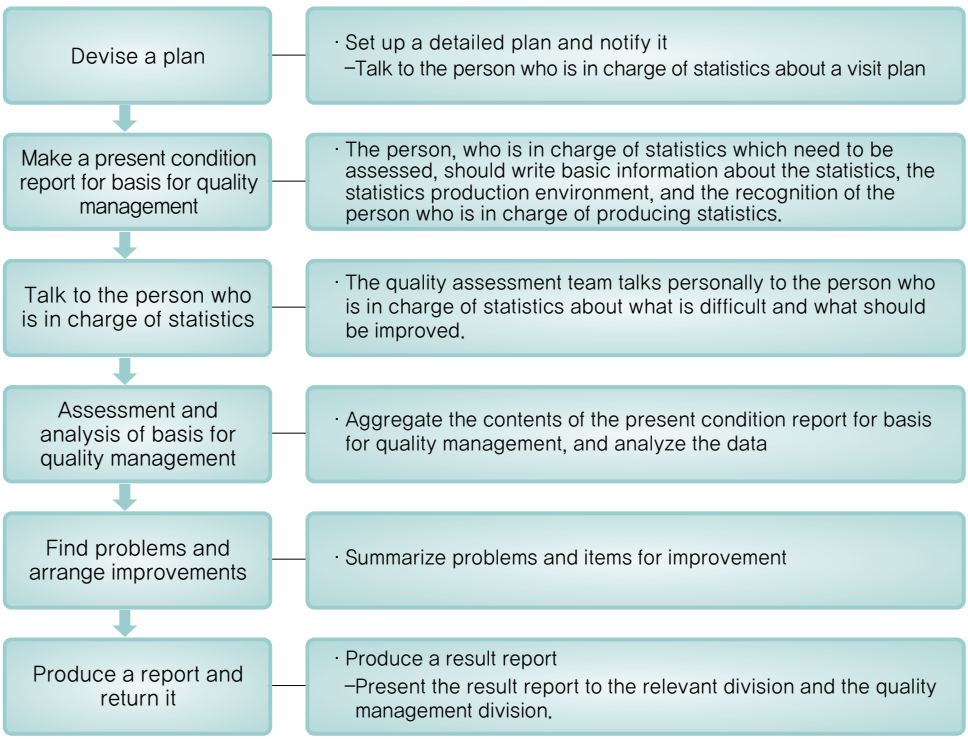
1 How is basis for quality management?

The statistics production environment may affect statistics quality. For example, leadership and human resources management are essential elements in producing statistics. If leadership in organizations is weak and human resources are insufficient, it is little wonder that the quality of statistics produced by these organizations will be low. Therefore, it is necessary to assess basis for quality management by figuring out the interests of the head of organizations, the strategy and policy, human resources management and budget size, and statistics production environment.

If the head of organizations have a strong will to fulfill quality management, it will be the locomotive for carrying out statistics quality assessment. Therefore, if the head of organizations outlines a vision, a related strategy, policy, plan, goal, and concrete goal should be created. To do so, it is necessary to form an organization and then manage human resources.

Basis for quality management is done according to the following four steps. The first step is set a detailed plan for assessing quality management, the second is ask the person who is in charge of statistics to create a present condition report for basis for quality management, the third is confirm the survey data again through interviews, and the last is assess the statistics production environment after analyzing interview results. The most important step is create a present condition report for basis for quality management. Why? Unless any feedback is given from the person who is in charge of producing statistics, it will be difficult to figure out a statistics production environment.

The chart flow of basis for quality management



Devise a plan

The quality assessment team should draw up a detailed plan as part of assessing basis for quality management, and the plan includes assessment time, a present condition report, and assessment methods and procedures. Then, the plan should be notified to the person who is in charge of statistics which are the subject of assessment, which makes it easier to create the present condition report for basis for quality management.

Make a present condition report for basis for quality management

The quality assessment team should ask the person who is in charge of the statistics which are the subject of assessment to create a present condition report for basis for quality management. The present condition report consists of various items, such as basic information about statistics, statistics production environment, the recognition of people who are in charge of producing statistics. The instructions are also distributed

to ensure that respondents easily fill in the blanks of the present condition report.

The quality assessment team should check the progress of the statistics production in advance. Based on this, the team examines the present condition report of basis for quality management which was created by the person who is in charge of statistics.

Talk to the person who is in charge of statistics

After the present condition report is created, request a meeting with the person who is in charge of statistics. Check the contents of the present condition report while having a meeting with him or her, and then collect relevant data. In particular, focus on gathering information about the organization's leadership, policy, goal, and process. Why? Such information should be utilized when assessing other areas. basis for quality management directly affects user satisfaction, the reflection of user demands, detailed process of producing statistics, accuracy of collected data, and statistical data services.

Assessment and analysis of basis for quality management

Aggregate the scores of Chapter one (Basic Information), Chapter two (Statistics Production Environment), and Chapter four (Interviews) in the statistics, and then use them in assessing other areas. Aggregate the results of Chapter three (The recognition of the person in charge of producing statistics) and assess it based on five-point scale. The score is used to assess the basis for quality management.

Find problems and arrange improvements

Arrange problems which are found through interviews or in the assessment form, and then summarize what is necessary, which will be used to improve basis for quality management later.

Produce a report and return it

Produce the assessment report about basis for quality management after compiling data concerning the statistics production environment, the score result about basis for quality management, and interview results Then, tell the report to the head of the division which is responsible for the statistics which are the subject of assessment, and return it to the person who is in charge of statistics to ensure that he or she uses it as the basic data resources for improving statistics quality.

2 Are users satisfied with statistics?

(User satisfaction and the reflection degree of user demands)

Statistics users want to gather enough information from the statistics they use. High quality statistics contain much information users need. Therefore, it is necessary to investigate how much users are satisfied with statistics, and use them when quality management is done. The statistics production agency needs to make a list of professional and amateur statistics users, and regularly check whether users are satisfied with statistics.

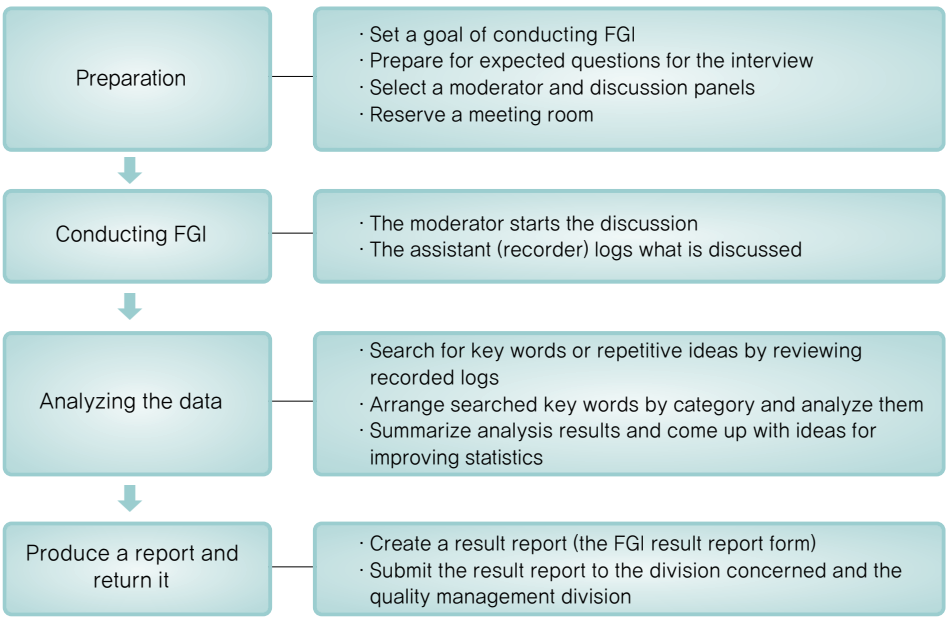
This area assesses the satisfaction level of statistics users, and reflection degree of user demands. To meet this end, focus group interviews need to conducted, which targets statistics experts and general statistics users. Also, the overall satisfaction survey should be carried out, which targets statistics users.

(1) Focus Group Interview (FGI)

The focus group interview (FGI) is a form of free discussion about a particular subject. FGI is conducted in a small group. FGI makes it possible to gather information faster than the one-on-one interview. Also, it creates synergy effects. Why? While a group of people exchanges their opinions, they may get a hint from someone's idea and then come up with concrete ideas. For this reason, FGI is usually used for qualitative research.

FGI targets general statistics users, such as undergraduate students, graduate students, and citizens. Through the FGI, information about what users demand and complain can be collected in advance. Then, this information can be used to judge which items are heavily dealt with while doing the work of assessment, such as a user satisfaction survey. Policy customers, professors, and researchers are professional statistics users. They are the best to represent the attitude, recognition, and opinions about statistics. FGI targets these professionals. This means that it is possible to find statistical problems and collect good ideas from these professionals.

The flow chart of FGI



Preparation

○ Set a clear goal

Set a clear goal of why FGI is conducted and what issues will be discussed

○ Prepare for expected questions for the interview

Prepare for open-ended questions which offer the over all direction of the discussion and facilitate it.

Example) For what purpose do you use this statistics? Do you think that the survey method and sample design is appropriate? Can you easily access the data you need? Otherwise, do you think what should be improved?

○ Choose a moderator

A researcher should fully understand the role of a moderator. Then, he or she assumes the role of the moderator or a professional moderator takes on the job. The moderator does not express his or her opinion or judge other's opinions. Instead, he or she must have the ability to facilitate the discussion like an orchestra conductor.

○ Select participants

Select two groups with different perspective which are interested in the research. It is desirable that participants in the same group should be total strangers. To maximize the effects of the research, each group should consist of six to eight people. A letter is sent to participants in advance, which contains information about the purpose of the meeting, the organizer and supervisor, questions, and so on. Also, the letter clarifies that what they say will be kept in secret.

○ Reserve a meeting room

The meeting room should be quiet, comfortable, and is even not disturbed by outside environments. The round table should is suitable, which makes it possible for participants to see them each other. Seats should be arranged, considering the positions of participants. It is recommended that the meeting room should have the room expressly for FGI, in addition to recording facilities.

Conducting FGI

Welcoming remarks, introducing the moderator and assistant → Explaining what interviews are for, and how participants are selected → Introducing basic principles → Start with a light question → Discussion → Conclusion

Analyzing the data

Record what is discussed, and search for key words and repetitive opinions while meticulously reviewing the record. Arrange key words by category, use them for data analysis, summarize analysis results, and come up with ideas for improvement.

Produce a report and return it

Produce a FGI result report, solicit opinions from the division which is responsible for the statistics which are the subject of assessment , and then submit the report to the statistics production agency and quality management division.

The role of the moderator for FGI

The moderator prepares thoroughly for the meeting based on the overall understanding of the statistics. For the smooth meeting, the moderator should make an interview guide in advance, in which a list of questions and the order of the questions are written down. According to the planned scenario, the moderator should create an atmosphere which makes it possible for participants to talk comfortably. At this moment, the moderator should break the ice by conducting a brief interview. Then, he or she carries out interviews concerning the statistics.

- Excellent communication skills, deep knowledge about the subject, modest control
- Create a warm and friendly atmosphere which helps people freely express their opinions
- Lead the discussion by not expressing his or her opinion, or judging others
- Encourage all people to participate in a discussion and prevent one person from leading the discussion
- Before closing the meeting, check again what is discussed and then summarize it

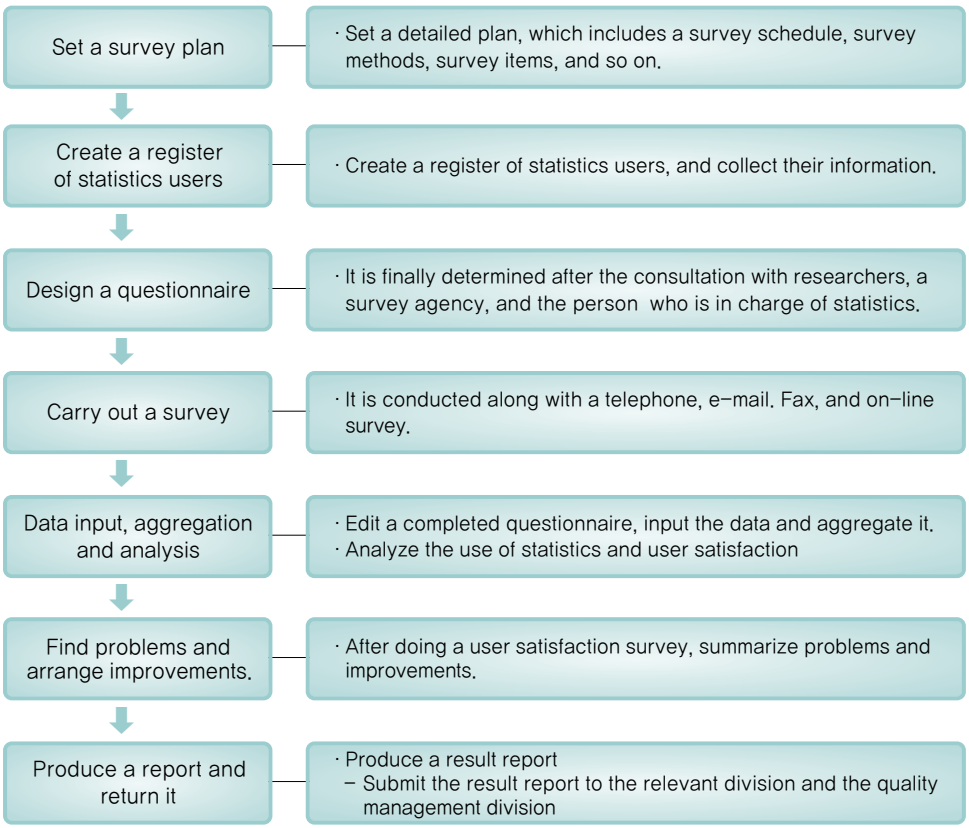
(2) User Satisfaction Survey

A user satisfaction survey targets statistics users. This survey focuses on collecting information about how much users are satisfied with the statistics and what should be done to improve statistics quality. It is also designed to incorporate the needs of statistics users into the process of producing statistics and providing data. The satisfaction level of statistics users is based on "Fitness for Use", which indicates an assessment score given by users. Also, the data about the use of statistics and the request for improving statistics are used as basic data for improving statistics.

The user satisfaction survey is as follows:

Set a detailed plan, create a register and a questionnaire, input collected data and aggregate them, and analyze how much users are satisfied with the statistics and how they take advantage of them.

The flow chart of user satisfaction survey



Set a survey plan

The quality assessment team should set a detailed plan for doing a survey on the use of statistics and user satisfaction, which includes a survey schedule, survey methods, and survey items. Also, the team should talk about the plan to the person who is in charge of statistics and receive the register of statistics users as part of facilitating the survey.

Create a register of statistics users

The survey should be accurately carried out. To meet this end, it is necessary to collect information about the names of statistics users and their working

departments, telephone numbers, FAX numbers, E-mail addresses, zip codes, and addresses. Based on this information, create a register of statistics users in the following way. It is possible to conduct the survey only when information about at least one item above is gathered.

Example : Create a register of statistics users

Name	Department	Telephone Number	FAX number	E-mail address	Zip Code	Address	User Division
Lee Yeong-ja	Statistics Quality management Division, Statistics Korea	(042)481-20××	(042)481-20××	exam@nso.go.kr	302-701	Seonsaro 139 Seogu Daejeon	Professional User
–	–	–	–	–	–	–	–

Conducting a survey requires setting a survey population. In this process, sampling about the survey targets is needed. If sampling is too small, it does not represent the population. In this case, therefore, FGI needs to be done after the consultation with the quality management division.

Reference | The source of the register of statistics users

- A list of the agencies which offer free distribution of statistics periodicals, a list of people who buy statistics periodicals.
- A list of micro-data users
- A list of statistics experts and the advisory meeting participants
- A list of policy customers concerning the statistics
- A list of users who use the website of the statistics production agency
- A list of library and the public service center users
- A list of members of the organization which is associated with the statistics
- A list of users who use the statistical data of their organizations
- A list of people who use the statistics in other ways.

Design a questionnaire

Survey items and contents of the questionnaire have to be finally decided after the consultation with the person who is in charge of statistics. It is recommended to survey 23 items in total, including "use of statistics (4 items)", "the degree of satisfaction with statistics (12 items)", "the willingness to re-use statistics (1 item)", "improvement opinion (1 item)", and "the characteristics of respondents for analysis (4 items)". But, the addition of survey items, such as "comparison convenience of time series data" and "comparison convenience among countries" needs to be judged by researchers.

In addition to recommended items above, survey items may be added considering the attributes of the statistics which are the subject of assessment. In this case, the consultation with the person who is in charge of the statistics is necessary.

User satisfaction survey items

Division	Item
Use of Statistics	1. Frequency 2. Purpose 3. Type 4. Channel
The degree of satisfaction with statistics (12 survey items)	5-1. The suitability of statistical data dissemination 5-2. The meeting of statistical data dissemination schedule 5-3. The easiness of statistical data search 5-4. The provision of cautions, concepts, and words when using statistical data 5-5. The sufficient provision of statistical data 5-6. The diversity of information on statistical data provision 5-7. The reliability of statistical data 5-8. The convenience of using micro-data 5-9. The degree of the satisfaction with spending costs 5-10. The comparison convenience of time series data 5-11. The comparison convenience among countries 5. The overall satisfaction with the statistics
The willingness to re-use the statistics	6. The willingness to re-use the statistics later
Quality Change	7. The quality change of statistics
Improvement opinions	8. Improvement opinions (open-ended)
※ The characteristics of respondents:	Gender, age, occupation, the percentage of using statistics

Carry out a survey

Create a register of statistics users, form a survey population, and then determines a survey target or sample size, considering budget and survey staff. It is necessary to get information about the contacts of users through various channels by consulting with the responsible people of the statistics production agency when a register of statistics users is created.

Respondents do not have any legal duty to respond to a survey. Therefore, collecting accurate data is possible if respondents volunteer to respond to the survey. This means that a survey method should meet the needs of respondents. Firstly, take advantage of a register of statistics users. Secondly, receive permission from respondents via calling or e-mail. Finally, conduct a survey by choosing one of the following methods.

- Mail / Fax / E-mail surveys : send a survey questionnaire and receive it
- Telephone survey : call directly
- Internet survey : carry out a survey by popping up a screen either on the website of the agency which is the subject of assessment or on particular websites.

This method may encourage people to respond to the survey. This survey may be done in two ways. One is that the quality management team recruits survey examiners. The other is entrust the survey to a professional survey agency.

Data input · aggregation and analysis

After a completed questionnaire is reviewed, enter the data about each survey items and aggregate them. Regarding the use of statistics, the data is aggregated and analyzed according to the features of respondents. Concerning the degree of the satisfaction with statistics, aggregate data by item, and then assess both the degree of satisfaction by item and the degree of overall satisfaction. Then, assess the degree of overall satisfaction with the statistics by using the degree of satisfaction by item and the degree of overall satisfaction. The analysis of survey data should focus on not comparing different statistics, but finding what should be improved from the viewpoint of users, and why the degree of satisfaction with statistics is low.

Find problems and arrange improvements

At the stage of data analysis, find problems and arrange improvements which are necessary to enhance user satisfaction.

Produce a report and return it

Produce a report about the use of statistics and the degree of satisfaction with statistics. The report should contain the survey data about the use of statistics, the assessment data about the degree of satisfaction with statistics, and improvement opinions. When statistics are comprehensively assessed, the data of measuring the degree of satisfaction with statistics are used as the assessment data. Other data, such as the use of statistics and improvement opinions, are utilized to enhance statistics. Present the report to the head of the statistics assessment division, and then return it to the person who is in charge of statistics to ensure that it is used to improve the work of statistics.

Assess the degree of satisfaction and use it

The degree of satisfaction by item and of overall satisfaction

The table below is the response to each item of the degree of satisfaction by item and the degree of overall satisfaction. The degree of satisfaction is displayed in five-point scale form.

Response Item	Very satisfactory	satisfactory	average	a little satisfactory	unsatisfactory
Score	5	4	3	2	1

Calculate the degree of total satisfaction

The degree of total satisfaction reflects the importance of items which affect the degree of overall satisfaction. In this case, weight is added. The process is as follows:

Calculate the importance of item : (weight)

$$\text{The importance of item } (W_i) = \frac{r_i^2}{\sum_{i=1} r_i^2}$$

r_i : A coefficient of correlation between the "i" item of 5) and the degree of overall satisfaction of "Question 5"

Calculate the degree of total satisfaction :

$$\text{The degree of total satisfaction } (S) = \sum (S_i \times \omega_i)$$

S_i : The degree of satisfaction with the "i" item
W_i : The degree of importance of the "i" item

The example of calculating the degree of total satisfaction

	A coefficient of correlation (r_i)	The importance of item (ω_i)	$S_i \times \omega_i$
The suitability of the announcement time of statistical data	0.428	0.042	0.156
The observance of the announcement schedule of statistical data	0.399	0.037	0.141
The easiness of searching statistical data	0.308	0.022	0.072
	…	…	…
The convenience of using micro-data	0.578	0.077	0.287
The degree of satisfaction with expenditure costs	0.636	0.093	0.378
Aggregation		1.000	3.825

After the degree of total satisfaction is calculated, both the degree of overall satisfaction and a comparison table should be created in the following way, and then be incorporated into the report.

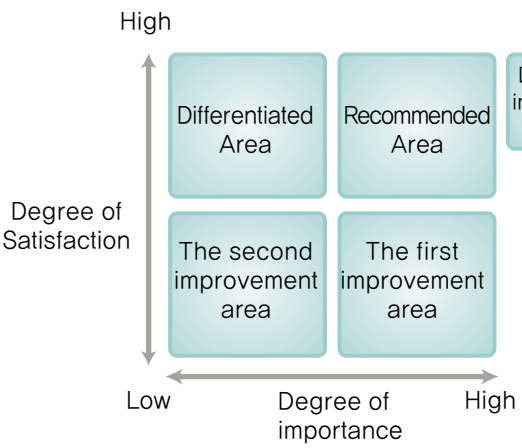
Example : The comparison table between the degree of total and overall satisfaction

Respondents	Total Satisfaction	Overall Satisfaction
100	3.75	3.90

Portfolio Analysis

The degree of satisfaction by item and the degree of importance is displayed in the form of X and Y coordinate system. This is called "Portfolio Matrix" in which 11 items are able to be marked in four areas that are divided at the center of the point where the average of the X (Degree of satisfaction) and Y(Degree of importance) axis meets. According to the location of each item, it is classified into the following four areas:

· The first improvement area: High in importance, low in satisfaction
· The second improvement area: Low in importance, low in satisfaction
· Differentiated Area: Low in importance, high in satisfaction
· Recommended Area: High in importance, high in satisfaction



Degree of importance (X axis)	Degree of importance (Y axis)	Area
High	Low	The first improvement area
Low	Low	The second improvement area
High	High	Recommended Area
Low	High	Differentiated Area

Assessment form: the FGI result report form, the use of statistics, and the satisfaction questionnaire

❸ Are statistics produced according to the appropriate procedures?

(Detailed process of producing statistics)

The process of assessing the detailed process of producing statistics requires a checklist to ensure that the assessment is properly undertaken, which is needed to fulfill the aim of producing statistics. The checklist is an assessment tool which consists of five-point scale questions. These questions are the indicators which affect the quality of statistics during the process of statistics production. According to the statistics production process, the checklist is classified into three kinds: survey statistics, administrative statistics, and processed statistics.

Statistics assessment consists of internal and external assessment. The person who is responsible for producing statistics carries out the former, and outside experts do the latter. Also, researchers do statistics assessment. Outside experts in assessing statistics undertake the external assessment again based on internal assessment results and relevant data. When the external assessment is done, assessment examiners have to submit a quality improvement report, which explains what should be done to improve the procedures of producing statistics.

Sample experts, who are designated as advisors, have to thoroughly assess the sample design of survey statistics, and then submit a result report to assessment researchers. The assessment researchers send the report to the quality management division after reviewing it. The quality assessment team sorts out the checklist created by the person in charge of statistics, outside assessment examiners and assessment researchers, and the assessment results of sample design, produce a report and then return it to the person who is in charge of the statistics to ensure that he or she uses the report as basic data for improving the quality of statistics. The following picture helps users understand the flow of work.

Prepare for assessment

Set a detailed plan for the detailed process of producing statistics, inform the person in charge of statistics of assessment contents, talk to them about the assessment schedule, and then ask for their understanding and cooperation.

Conduct internal assessment

Through internal assessment, it is necessary to let the person who is in charge of statistics know why the detailed process of producing statistics are necessary and what should be assessed. He or she has to submit the data that constitute the elements of

quality assessment report. These data, for example, show the elements which affect the quality of statistics. To be specific, they could be documents which clearly offer the purpose of statistics production. These data will be importantly used when the detailed process of producing statistics are assessed.

* If items are marked as “above average”, relevant sources have to be revealed and something has to be filled in the "opinion" sector.
* If statistics quality indicators are not associated with the statistics, 「not related」 should be filled in the “opinion” sector.
* The assessment mark should be displayed in the quality elements of each quality indicator.

The flow chart of assessing the detailed process of producing statistics

Prepare for assessment	· Notify assessment contents to the person who is in charge, and explain it. –Talk about the assessment schedule and ask for understanding and cooperation.
Conduct internal assessment	· The person who is responsible for statistics creates a checklist of the detailed process of producing statistics, and submit relevant data.
Choose outside assessment examiners	· People with experience of analyzing statistics and using them. · People with experience of participating in professional and user meetings concerning statistics. · People with experience of assessing and managing statistics quality assessment.
Conduct external assessment	· Create a checklist based on the internal quality assessment report and relevant data. · Attach the quality improvement opinions, which describes the procedural problems and the improvement request items.
Conduct the assessment by researchers	· Examine a checklist of internal and external examiners and conduct a feasibility study. · Create a checklist through the interview with the person who is in charge of statistics.
Analyze assessment results	· Analyze assessment results regarding internal, external, and sample design. – Statistics quality indicators are converted into the five-point scale. Aggregate them by quality dimension. – If internal and external assessment results are different, the cause needs to be analyzed. – Reflect assessment results of sample design.
Find problems and arrange improvements	· Summarize the problems which are revealed during the assessment process and improvements.
Produce a report and return it	· Produce an assessment result report. – Send the result report to both the division which is in charge of the statistics which are the subject of assessment and the quality management division.

Choose outside assessment examiners

Take advantage of experts who are in charge of conducting external assessment and providing professional opinions about quality improvement. The person who is in charge of statistics recommends one external assessment examiner who meets the following requirements. The quality assessment team additionally chooses one statistics expert.

- People with experience of analyzing the statistics and using them
- People with experience of participating in professional and user meetings concerning the statistics
- People with experience of assessing and managing statistics quality assessment

External examiners will be finally selected after the consultation with the quality management division. External assessment has to be done objectively and properly. To meet this end, the following rules are applied.

- If more than two assessment examiners work for the same agency, they are not allowed to assess the same statistics at the same time.
- One examiner is not allowed to assess more than three statistics
- Assessment examiners are not allowed to assess the statistics which are produced by their organizations, or higher or affiliated ones.
- Quality management researchers who assess the quality of national statistics are not allowed to assess the subject which is associated with the statistics assessment project. It is possible to assess other subjects, but it is desirable for researchers to improve their professionalism in one subject. It is essential to receive the consent form (including real names) from the final external assessment examiners. They have to take a pledge not to reveal any secret which will come to light during the assessment process.

To ensure that "external examiners" sincerely carry out the assessment work, it is necessary to let them know the following facts through a meeting.

- The work concerning the statistics which are the subject of assessment
- A detailed plan for assessing the quality of statistics
- External assessment methods
- Cautions (include filling in the consent form)

Conduct external assessment

Designated external examiners re-assess the internal checklist based on the internal quality examination table and relevant data. At this moment, external examiners should submit the quality improvement opinions which describe the procedural problems of the statistics which are the subject of assessment and the requests for improving the statistics.

"External assessment examiners" can ask for necessary data or an interview with the person who is in charge of statistics to ensure accurate assessment. In this case, the quality assessment team should take appropriate actions by cooperating with the person who is responsible for statistics.

Conduct the assessment by researchers

Researchers examine the suitability of the checklist which was created by internal and external assessment examiners. Then, they fill in a checklist by interviewing with the person who is in charge of statistics.

Assess sample design

Professional advisories on sample should thoroughly examine a series of process which is associated with sample design. This process includes population, sampling frame, sampling method, error for goal, sample size, weight, estimation, and the scope of announcement by item. Advisories provide the report for researchers after examining whether statistical data which represent population are properly produced.

Consider the following elements when assessing sample design.

1. Examination Method

In the case of a sample survey, a series of process, which is associated with sample design, should be thoroughly examined. This process includes the definition of population, sampling frame, sampling method, sample size, weight, and estimation. In this sample survey it is necessary to check whether the basic principles of sample design are properly met and statistical data, which represent population properly, are produced.

If non-probability sampling, such as an Internet survey, is used, the examination of population, sampling frame, error for a goal, sample size, sample distribution, and estimation needs to be done. Also, it is necessary to examine why non-probability sampling was chosen and whether the possibility of applying sampling methods exists.

In the case of a complete survey, it is necessary to examine whether the population is well defined, the complete survey is a right method, and it can be changed to a sample survey.

2. Basic principles to consider for sample design

2.1 Population

- Clear definition of survey units which are included in group and population
- Clear understanding of the difference between target population and survey population

2.2 Sampling Frame

- Meet the purpose of the survey
- Whether to include side information about the survey
- Whether to include sampling frame
- Prepare for a secondary sampling frame

2.3 Sampling Method

- The background of deciding a probability sampling or non-probability sampling method
- Choose the most efficient one among various sampling methods
- Consider survey purpose and survey convenience, expense when a sampling method is adopted
- How to select stratification criterion and variable when stratified sampling is applied
- Select stratification variable when statistics concerning region of interest need to be partly produced. Why? Stratification variable can be instantly reflected into the statistics (example : statistics by gender, region, and income)

2.4 Sample Size

- The formula for calculating sample size
- Error for a goal, margin of error, relative standard error
- Determine sample size, considering budget, feasibility, and scope of announcement
- The size of subpopulation

· (In the case of stratified sampling) stratified sampling distribution, minimum sample size by stratification and category, and estimated relative standard error

2.5 Weight

· Create a self-weighting design. If it is not possible, add weight, depending on the adjustment level of weight
· Capitalize on side information available during the weight adjustment process
· Calculate the effects of weight application
· Non-response and post-stratification weight

2.6 Estimation

· Use estimation which is fit for sampling method
· Not in the case of self-weighting design, use weighted estimation
· Offer relative standard error
· In the case of composite design, consider linearization or repetitive variance estimation

Analyze assessment results

After a quality checklist is created, assessment results of each indicator are converted into quality metrics by production procedures and quality dimension. Then, aggregate quality metrics and analyze them by assessment examiners, production procedures, and quality dimension, in addition to the comprehensive quality of the statistics which are the subject of assessment. In the case of survey statistics, the assessment results of sample design should be analyzed as well.

Find problems and arrange improvements

After the analysis of assessment results, compile problems and arrange improvement request items considering the opinions of internal and external examiners, and assessment researchers.

Produce a report and return it

Based on collected data, produce a preliminary report. Then, create a final report after considering the opinions of the person who is in charge of statistics which are the subject of assessment. Assessment results about production procedures are explained to the person in charge, and they are sent to the division which is

responsible for the statistics which are the subject of assessment to ensure that they are used as the basic data for improving the quality of statistics.

Statistics Quality Indicators

In order to assess the quality of statistics, tools, such as statistics quality indicators, are needed. Statistics quality indicators consist of elements that affect the quality of statistics during the procedures of producing statistics. In general, the following indicators are the first to consider. For example, they should check the procedures of producing statistics, offer the direction for improving the quality of statistics, and be measurable in terms of technology and budget. These quality indicators require being measurable and objective.

Quality indicators should be assessed based on facts. Therefore, detailed quality elements are suggested in each quality indicator. Also, the items of quality elements are marked to ensure whether they are implemented. This means that the quality checklist is used to check whether it complies with the procedures of producing statistics.

Statistics quality indicators take the form of a questionnaire. This is called "the checklist of detailed process of producing statistics". According to the procedures of producing statistics, quality indicators are arranged in this checklist. Also, there are three kinds of statistics, such as survey statistics, administrative statistics, and processed statistics. The detailed process of producing statistics consist of the seven courses – planning for producing statistics, designing statistics, collecting data, entering data and processing them, analyzing data and assessing quality, publishing documents and providing data, and management after statistics production.

Statistics quality indicators for survey statistics

Production procedures / Quality dimension	Planning for producing statistics	Designing survey statistics	Collecting data	Entering data and processing them	Analyzing data and assessing quality	Publishing documents and providing data	Management after statistics production	Total
Relevance	3					1	1	5
Accuracy	1	7	6	4	4	2	1	25
Timeliness / Punctuality						2		2
Comparability	1				2			3
Coherence					2	1		3
Accessibility / Clarity						5		5
Total	5	7	6	4	8	11	2	43

The number of statistics quality indicators for report statistics

Production procedures / Quality dimension	Planning for producing statistics	Designing survey statistics	Collecting data	Entering data and processing them	Analyzing data and assessing quality	Publishing documents and providing data	Management after statistics production	Total
Relevance	3					1	1	5
Accuracy	1	4	3	3	3	2	1	17
Timeliness / Punctuality						2		2
Comparability	1				2			3
Coherence					2	1		3
Accessibility / Clarity						5		5
Total	5	4	3	3	7	11	2	35

The number of statistics quality indicators for process statistics

Production procedures / Quality dimension	Planning for producing statistics	Designing survey statistics	Collecting data	Entering data and processing them	Analyzing data and assessing quality	Publishing documents and providing data	Management after statistics production	Total
Relevance	3					1	1	5
Accuracy	2	5	5	4	3	5	1	25
Timeliness / Punctuality						2		2
Comparability					2			3
Coherence					2	1		3
Accessibility / Clarity						5		5
Total	6	5	5	4	7	14	2	43

The response to the questions about statistics quality indicators is assessed in five-point scale form according to the following criteria.

Response Item	Very satisfactory	satisfactory	average	a little satisfactory	unsatisfactory
Score	5	4	3	2	1

Among the response to the questions of statistics quality indicators, the item, "Not-related", is not reflected in the total score.

The formula for measuring level of detailed process of producing statistics is as follows :

$$\frac{\text{'Very satisfactory'} \times 5 + \text{'satisfactory'} \times 4 + \text{'average'} \times 3 + \text{'a little satisfactory'} \times 2 + \text{'unsatisfactory'} \times 1}{\text{The total number of response indicators}}$$

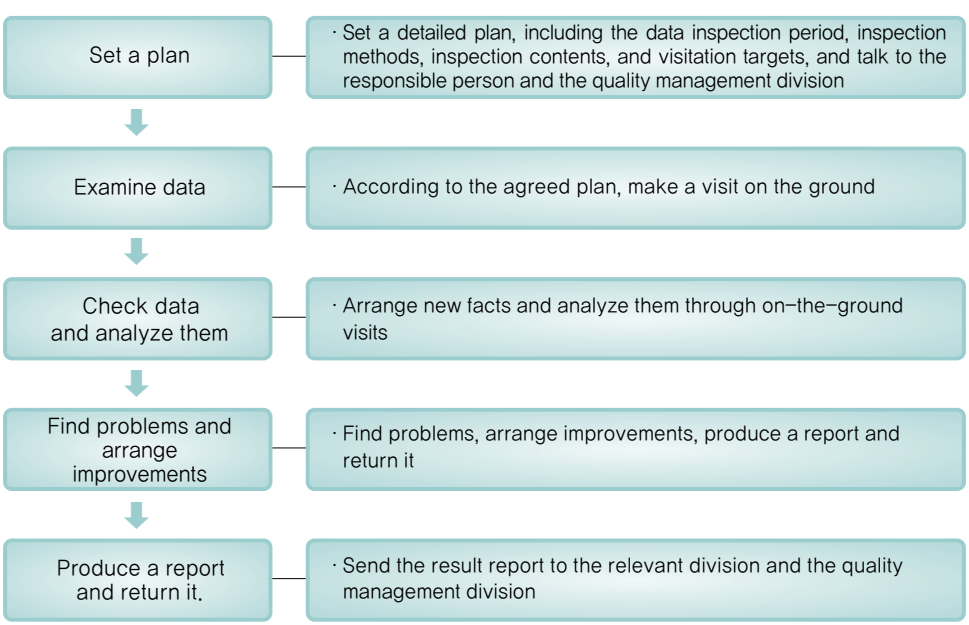
Assessment forms: the checklist of the detailed process of producing statistics, quality improvement opinions, consent, the assessment result report concerning sample design

4 Are data properly collected? (Accuracy of collected data)

The accuracy of statistical data depends on how reliable collected data are. The reliability of the data hinges on the efficiency of the data collecting system.

The process of checking whether data are properly collected or there are procedural errors or not, is a key to determining the quality of statistics. As for survey statistics and administrative statistics, it is important to systematically check whether errors were made in the process of collecting data. As for processed statistics, it is important to check the possibility of any data error which might occur in the process of choosing data and dealing with them. These methods are designed to enhance the quality of statistics in the process of collecting data.

The flow chart of assessing the accuracy of collected data



(1) Check the accuracy of survey and administrative statistics on the ground survey

In the case of survey statistics, data are collected on the ground. Therefore, the accuracy assessment of collected data can be called "the accuracy check of the on-the-ground survey". The aim of this assessment is analyze types and causes of non-sampling error and then improve the quality of a survey.

In the case of survey statistics, surveyors collect data on the ground. They get back questionnaires from respondents through interviews, calling, the Internet, and e-mail. Then, they examine the contents of questionnaires and enter data. Survey errors may occur, depending on the skills, diligency and attitude of surveyors. Also, survey errors can be found in the way surveyors gather data. In order to figure out the causes of these errors, the interview with a survey organizer, a supervisor, surveyors, or even survey respondents may need to be done. In this way, the on-the-ground survey can be directly checked. Visitation targets should be limited to around 10. In this case, it is necessary to talk about them to the quality management division.

In particular, if a lower organization or outsourcing company conducts a survey, the accuracy of an on-the-spot survey may be highly affected, depending on how much the statistics production agency is involved in the survey. Therefore, it is necessary to check whether the agency has questionnaires and micro-data management guidelines, which indicates that how much the agency is involved in survey management and participation.

When it comes to an on-the-ground survey, the system to spot various errors and handle them needs to be created. To do so, it is necessary to offer good ideas which can improve the system.

1. Inspection Method

Survey errors may occur in an on-the-spot survey. The interview with a survey organizer, a supervisor, surveyors, or even survey respondents may be done to figure out the causes of errors.

2. Things to consider

2.1 Fitness of data collection methods

· Currently available data collection methods
(Self-reported surveys, telephone surveys, interviews)
- Why this method was selected
- The right to choose a response method was given to respondents
- Suggestions for improving data quality

· The system for survey accuracy, when a self-reported survey is chosen
(the instant verification of the connections between items, follow-up interviews, the interview with non-respondents)

· When a survey is firstly designed or survey items are changed, a trial survey is conducted.
Consider whether the facts, which were found through this survey, were reflected in designing a survey.

· The questionnaire retrieval rate
- Suggest a method for improving the retrieval ratio of questionnaires

· Non-response rate
- Attribute analysis of non-response unit (the inclusion of survey targets, the examination of key items for non-response adjustment)

· Collect indicators to assess the connection between data-gathering efforts (interview time, movement costs) and results (response rate) etc.

2.2 The on-the-ground survey and management system

· Share role and responsibility in the whole process of collecting data

· Prevent the inaccuracy of an on-the-spot survey in advance

· Accumulate information about paradata through previous survey experiences and take advantage of it.

· Set a plan for guidance, implement it, find problems, educate the causes of errors, and devise a plan to prevent errors

· Check the accuracy of survey contents
(Check them before and after a survey)

· Secure contacts for a tracking survey

· Record types of survey errors, manage and analyze them

· Provide the guidelines on what is examined on the ground

2.3 Manage surveyors

- Set a special plan for managing new surveyors and investigators with frequent mistakes
- Provide the guidelines for surveyors, teach them how to make a survey
- Check the ability of surveyors and improve it
- Manage questionnaires and original data
- The criteria of recruiting surveyors
- Provide customized education for surveyors
- Figure out the diligence of surveyors

2.4 Survey objects / respondent management

- Support the persuasion of survey targets which do not give any response to survey questions (The guidelines on the management of respondents who are absent or do not give any response)
- The relationship with respondents
  - The provision of a return present, the fitness of a return present
- The procedures of sample management
  - Provide the guidelines on sample replacement and manage it
  - Compare the first sample list with the final respondent list

In the case of administrative statistics, it is necessary to visit people in charge on the ground, talk to them, figure out how to collect data, examine problems and improvements. In particular, it is essential to examine the possibility that the first one who submits the report could do a wrong survey in the process of collecting data, report errors could occur when data were reported to a higher organization, and data could be inefficiently reported through the administration network and report forms.

It is necessary to inspect more than 10 areas. In the case of the report system of the city, district and ward, if you visit a local government (metropolitan cities and provinces) – ward, city, and district – eup, myeon, and dong, respectively, it is acknowledged that you inspect three objects. In this case, sample areas are arbitrarily selected, but they should not be disproportionately concentrated on a

particular area, such as the Seoul metropolitan area. As the number of sample areas for inspection is small, it is better for researchers to visit them than to recruit inspectors. This method helps quickly understand the work and produce a result report. If the assessment team produces a checklist which considers the features of statistics, it will enhance the efficiency of the work when the team visits areas on the ground.

(2) Analyze the adequacy of choosing input data of processed statistics and processing them

In the case of processed statistics, the process of gathering data includes the first data selection, data gathering, data input, the interim and final results This process has to be examined from start to finish. There are various types of processed statistics, meaning that the amount of assessment work may differ. But, part of the process leads to the accuracy of the final statistics, which is directly associated with the reliability of statistics. Therefore, it is necessary to carefully analyze the statistics.

The quality of processed statistics depends heavily on the first input data. Therefore, it is necessary to check whether there are procedural problems until data, which are used to produce statistics, are finally determined, in addition to the inspection of data input, the interim and final results.

Processed statistics are divided into three types: "input data editing"(data categorization and aggregation type–Korean Tourism Statistics), "input data processing by level" (estimate type – housing supply ratio, assumption type – economic composite index), and "composite" (comprehensive national economic statistics–national accounts).

In the case of some processed statistics, when input data is collected, a part or total of the data can be gathered by a direct survey. In this case, carry out the accuracy assessment of the on-the-ground-survey based on survey statistics. Choosing additional input data, analyzing the suitability of processing them, and then come up with improvement methods.

Assessment forms : The result report form Ⅲ about checking the accuracy of collected data

5 Are statistical data accurate and various?

(Reliability of statistical data services)

Let's say that no errors were found in the process of producing statistics. But, if errors are found in the process of publishing statistics, they are incorrect. In this case, there is no point in assessing the quality of statistics. This is why it is very important to assess the reliability of statistical data services. In South Korea, many statistical data are produced every year in the form of statistical periodicals, survey reports, various white papers and statistical DB. However, these data need to be checked before and after they are produced.

There are two reasons why the reliability of statistical data services is assessed after they are produced. The first reason is prevent any errors by examining both frequent error types and causes of error. The second is check whether basic information is included in statistical periodicals. These efforts are designed to enhance the quality of statistical services.

The work of assessing the reliability of statistical data services includes setting a detailed assessment plan, checking any errors of statistical periodicals and DB, increasing user convenience, checking inspection contents and aggregating them, and returning them to the person who is in charge of statistics which are the subject of assessment.

The flow chart of assessing the reliability of statistical data services

Set a plan

Set a detailed plan for assessing the reliability of statistical data services, including inspection targets, inspection time, methods, and items. Then, notify this plan to the person who is in charge of statistics which are the subject of assessment, consult with him or her about the plan, collect the latest statistical periodicals, such as news releases, statistics reports, and survey result reports. Also, get permission to utilize the database of statistics which are the subject of assessment.

Examine data

Assessing the reliability of statistical data services includes both checking errors of published data and user convenience. The subjects of assessment are statistical periodicals, such as the most recently published news releases, and monthly and annual statistics reports. If both the monthly and annual reports are published, the latest ones should be examined, respectively. In the case of statistical database, the database and periodicals should be checked. The details are as follows:

First, the error check on published data is conducted either by comparing them with relevant data or checking spelling error or omission. Create the guidelines and then check statistical periodicals (news releases, statistics reports, and survey result reports) and the statistical database. In particular, when a group of researchers check one periodical, key checkpoints and checking methods should be consistent to minimum deviation between researchers. These researchers should cross-check what they examined.

- Check numbers by comparing the contents of periodicals and the statistics database. In this case, check the logic of the numbers by making a comparison with not only simple mistakes or spelling errors, but also previous time series data, other statistics tables and related statistics.

- In addition to the numbers of statistical data, it is necessary to check table forms, contents, glossaries, units, footnotes, sources, charts, pictures, items, English names, numbers, and graphs.

- If statistical data come from other organizations or foreign countries, compare them with original data.

Secondly, basic meta-data allow people to conveniently use statistical periodicals. Checking user convenience is designed to confirm whether basic meta-data are included and their contents are easy to understand. A checklist of user convenience is utilized to carry out this examination. Things to carefully consider are as follows:

- In order to increase user satisfaction, it is important to check whether these data provide information about data analysis, cautions, and interpretation methods besides containing simple statistical data in new releases

- Each report should include a survey overview, sample characteristics-related explanation, glossary explanation, and appendix. It is necessary to check whether these items are contained.

- In the case of running the statistics DB, the meta-data DB should be created and maintained to ensure that users are able to search for statistical data and understand them. The minimum amount of meta database is as follows:

  - Site maps and table of contents
  - The information about a survey agency
  - The overview of produced statistical data
  - The contact number of the person in charge
  - The announcement schedule about survey results
  - The link to major statistics websites
  - The contact numbers for information purchase or subscription

Check contents and aggregate them

Regarding the errors of published data, seek advice from the person who is in charge of statistics which are the subject of assessment, categorize errors by type, and then analyze them. As for inspection result of user convenience, check whether omitting certain contents has reasonable grounds or not.

☞ If the errors of published data come from the statistics DB, categorize these errors into improvements. In particular, many people who are in charge of statistics do not know why it is important to check user convenience. Thus, it is essential to let them understand the importance of user convenience by giving a detailed explanation and showcasing foreign examples.

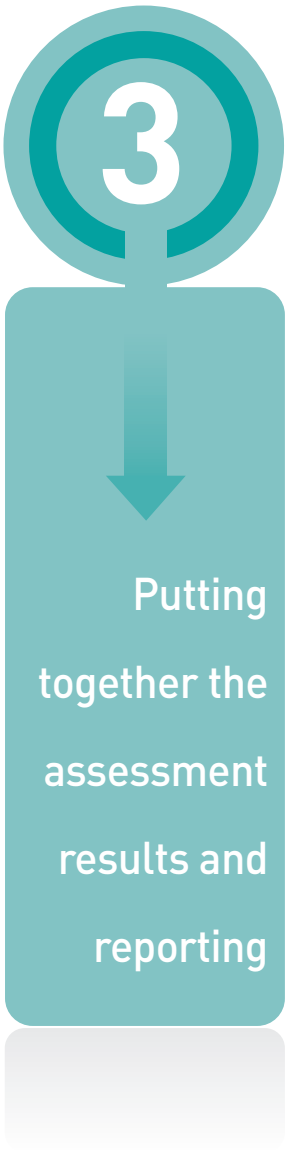
Find problems and arrange improvements

After analyzing the assessment result regarding the reliability of statistical data services, the use of statistics should be improved from the viewpoint of users. To meet this end, the problems of published data and the database and improvements should be sorted out.

Produce a result report and return it

Look into inspection results by area. One is "published data error" and the other is "user convenience". Then, arrange and analyze them, and produce an assessment report. In particular, this report must contain error contents, error types and the causes of error. Also, this report has to offer a method for preventing statistical errors. After the final report is sent to the head of the division which is in charge of assessing statistics, it should return to the person in charge and then be used to improve statistical data services.

Assessment forms : The error checklist of published data and the checklist of user convenience



1 Comprehensive report of the results

When the assessment of the five areas is finished, researchers will putting together the assessment results by category, arrange key issues and problems, offer improvement tasks and methods, and a long-term development strategy. This is the process of producing an assessment result report. The assessment team, which finishes the assessment of each statistics, will produce this report and submit it. This report should contain assessment results, problems, and improvement tasks.

Also, this report should summarize key contents of the five areas-basis for quality management, user satisfaction and reflection degree of user demands, detailed process of statistics production, accuracy of collected data, and statistical data services-Assessment results by area can be analyzed through the following quality dimensions : relevance, accuracy, timeliness/punctuality, comparability, coherence, and accessibility/clarity.

Offer a concrete method for implementing recommendations through the analysis of assessment results by area and dimension. The method should be adaptable by a statistics production agency, and be accepted by a relevant agency. The expected completion time should be offered through the discussion with the statistics production agency. The opinion of the person in charge has to be reflected.

Take a look at what the problems of the statistics and improvement tasks mean in terms of policy, and then offer the direction of how statistics are used through the policy.

Examples of carrying out improvement tasks

Improvement Tasks	Implementation Methods	Expected Effects	Expected Problems
Expand population to companies with more than 50 employees	Expand population to companies with more than 50 employees from 100	The expansion of population makes it possible to analyze the revenue of small businesses in depth.	The issue of securing budget due to the expansion of survey targets
Connect previous time series data (1995 to 2001)	Expand the time series database, which was produced after 2002, to the year of producing statistics (1995)	The connection of previous time series data allows researchers to easily analyze long term time series data	It is necessary to devise a method for connecting time series data due to the changes in classification
Manage non-response and come up with a solution	In the case of collecting data, draw up a method for non-response management and non-response replacement	Improve response rate by analyzing the pattern of non-respondents	The criteria for accepting non-response should be laid down in order to prevent rules from being abused.

Also, discover "current best practice" by area, and let statistics production agencies share CBP. "Current Best Practice" is that either part or the whole process of producing statistics is superior to other statistics. These statistics should be a role model for improving the quality of statistics.

"Current Best Practice" should be discovered by assessing the following areas: human resources, budget, the leader's interests (provide a vision), statistics planning and management, population and sampling design, questionnaire design, on-the-ground survey (the report system management), data processing and aggregation, data use (published data), and user satisfaction.

Also, unique practice(rather than general one) should be selected as CBP. The assessment team evaluates the effort of maintaining the quality of statistics.

2 Quality Report

After analyzing assessment results, produce a quality report which succinctly summarizes the quality of statistics by dimension.

The quality report is important to both statistics users and producers. Statistics users need to both understand the strengths and limitations of statistics and access information about the quality of statistics for a better use of statistics.

Statistics producers need to know the strengths and weaknesses of the statistics they produce. Also, they should have correct information about the quality of statistics in order to know what is improved. To meet this end, it is essential to access quality report.

The quality report, which provides the quality information of statistics for users, should not contain a summary of assessment results by area or assessment scores. Instead, it should include the opinions of experts or users, or various data which were collected during the assessment process.

Quality report constitutes the following form and contents.

1. Introduction

Briefly describe the aim of quality report, and introduce key meta-information about statistics production methods and procedures, sampling design, periodicals and DB, and contacts.

2. Quality status by dimension

2.1 Relevance

"Relevance" focuses on the viewpoint of users. It shows how much the comprehensive scope, concept and contents of statistics meet the needs of

users. In short, relevance is associated with the concept of how much statistics are useful and meaningful to users. In terms of relevance, describe the assessment result of statistics quality by constantly checking whether the aim of statistics is clearly defined or whether the demand of users is met, and it is reflected in statistics through expert advisory meetings or user satisfaction surveys.

Offer the assessment results about the following items, and then provide improvement methods

☑ Figure out major users and categorize them?
- The number of subscribers of periodicals, including electronic periodicals
- The number of accessing related websites and downloading specific statistics tables

☑ Is the priority number set by figuring out user demands?
- The user satisfaction survey result
- User satisfaction improvement methods

☑ Do published statistics meet the needs of users?

☑ Are statistical data which users need produced sufficiently?
- The ratio of the number of statistics to the number of non-produced statistics

☑ In the case of a lack of relevance, what is the cause? How will it be dealt with?

2.2 Accuracy

Most statistics estimate unknown true value. Accuracy shows how close this estimated value is to unknown true value. Therefore, the accuracy of statistics is high when the gap between true value and estimated value is small. In short, the smaller errors are, the more accurate the statistics are. In the case of survey statistics, sampling and non-sampling errors may occur in every process, such as survey planning, sampling design, data collection, and data processing. Sampling error estimates the whole

statistics by surveying part of them. Sampling error may vary, depending on sampling design and estimation method. Non-sampling error includes measurement error and processing error, which have nothing to do with sampling. In addition, non-sampling error takes place in both sampling and complete surveys. Non-sampling error could affect complete survey more than sampling survey.

In the case of processed statistics, such as national accounts, errors may occur due to the mismatch with other sampling surveys, total survey error or comprehensive scope, survey time, and assessment method. Therefore, it is necessary to check whether appropriate measures are being taken to minimize the size and cause of sampling and non-sampling error.

Offer numerical or technical assessment results and improvement methods.

- ☑ The size or direction of variable bias
- ☑ Qualitative assessment of estimated value or volatility, such as coefficients of variation (CV), confidence interval (CI), mean square error (MSE)
- ☑ Explain types of error which is considered in variance estimation,
- ☑ In the case of not complying with the standard or recommendations, explain the "why"
- ☑ The detailed information about sampling error and non-sampling error (scope, measurement, processing, non-response, model assumption error)

2.3 Timeliness and Punctuality

Timeliness is the concept that is associated with the difference between statistics production time and statistics announcement time. Timeliness shows how much statistics reflect the reality. Punctuality is the concept that tells whether statistics are published according to the previous notice. If the time gap between statistics production and announcement is wide, people will lose their interest in the statistics. In terms of timeliness and punctuality, describe the assessment result of the quality of statistics by checking whether the

statistics production cycle or period is appropriate.

Check the following things and offer improvement methods.

☑ Statistics Production Cycle

☑ The average and maximum announcement period (The period from production to announcement)

☑ The average and maximum announcement delay period (The difference between the expected announcement day and the actual announcement day)

☑ The reason of the announcement delay

2.4 Comparability

Statistical data are acquired based on the same concept, categorization, measurement tools, measurement process and basic data, regardless of time and space. Why? These data have to be compared with others. Comparability shows whether data are comparable to others in terms of time and space. In short, comparability shows whether data can be compared with other data from different countries, cities and years. In terms of comparability, describe the assessment result of the quality of statistics by checking the impact of the difference of the concept, definition and measurement method when statistics are compared through geological and non-geological areas.

Check the following items and offer improvement methods.

Geological comparability shows whether statistics are compared to those of other countries or areas.

☑ The difference between international and national standard, or between national and urban standard, and the impact of these differences on statistics

☑ The brief explanation of all concepts and methods which can affect comparability

Time comparability shows whether statistical data can be compared to others from different years.

- ☑ Survey period when times series interruption occurs
- ☑ The concept of before and after time series interruption and the difference between production methods
- ☑ The explanation of the difference in the case of changes in categorization, methodology, population and data handling method
- ☑ The impact of these changes above on statistics

2.5 Coherence

Coherence shows whether statistical data about the same economic and social phenomenon is similar to others. Even though statistics are produced based on different basic data or different methods, statistical data that reflect the same phenomenon have to show similar results. For example, describe the assessment result of the quality of statistics in terms of coherence by checking whether provisional data and final data, annual data and quarterly (monthly) data, statistics by industry and national accounts show similar results.

Check the following items and offer improvement methods.

- ☑ Compare estimated and final value. If the two is greatly different, explain the "why"
- ☑ Compare annual data and quarterly (monthly) data. If there is any difference, explain why it happened.
- ☑ Compare statistics and national accounts, and then explain the adjustment method which is applied to national accounts.

※ Comparability and coherence have something in common, given that they compare datasets. But, the criteria of judging the coherence of two datasets are based on the match between the two datasets, while the criteria of judging the comparability of two datasets are based on meta-data. This means that comparability is the comparison of statistical data

based on two different populations, while coherence is the comparison of statistical data based on two similar populations.

2.6 Accessibility and Clarity

Accessibility is the physical conditions that show whether users easily access statistical data. Clarity shows whether users easily take advantage of Statistical data. The methods of improving the access to statistics are as follows – the DB creation of statistical data, the notice of periodicals and news releases on the homepage, the delivery of breaking news by SMS, and the addition of search function.

Statistics are provided through various media. To better understand them, it is necessary to provide the statistics production process, data availability methods, micro-data availability methods, meta-data (footnotes, explanations, documents and so on) and quality information. This is the way of increasing the clarity of statistics. Therefore, it is vital to check whether statistical information is provided in a user-friendly way to ensure that users easily access it. Then, describe the assessment result of the quality of statistics in terms of accessibility and clarity.

- ☑ The conditions for accessing data, such as the media of data supply, marketing, and access control
- ☑ Statistics-related information (documentation, explanation, quality control, and so on)
- ☑ How to request additional assistance

3. Others

Describe information which does not directly affect the quality of statistics, but is useful to assess it.

4. Conclusion

After examining the quality of statistics by dimension, give advice on what is urgently improved, and which items need to be studied later.