Application of Modern Information Technology in

Statistical Survey

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Introduction

According to Director General Ma Jiantang of National Bureau of Statistics of China, the priority of statistics for the present and the foreseeable future is to prompt performance, quality and pubic trust of statistical survey. The "Three promotions" are not only the orientation and target of Chinese statistical construction, but also indicate that the current status of statistical performance, quality and public trust in China. To achieve the "Three Promotions", the critical point is how to figure out the solution. "Three principles" should be regarded as guidance to the solution in respect of methodology, which refer to authenticity of information source, precision of statistical data under spreading and correction of data calculation; technical supports for statistics should be based on "Four transitions", which refer that flatmodel of source data, hierarchymodel of data quality, science of integrated calculation system and modernization of statistical approaches. Application of modern information technology to statistical survey is undoubtedly the key to activate "Three principles", "Four transitions" and "Three promotions".

Statistical survey tools and technical means around China are distributed irregularly and unevenly; software applications are not standardized, causing low efficiency in gathering and processing data as well as increasing unnecessary manpower and material, high requirements to the end-users and unaccessiblity to the public; traditional statistics management mode and governmental survey departments are not arranged scientifically, resulting in low working efficiency and instable data quality.

Traditional statistical mechanism and system have been posing more and more deficiencies, like complicated processing flows, old-fashioned means, behind schedule results, unauthentic data, unwillingness of surveyed target. All those deficiencies restrict improvement of Chinese statistical performance and efficiency, meanwhile which have negative impact on quality of statistical data and public trust of governmental survey. Modern information technology has been applied in statistics survey extensively, but its application in respect of scope, depth, pertinence and efficiency are relatively unable to keep pace with increasing demand of statistical information.

Based on modern information technology, science and standardization should be accounted into the wh ole process from data gathering, spreading, summarization and organization. Data gathering and processing p latform should be established through technical integration, which will be one system combined with reporti ng over mobile phone, computer network and CATI telephone survey, realizing "One Platform, Infinite Expa nsion". Application of modern information technology in statistical system will be highly significant to statist ics. According to case analysis, it is turned out that how important the information technology is to grow stati stics up, reduce workload of surveyed target, simplify the whole process to avoid impact on data quality, reali ze standardization of statistical data output, achieve"Three promotions" finally.

1. Method

1.1 Principle of data gathering system construction

•General-general reports generator, which is accessible for user to define, design format of reporting, calculation and approval, make analysis statement, revise used statement system, and truly satisfied with

changing demand for statistical projects, eliminate the deficiencies of "customized mode".

•Integration-data is gathered through three means, including reporting over mobile phone, computer network and CATI telephone survey, which will facilitate to make centralized approval and organization. The three means are application to different surveyed targets, which can be selected as per willingness of the target, improving accessibility and timeliness for gathering data.

•Standardization-synchronous management on gathered data by national, provincial, municipal and prefectural offices, which can ensure the authenticity of source information, realize the hierarchy-model of data control, lessen the disturbance to data acquisition and guarantee precision of data transimit.

•Authorization-system management tree should be set according to management access from different hierarchies, source database applies trace management in log. The system can keep operational records for the user who log in source database. It should ensure that all source data are gathered from surveyed targets, and only the survey target have access to revise the uploaded data. Reviewer and administrator are accessible to verify and search the data but not to revise.

•Safety-external data gathering network platform and internal specialized data processing platform are designed in separate manner physically but connected with each other technically, to ensure safe running of data gathering platform.

1.2 Major functions and features of data gathering and processing system

•Customization of reports

Data gathering and processing system platform apply Win Table generator as its middle-ware. The generator can provide advanced format for various reports, which is helpful for users to design complicated reporting in fast way, realizing the input format be compatible with back-stage management format. Reporting design system can accept the report inputed from EXCEL directly, and the pasted contents from EXCEL and Word file. Reporting design system provides stable formula definition guidance, assists users to make fast definition on calculation formula, evaluation formula and various analysis reports.

Self-defined reporting design, multiple report types and models are undoubtedly enough to cater for complicated demands and different purposes.

•Data share

Data gathering and processing system platform can realize data share to the maximum for different survey purposes through special labelling design and original database, to reduce repeated surveys or mismatching data.

•Automatic establishment of database report

The system can make report automatically based on database report generated by report template and enter into database after auto-bundling. Its advantages are: database only save the data correlative with report; data input and inquiry are faster; analysis report data can be obtained by current tools.

•Convenient operation

Data gathering and processing system platform is designed in humanity manner, which requires no additional application software for mobile phone or computer. User just needs to open browser and log in the platform to undertake reporting or inquiring online through server. Report can also be submitted by mobile phone WAP browser.

•Verification function

Data gathering and processing system platform can provide more than 100 system functions, which are used for formula of reports, saltatory task to pick up data formula, calculation based on actual requirements; define various audit relationships.

•Update reporting and index alteration

Data gathering and processing system platform applies all-in-one report software mode from supervision and subordinate, which can fulfil demands of data summarization from different time and hierarchies, and be accessible to make any adjustment on index system of reports. Bottleneck of report software update can be avoided completely through the intelligent and automatic report tool.

•Expansion and openness

As the change of statistical demand and situation in the future, software researcher can develop specialized application system based on internet and open interface, to cater for different statistical demands. For example, office automation system for statistical survey can be expanded under the platform.

•Dictionary index

Data gathering and processing system platform has powerful dictionary index function, which can reset the search base library based on statistical demands, such as list of structure name, product catalogue and list of consuming goods. Pull-down menu under the system is the path to get dictionary index function, to help users upload or fill reportings.

1.3 System application in statistical work

1.3.1 Working flow

With the support of B/S technical structure, system applies the mode to gather data through website and data management based on server of machine room background, to realize the flat-model of data gathering terminal as per surveyed target; hierarchy-model of data management based on controlling data quality by different hierarchies. Then, the traditional serial data gathering and report data by hierarchy will be transmitted into compound mode combined with parallel and synchronous data gathering and serial data quality control. The flat-model will simplify the process to gather data; while hierarchy-model will make more clear about duties to ensure data quality for survey structures.

1.3.2 Application of reporting over computer and mobile phone for household survey

Traditional household survey applies the mode to record on paper. With the improvement of residential life, computer and mobile phone have been the popular tools, and report on paper has been far away from current survey demand. Data gathering and processing system platform is proved that it can simplify recording, stimulate survey targeted to submit report, and ensure data quality.

Data gathering and processing system platform has only one account, which can provide access to telephone survey, report over mobile phone or computer, which is its great application advantage. For example, the urban residential survey, one survey household will have one account, which can be used to make report over mobile phone, realizing real time of report, or report over computer, making inquiry, check more convenient and with more functions.

•Computer reporting

User can visit data gathering processing system website over IE browser and get the login page.

After login, user needs to skip to guide page and select the table for report.

Report fill up interface will be displayed after the report is filled, which is identical with account book.

User should save the report after fill up, and proceed to the verification phase before submit. System can detect the error accounting information through the reset logical relation of filled data.

The report will be submitted after it is approved or revised.

•Report over mobile phone

Mobile phone with access to 3G or GPRS can make report.

Log in by mobile phone, open browser on the phone, input data gathering system and skip to login interface.

Select report and fill up the report. Mobile also has access to inquiry, data initialization and submit for approval, with convenience for users.

•Verification

Data reviewer will be accessible to the report after user submit it over mobile or computer, who will make verification on data.

Verification interface is similar with fill-up guide page. User can select the target report record and open the submit report of user over mobile phone or computer. Reviewer can check the report by opening the submit record of user over mobile phone or computer, and make check on the data.

1.3.3 Application of telephone survey for enterprise status

In actual application, for the same report, it can select direct report way according to questionnaire survey and surveyed targets. For example, enterprise status survey, manager or director of the enterprise should be first target to make the report. CATI telephone survey for enterprise survey can ensure rate of report submit and data quality.

Telephone survey
•Gather enterprise information: name, title, gender and phone number
•Make questionnaire, entrepreneur information input system
•Telephone surveyor search
•Data output, verification, input to national tables for submit.

2. Results

Compared with traditional survey means, it is turned out that new data gathering and processing system has represented great effects after it was used by Pingdingshan Survey Group of National Bureau of Statistics of China. The number of surveyors in the front line can be reduced by abound 33%, while workload of basic survey can be less by 60% through the new system. The reduction of manpower can be assigned to make sample checking on data quality, survey area development, statistical analysis and research. Furthermore, the new system can uplift working efficiency by 30%, avoid the process to deliver paper reports, reduce input work for surveyors and work cost, ensure data quality remarkably.

3. Conclusion

The system is praised as innovative tool by Director General Ma Jiantang of National Bureau of Statistics of China, which is significant to research and improvement of Chinese statistics, activates modern information technology to be used by traditional survey, and has fundamental impact on Chinese statistics. If the system can be spreaded and used around the country, it will improve statistical performance, efficiency and quality, making great contribution to global statistics positively. Innovative means for survey will be undoubtedly prompt transitions of survey mechanism and system.

The different survey means used by surveyed targets should be accounted into considerations for survey. The first priority is to ensure that the system can be satisfied by surveyed targets. For this reason, we adopt the mode with three technical means combination. The bottleneck will be cooperation of customers and carriers. We will apply the system researched and developed independently, realizing beneficial situation for statistical departments, surveyed targets and carriers, and keep cost unchanged but ensure statistical work running smoothly.

Further verification will be made to check the stability of system. Statistical mechanism and system needs more innovative improvements. Internal structure, statistical means and system, working flow and regulations also need to be adjusted and improved.

ABSTRACT

It is commonly agreed that information technology should be an approach to improve governmental statistical work. For this reason, Chinese governmental statistical department has researched and developed the "Data gathering and processing system platform", which is a general reporting system, with functions for self-defining, auto-management on reporting data, verification and search, summarization and submit, as well as data output. The system applies B/S technical structure, to create combination of three means for reporting: mobile phone, computer and CATI telephone survey, and provide a comprehensive solution scheme to gather, transmit, verify, search, correct, summarize and analyse statistical data.

The system has been used by Ping Dingshan Survey Group of National Bureau of Statistics of China for demonstration, which has achieved the specialized reform for urban and rural household survey, CPI and PPI price survey, enterprise status survey; based on commercial strategy, it achieves low cost operation with new survey technologies through working together with carriers; authenticity of gathered data and precision over

transmission are also prompted incredibly through system innovation, process re-engineering, establishment of management system and mechanism supporting new survey system.