Design and Implementation of the Integrated Business Survey in China

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Abstract

From November 2005 to March 2013, the National Bureau of Statistics of China (NBS) and Statistics Canada (StatCan) carried out a cooperation project on the economic statistics, in order to develop a General Integrated Framework for Business Surveys, meeting China's conditions and suitable for economy-wide implementation.

The goal was to improve and standardize the current working mode under which various statistics surveys are conducted by different subject matter departments separately, and thus improve the time, efficiency and quality of the measurement of Gross Domestic Product (GDP). During the project, NBS and StatCan evaluated the current business survey activities in China, and shared practices. With both sides' coordinated efforts, an Integrated Framework for Business Surveys has been developed in China. NBS implemented pilot surveys in several service industries, tested and improved the programs, finally extended the scope of application to all economic surveys, and achieved the goal that the NBS collect, manage, maintain and develop the enterprise data in a centralized manner. As a result, enterprises' burdens are lightened, the survey efficiency is increased, and most importantly, the quality of statistics is improved. This paper will introduce the experience learnt from the project, that is the design and implementation of the Integrated Framework for Business Surveys in NBS, from aspects of management, business register, questionnaire design, data collection system, processing method and data quality.

Key Words: Data quality improvement, Integrated Survey Framework

1. Brief introduction

In November 2005, National Bureau of Statistics of China (NBS) and Statistics Canada signed the Economic Statistics Project, in order to develop a General Integrated Framework for Business Surveys, meeting China's conditions and suitable for economy-wide implementation. The goal of the economic project was to develop，improve and standardize the current working mode under which various statistics surveys are conducted by different subject matter departments separately since the concept, standard, survey content, data collection, data processing are different, and thus improve the time, efficiency and quality of the measurement of Gross Domestic Product (GDP). NBS also aims to integrate and standardize the Chinese enterprises survey system by the Economic Statistics Project, so that the enterprise survey system of NBS will be more efficient, and provide the support and services for the improvement of the national accounts.

Implementation of the project consists of three phases, including developing General Integrated Framework for Business Surveys, carrying out pilot and expanded pilot surveys in several service industries, and extending the pilot results to all sectors of economic statistics. In March 2013, the project was very successfully finished, and achieved the integration of the business survey. The Commissioner of National Bureau of Statistics of China Ma Jiantang fully affirmed the results of the project in the conclusion meeting, he said, "In the past seven years, the Statistics Canada made every effort to advance the project, and the Canadian statisticians worked hard to do their part, and shared their knowledge with their Chinese counterparts selflessly. On the other hand, the NBS and its staff, based on the national conditions of China, deepened their studies and boldly borrowed the Canadian experience before applying the advanced statistical concepts and experience of the Statistics Canada in China in an original way, and sped up the statistical modernization in China. The Sino-Canada cooperation project has attained fruitful results."

This paper will introduce the experience learnt from the project, that is the design and implementation of the Integrated Framework for Business Surveys in NBS, from aspects of management, business register, questionnaire design, data collection system, processing method and data quality.

2. Organization and management

Statistics Canada manages the integrated enterprise survey projects by matrix form through a number of strategy and implementation committees, and has established the Enterprise Statistics Department which is responsible for coordination.

Learnt from the Statistics Canada management experience, NBS established the management organizational structure for the Integrated Enterprise Surveys in the beginning of the project,　including project leading group (providing the guidance and coordination for the overall implementation), project working team (responsible for the organization, management and coordination of project activities), project technical team (responsible for the implementation of specific technical work), and consultant committee (providing advice for the project activity). Operation of the pilot survey proved this is a well-functioning management mode, in which each group plays a role with the specific responsibilities. Project working group fully plays a role of centralized management and coordination. It is not only the coordination headquarters, but also the command center of business activity. Despite it had a heavy workload, the working group was involved in each stage work, making the decision-making relatively easy, targeting accurate, high efficiency, good results, and ensure the project work very smoothly.

NBS decided that the Department of Statistical Design and Management was responsible for unified management and coordination work in the promotion stage of the project, and enriched personnel for each working group. Local statistical organizations have also established comprehensive operational coordination agencies,

to be responsible for the coordination of specific work in strict accordance with the unified national plan, and earnestly implement the various programs and implementation work.

3 . Business Register and frame

In 2009, the Business Register was established based on the 2008 Second National Economic Census. The national, provincial, municipal and county statistical organizations build their databases and maintain them. In non-census years, NBS use the administrative data to update the number of units twice a year and all information is based on the 2008 Economic Census data. The Business Register was not used for the survey frames then.

One goal of the Integrated Business Surveys is to create and maintain a centrally managed Business Register. China learnt maintenance experience from Statistics Canada, opened up ideas. The Statistics Canada put forward many valuable suggestions for the update and maintenance, quality estimation, feedback mechanism and play an active references for the development of the Business Register.

Integrated Business Survey requires the national Business Register to be the survey frame. In the implementation phase of the project, NBS had initially built a true, complete, and timely-updated Business Register. The management mode is "Unique Online Register, Maintenance by Different Levels, Timely Updated". NBS have promulgated the " Implementation Rules of the Interim Administrative Measures for the Construction, Maintenance and Use of the Basic Business Entity Register of the National Statistical System". The Business Register was also constructed, maintained, managed and used according to the principle of "Unified Units Standard, Unified Maintenance Management, Unified Workflow, Unified Software Platform". NBS established the update mechanism of timely feedback from various surveys while made use of the administrative data to update the Business Surveys.

NBS had basically established a working mechanism based on the basic business entity register, with uniformly identified units by Business Register management department and other statistic departments. By the 2012 annual reporting, a uniform database of the surveyed units including 800,000 "three above" companies(industrial enterprises above designated scale, service enterprises, wholesale and retail enterprises above designated scale, hotel and catering enterprises above designated scale, qualified construction enterprises and real estate enterprises) has been basically completed. The self-determined survey units method by every professional department had been changed into a uniform units identified mode.

4. Questionnaire design

Integrated Business Surveys should use the same concepts, definitions and classification criteria and the same questionnaire design consistent with the national accounts. In the past time, various departments designed their own required survey

indicators. Their requirements for the enterprise were different, so the name, meaning, calculation method, classification criteria and statistical coding of the same indicator were inconsistent.

In the pilot survey, based on the analysis of existing questionnaires, we communicated deeply with the National Accounts Department which is the main user of the data, and then designed survey indicators, standardized indicators definition, learnt Canada's experience in the questionnaire design, listened to the views of outside consultants, arranged small-scale test to fully understand the evaluation and the burden from the respondents. Ultimately, we finished the questionnaire module file, including public module and featured module, not only considering the same part of different industries, but also taking into account the different characteristics of each industry. In the process, enhanced the new working philosophy, fully considered the convenience and minimized the burden for the respondents, and put more emphasis on the protection of trade secrets in order to win the understanding, trust, support and cooperation from the respondents.

In the project promotion stage, NBS sorted out all the statistical survey sheets designed for the enterprises, initially established the core indicator system and main metadata standards for the uniform business survey sheets, unified the name, definition, calculation method, classification criteria and statistical coding of the same indicators used in different professional statements, and designed the electronic integrated business survey sheets system instead of the various statistical survey questionnaires, moving from design separately to uniformly, from implementation separately to uniformly.

5. Data Collection and processing
Integrated Business Surveys should create centralized and unified statistical data collection system, adopt a unified data processing method. Previously, different departments used different software, some of which were stand-alone version, some were network version. Data processing methods were also different.

According to the Integrated Business Surveys experience used in data processing system and pilot survey data processing requirements in Statistics Canada, we decided to developed a special data processing system for the pilot survey including sampling procedure, data collection procedure, editing and imputation systems and estimation procedure. Using stand-alone version, we centralized data collection methodology, successfully completed the data processing tasks. Learnt the method of data state tracking from Statistics Canada, we recorded the data state in the editing, imputation and processing stages. Learnt the missing data imputation method, we used mean imputation, ratio imputation, historical imputation and donor imputation methods for the non-response indicators in the pilot survey. And we also learnt the outlier detection and process methods.

Currently, NBS has developed more convenient and applicable data collection and

processing software, which can basically meet the needs of statistical agencies at all levels for online collection, processing, summarization, sharing and storage, with other functions such as review, modification and query. We have broadened the bandwidth of the internet gateway, expanded and updated system equipment, integrated and optimized the CA security certification system, established the uniform national business direct reporting network system. Build a network security system, established the direct reporting network call center. By 2012 annual report, approximately 800,000 enterprises in the country have started to submit the basic statistical data directly to the national data center or the provincial data center certified by the state via the internet, and realized the automatic data edit, history imputation online. We also moved from indirect collection to direct collection, from bottom-to-top report to simultaneous sharing of data. At the same time, with the help of advanced computer and network technology, the overall effectiveness of the statistical production was greatly enhanced.

6. Data quality measurement and estimation

In the Integrated Business Survey Frame, quality indicators are very important, the ideal way is placing them into the proper position to measure all possible errors.

Learnt from the Statistics Canada experience, combined with China's actual situation, we analysed the results of the pilot survey data analysis, including descriptive analysis and statistical analysis, internal consistency and external consistency analysis, error analysis. We use the coefficient of variation CV to measure sampling error, use the invalid sample ratio and industry divided error ratio to measure coverage errors, and use the response ratio to measure nonresponse errors. Using the recheck method, calculate the difference ratio between recheck result and survey result to measure response errors, use the recapture method to calculate the data capture error ratio to measure input errors. Through colloquia and research, listen to the investigators and relative personnel evaluation and opinions, we conclude that the pilot data are reliable.

NBS takes selective examination effective measures to control the data quality, and draws experiences from "Statistics Canada's Quality Assurance Framework" , combined with China's actual conditions, study and establish the preliminary framework for China's Statistics Survey Data Quality Control.

7. Conclusion

NBS has fully learned from the practice of integrated surveys and of updating and maintaining basic business entity register in Canada, absorbed the experience for the Chinese integrated framework for business surveys, taken into consideration the statistical reality in China, relied on modern information technologies, enriched the contents of integrated business surveys, and designed the plan for the reform of integrated business survey statistics in China and put it into practice. In another word, we have launched the four major statistical projects. Since 2010, the NBS has initiated the four major statistical projects: to build a truthful, intact, timely-updated basic business entity register so as to provide a scientific and complete database of the

surveyed and sampling framework for all types of conventional statistical surveys with the basic units as the respondents; to design a uniform, standard and convenient-to-fill-in set of business survey sheets incorporate the result of all the enterprise-oriented scattered statistical surveys into a set of e-statements; to build a uniform and compatible Data Collection and Processing Software System with complete functions as the software platform, on which such statistical businesses as system design, task assignment and data collection, review, processing, summarization and release are conducted; and to build a safe, smooth, convenient and efficient Direct Reporting Network System through which   both the surveyed and the surveyors can send directly original data to the national center of data via the Internet.

The Big Four Projects is the innovation and extension of the Sino-Canada integrated business surveys, the implementation of which has changed the Chinese statistical surveys from being loosely professional into being uniformly professional; from paper-based data collection from into electronic data collection; from bottom-to-top data reporting into direct reporting to the central statistical agency. As a result, the business procedures of the Chinese statistics have been reformed, statistical data is produced with modern information technologies, enterprises' burdens are lightened, the statistical work is standardized, the survey efficiency is improved, and most importantly, the quality of statistics is improved.

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