



## **New challenges to Promote Use of Statistics in Japan - Toward the Creation of Higher Value by Utilizing Official Statistics -**

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With the remarkable progress of Information and Communication Technology (ICT) and the growing demand for data analysis, circumstances surrounding official statistics in Japan have drastically changed in recent years. The government of Japan has faced two pressing issues: how to provide the statistical data so that people can have easier access to them and how to increase human resources with deep analytical skills who are in short supply all over Japan. Therefore, the Statistics Bureau of Japan (SBJ) unveiled several projects to solve these two problems and achieve more convenient and advanced use of official statistics.

As a part of an initiative to boost “Open Data” for official statistics, the SBJ is making continuous efforts to improve the methods of providing statistics. Installation of the Application Programming Interface (API) function and statistical Geographical Information System (GIS) into “e-Stat”, a portal site of official statistics of the Japanese government, makes it possible for users to analyze a huge amount of statistical data in an advanced and sophisticated way. By the API function, the most recent data of e-Stat is automatically updated to the user's system. Advanced analysis of statistical data by mash-up with other data of users is also available. By statistical GIS, users can easily visualize statistical data with geographical information and compare data in an arbitrarily designated area. The approaches described above can contribute to empowerment of business activities, development of new businesses, improvement of government services and so on.

To increase the number of deep analytical talent, the SBJ has released two educational websites since 2014. One of these is the “Data Science School” which gives users fundamental knowledge of statistics. The other is “Data Science Online Courses” which provides business people with advanced techniques of statistical analysis through Massive Open Online Course (MOOC).

Although the SBJ's challenges in Japan are just beginning, the SBJ will play a key role not only in providing official statistics but also in achieving more convenient and advanced use of statistics and creating higher value for economics and society by promoting the above mentioned projects.

\* This paper presents the opinions of the authors and does not necessarily represent the opinion of the SBJ or the Japanese government.

**Keywords:** statistical policy; open data; deep analytical talent

### **1. Introduction**

Information and Communication Technology (ICT) has made remarkable progress and the evidence-based decision has been regarded as highly significant at the government, business, and even personal level. Therefore, the value of “Information” and the demand for “Data” is rapidly increasing. Traditionally, the Statistics Bureau of Japan (SBJ) has played a major role in conducting effective surveys and releasing accurate results. In response to a higher demand for the advanced analysis of data, the SBJ is required to play another role. In this paper, we introduce several statistical policies of the SBJ, from two points of view; one is “providing statistics” and the other is “increasing deep analytical talent”.

## 2. How to Provide Statistics – Promotion of Open Data for Official Statistics –

The SBJ has published official statistics in several ways, such as in books, reports and websites. Recently, the word “Open data” has spread widely to the public and there is a growing demand for the statistical data owned by the government. The Japanese government is required to provide people with data in a readily-accessible and user-friendly form. Therefore the SBJ adopted new technologies for providing statistics.

In April 2008, the SBJ set up the portal site of official statistics of Japan, “e-Stat” (Fig.1). This site delivers a one-stop service for official statistics of the Japanese government, aiming to provide information from all statistical departments of Ministries and Agencies (The statistical system of the Japanese government is decentralized). So, when you want some statistical tables, all you have to do is visit e-Stat and search the name of the statistics you want.



**Fig.1 screenshot of e-Stat**

e-Stat contains the following functions:

(1) Search for official statistical tables and draw graphs

Users can search, browse and download statistical tables in the Excel, CSV and PDF form. Users are also able to draw out statistical tables and graphs from databases, which are compiled from statistical survey results.

(2) Easy access to main statistics (“Looking through figures and graphs”)

e-Stat offers easy access to main statistics such as population, labor force and so on. Users can grasp the actual conditions of Japan through tables, figures and graphs prepared and updated by the e-Stat system.

(3) Statistical GIS (Geographical Information System)

Displaying statistical information on the map is also available on e-Stat. Users can compare the conditions of municipalities by the graphs with geographical information.

(4) Schedule of release and What’s new

\*Some of the content on the site is presented both in Japanese and English.

Through these functions of e-Stat, the SBJ has tried to bring the official statistics much closer to the public. With the aim to promote the use of official statistics, the SBJ released the installation of the Application Programming Interface (API) function into e-Stat in 2014 and the improvement of the Statistical Geographical Information System (GIS) of e-Stat in 2015. Let us introduce the detail of these new functions of e-Stat.

### **[Provision of Statistics Utilizing the API Function]**

The API function installed into e-Stat is an interface that enables computer systems of private sectors and local governments to automatically obtain statistical data from the government. Statistics data on e-Stat are converted into machine readable formats and provided to users via the internet (Fig.2). In October 2014, learning from feedback received during an experimental period, the SBJ conducted the full-scale addition of the API function to the e-Stat system.

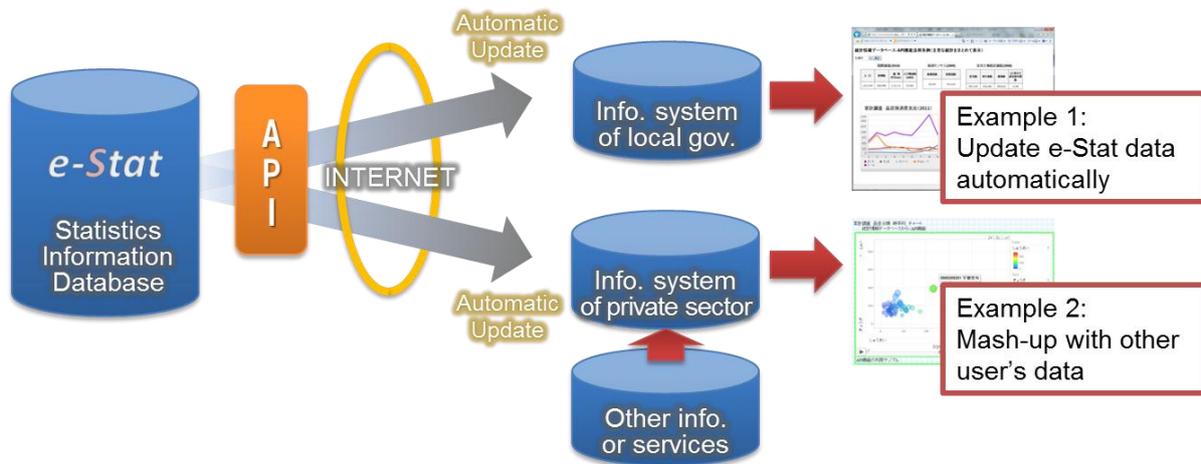
The API function offers several benefits described below.

- The most recent data of e-Stat is automatically updated to the user's system.
- Advanced analysis of statistical data by mash-up with other data of users is available.

Statistical data contained in the e-Stat database are automatically converted into the XML or CSV format upon URI (Uniform Resource Identifiers: Broader concept of URL) requests from users. By

use of the API functions of e-Stat, users are able to obtain up-to-date statistical data of the government without checking regular updates or downloading tables manually. As of February 2015, the SBJ provides more than 74 thousand pieces of statistical data of the government in the API format. Moreover, the API function enables you to sophisticatedly visualize the data in combination with public services. For example, combination with Google Motion Chart gives you a dynamic chart to show changes of several indicators over time. We may show you some example charts at a congress.

The API function of e-Stat makes it easy for businesses and academics to combine the statistical data of the government with various data from other sources and analyze them in an advanced way.



**Fig. 2 schematic view of the API function installed into e-Stat**

### **[Provision of Statistics through an App for Smartphones]**

In April 2014, the SBJ released the app, “Appli De Toukei (Statistics through App)” for smartphones, utilizing the API function of e-Stat.

The aim of this app is to promote the use of official statistics, especially among the young generation familiar with smartphones. The data of the app are automatically updated by the API function and users can obtain the newest information. The app offers the three main pieces of information described below.

(1) City Stat

Combined with GPS, the app provides you the statistical data about the city where you are now, such as the number of people, households, schools, hospitals and so on. This content is called “City Stat”. City Stat also offers a wide range of information, not only statistical information. You can also get the tourist information of the city around you with City Stat. The SBJ plans to extend and deepen the data and information of cities (As of February 2015, more than 300 cities provide their tourist information on City Stat.).

(2) Pocket Stats

“Pocket Stats” gives you easy access to the main statistical data of the government. With just a few touches on your smartphone, you can obtain up-to-date data of Japan including population, labor force, consumption expenditure, CPI, etc.

(3) Statistical Clock

The app also provides the interesting statistical information of the day. For example, on Halloween, the app introduces the annual average expenditure on pumpkins in Japan.

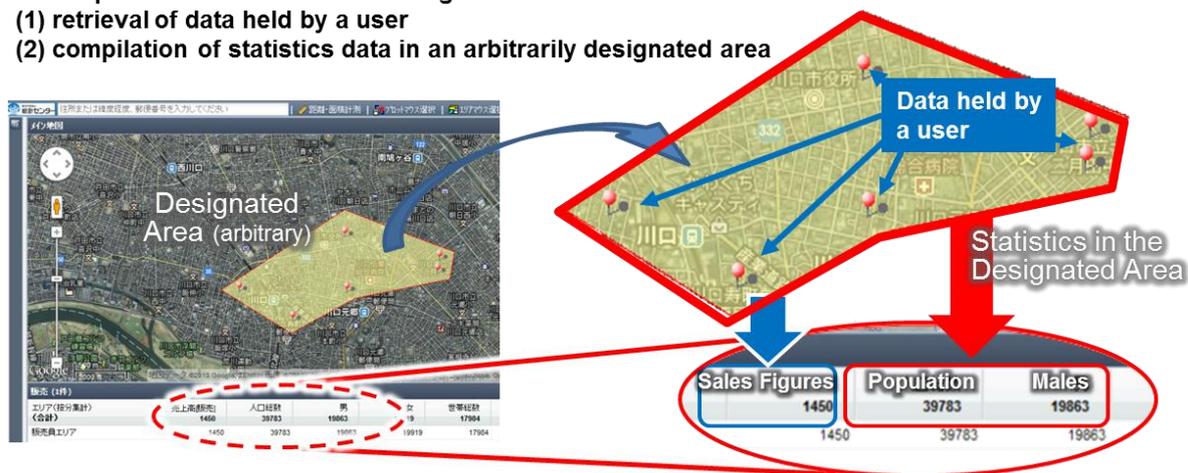
**[Provision of Statistics Utilizing Statistical GIS]**

Statistical GIS is a system integrating the statistical data into geographical information. The SBJ first released statistical GIS of e-Stat in April 2008. This additional function enabled users to visualize statistics with geographical information easily. Since the SBJ improved Statistical GIS in 2013, it has been possible to retrieve not only data held by the government but also data owned by each user and compare statistics data in an arbitrarily designated area (Fig.3). Moreover, the SBJ also released another app for tablets, “Map De Toukei (Statistics through Map)”, which enables you to use statistical GIS on your tablet.

Statistical GIS allows for further analysis of data and advanced use of official statistics. For example, it is used to build store launch strategies based on fundamental data (e.g. age structure of population and male-female ratio). The government and municipalities also can take measures to minimize the damage of natural disasters by use of Statistical GIS. As you know, Japan often suffers extensive damage from big earthquakes. Preparation for such disasters is an urgent and important task of Japan. Statistical GIS serves as a powerful tool to determine an evacuated area for example. Some municipalities optimize the location of refuge accommodations by considering population distribution on a map and the capacity of them.

**The improved statistical GIS enabling**

- (1) retrieval of data held by a user**
- (2) compilation of statistics data in an arbitrarily designated area**



**Fig.3 schematic view of Statistical GIS of e-Stat**

As a part of an initiative to boost “Open Data” for official statistics, the SBJ is making continuous efforts to improve the methods of providing statistics. The approaches described above can contribute to empowerment of business activities, development of new businesses, improvement of government services and so on.

**3. How to Increase Deep Analytical Talent – Through Online Lectures –**

As mentioned in the preceding chapter, the SBJ conducted actions to promote open data for official statistics. However, in spite of the increasing amount of accessible data and the growing demand for data analyses, human resources with deep analytical skills are in short supply in Japan. According to the report of McKinsey Global Institute (2011)<sup>[1]</sup>, the number of deep analytical talent in Japan decreased by 5.3 % in the 4 years spanning from 2004 through 2008, while in the United States it increased by 3.9 % and in China by 10.4 %. One of the causes of shortfall in deep analytical talent is poor education. No university in Japan has a department of statistics, and only one graduate university has one. Only 60 persons obtained doctoral degrees of statistics from that graduate university from

2002 to 2012<sup>[2]</sup>. Moreover, another survey showed that 93 % of enterprises in Japan suffered from a great shortage of deep analytical talent<sup>[3]</sup>.

So, increasing the number of deep analytical talent is imperative in Japan. The “Master Plan Concerning the Development of Official Statistics”, which was designed by the Japanese government in March 2014 for the purpose of developing official statistics in Japan more systematically and efficiently, says improving statistical literacy and enriching statistical education is required in order to promote cooperation of citizens to statistical surveys.

In this chapter, we introduce the SBJ’s approach to increase deep analytical talent.

**["Data Science School" - Introduction to Data Analysis]**

In June 2014, the SBJ set up the website, the “Data Science School”, which provides basic information about how to utilize statistics on computers and/or smartphones. The website has four features, “Introduction to Data Analysis for Business”, “Advice to Draw Statistical Graph”, “Interviews to Experts in Use of Statistics”, and “Measuring Statistical Ability”.

(1) “Introduction to Data Analysis for Business”

The MANGA (cartoons) about noted statisticians shows basic knowledge of statistics for business (Fig. 4). For example, the story about Nightingale shows how she utilized statistics to improve the sanitary conditions of England army (Fig.5).

(2) “Advice to Draw Statistical Graph”

The sophisticated ways to draw and use graphs in business scenes are described with this content. It will work in making a selling strategy.

(3) “Interviews to Experts Using Statistics”

This website contains the interviews to business people utilizing statistics effectively. They encourage the importance of evidence-based thinking in their talks.

(4) “Measuring Statistical Ability”

You can measure your statistical ability by the web test on the site.

The SBJ plans to enrich and update the content, so that many more people get interested in statistics and data analysis.

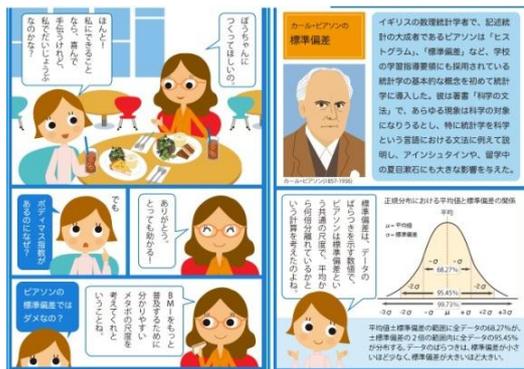


Fig.4 MANGA(cartoon) about noted statisticians

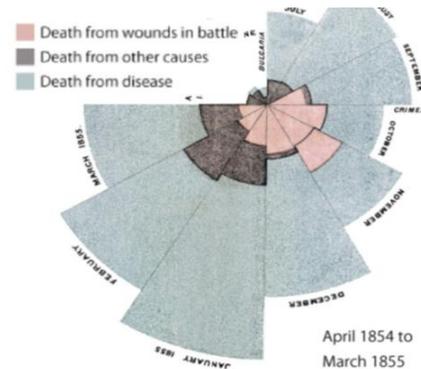


Fig.5 graph drawn by Nightingale

**["Data Science Online Course" - Advanced Steps of Data Analysis by MOOC]**

In December 2014, the SBJ launched a massive open online course (MOOC\*), “Data Science Online Courses (hereinafter the courses)”, which is open to anyone who is interested in learning statistics (Fig. 6).

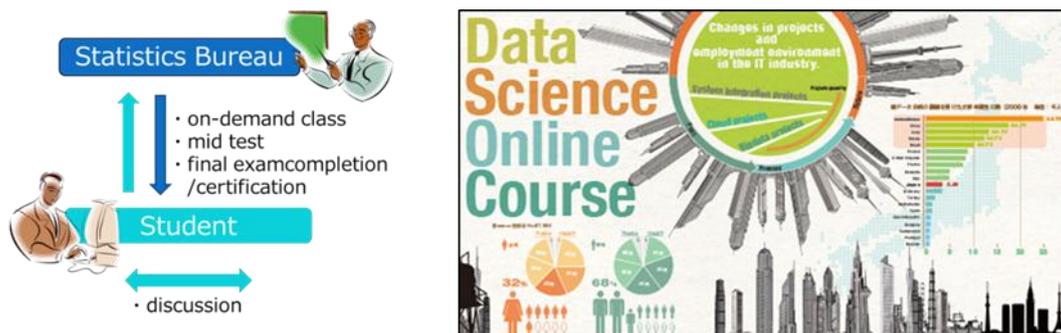
\*MOOC: Model for delivering learning content online to any person, with no limit on attendance, free of charge.

The students of the courses can learn advanced techniques of data analysis through the internet. The courses are available on your PC and smartphone with no charge and no entrance exam. However, in the same manner as face-to-face lectures, the students are required to submit some reports and take exams on the internet. Users can also discuss difficult assignments with each other on the “Discussion Board”.

The first course, “Introduction to Data Science” (hereinafter the introductory course) starts in March 2015. It is a four hour course (ten minutes each lesson, six lessons per week, for four weeks) providing basic knowledge of statistics and the way to utilize official statistics. As of two months after launch, about 8,000 people have registered for the introductory course. In total, the SBJ expects more than 15,000 students will learn from it. As of this writing, we don’t have any feedback from students, however, we may share some at a congress.

The courses will continue to provide thousands of people with an opportunity to learn about statistics and advanced techniques of data analysis. The SBJ plans to have this introductory course several times. The SBJ also will start an advanced course in the near future.

Through two websites, the SBJ aims to improve the statistical literacy of citizens and spread efficient use of statistics which could eventually contribute to overcoming the shortage of deep analytical talent in Japan.



**Fig.6 Data Science Online Course**

#### 4. Conclusions

The SBJ is struggling to improve the accessibility to official statistics and to increase deep analytical talent. To provide high-valued data, the SBJ should supply more advanced forms of data such as LOD (Linked Open Data). The SBJ also should improve the contents of educational websites so that they would meet needs in up-to-date business scenes. Although the SBJ’s challenges in Japan are just beginning, the SBJ will play a key role not only in providing official statistics but also in achieving more convenient and advanced use of statistics and creating higher value for economics and society. User friendly statistical data and improved ability to analyze them would certainly support evidence-based decision making of government, business, and even the personal level.

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