Cultural Manifold Analysis on National Character

Methodology of Cross-National and Longitudinal Survey

Content

Preface

> *"Cross-National Comparative Survey is a treasure trove of social surveys."*
> (Chikio Hayashi, 1984a [2011 reprint, p.158]. Translated by the present author.)

The late Chikio Hayashi (1918-2002), a leading figure of Japanese statistics since the postwar period, once mentioned this after a long experience of survey research. As a key member of the Institute of Statistical Mathematics (ISM), he has initiated and developed a longitudinal and international comparative survey by ISM for more than half a century. The present author has been a member of the survey team for the past three decades.

In this book, I will explain about our past surveys and a paradigm called "*Cultural Manifold Analysis (CULMAN)*" that have been developed for the longitudinal and cross-national comparative research under the statistical philosophy of "Data Science."

Some explanation is needed here to distinguish the " Data Science " from the "data science" recently used in the fields such as AI, IT, or big data technologies. This term was coined by Hayashi in the 1980s. At a keynote speech by the International Classification Society (IFCS) held in Kobe in 1996, Hayashi explained that conventional hypothesis testing, numerical models, and statistical models were not suitable to the study of complex and ambiguous phenomena such as human science and social science. And he proposed to construct " Data Science " based on a data-driven, exploratory and holistic approach that deals with such complex and ambiguous phenomena (Hayashi, 1998a; Osumi, 2003).

In the postwar period (1945-1955), the members of ISM worked for reorganizing statistical systems of the government and civil sections including mass media polls and marketing research in order to recover national economy and develop post-war democracy in the devasted country. Among various works, Hayashi started the Japanese National Character Survey (JNCS) with his colleagues, Hiroshi Midzuno, Hirojiro Aoyama and Shigeki Nishihira in 1953. This survey has lasted now more than 60 years. To my knowledge, this is the longest lasting statistically random sampling survey of people's consciousness. And Hayashi and Nishihira expanded it into cross-national research in the 1970s, when Japan was close to the peak of rapid industrial development. Meanwhile Hayashi had been the leader of the Japan Statistical Society, contributed to the cabinet policymaking of several prime ministers, and served as presidents of many national and international academic communities. Not surprisingly, all these experiences are closely linked to the birth of the " Data Science " (Hayashi, 1998a, 2001b), which is expected to contribute mainly to the practical solution of various social problems.

Scientific measurements can be thought of as the interaction between the observer, the observed object, and the representation of the measurement system (i.e., as models, theories, statistical graphs,

and tables). No matter how good a model or theory is, it cannot be considered a reality in itself. It's just one of the possible expressions of reality. The model or theory is the “finger pointing to the moon” in *Zen* teaching. The finger itself is not the “moon”, but it helps others understand what and where the moon is. We have created “*Cultural Manifold Analysis (CULMAN)*” as a “finger” for others to understand our survey research.

JNCS include dozens of questions. Here is an example of question in JNCS. “If you were born again, would you like to be born as boy or girl?” Figure A shows the stability of Japanese men’s response “boy” (some 90%) as well as the significant change of the Japanese women’s response from “boy” to “girl,” in the past 60 years. This question is directly related to the issue of gender equality. But among other questions, it may seem to symbolize the steady change in social situations since the postwar period in Japan (See Chapter 2 for details). However, before jumping to any particular interpretation on the distribution of response data, it is better to understand and the holistic changes in the social systems, social values, and international relations behind the survey data. For reference, see Figure B1 and B2 of the Asia-Pacific Values Survey. Countries seem to exhibit their own modalities closely related to their history and politics.

*** Figure A Japanese Answers Boy or Girl ? ***’

*** Figure B1 Men’s Answers in APVS ***’

*** Figure B2 Women’s Answers in APVS ***’

Another example shows the change of Japanese social values. The question is” What is the most important thing for you? (Open-ended question).” As shown in Figure C, the response rates of “life”, “health”, “oneself,” “love”, and “child(ren)” show relative stability; the rate of “family” shows the rapid increase.

*** Figure C Most important thing for yuo ***’

The data may have several possible interpretations. It would be even more interesting if it could be compared to cross-national data. However, scientific comparison between countries is not a simple matter of comparing response distributions superficially. Due to differences in sampling methods, languages, history, culture and ways of thinking, some essential problems must be overcome. The obvious problem is to translate the question into different languages without losing semantic equivalence. Another issue is that due to differences in social survey infrastructure (including political restrictions), countries need to use different statistical sampling techniques. This is not

negligible for cross-national comparisons. Among them, one of the most difficult problems is the difference in general response tendency. People in countries like the United States usually answer clearly with “yes” or “no,” while people in other countries like Japan often give ambiguous answers. Scientific cross-national research must overcome these problems. However, our past studies lead us to the recognition that studying these issues themselves reveals important national characteristics beyond the superficial comparison of response data.

The world in 2020 began with the coronavirus turmoil from China. Differences in government behavior, media coverage, scientist activity, and people's panics clearly reflect differences in values and attitudes towards life, science, and the political system.

Over the past 65 years, our research team has collected statistical random sampling data of people's awareness and opinions with development of our paradigm to justify longitudinal and cross-national research. The purpose of our research is to promote mutual understanding of people's attitudes, behavioral manners, religion, and values. Although our work is still under construction, an overview of past work may give the reader some ideas for further development. I am a survey statistician with a background in mathematical psychology and psychometrics, but I'm not an expert in anthropology, sociology, or international relations. Therefore, I may need to refrain from developing substantive discussions for those empirical sciences. However, I believe that experts in a variety of disciplines, such as economics, politics, religion, sociology, and international relations, can use our data to find new ways to advance their own research.

The ancient Chinese martial artist Sunji said, “If you know the enemy and you know yourself, you are not in danger of 100 battles. It is best to win without fighting.” To the people of other countries, the Japanese attitude may often seem vague. This may be derived from the principles that are deeply ingrained in the Japanese (self-restraint of behavior, self-restraint of freedom). Mutual understanding is the key to avoiding unnecessary conflicts between countries. To that end, it is important to strive to make other countries understand our values and ideas.

I hope this book will help expedite empirical social science and evidence-based policy making for world peace and prosperity.

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This book is dedicated to my parents, Mitsu Yoshino and Kinjiro Yoshino, and to my brother Kotaro Yoshino.

Note) This book introduces various survey data collected by the Institute of Statistical Mathematics (ISM). For details of the questionnaire, survey method, and total of each survey, please refer to the series of ISM Survey Reports and related websites.

1) http://www.ism.ac.jp/editsec/kenripo/index.html (ISM Survey Research Reports in Japanese).
2) http://www.ism.ac.jp/editsec/kenripo/index_e.html (ISM Survey Research Reports in English)
3) http://www.ism.ac.jp/ism_info_j/kokuminsei.html (JNCS in Japanese)
4) http://www.ism.ac.jp/ism_info_e/kokuminsei_e.html (JNCS in English)
5) http://www.ism.ac.jp/~yoshino/ap2/index.htm (ISM Cross-National Studies in Japanese)
6) http://www.ism.ac.jp/~yoshino/index_e.html (ISM Cross-National Studies in English)

Among the cross-national data, the following data are frequently used in this book..

7) The Seven Country Survey (1987-1993) (Hayashi et al., 1998).
https://www.ism.ac.jp/editsec/kenripo/contents_e.html (ISM Survey Report, No.63, 64, 70-73, 75-82)
https://www.ism.ac.jp/~yoshino/arito/eg/top_e.htm (Website 1)
https://www.ism.ac.jp/~yoshino/data/1_e.html(Website 2)
8) The East Asian Value Survey (EAVS) (1992-1995) (Yoshino, 2006)
https://www.ism.ac.jp/~yoshino/sr/index.html (Summary Report)
https://www.ism.ac.jp/~yoshino/ea/index_e.html (Website)
9) The Pacific-Rim Value Survey (PRVS) (2004-2009) (Yoshino 2010).
https://www.ism.ac.jp/~yoshino/sr/index.html (Summary Report)
https://www.ism.ac.jp/~yoshino/pr/index_e.html (Website)
10) The Asia-Pacific Value Survey (APVS) (2010-2014) (Yoshino, Shibai & Nikaido, 2015).
https://www.ism.ac.jp/editsec/kenripo/pdf/kenripo117.pdf (Summary Report)
https://www.ism.ac.jp/~yoshino/ap2/index_e.html (Website)

For a detailed list of publications

11) https://www.ism.ac.jp/~yoshino/references_e.html

Chapter 1 History of the Japanese National Character Survey (JNCS)

All survey studies are woven by the trinity of history, and theory and a practical method of the research, and should not be described only by superficial data. Therefore, I start this book by a brief history.

Most of today's statistics sampling survey systems for Japanese official and private sectors have been established as joint research by experts from various fields, led by the Institute of Statistical Mathematics in the decade after WWII. Those experts gathered to work for post-war national economic recovery and peace.

1 Postwar Democracy--- From Statistics for War to Statistics for Peace

1.1 Birth of "Statistical Mathematics" – Philosophy of Statistics

"Statistical mathematics" is a philosophy that began in the field of Japanese statistics since the early 1940s. Traditional "mathematical statistics" rely on the mathematical assumptions of probability distribution theory which are almost impossible to verify directly. Several groups of statisticians criticized this and aimed to develop new statistical approaches to solving social problems in a practical way (Midzuno, 2003, pp.191-192). Since then, this idea has successively developed as a "Quantification Method" in the 1950s and 1960s, "Multidimensional Data Analysis", "Behaviormetrics", and "Science of Survey" in the 1970s and 1980s, and "Science of Data" since the 1990s (Hayashi, 1998a, 2001b, Yoshino, 2001b; Yoshino & Hayashi, 2002; Yoshino, Hayashi & Yamaoka, 2010).

Unfortunately, this new philosophy of statistics was once incorporated into war in the course of the times. In 1943, during the war, the Academic Research Council established the Institute of Statistical Sciences with a focus on statistical mathematics. After the Cabinet's decision in 1944, the Institute of Statistical Mathematics, under the control of the Minister of Education, took charge of the study of mathematics and its applications related to probability and promoted the research. Soichi Kakeya, professor at Tokyo Imperial University at the time, served the post of director-general.

It was the era when universities and research institutes all over Japan were incorporated into a wartime system called total war. For my generation born after the war, the details of what the Institute did at the time are almost unknown. But it is said that they were engaged in decryption or what is now called operations research (Inose, 1983; Kimura, 2002; Yoshino, in press).

1.2 New Mission for Democracy

1.2.1 Reorganization of Official Statistics

Under the US occupation after the war, the institute was reorganized into the 1st Research Department (basic theory), the 2nd Research Department (natural science statistical theory), and the 3rd research department (statistical theory social science) in April 1946. This reorganization was related to Rice

Statistics Mission's recommendation from the United States in December 1946.

ISM members reportedly believed that the institute created for strategic research would be abolished under the post-war occupation. Therefore, when the people from GHQ / SCAP (Headquarters General, Allied Supreme Commander) arrived, they thought the institute would soon be abolished (Hiroshi Midzuno, 1991 [Personal Communication]). However, the United States had a detailed understanding of human resources in various areas of Japan, including information from interrogating Japanese prisoners of war (Nakata, 2010). And they used Japanese experts from various fields to create a new democracy and restore the economy and industry. Thus, the institute was given a new mission to take the lead in reorganizing official (governmental) statistics and in establishing a method of scientific opinion polling as the basis for the development of postwar democracy.

Chikio Hayashi, later a director-general of ISM but a then young member, was dispatched with Hiroshi Midzuno to the Ministry of Finance as a member of the Institute of Statistical Mathematics. There they handled a variety of large data. Midzuno was a senior to Hayashi in the Department of Mathematics at the University of Tokyo. And he inspired his intimate life-long friend Hayashi to develop new statistics.

Through this experience at the Ministry of Finance, Hayashi and Midzuno confirmed that real data could not always be on normal distribution even if the sample size of the data is large. This can be an important basis for criticizing the armchair theory of mathematical statistics. Then, in the processes of solving real-world problems such as market research, personnel management, and criminal law issues, Hayashi collaborated with Midzuno to build “Hayashi's Quantification Theory.” The most striking feature of the theory is that it does not assume a priori probability distribution of variables. This frees us from mathematical assumptions that cannot be checked directly (Hayashi, 1993a; Midzuno, Hayashi & Aoyama, 1953; Morimoto, 2005, 2012; Takahashi , 2002b).

Incidentally, after the war, Hayashi obtained the US military OR (operations research) textbook “Methods of Operations Research” (Morse & Kimball, 1946). And he found that Americans had thought the same in their military operational studies and had reached similar conclusions as the Japanese (Maruyama, 2015).

In this way, Japanese researchers took off military uniforms, began reorganization of government statistics, developed statistical marketing surveys for economic recovery for the reconstruction of destroyed land, and established a scientific opinion poll system for democracy. On the other hand, the U.S. government, ending the occupation in 1953, believed that a reliable and rigorous statistical system had been established so that they could constantly monitor Japan from Washington and respond immediately in the event of an emergency (Kondo, 1953, p.15). In those days, the US government did not seem to believe democratization of the Japanese. Besides, in the start of cold war, they needed to monitor people’s movements including residents near the US military bases in Japan. During the Vietnam War, the US military bases faced severe opposition from the residents.

1.2.2 Japanese Literacy Survey

In the history of postwar surveys, it is important to explain about the "Japanese Literacy Survey" as the first nationwide statistical random sampling.

In policymaking during the US occupation, there was some argument in the US government and military that Japanese use of esoteric *kanji* (Japanese version of Chinese characters) prevent them from developing their academic abilities and democracy. On this matter, in 1948, a nationwide statistical random survey was conducted to investigate the literacy of Japanese people. The result turned out that Japanese people had sufficient literacy to develop democracy. Thus, the Japanese language was saved (Hidano, 2018; Yomi-kaki-nouryoku-tyousa-iinnkai, 1951).

"Romanization" (abolishment of "*kanji*" and use of alphabet) has been strongly insisted by Major Robert King Hall of the GHQ Civic Information and Education Agency (CIE) without any coordination with the US government. He seems to have conceived this idea through his own difficult experiences of learning Japanese at the time of Princeton University and the Naval Academy. However, Gordon T. Bowles, Advisor to the Education Mission of the State Department, believed that language reforms should be left to Japan and should not be enforced externally. And Hall was left out of this matter. After all, the results were in agreement with the report from Tokyo Imperial University Educational System Research Committee to President Shigeru Nambara (Kayashima, 2000; Unger pp.79-81, 1996). In fact, there was a complicated background, such as censorship under the occupation and conflicting views within the U.S. government and the military. However, at least on the surface, it provided a model for policy-making based on a scientific survey of stakeholder intent.

In addition, this provided a model to check statistical random sampling theory and its practice. Prior to this survey, an exhaustive survey (almost 100% valid return rate from the target population of more than 20,000) was conducted in some cities such as Odawara City of Kanagawa Prefecture. Because each city of Japan has almost complete list of the residents (then a list of Food Distribution Books made for governmental control of distribution of food during WWII), so they used the list for a certain statistical random sample from the total population (stratified multi-stage sampling). Next, the distribution of literacy scores across the population was compared to the estimated distribution of scores obtained from statistical random samples. The estimated score was close to the true score within the theoretical sampling error calculated according to the sample size (eg, 1000 or 3000 respondents from the total population). After this confirmation, this sampling method was extended to apply to the nationwide survey (For more details, see Yomikaki-nouryoku-iinnkai [1951]).

1.2.3 Establishment of Public Opinion Poll

The method invented for the Japanese Literacy Survey provided a model for later rigorous statistical surveys, including resident survey, marketing survey, public poll survey, surveys to forecast election

outcomes, etc. (Later, they began to use a list of registered residents or voters rather than a list of food distribution books.) Of course, the governmental surveys started to use the method.

Usually an ordinary public poll cannot be directly checked as to whether it is conducted statistically adequate or not. Therefore, it is important to stick to a rigorous statistical method validated by theory and practice, such as the Japanese Literacy Survey. But an exception that we can directly check validity of a survey method is on prediction of election outcome based on public poll.

During the occupation, anthropologist John Perzel worked for the CIE (Civil Information Education Section), which was in charge of public opinion polling in Japan. In 1947, he was surprised to know that a Japanese survey company, Yoron Kagaku Kyokai (Public Opinion Scientific Research Center [POSRC]), successfully predicted the winner of the highly competitive election of the governor of Tokyo metropolitan city by a statistical random sampling survey. The sample size was only 500 respondents. He knew American mass media's failures of public opinion polls on elections such as the 1938 presidential election. Therefore, he hardly could believe the validity of the Japanese survey on such a small size sample. In those days, most surveys of major Japanese newspapers collected a sample of more than 60,000, sometimes more than 200,000 respondents. He ordered the POSRC to explain about the details of the survey. Eventually, however, he understood the validity of rigorous statistical random sampling survey and admired them on the performance.

Meanwhile, Japanese researchers were surprised to learn that a US survey firm mis-predicted the winner in the 1948 US presidential election. After studying American survey methods (quota sampling with respect to age, gender and race), people found that Japanese sampling methods were much more rigorous in statistics.

The survey research of Japan was under supervision of the US, but the Japanese successfully performed beyond the US research. However, the Japanese know that the United States, along with Japanese staff, made significant contributions to Japan during the early days of occupation, not only for survey research but also in realizing an ideal system of social security and medical care that could hardly have been realized in its own country.

Since the success of literacy surveys or the election predictive survey, statistical random sampling has become more and more dominant in surveys by governments, mass media, marketing researchers, academic researchers, and others.

1.2.4 Resident Surveys under the 1945-1952 Occupation by USA

It may be worthwhile writing about some resident surveys in islands such as Amami-Oshima Island and Okinawa Island in the occupation time. With Japanese cultural anthropologists, Hiroshi Midzuno (a member of ISM) was engaged in the survey of Amami-Oshima (Hiroshi Midzuno, private communication, 1991; Yoshino, Hayashi & Yamaoka, 2010) . The United States did not brief them

the real purpose of the survey, but totally relied on credible Japanese statisticians and anthropologists to conduct the survey. The report was classified and sent to Professor Ishino Iwao, Ohio University, for the analysis for their own purpose. As a result of the survey, the residents of Amami had an overwhelming sense of belonging to Japan, but the residents of Okinawa did not. (It may be natural given cruel actions of the Japanese military to Okinawa residents during the war.) It was the time that complicated international relations were seen, such as the resident movement and the start of cold war between the USA and the Soviet Unions. After all, Amami Oshima returned to Japan several years after the war, whereas the American military base was built in Okinawa and it had been under the US custody until 1972 (Eldridge, 2003, pp. 106-107; Takahashi, 2002a)

The United States entered the Cold War era and asked many Japanese anthropologists to survey islands throughout Japan (The Japanese Society of Ethnology, 1952). The nine academic societies such as anthropology, psychology and sociology were organized as an association for survey research and they carried out many surveys (Sakano, 2012). This can be thought of as a model of the basic spirit of intelligence: independence between the information collector and the information analyst. It can also be said to be a model for policy making based on empirical research data collected by highly credible local researchers.

After the war, the United States immediately disarmed Japan and demanded to enact a peaceful constitution. Japan peacefully fulfilled its demands. However, the Soviet Union and China began targeting the disarmed Japan. Then, the USA changed its policy and demanded Japanese rearmament in anticipation of the Korean War (Ezaki, 2019). It became the origin of the still lasting subordination of the Japanese government and the Japanese Self-Defense Force to the United States Military (Suenami, 2012; Tanigawa & Sudo, 2019).

Many documents on survey research during the U.S. occupation were declassified around 1990 and returned to Japan Association for Public Opinion Research (JAPOR). The documents are currently kept by Waseda University.

2 The Japanese National Character Survey (JNCS) since 1953

2.1 History and Theory

In 1953, the Institute of Statistical Mathematics started the “Japanese National Character Survey”, based on the statistical random sampling method developed practically in the “Japanese Literacy Survey” (Mizuno et al., 1992; Yoshino, 2011a, b, c). The word “national character” may be a problem in academics and politics, but it is used as a nickname for our research. In our terminology, “national character” refers to a characteristic that is reflected in the response patterns of people's consciousness surveys in a country. This is closely related to Inkeles’ (1997) concept of “national character” regarding the statistical mode of responses of people. Incidentally, as for measurements of national character, Inkeles (1997) claimed that aspects directly related to economic or political

conditions should not be regarded as part of the "national character." It is reasonable, however, to assume that people of different countries may respond differently to certain economic or political items on a questionnaire even under the same economic and political conditions, and that such differences in response patterns may be closely related to "national character." For example, in the late 1980s, Brazilians showed a high degree of life satisfaction and happiness even when their country was experiencing severe conditions regarding international debt. In contrast, the Japanese did not show a high degree of life satisfaction and happiness even when their economy was close to being the best-performing one in the world (cf. Easterlin paradox).

Today, this survey is called one of the three major statistical sampling consciousness surveys in Japan, together with the "Shakai-ishiki ni kansuru Chosa [Social Survey on People's Consciousness]" by the Cabinet Office and the "Nihon-jin no Ishiki Chosa [Japanese Consciousness Survey]" by NHK [Japan Broadcasting Corporation]. The team of JNCS thought that "national character" wouldn't change greatly over years, therefore, they didn't necessarily assume to repeat the survey over years at first. And many new question items were introduced in the second survey of 1958, five years after the first survey. However, they found considerable changes in the response distributions for some of the same questions, recognizing the importance of conducting a longitudinal survey with the same question items. However, from the 8th in 1988, taking into account changes in the times, they created two types of questionnaires: K type (continuous type) mainly consisting of the same questions and M type (future-oriented type) which replaced some items with those to capture possible future changes of Japanese attitudes.

This survey, which has been continuing for over 65 years (Hayashi, 1992a, 1992b; Mizuno et al., 1992; Sakamoto, 2000; Yoshino, 1997), is a globally unique longitudinal survey supported by the Ministry of Education. It has subsequently prompted similar types of statistical surveys in other countries such as ALLBUS (Germany), CREDOC (France), Eurobarometer, the European Values Survey, and the General Social Survey (GSS) in the USA. Meanwhile, many experimental research on survey methodologies have been conducted by ISM since the 1950s.

2.1.1 Kameda's Simple Random Sampling Theory

Regarding the theory of statistical random sampling, Toyojiro Kameda presented a theory of simple random sampling and applied it to calculate the accuracy of sampling data on the first Japanese Census Data (1920) in 1923. (See Note 1). Furthermore, he applied the theory to the work of security insurance, and also applied to the estimation of damage caused by the Great Kanto Earthquake in Tokyo and its surrounding areas in 1923. He reported the results at the 19th Conference of the International Statistics Institution (ISI) held in Japan in 1930 (Kawasaki, 2020, Sec.4; Takahashi, 2004, p.109). Although it was the era of "Taisho democracy", a peak of democracy before World War II, his theory had never been applied to opinion polls. (Taisho era is 1912-1926. Democracy movements

peaked in the 1910s and 20s.)

However, in the 1948 Japanese Literacy Survey, Japanese staff did not pay attention to Kameda's work. They studied American books on statistics borrowed from the CIE library and invented a practical method of nationwide random sampling suitable for Japan. As mentioned, officially registered "food distribution books" were used to design multi-stage stratified sampling. (In later public opinion surveys, they started to use list of resident registration or voters that are updated regularly and are almost complete. Compared to other countries, this gives Japan a significant advantage in the precise estimation of sampling error of public opinion survey.)

2.1.2 Multi-Stage Stratified Sampling of JNCS

This section describes the sampling design of Japanese National Character Survey (JNCS). The basic design has been the same, but the detailed steps have changed slightly over the years. For more information, please refer to the homepages of Japanese National Character Survey Committee (https://www.ism.ac.jp/kokuminsei/en/page9/page10/index.html), or Mizuno, et. al (1992). The following is from the explanation of the 13th survey (Nakamura et al., 2017).

In general, the procedure for the 13th survey was the same as for the 8th to 12th surveys. The selection of samples for each survey was performed by a three-stage stratified stochastic sampling method. First, we stratified boroughs, cities, towns, and villages, considering population size and demographic variables. One administrative area was randomly selected from each level so that the probability of selection was proportional to the size of the population. In the 13th survey, 400 districts were selected (Stage 1). Second, from each randomly selected district, a small area called CHO / AZA (the same as the census unit) was selected in the same way (Stage 2). Finally, respondents were selected from the resident register of the selected district using systematic random sampling (Stage 3). In the 13th survey, a total of 6,400 respondents were selected.

In the 12th and 13th surveys, we refined the geographic stratification and increased the number of sampling points and sample size (number of respondents) compared to the 8th to 11th surveys. We also used the resident listings in the last two surveys, with some exceptions, instead of voters' listing previously used. Thus, the sampling point unit was a voting district in the previous surveys, but "CHO / AZA" in the recent surveys.

The surveys up to 8th one were conducted with the cooperation of many universities. In these surveys, districts were assigned to universities, and members of the research committee visited the universities and directed student interviewers. However, since the 9th survey in 1993, each survey has been conducted with the cooperation of a private survey company.

In the case of the 13th survey, prior to the fieldwork survey, the sampling manager randomly selected respondents from the resident registry according to the designated procedures at the city hall. An average of 16 respondents were selected for each sampling district. Fieldwork was

conducted from the last 10 days of October to the first 10 days of December 2013. As a result, 3,170 (1,591 for the K type and 1,579 for the M type) were completed from the target sample of 6,400, and the completion rate was 50%. Details of imcompletion rates are summarized in Tables 1 through 5 of Nakamura, et. al. (2017).

2.1.3 Installment of JNCS

In the 13th survey, the installment of the survey was entrusted to the Nippon Research Center (NRC)(Gallup International Association). However, prior to the interview, the Institute of Statistical Mathematics (ISM) processed some of the respondent sampling from the registered resident card (80 out of 400 locations in Tokyo, Osaka and two other prefectures). The researchers of NRC and ISM responsible for sampling visited the town hall, ward office, and city hall of their town or village and sampled there from the Resident Register using a designated statistical random sampling method.

We then mailed a request form of cooperation to the sampled respondents in advance. The interviewer visited each house, met with the respondents directly, handed over the request from the Institute of Statistical Mathematics, and requested cooperation. If respondents were unavailable due to absence or other reasons, a new date and time was set for the interviewer to visit again.

When a respondent agreed to cooperate with the survey, the interviewer read the questions on the questionnaire, and recorded the answers provided by the respondent verbatim on the questionnaire. For questions indicated with show cards of response choices, the cards were presented to the respondents. If a sampled respondent didn't agree to cooperate, the interviewer recorded it as" refusal." If the interviewer was unable to meet the respondent after visiting many times for some reason, the reason was recorded according to each situation, such as "temporary absence," "long absence," or "moved."

Note of Chapter 1

Note 1) For simple random sampling, the estimated sampling error *E* at a 95% confidence interval for the percentage of a statistics in the population (e.g., the response percentage of "yes") is given mathematically as

$$E = \pm 1.96\sqrt{(P(1-P))/n \cdot (N-n)/(N-1)},$$

where *P* is the response percentage in the population ($0.0 \leq P \leq 1.0$), N is the population size and n is the sample size. For large N (for example, over 10,000), this is approximately equal to

$$E \fallingdotseq \pm 1.96\sqrt{(P(1-P))/n}.$$

If n is large enough, P is approximated by the observed response percentage *p* in the sample.

$$E \fallingdotseq \pm 1.96\sqrt{(p(1-p))/n}.$$

This is maximized when p = 0.5. Often, the estimated sampling error is treated roughly as

$$E \fallingdotseq \pm 1.96/\sqrt{n}.$$

For example, if the sample size *n* is 10,000, the sampling error of the estimated response percentage is ± about 2%. If the sample size *n* is 1,000, the sampling error of the estimated response percentage is ± about 6%.

In practice, you should also consider non-sampling errors (a variety of errors, including errors in sampling coverage of population, recording responses, processing data, etc.). Non-sampling error cannot be calculated accurately in theory, but it is sometimes assumed to be approximately at the level of sampling error (Hayashi, 1984a).

In the early days when modern computers were unavailable, accurate calculations on a set of big data was very time consuming and costly. As a result, even if a large set of data was generated by an exhaustive survey, a tentative rough calculation was often done using a small dataset randomly sampled from the original large set of data. Some researchers insisted that calculating statistics on random sampling made sense only if exhaustive survey data were available. From the point of view of modern statistics, it seems strange. It took a long time before random sampling surveys like today became frequently used.

Summary of Chapter 1

After World War II (late 1940s to 1950s), the government and private sector statistical systems and institutions were intensively reorganized as the basis for regaining national power under Japan's new democratic regime. In 1958, the Institute of Statistical Mathematics (ISM) launched the “Japanese National Character Survey” based on the statistically rigorous sampling method devised in the 1948 “Literacy Survey of Japan”. This survey is based on multi-layered and multi-stage statistical random sampling from a nearly complete list of voters or residents across the country.

JNCS has been in operation for over 65 years. It is also currently known as one of the three major longitudinal statistical consciousness surveys, together with the “Shakai-ishiki ni kansuru Chosa [Social Survey on People’s Consciousness]” by the Cabinet Office and the “Nihon-jin no Ishiki Chosa [Japanese Consciousness Survey]” by NHK [Japan Broadcasting Corporation]. The survey motivated other countries to launch similar longitudinal general surveys, such as the General Social Survey (GSS) in the United States, the Eurobarometer in the EU, and ALLUBUS in Germany.

JNCS was closely linked to the reorganization of official statistics and the establishment of statistical public opinion polls to develop Japan's postwar democracy. It also symbolizes the development of Japanese statistical philosophy such as “Statistical Mathematics”, “Quantification method”, “Multidimensional Data Analysis”, “Behaviormetrics”, and “Science of Data”.

Chapter 2　Findings of the Japanese National Character Survey (JNCS)

1 Start of the Longitudinal Survey

Initially, the JNCS research team did not intend JNCS as a longitudinal survey because they expected the "national character" to be stable over the long term.　Thus, the second survey in 1958 introduced many items on various topics that were not covered in the first survey in1953.　However, the results turned out to show significant differences on some of the same items used in both surveys. This observation led the JNCS team to recognize the importance and necessity of conducting a longitudinal survey of the same items.　Thus, except for some items, the same items were used as in the first survey from the third survey until the fourth survey in 1968.

However, around 1970, Japan's remarkable social change required new items to capture new aspects of the Japanese people.　So, they launched two types of questionnaires: K-type ("Keizoku" [continuous]) and M-type ("Mirai" [future]).　The K type consists of almost the same items as a series of surveys, but the M type captures new aspects by replacing some items of the K type with new items. This idea later leads to the CLA (Cultural Link Analysis) research paradigm as it expands to cross-national research in the 1980s.　(Unfortunately, the core concepts of K-type and M-type were not necessarily well maintained, and the distinction between these questionnaire items was confused in later surveys.　Chikio Hayashi had been the leader of JNCS but retired from the Institute of Statistical Mathematics in 1988.　After retirement from ISM, he began to focus on cross-national survey. Therefore, the remaining members of the Japanese survey may not have fully recognized the importance of the distinction of questionnaires in survey design.)

This section summarizes the main findings of JNCS.　To understand the findings, it is helpful to take into account historical background and generational features in the Japanese character.

There are many ways to divide the period from after World War II to the present.　The following classification is an example.　(See Table 2.1).

1. GHQ Occupation Period (1945-1952)
2. Postwar Recovery and Rapid Economic Development (1952- 1973)
3. Recession and Stable Development (1973 -1986)
4. Bubbling Economy (1986 -1991)
5. Recession after the End of Cold War (1991-present).
   (After collapse of Bubbling Economy)

*** Table 2.1 History of Japan ERA & PERIOD　**

Table 2.2 shows a generational classification of the Japanese.　Each generation has a nickname and