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Non-Traditional Data Collection Approaches in The 2011 Kuwait General Census

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Abstract

The general census is the bedrock and one of the main pillars of the official statistical system. It provides comprehensive statistical data covering all aspects of life: population distribution and their basic demographic, social and economic characteristics. The census also furnishes innumerable data about housing and housing conditions, as well as the public utilities needed for dwellings. Extensive data about public and private establishments and institutions, together with the economic activities undertaken by these establishment, the number of employees and their geographical distribution,...etc. All these and other data and information are provided for planning economic and social development.

With the accelerated development in the technology of processing and storage of data, the computer system was introduced. Data base programs were used in the census activities such as entering the electronic data and storing them coherently to reflect the relations between the fields of the paper form, compilation and tabulation in the output which will represent the results of the census that will be displayed and disseminated at a later stage to fit the requirements and purposes. These purposes includes drawing and schematizing planning and administrative policies, analytical researches and studies, purposes of commercial and industrial uses and employment, pinpointing electoral constituencies, and develop housing programs and policies.

Non-traditional data collection approaches adopted had a substantial technological impact on the entire census process, especially in the transformation from the methodology of the traditional field census to the multi-mode process (hybrid methodology). This influenced tremendously the census activities and output through minimization of overall costs and efforts, as well as upgrading and improvement of data quality.

This paper presents non-traditional data collection approaches applied in the Kuwait 2011 Census, such as using the internet as a collection method (E-census). Also it explains the role and importance of call center for supporting of e-census, and solving the problems of citizens and residents. Furthermore, it presents the Kuwaiti experience in Pilot Project for Register-Based Census.

1- Introduction

A population census is the total process of collecting, compiling, evaluating, analyzing and publishing or otherwise disseminating demographic, economic and social data pertaining, at a specified time, to all persons in a country or in a well delimited part of a country. Analysis of the data yields demographic trends and patterns which are crucial to planners and decision-makers. Kuwait Law No. 27 of 1963 stipulates that a general census of Kuwait's population and buildings is to be conducted every ten years. The United Nations Economic and Social Committee proposed that all nations undertake a general census in the year 2010. This UN proposal has been adopted by the GCC Supreme Council via its resolution to conduct a census for all GCC countries between 2005 and 2014. The General Census for the State of Kuwait was conducted during April 21st – May 31st 2011. It was conducted by the Central Statistical Bureau, and addresses all individuals and families residing in Kuwait, both Kuwaiti and non-Kuwaiti, as well as houses, apartments, and buildings. Entities and institutions such as banks, schools, and companies will also be included in the 2011 Kuwait General Census. The 2011 Kuwait General Census collects information on the socio-economic characteristics of all residents, such as: Age, Gender, Employment, Level of education, Nationality, Marital status, Special needs, etc.

2- Objectives

Initial planning includes a set of goals for the enumeration process. These goals are used to guide the census in general and the enumeration process specifically. While the goals are composed of both quantitative key performance indicators and qualitative indicators, the primary purpose of the key goals is to provide a portrait of the country's population, geographic distribution, and demographic, social, and economic characteristics. The primary goal of the Kuwait Census was to collect comprehensive and detailed data on the social and economic structures of Kuwait with the purpose of making strategic and targeted policy decisions in the future based on the statistical results of the census.

3- Non-traditional approaches in the 2011 Kuwait census

The state of Kuwait is testing and implementing non-traditional data collection approaches (alternative methods) for collecting, processing and disseminating key statistics that used to be generated by the traditional approach to population and housing censuses. There are three non-traditional data collection approaches of census, which are as follow:

3.1 E-census

The internet is being increasingly favored as the mode of communication between citizens (companies, government, and the society in general). In recent years, a number of countries have used the internet as a response to census operations. The USA, Singapore, Switzerland and Spain were pioneers in the 2000/2001 census and Canada, Australia and New Zealand followed in the 2006 census (Haug, 2001). Although response rates were relatively modest, 22%, 7% and 9%, respectively, the latter countries have made a positive evaluation of the e-census as it enabled them to meet population expectations and helped transmit a modern and innovative image of the national Statistics Bureaus. However, this new use of technology resulted in an increase and not a reduction in costs. The e-census has been seen as part of the strategy to modernize the collection mechanisms that would be extended to other surveys of families and therefore was considered as an investment that would bring future returns. Just as in other countries, The Kuwait 2011 Census of Population and Housing allowed people to respond via the internet as part of an effort to innovate and bring the country in line with the best international practices.

Five main principles were adopted for the e-census application of the 2011 census in Kuwait: it must be easy to use, guarantee data security, having similar navigation features as other sites, a similar questionnaire layout to the paper version and no central database of dwellings.

3.1.1 The goals of E-census

Several goals can be achieved via the option of the Web:

1. A modern image for the census

In the early days of censuses and almost until the end of the 20th century, there was no other possibility to collect the necessary information on persons and households than with the help of paper forms and enumerators. But this traditional survey method began to take an increasingly antiquated image as the information society developed at a breathtaking pace. Modern ICT tools enhance the image of the census and can reduce some of the resistance against census taking.

2. Better user-friendliness

The Web has no limits to the size of the questionnaire, the support and help functions. Respondents can choose the language in which they want to respond, they are assisted by the good legibility of the questions and a large number of electronic aids and notes about completing the questionnaire. The questionnaire can be customized (personalized questions, suppression of non-applicable questions) depending on the answers to preceding questions and to the characteristics of a person according to age, sex, economic activity etc. In addition, it is possible to print a personal copy of the completed questionnaire.

3. Better data quality

The Web offers the opportunity to build in consistency checks and show immediate warnings for missing or implausible data. Each field can be linked to attributes, which have to apply before the questionnaire can be completed. Selection menus reduce the range of wrong or unclear answers and support the coding process. Data entry is completed directly, without intermediate stages of writing, posting, scanning or copying. Progress can be monitored immediately and any problems arising with the data can be recognized early on.

4. Cost reduction

The costs of data acquisition decrease thanks to the direct data entry in a central database, the skipping of intermediate stages (scanning, manual data entry) and the lower proportion of missing, wrong or implausible data thanks to better coding and on-line checks. However, in order to reach these goals, a number of technical and political challenges have to be met. And if they are not well handled, they can easily offset the possible gains in efficiency or can even have reverse effects on the image and the quality of the census.

3.1.2 Methodology of E-census

E-census depends on two steps: Registration and Data completion.

Step (1): Registration

The Kuwait E-Census web site is open for all Kuwaitis and residents of Kuwait who have a Civil ID issued by the public authority for civil information. The data should be entered by the head of the family or a delegated family member, as follow:

- a. Entering household head civil ID.
- b. Entering password you received by Email or SMS
- c. Verifying the household head or someone on behalf of him / her.
- d. Then press "Login" to start the electronic census.

Step (2): Data completion

Household head will add all household members' details (including maids and drivers), including ones who are temporarily out of Kuwait with basic information for each member as follow:

- a. Adding all household members' details.
- b. Confirmation for entering all members.
- c. Entering detailed information for all members added on the previous step.
- d. Using call center at any time for more help.
- e. Visiting the login page again to continue the Information at a later time.
- f. Entering residence Information.

3.1.3 E-census results

The overall results of the e-census were positive. The E-census application functioned reasonably well. The E-census also allowed the potential peak days and times to be identified. It is necessary to ensure that all the available servers will be capable of dealing with the entry flow into site for the future operation. The website was monitored 24 hours a day in order to minimize respondents' problems in accessing. The e-census present set of different reports as follows:

- a. Total number of E-census registration (includes only not completed forms) = 565,713
- b. Total number of E-census registration (includes only completed forms)

Table 1: E-census registers percentage and number of registers to the total number of population.

E-census registers percentage to the total number of population	Number of E- census register	Total number of population
15.65%	479,729	3,065,850

- c. Total number of incomplete E-census forms = 85,984

The percentage of incomplete E-census forms = $85,984 / (479,729 + 85,984) = 15.20\%$

- d. Comparison with E-Census Nationalities

Table 3: Comparison with E-Census Nationalities

Population	Country
243,135	Kuwait
63,013	India
25,880	Philippines
20,686	Egypt
16,428	Saudi Arabia
11,688	Pakistan
10,215	Sri Lanka
9,783	Jordon
8,581	Syria
70,320	Others
479,729	Total

3.2 The Call Center

Kuwait Census 2011 project had a great deal of challenge, having had a new direction of implementing a multichannel communication model with Kuwait population to maintain the high quality & efficiency of information given under a customer centric service approach.

3.2.1 The Call Center objectives

To utilize the latest communication technology to match the needs of different segments of Kuwaitis and/or residences by providing 24/7 immediate support helping them to submit their census information through multiple channels such as:

Phase I: Enumerator recruiting

- a. Answering inquiries
- b. Confirming training.
- c. Calling for contract.
- d. Supporting during field work.

Phase II: Census

- a. Running awareness campaigns
- b. Quality Control of enumerators
- c. Home visits follow-ups and appointment fixing
- d. Information corrections
- e. Customer satisfaction surveys
- f. Supporting E-Census.

3.2.2 The Call Center functions

- a. Outbound calls “awareness, quality assurance, customer satisfaction surveys, registrations confirmation and feedbacks”
- b. Inbound calls “Inquiries, complaint management, suggestions and revisit arrangements”
- c. Back office “Data corrections, accounts reset, trouble tickets closing and reporting”

3.2.3 The Call Center Added Values

- a. Increased customer satisfaction.
- b. Immediate progress feedback.
- c. High level of responsiveness.
- d. Project close monitoring.
- e. Managing with numbers “detailed reports”
- f. High security of information.

3.2.4 The Call Center and the E-census

The Call center has an important role in the success of the E-census through making or receiving a wide range of calls and directing a large amount of text and audio messages to raise awareness of the citizens and residents and helping them to complete the registration. The following table shows the number of calls and their types:

Table 4: the number of calls and their types

Outgoing Calls	Incoming Calls	Total
82453	68268	150721

a. Type of incoming & outgoing calls.

- Incoming calls include: modifications and inquiries received from citizens to modify or delete data that have been made during the recording.
- Outgoing calls include: A campaign by the call center, including: Updated data registered in the E-census.
- Voice messages reminding the people of the expiration date of the E- census
- Ensure completion of the E-census: What are the citizens and expatriates' opinions of the website

b. Incoming Calls

The call center receives calls regarding the problems faced by citizens and expatriates during the E- census and tries to resolve them immediately, for example:

- Missing the password
- Entering the data incorrectly for citizens and expatriates
- Updating the number of family's members after the registration
- Requests for assistance in the registration process and asking for the required data

c. Campaigns that have been completed and their objectives:

- Campaign (1): Updating data

- To ensure the validity of the data that have been presented by the citizens and expatriates, including the number of family members and the number of families residing in the same house.
- Targeted number: 45.000 persons Results: Data correction and re-contact them to confirm the data that have been modified in order to complete the phases of electronic registration.
- Campaign (2) : Announcing the date of the E-census completion
 - To remind the citizens and residents through automatic SMS on the last date to complete the data on the site
 - Targeted number: 36.000 persons
 - 31.000 has been reached
- Campaign (3):
 - The call center to contact a sample of 500 people who completed the E-census and measure their level of satisfaction with the website as well as the time spent to complete the E-census. The result was 87.2% of customers were satisfied with the site
- Campaign (4): Make sure to complete the E-census
 - Targeted number: 4.000+ 28.000
 - Objective: Urged citizens and expatriates to complete the data and help who didn't understand the process.
 - Results: Over 1,000 people a day completed the E-census correctly.
- Campaign (5): Make sure to complete the E-census
 - Targeted number: 24.000
 - Objective: Urged citizens and expatriates to complete the data and help who didn't understand the process.

d. Response

It should be noted that the call center received a good response from the citizens and residents of Kuwait, where observed high rates of incoming calls on a daily basis, this reflects the growing customer's confidence with the services provided by the Center. This was due to cooperation between the various departments to improve and develop the

level of services. This includes: data correction through technical support and continuous tracking of customer complaints and suggestions; which raises the level of service and increases customer satisfaction.

3.3 Register-Based Census

If we refer to the technical classifications of defining the census activities, we can develop another methodology for carrying out censuses, namely register-based census (RBC) which differs from the traditional field census in two process: locations identification (set the general framework of the census) and the capture of individual data, which the derived input (data) of these processes from sources would work as an administrative records maintained by the state, instead of the initial data which are identified and captured in the field. However, the register-based census methodology can be similar to the multi-mode process (hybrid methodology) mentioned above in the process of data collection, auditing and classifying them, and also in the process of dissemination of multiple patterns.

3.3.1 Advantages

RBC compared with the traditional one, has many advantages, such as:

- a. Cost minimization.
- b. Producing results in relatively shorter time.
- c. Lesser dependence on estimates.
- d. Better support to the government annual plans.

3.3.2 Disadvantages

RBC has many disadvantages, such as:

- a. Data are derived from the records and registers which are set for administrative purposes. Therefore, such data many not satisfy or be compatible with the census needs, and
- b. Diversity of data sources requires the development of special systems for data processing and cleaning (Data Cleansing), as well as making sure to secure the

existence and structure of what is known as the (Common Field/Key), otherwise the data will be non-correlation.

- c. The census' total data (for individuals or housing) among administrative restrictions will be different for technical, administrative, security or even political reasons which doesn't fit the need to issue census data to comply the requirements of the agencies or departments of the CSB.

3.3.3 Pilot Project for Register-Based Census: A Kuwaiti Experience

Law No. 27 of 1963 regarding statistics and census states that the Central Statistical Bureau in Kuwait (CSB) should undertake a Population and Housing Census every 10 years, using the traditional field census. CSB, since its establishment, conducted the censuses using the traditional census methodology. However, within its efforts to go along with the new technological developments, and to improve its performance and data quality, CSB initiated a pilot project to develop the register census system based on the data available from various government sources (restrictions and administrative records), especially since the Law No. 27/1963 gave CSB full power to request any needed data from all of the administrative units of public and private sector. Accordingly, the CSB management has allocated a small budget for a pilot project to develop a register-based system for the census year 2010, and assigned responsibility for implementing the project to a group of Kuwaiti researchers and experts.

The project's main aim was to assess to what extent CSB can publish the census data – in time – from the administrative records and registers. That is to say, to what extent can the register census methodology be synonymous or even alternative to the traditional one? Nevertheless, the detailed objectives of the project were:

- a. Assessing and marking out the availability of the census data in the registers and records of Kuwait.
- b. Bringing out a manual of the census data classified according to their availability in these records and registers.
- c. Collecting the necessary data from the different administrative registers and records according to CSB classification.
- d. Adoption and development of an automated system set on a central database from the different administrative registers and records. The system derives and produces the census results according to the census needs and the prerequisites of the GCC data basket.

3.3.4 The Project Achievements

Because the methodology is a new one and it was not applied by CSB before, the project team specified (13) government bodies: (2) administrative records and (11) administrative registers. These contained some data necessary to produce census results, namely, some demographic, economic and social characteristics of the population, as well as housing and establishment characteristics.

However, the degree of response to the governmental sources in the provision of data has been uneven at the beginning based on the laws of the establishment of such government institutions, which prevent circulation or dissemination of data at the individual level for reasons of confidentiality and privacy, note that all letters were contained the text of Article 4 of Law No. 27 / 1963, which required all government agencies to cooperate with the CSB and provide the necessary data and follow the instructions from the technical point.

Although most of the governmental entities agreed to the CSB request to provide data, but this did not occur until after several rounds of legal talks when the authorities knew that the Kuwaiti legislature gave the law No. 27/1963 - regarding the Statistics and Census - which restricts the implementation of all general laws which created them and the hardware and set tasks and functions.

Hence, a manual was developed in the form of census data plan classified according to their availability in the records and registers. The manual was then used to get more data according to the CSB classification and coding.

A similar effort was done to develop an automated system which resembles a central database for driving the census results according to the needs and requirements of Kuwait census and the GCC data basket. This system was tested (from the technical and statistical standards) on the 2005 census data. The system proved its ability, reliability and efficiency. Accordingly, the register and record data were included in the central database after subjecting them to data cleaning and preparation.

The project faced several difficulties such as limited resources, the short implementation period, inability to cover some of the statistical variables (such as: computers utility, the Worldwide Web utility for information, sources of water, and communication to the electricity grid, ... etc.) from the sample available from the administrative records, the lack of available data which weren't coded by government agencies as required by the CSB. In spite of all these constraints and difficulties, the project team succeeded in operating the system to produce the following:

- a.** 23 out 101 population census tables, i.e. 22.7% of the total tables.
- b.** 15 out of 39 tables concerning data about disability, i.e. 38.5%.
- c.** 8 out 76 tables for housing data, i.e. 10.5%.

- d. 30 out of 36 tables for establishing data, i.e. 83.3%.
- e. 10 out of 61 tables for the requirements of the GCC data basket, i.e. 16.4%.

To sum up, the automated pilot system of the register-based census produced 27.5% of the expected output of the 2010 census data and the GCC data basket. This represents 86 tables out of 313 tables.

This is by all means a notable achievement, especially if we bear in mind all the challenges and constraints which faced the project as a whole. The trial, although being new, proves the methodology ability to produce the census results from data which were not basically devoted to the census purposes.

4 Conclusion and Recommendations

The global experiences of the year 2011 proved that the E-census is feasible from a technical and operational point of view and that safe solutions exist. The general acceptance and the image of the internet option were very positive. The data were available much more rapidly and in better quality than the paper-based data, due to online data entry and online checks, thus saving several months of processing time. However, saleable and flexible solutions, secure and powerful data connections as well as the monitoring of online transactions are expensive. And as long as the access to the Internet and the incentives to use it are not radically improved, official statistics will continue to use a mix of data collection methods. Harmonized and up to date population and housing registers are the backbone of the central database and mailing systems, which are essential for online surveys. Therefore, improving electronic registers and their linkage is also an investment in online surveys. Future trends are promising and will lead to safer and less costly solutions.

The main advantages of the 2011 E-Census are: it simplifies response, transmits a modern image of Kuwaiti Statistics and the 2011 Census and creates a positive climate which favors citizens' cooperation, and improves response quality. Our objective; enumerators and paper questionnaires will entirely disappear in future Population Censuses and applying this in Household surveys at a later stage. To place online surveys in the more general perspective of E-Government, this will promote a new administrative culture, building on transparency and the standardization of the available information and fostering the regular electronic exchange between administrations and the empowered citizens.

Although the general census results and data of administrative records showed similar output to the traditional field census methodology, but it depends on practice on the coverage, quality and categories of data available in the administrative records, this will lead to a disparity in the output results of the census from country to country. It also proved that the census results from the administrative registers and records in Kuwait can only be partial alternative to the results of the traditional one (or even the hybrid

methodology). The test also shows that the ratio of producing census results can notably increase if financial and human resources are sufficiently provided. On the other hand, the experiment revealed that there is need for more research on a number of issues:

- Increasing the coverage of the statistical variable by adding new government records and registers (e.g. Ministry of Justice and Ministry of Health), as well as data from the private sector (private universities and internet and cell phone providers).
- Designing a form for the register-based census (similar to that of the field census), and the possibility of determining the logical relation between the cells and the variables in each cell.
- The possibility of connecting the GPS outputs and the census frame for the population and housing through the GIS instead of the postal addresses.

Furthermore, the experience revealed the need for more cooperation, coordination and complementarity between CSB and the other concerned units which produce statistical data to achieve the following objectives:

- Unification of the statistical concepts, definition and terminologies.
- Organizing and coordinating the utilization of the international and regional statistical criteria which determine the statistical data variables and their coding.
- Listing the basic demographic, social and economic variables needed in the statistical data, and determining the units and entities which should cover these data in their administrative records. The concerned units and institutions should coordinate with the CSB in unifying the definitions of these variables, their classification and coding.
- Unifying the dates of providing the statistical data, as well as increasing the periodically of their updating.
- Activating cooperation and communication among the institutions and units in charge of producing statistical data related to census to achieve coordination and complementarity between CSB and these entities.

5 Future Works

The rapid development of information and communication technology, which included the development of hardware, software and information networks have led to the emergence of the information age and knowledge. It makes the information source of wealth one of the essential elements for economic development and human resources. Standards development became dependent on the importance of data and availability of its origin, and also processing, dealing, safety, and taking these development standard as a basis for decision making process. So, there is a large correlation between the statistics and information technology and cannot set limit on separate between them.

Therefore, with the revolution in technology which became vital and necessary to go along with and catch up these development troughs what is called Electronic-Stat (E-Stat) in a manner which comes and goes along with the global trends and the worldwide new development in technology, and collecting and exchange of information.

The proposed E-Stat is easy way for collecting, processing, exchange and dissemination of information, taking into account the transparency and security of Information.

1-Information Transparency

The abundance of data available on the Internet tends to make information more transparent in web sites of National Statistical offices. Since the advent of the Internet, National Statistical offices have enjoyed unprecedented flexibility to reveal information. In this new technological environment, National Statistical offices can implement transparency strategies by using information strategically to compete.

2- Information Security

Security is a basic human concept that has become more difficult to define and enforce in the Information Age. Like the Internet, have made it possible to send vast quantities of data across the globe with ease. However, the challenge of controlling and protecting that information has grown exponentially now that data can be easily transmitted, stored, copied, manipulated, and destroyed.

Within large organization information technology generally refers to laptop and desktop computers, servers, routers, and switches that form a computer network, although information technology also includes fax machines, phone and voice mail systems, cellular phones, and other electronic systems. A growing reliance on computers to work and communicate has made the control of computer networks an important part of information security. Unauthorized access to paper documents or phone conversations is still an information security concern, but the real challenge has become protecting the security of computer networks, especially when they are connected to the Internet. Most large organizations have their own local computer network, or intranet, that links their computers together to share resources and support the communications of employees and others with a legitimate need for access. Almost all of these networks are connected to the Internet and allow employees to go "online."

Information technology security is controlling access to sensitive electronic information so only those with a legitimate need to access it are allowed to do so. This seemingly simple task has become a very complex process with systems that need to be continually updated and processes that need to constantly be reviewed. There are three main objectives for information technology security: confidentiality, integrity, and availability of data. Confidentiality is protecting access to sensitive data from those who don't have a legitimate need to use it. Integrity is ensuring that information is accurate and reliable and cannot be modified in unexpected ways. The availability of data ensures that is readily available to those who need to use it.

Information technology security is often the challenge of balancing the demands of users versus the need for data confidentiality and integrity. For example, allowing employees to access a network from a remote location, like their home or a project site, can increase the value of the network and efficiency of the employee. Unfortunately, remote access to a network also opens a number of vulnerabilities and creates difficult security challenges for a network administrator.

Finally, it is recommended that high-level meetings and symposia be organized between the statistical and IT communities to delineate future developments, depending on the changes and needs.

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Note: This paper depend on the preliminary results of the 2011 Kuwait General Census