E-census Implementation: A Case study in Naikoten II, Kupang, Indonesia

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Abstract. Growth in human population around the world affects all people through its impact on the economy and environment. Therefore, the population in a region should always be recorded. Government as a public decision maker has a big responsibility in the welfare of the community. The government needs information about the people lives to determine what policies should be taken. Government needs census data accurately to assist in making decisions. The government of Naikoten II wants to bring this village become digital village using technologies in their public services. In Naikoten II, the population data collection process (census) still uses paper form using Canvaser method which is filled in by the census officer by visiting and interviewing residents directly. It has a big risk of data loss. The main objective of this research was to provide a viable solution that allows surveyors to conduct the census efficiently. This research also provides a web based application to help data analyst to manage the census data. These application have been designed and implemented. The testing has been conducted within the small group of stakeholder that volunteered to use this early version of the application for a specified amount of time to provide feedback for possible changes and improvements.

1 Introduction

The population of a region is constantly changing, sometimes in a certain period, the changing of population is high, stable, and even low. Population can grow rapidly if public awareness of life quality is lacking, the rising welfare and improvement of the health facilities. Moreover, nowadays, rate of population growth is high as the outcome from a gap between the birth rate and the death rate. A simple explanation about this gap is the birth rate is greater than the death rate, which led to rapid population growth around the world. On the other hand the reason that made population grow stable is because the other factors that influenced the high and fluctuating death rates, such as disease outbreak, malnutrition, natural disaster, plague, war and the limitation of technology at that time [1].

In general, the reason for the growth in the population of Indonesia is more or less the same as the reason of the population growth in other countries, which is an improvement in the distribution of food, improving public health and the conquest of disease. These three reasons are the main factor that affect why the population growth in Indonesia can be very high. In addition, there are other factors as well contribute to the growth of the Indonesian

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population; these factors are religion and culture [2]. The growth in human population around the world affects all people through its impact on the economy and environment [3]. Therefore, the population in a region should always be recorded.

In order to support good governance, population policies need to be formulated nationally and thorough that is poured into the population programs that integrated, directed and sustainable. To strengthen the formulation of policies in the field of population complete and detailed data are required through the procurement of the Population Census. Government considers this issue by conducting population census [4]. Based on Government Regulation, the definition of Population Census is collection, processing, presentation, assessment, and data analysis, number and nature of socioeconomic and socio-cultural population of residents who at the time of the Population Census are residing or located in the geographical region of the Republic of Indonesia [5, 6]

Government as a public decision maker has a big responsibility in the welfare of the community. The government needs information about the people lives to determine what policies should be taken. Government needs census data accurately to assist in making decisions.

Population census conducted by the Statistics Indonesia (Badan Pusat Statistik/BPS) has been causing problems. A long span of ten years is a problem for agencies that use census data from Statistics Indonesia. Within 10 years, population census data have been obsolete and many changes that caused death, birth, migration of the population. Census officers are still using paper and the data recording process is still done manually thereby increasing the risk of data loss [7].

Naikoten II is one of the urban villages in Kota Raja (district), Kupang, East Nusa Tenggara, Indonesia. The government of Naikoten II wants to bring this village become digital village using technologies in their public services [8]. In Naikoten II, the population data collection process (census) still uses paper form using Canvaser method which is filled in by the census officer by visiting and interviewing residents or respondents directly. It has a big risk of data loss. In this research, a mobile based for population census application is needed to assist the government, especially the Kupang (in this case Naikoten II as study case), in conducting the census in the city level government, so that the government get information on the population in the region quickly and accurately. e-Census system to minimize the cost of census-taking and maximize efficiency of available resources.

2 Literature Review

2.1 Population census

Population census is an activity carried out by taking the population data in a region based on the population number of gender, age, ratio and density [9].

Population census is a concept of social geography which is one of the oldest and most extensive statistical activities undertaken by governments throughout the former duo oriented for military and taxation estimates. The census was also developed to gather information on housing, manufacturing, agriculture, mining and the business world.

There are two common methods of conducting the population census, i.e [10]:

1. Householder method. In this method, filling in a list of questions about population data is left to the residents or respondents, so that the population is given a list of questions to fill in and will be taken back some time later. Such a method can only be done in areas where the education level of the population is relatively high, because they are able to understand and answer any questions submitted to them.

2. Canvaser method. In the Canvaser method, the questionnaire is filled in by the census officer by visiting and interviewing residents or respondents directly. The census officer asks the questions according to the list and the residents who were replied verbally in accordance with the actual circumstances.

Based on the resident status of the population, the census can be distinguished into the de facto census and the de jure census. Below is the population census difference between the de facto census and the de jure census method [10].

1. De facto census. In the De Facto method, data collection is conducted by counting people as residents who are present physically to be at the time the census is taken. Only those that are present physically are seen and counted.
2. De jure census. In the De jure method, population records are performed by officers only for residents who are officially registered of a specific area. It does not matter whether the person is present or not.

The last population census in Indonesia was done in 2010. In the implementation, the population census used two stages, namely complete enumeration and sample enumeration. The de jure and de facto approach was applied to cover everyone in the enumeration area. Those who had permanent identity card were approached with de jure approach. They were recorded in accordance with their formal residence; whereas those who did not have permanent identity card approached with a de facto approach and recorded where they are. The result of the census was 237,556,363 people, consisting of 119,507,580 men and 118,048,783 women [8].

2.2 Naikoten II, Kupang

Naikoten II is one of urban village in Kupang, East Nusa Tenggara, Indonesia. The government of this village has program to create smart village using technology for its public service. People can use this service digitally, without being limited by space and time. Kupang is the capital city of East Nusa Tenggara (province of Indonesia). This municipality is the largest city on Timor Island located on the coast of Kupang Bay, northwest of the island of Timor. As the largest city in the province of East Nusa Tenggara, Kupang is inhabited with various ethnic groups. Significant ethnic groups in Kupang are Timor, Rote, Sabu, Tionghoa, Flores and a small number of migrants from Bugis and Java. The total area of Kupang City is 180.27 km² with a population of about 450,360 people [8]. This area is divided into 6 districts and 51 sub-districts.

2.3 Bootstrap

Bootstrap is an open source toolkit for developing with HTML, CSS, and JS. [11]. Bootstrap was developed by Mark Otto and Jacob Thornton at Twitter, and released as an open source product in August 2011 on GitHub. Bootstrap has become a de facto standard for web design. Bootstrap is a front-end framework of HTML, CSS, and JavaScript to create templates based on typography, forms, buttons, tables, navigation, modals, image carousels and many other optional JavaScript plugins, as well as sidabootstrap aims to create responsive and mobile-first website design [12].

3 E-census: system design

From the analysis of business process and problem analysis in Naikoten II, Kupang, it can be concluded that Naikoten II, Kupang needs e-census as real population data collection.

The e-Census system was developed under objectives related with survey environment, low cost, high efficiency, improvement of data quality, and shortening data release time. To meet the objectives, the e-Census system was organized into three entities including Surveyor, Data compiler and Residents.
The main features of this application are:

1. Login
2. Input the surveyor
3. Data management such as surveyor, district, city, province and census period.
4. Questionnaire management
5. Census result.

This research build two application, which are web based application and mobile application (Android version). The mobile application is used by surveyor meanwhile the web based version for editing and coding questionnaires, handling statistical computations, and reporting the census result.

4 Result and discussion

Residents list conducted to retrieve data from the existing data in Statistics Indonesia before doing the population census. Surveyor should login to the application to access the features. The main menu for surveyor as presented in Fig. 1.

Fig 1. The main features of the application

Surveyor can choose the menu and the page will appear. If the resident is not in the list, the surveyor can create new data to input the resident data. Once the resident data is enrolled, the surveyor conducts the population census by clicking on the population census menu. After completing the data, the surveyor can save the census results by clicking the save button. The data will be saved in database in the server.

If the internet connection lost when the surveyor performs the census and input the data, the answer will be accommodated into the local database and will appear notice as in Fig. 2. Surveyor can return to the main menu and click the sync button when there is internet connection.

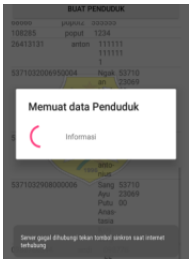

Fig 2. The warning message when the internet connection is lost

5 Conclusions

The main objective of this research was to provide a viable solution that allows surveyors to conduct the census efficiently. This research also provides a web based application to help data analyst to manage the census data. The testing has been conducted within the small group of stakeholder that volunteered to use this early version of the application for a specified amount of time to provide feedback for possible changes and improvements. The questionnaire of their experience using the application has been distributed to these respondents. The result of the questionnaire for Android interface, 80% of respondents stated good. For instructions in the application 86% of respondents stated very well. User friendly level on the application 88% of respondents stated good. For application performance 92% of respondents stated very well. For the whole application 90% of respondents stated very well.

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