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The Effectiveness and the Efficiency of the Use of Biometric Systems in Supporting National Database Based on Single ID Card Number (The Implementation of Electronik ID Card in Bandung)

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Abstract

The emerging of The Law 23 of 2006 on Population Administration is a step to control the issuance of population and the development of population database. Residents are allowed to have one ID card only. The issuance of a single ID card and the establishment of an accurate and a complete population database require technological support to ensure the accuracy of a person's identity and the identity card which has a strong authentication method and a high identity data security to prevent counterfeiting and duplication. The use of biometric systems in electronic Id card (e-KTP) makes it possible to the owner of the e-KTP to be connected into a single national database. Therefore each resident requires one ID card only. The objective of this research is to explore the extent of the effectiveness and the efficiency of the use of biometric systems on the preparation of national database based on single-KTP number (NIK) in Bandung. The method of this research is qualitative descriptive analysis technique. The Measuring of the effectiveness and the efficiency is the dimensions of system quality Wilkinson. The effectiveness of the use of biometric systems in the process of e-KTP in Bandung is effectively categorized based on quality systems indicators such as: Relevancy, Capacity, Timeliness, Accessibility, Flexibility, Accuracy, Reliability, Security, Economy and Simplicity. The Efficiency of the use of the biometric system is quite efficient because the reviewing of the recording results can be done more quickly and automatically, biometric systems can increase productivity and efficiency as well as reduce job turnaround time in checking the accuracy of the data with the card owner.

Keywords: e-KTP; Biometric system; Effectiveness; Efficiency

Introduction

Biometric technology has developed rapidly after the widespread implementation of e-government in the workplace. E-government is used by the government as one of the measurement to improve the efficiency and the effectiveness of government performance in internal and external relations of the country. In addition, the application of e-government is also intended to support public services to society.

One of the efforts to increase confidence in the use of e-government is a security system that can keep it up, it is the biometric scanning system. Biometric technology is a method of database security using limbs such as fingerprints, hand geometry, retina (eye), the voice and face as a password replacement.

In Indonesia, the application of biometric technology is the operationalization of e-KTP. The emerging of Law 23 of 2006 on Population Administration is a very important step for the country to curb the issuance of population and population data base development. In Article 63 paragraph 1 of Law no. 23 of 2006, it is stated that the residents are only allowed to have one ID card. To be able to manage the issuance of ID cards and to realize a complete and accurate singular demographic database, we need technological support to ensure a high confidence in the identity of one's uniqueness and identity cards that have a strong authentication method and a high security identity data to keep away from counterfeiting and duplication.

E-KTP is a new demography system that has been implemented by the government. E-KTP is a new method that will be applied by the government to build a new demography system. In 2010 the system began to be applied although it is not nationwide, it was only applied in a certain areas as a pilot project. The implementation of e-KTP is continued and it is targeted that at the end of 2012 all citizens already have an e-KTP. By using biometric system, any owner of e-KTP can be connected into a single national database, so that each citizen requires one ID card only.

Biometric technology is developed because it can fulfill two functions: identification and verification. In addition, such biometric characteristics that cannot be lose, cannot be forgotten and it is not easily faked as it inherent in human existence where each other will not be the same, the uniqueness will be more guaranteed. God creates man to have his own uniqueness. The part of the human body is not the same each other. Hence, the parts of human body are often used to determine a person's identity. In Article 64 Paragraph (3) of Law no. 23 of 2006, it is stated that we must provide a space on the ID card to load the security code and the electronic recording of demographic data. This is spelled out in the Presidential Decree No.26 of 2009 that in e-KTP recording, it is stored biodata, photographs, and prints of the hand of the citizen.

Until the beginning of 2010, the government still faced the thorny issues to realize Single Number of Population (NIK) or universally called Single Identity Number (SIN). The time mandated by Act No. 23 of 2006 on Population Administration to realize the Single Identity Number (SIN) is at the latest of 2011. Other complementaries in terms of legislation such as Law, Government Regulation, Presidential Regulation, and the Regulation of Minister of Home Affairs, are complete as well as the aspect of technology that has been prepared by the Ministry of Home Affairs partnered with the Center of Technology Development Agency (BPPT), the Sandi State Institution, Bandung

Institute of Technology, and the Organization of The College of Computer of Indonesia.

Some fundamental problems can hind the realization of SIN, for example, a SIAK (Population Administration Information System) development does not begin with the establishment of population administration system (SAK) as reference. The preparation of grand design of SAK just began in 2009, while SIAK was already developed and implemented in 2006. The use of the goods that has been held to support the creation of SIN is less. SIAK application is not the same in the each area. There are even areas that are not using the application of SIAK. Monitoring and evaluation systems to the SIN implementation in many areas are weak. Network infrastructure limits are resulting in inhibition consolidation of demographic data.

With the implementation of e-KTP, it is expected that there are no disputes in any kind of elections related to voter data because it is guaranteed that there will be no ID card imitation or double ID card. The application for public services will be better with this program because all processes are conducted by the government. People are easy to do day-to-day activities using this ID card.

The process of e-KTP data recording is targeted to be done on April 2012. On October 2012, it is expected that the residents in Bandung will get e-KTP. Before data updating in early 2011, the number of residents in the city of Bandung was 3,198,333 persons.

Based on background above, this paper examines the extent of the effective and the efficient of utilization of biometric systems based on the preparation of national database of SIN especially in Bandung which is implemented through e-KTP for the citizens of the city of Bandung.

The purposes of this paper are:

1. To analyze the effectiveness of the use of biometric systems based on access to a national database of SIN in the process of e-KTP in Bandung.

2. To describe and to analyze the efficiency of the use of biometric systems to e-KTP service in Bandung (efficient in time and in cost).

3. To identify and to analyze the supporting and inhibiting factors in the use of biometric systems in the process of data identifying and data verifying on SIN based on national database (Table 1).

A General Overview

Biometrics (derived from the Greek, bios means life and metron means measure) is a study of automated methods for recognizing humans being based upon one or more parts of the human body or the behavior of the man himself. According to Moody [1], biometrics system is a system that uses the characteristics of physiological and / or behavioral from human being to authentication system as verification and identification systems. There are four requirements that must be

No.	Indicator
1	Relevant (meet to requirements) a. The biometrics system and device (AFIS and Iris Scan) return outputs that are relevant to the needs b. Biometric systems provide the necessary information for agencies that require information generated by the system.
2	The capacity (of the system / device) The available biometric system and devices (AFIS, and Iris scan) has met with the needed capacity to produce the required item record / required information
3	Efficiency (of the system) a. Biometric system (AFIS and Iris scan) has an efficient characteristic (The test of recording results can be done more quickly and automatically) b. Biometric systems (fingerscan and Iris scan) can increase productivity and efficiency of work (the amount of data increases with the recording device specifications) c. Biometric systems (AFIS and Iris Scan) can reduce job turnaround time of the conformance checking of data with the card owner
4	Timeliness (in terms of yield) a. Biometric systems (AFIS and Iris Scan) can produce information more quickly and on time b. Biometric systems (AFIS and Iris Scan) can accelerate transactions and shorten the product cycle c. Biometric systems (AFIS and Iris Scan) can support the work of the personnel by giving the fast service
5	Accessibility (Ease of Access) a. Biometric systems (AFIS and Iris Scan) can facilitate access to information b. Biometric systems (AFIS and Iris Scan) provide an up-to-date and a necessary information.
6	Flexibility (of the system Dexterity) a. Biometric systems (AFIS and Iris Scan) can help to increase the flexibility of information requests b. The used biometric systems (AFIS and Iris Scan) is flexible
7.	Accurate (the accuracy of the system / device) a. Biomterik System (AFIS, and Iris Scan) has accurate characteristics b. The systems and the tools provide clear, precise and concise information c. The generated Information from the biometric system does not require further correction
8.	System reliability (the reliability of the system / device) a. The unit of biometric system / device is reliable b. The output of information produced by the system is reliable
9.	Security (from the system / device) a. The system / device that is only accessible by authorized employees of the system / device b. The connectivity system / software into the existing databases is free from loss of data (there are backup systems)
10.	Economic (economic value of the system / device) a. The current system has economical characteristics b. The existing system uses a low cost data storage medium c. The existing systems can find records and databases quickly
11	Simplicity (the ease of access to the use of the system / device) a. The biometric system / device are easy to operate b. The existing biometric system / device has friendly characteristics (user friendly) c. The existing system / device are easy to understand and to learn

Table 1: Operationalization of The Concepts of The Effectiveness and The Efficiency Measuring of Biometric Systems of The Preparation for Population Database (The Implementation of e-KTP)
Source: Processed and modified from Wilkinson (1992)

met in order to make the characteristic above into a biometric, they are:

Universality, these characteristics should be universal in the sense of the overall effect.

Distinctiveness, these characteristics should be able to distinguish each person.

Permanence, these characteristics are durable.

Collectability, these characteristics should be measured quantitatively.

Biometric scanner is a device that uses biometric data to identify individuals by measuring physiological characteristics. Physiological characteristics provide the ability to control and to protect the integrity of sensitive data stored in information systems. Biometrics is a computerized method that uses biological aspects, especially the unique characteristics possessed by humans. Unique physiological characteristics that can be used are fingerprint and retina. Both of those are found in the human body but they are almost different at each person, so they can be used as the password for identification. Biometric systems are able to prevent unauthorized person entering the facility or accessing something confidential by analyzing fingerprints or retina. Thus, the application of biometrics is able to secure data stored electronically and online transactions.

Thomas Ruggles [2] stated that the use of biometrics has several drawbacks. The problems related to the human factor are major consideration. Unfortunately, the human bodies are constantly experiencing physical changes, such as injury, the worn out as the impact of the environment, etc. In addition, the different categories of users will have trouble with some biometrics. Physically disabled users may have trouble with the authentication systems based on fingerprints, hand geometry, or signature. There are also practical problems associated with biometrics. When biometrics is used for personal identification, biometriks technology measures and analyzes behavioral and physiological characteristics of the human being and identifies the physiological characteristics of a person based on direct measurements of the parts of body - fingertips, hand geometry, facial geometry and eye retinas and irises.

How to realize a single ID card for each resident so that SIN could be the key to access to the public services by the government or private sectors? Technology plays an important role in supporting the realization of a single identity. In this case, every human being has special physical characteristics that are unique and they can show the uniqueness of one's identity with a high degree of accuracy.

There are several kinds of biometrics that can be used to determine individual's identity characteristics, they are retina or iris, DNA testing, hand geometry, vascular pattern, face recognition, voice and signature. Of these various biometric, fingerprint has two important characteristics:

1. The fingerprint has determination forms of human life [3], and

2. There are no similar fingerprints [4]. The fingerprint retrieving and fingerprint matching are quite easy to do and they are not expensive if compared to other types of biometrics.

Biometric system technology is very complex both in its ability and its performance, this biometric system typically uses additional tools such as cameras and scanning devices to capture images, to record, or to measure the characteristics of a person, and a computer software / computer hardware to extract, to encode, to store, and to compare those characteristics.

All biometric systems work in four stage processe comprising the following steps:

1. Capture: A biometric system collects samples of biometric features such as fingerprints, voice who want to log into the system.

2. Extraction: Extraction data was uniquely created of samples and templates. Unique features are then extracted by the system and converted into digital code biometrics. The sample is then stored as the biometric template for that individual.

3. Comparison: The template is then compared with the new sample. Biometric data is then stored as the biometric template or template reference to that person.

4. Appropriate / not appropriate: The system then decides whether the features extracted from the new sample was appropriate or not with the template. When you need to check the identity of the person who interacts with a biometric system, the new biometric sample is taken and compared with the template. If the new templates and samples match, the identity of the person is confirmed

To enhance the security of ID card from counterfeiting and duplication fingerprint data with biodata, photographs and signature images are stored in an encrypted and digitally signature into a chip for someone's identity identification purposes. Reading and writing cards are conducted through the two-way authentication between the card and the electronic reading device.

Biometric performance depends on other factors such as usability and / or user acceptance which can significantly affect the system performance. A few of those factors have been studied through a specific approach especially in certain biometric modalities, such as our fingerprints and facial [5]. Those factors include a variety of ways to present the biometric characteristics for sensors and the variability of biometric characteristics caused by disease or climate changes.

On the use of biometric systems with Multi-Factor Authentication dialog, it is believed that the Overall Security Level and the Average Right Call confirmed are much more effective in measuring the performance of the system, if they are compared with the performance of biometric individual without considering the impact of the overall dialogue [6].

The effectiveness and the efficiency of utilization of biometric systems such as fingerprint, iris / retina scans and electronic signatures are measured by using quality indicator system. More detailed measurements to assess whether the existing system or a system which will be made are effective and efficient presented by Wilkinson [7]: The 11 indicators used by Wilkinson, are:

1. Relevant (as needed),

2. Capacity (of the system),

3. Efficiency (of the system),

4. Timeliness (in yield),

5. Accessibility (ease of access),

6. Flexibility (flexibility of the system/device),

7. Accurate (the accuracy of the value of the information generated by the device / system),

8. Reliability (the reliability of the system/device),

9. Security (of the system/device),

10. Economic (economic value of the system/device),

11. Simplicity (ease of system/device)

Methods

The author used qualitative research methods with a descriptive approach directly from the facts of the real situation which begin from the assumption of objective realities and other theoretical (empirical) assumptions. According to Gulo (2002:18-19), the types of research can be divided into three types based on the basic question of the study, they are:

1. what, for exploratory research,

2. how, for descriptive research and

3. why, for explanative research. Descriptive research is broader than exploratory research since we examine not only on the problem itself but also on other variables related to the problem that described from their factors. To get better results, the study conducted with a sample. The author uses descriptive research type to assess the effectiveness and the efficiency of the use of biomterik system in conducting e-KTP service in Bandung.

The evaluation of the measuring of the effectiveness and the efficiency of the use of the biometric system is implemented using comparative descriptive and explanative survey. It means that the real situation illustrates all of the data and information related to the effectiveness and the efficiency of e-KTP in Bandung. Besides, the analysis result is compared to explain the factors that influence the effectiveness and the efficiency of the biometric system at the service of e KTP in Bandung.

Research Operational Scope

Singarimbun (1995:46) says that the operational definition is the elements of research that tells how to measure a variable, so that we know any indicators that support the analysis of those variables.

The effectiveness and the efficiency of utilization of biometric systems such as fingerprint, iris / retina scans and electronic signatures are measured by using quality indicator system. The 11 indicators used by Wilkinson, are: Relevant (as needed), Capacity (of the system), Efficiency (of the system), Timeliness (in yield), Accessibility (ease of access), Flexibility (flexibility of the system / device), Accurate (the accuracy of the value of the information generated by the device / system), Reliability (the reliability of the system / device), Security (of the system / device), Economic (economic value of the system / device), Simplicity (ease of system / device). Each of these indicators can be measured through the statement items as the following table:

The informants of this study include two types, they are (1) key informants, those who know and have a variety of basic needed information in this study, (2) main informants, those who directly involved in the study of social interaction. The author determine informants by using purposive technique, the technique that does determine based on strata, guidelines or region but on the specific purpose that remain associated with the study problem, then the informants in this study are consisted of:

1. Key Informant: The Head.

2. Main Informants : The Head of Sub-Section of The Program Compiling at The Department of The Population and The Civil of Bandung, The Head of Sub-districts in the research sites

3. Additional Informants, those who know and understand the issues in this study, the additional informants are ten employees of The Department of The Population and The Civil of Bandung and sub-districts employees who operate e-KTP.

The method of data collection in this study is by interview, documentation and observation.

The effectiveness of the use of biometric systems is measured by multiplying the value of the answer by the number of total statements having similar answers then the multiplying result is divided by the total number of the statements. The result of this calculation is the average value of the measurement of each indicator items of the effectiveness and efficiency of the biometric system used in the implementation of e-KTPs.

Then the average value was adjusted to the specified category criteria of decisions to obtain a real picture of applied biometric systems whether it is effective or not.

The data of the study is described by using research data analysis tools such as measuring the distance (range) and the number of interval. Measuring the distance (range) and the number of intervals can be determined by the formula of:

1. Range=the highest value – the lowest value=5-1=4

2. The amount of interval=the range or the width of interval=4/5=0, 80

3. The used interval scales are : Strongly Agree=5 ; Agree=4; Neutral=3 ; Disagree=2;

Strongly disagree=1

Category

4.21 to 5: Biometric Systems is very effective and efficient (VEE).
3.41 to 4.20: Biometric Systems is effective and efficient (EE).
2.61 to 3.40: Biometric Systems is quite effective and efficient (QEE).
1.81 to 2.60: Biometric systems are less effective and efficient (LEE).
1 to 1.80: Biometric Systems are really not effective and efficient (NEE).

The results of processing the data presented in tabular form of numbers, in this study the presentation of the results of the analysis are also presented in the form of a diagram and description of the display as result mapped the sites.

Results

The implementation of e-KTP in bandung

The process of data recording in the application of e-KTP in Bandung has been held since 16 April 2012 and the Implementation of e-KTP Launching officially began in the District of Coblong.

The implementation of e-KTP in Bandung is the second step with the District and other cities in West Java. Fifteen districts/City include: Bogor, Sukabumi, Cianjur, Bandung, Tasikmalaya, Kuningan, Subang, Purwakarta, Karawang, Bekasi, West Bandung, Bogor, Bandung, Tasikmalaya and Banjar.

The ID card compulsory population who to be data recording target are 1,980,856 persons. The Ministry of Home Affairs through the Directorate General of Population and Civil Registration targeting data recording process should be completed 100% in October 2012 (for 6 months), so the data recording monthly targets to be achieved at 16.67% of the total population of compulsory ID cards.

Under Regulation of Bandung No. 13, year 2007 on Establishment and Organizational Structure of Bandung District Office, the implementing agency that handles Nomenclature population and civil registry in the city of Bandung was population and listing of civil service. (Already mandated by the PP. 37 of 2007 on the Implementation of Law no. 23 of 2006 concerning Settlement Administration Article 27 paragraph 1)

Regulation Number 07 Year 2009 of Bandung on Population Administration is referring to national regulations on population administration. (Law no 23 of 2006 and Law no.37 of 2007). Bandung City has implemented SIAK since 2010.

Publication and distribution of the Notice SIN to residents per family will begin immediately after the results of the consolidated population database that still in the process by the Ministry of Home Affairs done. Office of Population and Civil Registration Bandung has sent the results of updating database on August 1, 2011 for consolidated by the Ministry of Home Affairs.

The personnel on e-KTP technical publication come from 30 districts in the city of Bandung. As Notice Letter 471.13/1565A/Sj from The Minister of Home Affairs dated 29 April 2011 on SIN Issuance and Stabilization of The Implementation of e-KTP in 2012 states that any region must prepare and provide technical personnel minimum of 4 people per site service (district), but at the time, it still need 76 personnel. However, this condition can be addressed by the Department of Population and Civil Registry by submitting additional personnel as the requirements of the Mayor of Bandung through the Regional Secretary as stated at the official letter of the Department of Population and Civil Registration No. 800/105-Disdukcapil dated June 30, 2011 on the Additional Personnel Application.

Based on the division of government authority in the implementation of e-KTP, one of the authorities of the local government (city) is preparing 4 (four) operational technical personnel of e-KTP per district.

As the number of districts, the Local Government of Bandung has set 120 technical personnel (4 people x 30 districts) who are temporary personnel during the data recording process, they are consists of: 106 personnel of The territorial authorities (district and village), 10 assistant personnel from the Department of Education, 3 additional personnel from BKD, 1 additional personnel from Diskominfo. 4 e-KTP operational technical personnel are accompanied by 1 technical personnel from PT. Sucofindo as the Ministri of Home Affairs consortium of e-KTP.

The use of biometrics system on the implementation of e-KTP

Biometric technology is developed as it can fulfill two functions: identification and verification, biometric is also has characteristics such as it cannot be lost, it cannot be forgotten and it is not easily faked as inherent in human existence which is different in any person, the uniqueness will be more guaranteed. God created man to have his own uniqueness. Hence, human body parts are often used to determine a person's identity.

On the implementation of e-KTP in Indonesia there are 3 types of used biometric systems, they are:

1. a digital signature biometric system,

2. fingerprint biometric systems and

3. the eye Iris biometric systems.

The analysis and result of the effectiveness and the efficiency of biometric system of e-KTP

The effectiveness and the efficiency of the use of biometric systems such as fingerprint, retina scan and electronic signatures are measured by using quality indicators system. The indicator used is the 11 indicators used by Wilkinson

Recapitulation of the data processing and the analysis on each of the indicators of the effectiveness and the efficiency using the AFIS biometric system and Iris Scan to e-KTP data recording can be seen in Table 2 below.

Relevant analysis (Compliance with the requirement)

Relevant in relation to the used biometric system/devices (AFIS and Iris Scan) is that the systems / devices should suit the needs of both the needs of agencies and other parties who will use the information that will be generated by the system / device. From the result measurement above shows that the system is relevant in meeting the needs of biometric information such as fingerprint and iris data to the database and e-KTP information system.

Capacity analysis of biometric system or device

The capacity of the biometric system or devices can be measured by the available biometric identification systems and devices (AFIS and Iris scan) whether they fulfill the required capacity to produce the required record/information items in accordance with the plan. The following table is the results of measurements of the capacity of equipment and devices.

Based on the result of the measurement of the capacity of the system as shown in Table 2, it indicates that the biometric system has sufficient capacity to meet the needs in producing record/information items that are required as the plan.

Efficiency analysis

Efficiency means minimizing the time required to produce the information as well as recording as material input and the maintenance of the database.

Table 2 shows that biometric systems used in the implementation of e-KTP have a good efficiency although at the initial use of the system, there is a troublesome because if the devices break or the systems stopped for a while because of intense recording readings, the

No	Indicator	Average
1	Relevant (as needed)	3.70
2	Capacity (of the system)	3.30
3	Efficiency (of the system)	2.66
4	Timeliness (in yield)	3.34
5	Accessibility (ease of access)	3.92
6	Flexibility (flexibility of the system / device)	3.08
7.	Accurate (the accuracy of the value of the information generated by the device / system)	3.48
8.	Reliability (the reliability of the system / device)	3.57
9.	Security (of the system / device)	3.50
10.	Economic (economic value of the system / device)	3.18
11	Simplicity (ease of system / device)	3.62
Total		37.35
Average 37.35/11=3.39 Category : Biometric Systems is quite effective and efficient (QEE).		

Table 2: Recapitulation of The Measurement of The Effectiveness and The Efficiency Indicators of Biometric Systems in The Preparation of SIN-Based Database; Source: Processing Result of 2012

data must be started again from the beginning. Of course this will be troublesome because the officers already burdened by targets.

Timeliness analysis

The design of biometric system both associated with the device and with the existing or used applications, it must able to generate the needed information on time. Delays in producing the information would reduce the value and usefulness of the information. Conversely, if the information to be published on time, can it facilitate operations.

Based on the results of the measurements on punctuality indicators as shown in Table 2 that the biometric system used in the implementation of e-KTP have a good accuracy both in quick and on time generating information and when viewed from the aspect of speed transactions and in support of personnel job to service fast.

Accessibility analysis

Accessibility here means that the information provided should always be new (up to date) and is always available any time. Ease of accessibility to the population data will be strongly influenced by the ease of the existing population databases and consolidated nationally. National population database is developed through the Population Administration Information System.

Population Administration Information System (SIAK) is an information system that was built to support the administration that includes population and civil registration. By this system, a national population database will be realized gradually. The development of this system began in 2003 with the launching of Online SIAK from District to Population Data Center then followed by Offline SIAK in regencies/cities in 2005. Online SIAK provides residents and civil registration in The Population Registration Recording (TPDK) area in districts directly connected to the Data Center of the Directorate General of Civil Registration (Adminduk) via VPN Dial. However, there are some constraints in the operation of Online SIAK applications such as Dial VPN connection fee and the slow transmission time. By recognizing the limitations of telecommunication infrastructure in these areas, the SIAK Online application is converted into offline SIAK in 2005. It makes possible to the area especially Regency/City to provide services for population registration and civil registration without having to connect to the General Adminduk Data Center. Both applications are the forerunner of the development consolidated national population database.

The realization of this database will support good implementation of the government and personal data protection facility of the citizens. In order to achieve the establishment of a consolidated national population database, there are several steps of the development of application systems that need to be taken, they are:

1. Evaluation current SIAK condition,

2. The design of SIAK improvements,

3. The Completion of SIAK implementation, and

4. The deployment of SIAK nationally.

Analysis flexibility (Flexibility system/device)

A flexible system can meet the needs of information widely. An effective way to achieve the flexibility of the system is to provide detailed and continuous data.

Based on the result measurements, the flexibility result of the used biometric system in the implementation of e-KTP is categorized quite flexible. Information requests can be made through fingerprint identification. It is certainly more flexible than to memorize pin. Fingerprint is a unique piece and is a part of the body that will always be attached to a person who is normal. This would facilitate the process of information access.

Accuracy analysis (The accuracy of system/device)

Accurate information is information that is precise, reliable and error-free, so it will be more useful to the organization. Systems and devices that exist or are going to be used must be able to produce accurate information.

The recording of fingerprints of ID card compulsory carried by the District using live fingerprint scanner, and have quality indicators, they are: green means good (greater than 40%), yellow means moderate (20% to 40%), and red means bad (less than 20%). The quality of thumb and forefinger fingerprints should be good as both of those fingerprints can be used for fingerprints verification or 1:1 matching.

Biometric fingerprint has two important characteristics, they are:

1. Fingerprint has determination forms of human life [3]; Human fingers and toes fingerprints are formed before birth and never changes in their life. The ridge on the fingerprint consists of individual characteristics of the ridge endings, bifurcation, dots and the various forms of the ridge. Each units Relationship of these characteristics in fingerprints does not change until decomposition after death. After formation, the ridge of fingerprints on the growing baby is like painting a face on a balloon using a pen and then the balloon is blown up to expand uniformly in all directions. Changes that are not naturally on the ridge fingerprints caused a deep laceration to penetrate all layers of the skin and diseases like leprosy

2. And no two fingerprints are alike. All hand and toe fingerprints have three characteristics (ridge endings, and bifurcation of dots called minutiae). They appear in various combinations that were never repeated on two persons [4]. In addition, fingerprint retrievaling and matching are quite easy to do and are not be expensive compared to other types of biometrics.

Reliability analysis (Reliability system)

Information resulted from a system or device should have a high standard of accuracy, the reliability of a system such as the resistance of the damage. Standard information with high accuracy only comes from a reliable system.

Used biometric sensor device is a tool that uses biometric data to identify individuals by measuring physiological characteristics. Physiological characteristics provide the ability to control and to protect the integrity of stored sensitive data in information systems. Biometrics is a computerized method that uses biological aspects, especially the unique characteristics possessed by humans. Biometric technology will provide a significant improvement in the accuracy of identification of a person's identity and can be adapted to any application related to government services.

Security analysis

An existing system or to be used system must be free from loss and cannot be accessed by parties who do not have the authority to enter the system.

Aspect of safety (security) is one aspect that is often questioned in the implementation of an information system. Moreover, the system that developed in Adminduk has very sensitive data. That is why

security issues should receive special attention. Biometric data security feature that will be applied not only on SIAK but also on the card are the Chips as electronic data storage media owners on the e-KTP.

The security features on distributed SIAK applications are divided into three groups based on function:

1. Network security: focusing on the media of information / data, such as computer networks;

2. Computer security: focusing on computers (servers, workstations, terminals), including the problems associated with the operating system, and

3. Application security: focusing on the application program (software) and database.

Other point of view, the security features that applied to Distributed SIAK divided into four, namely:
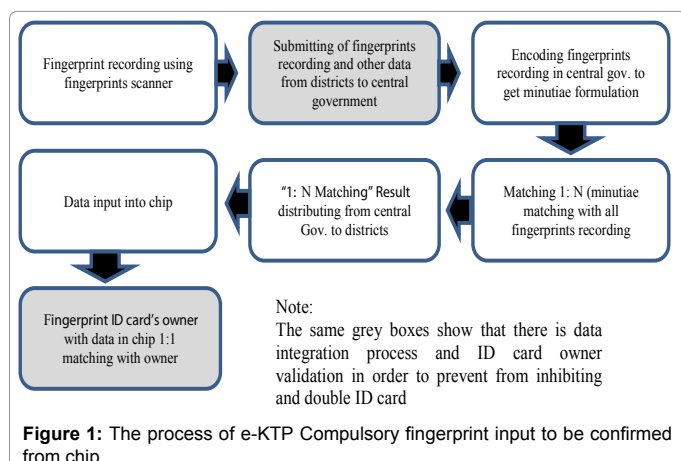
Physical security;

Security which deal with people;

Security of data and media and communication techniques;

Security in policies and security in procedures of operation.

The use of biometric system such as fingerprint stored on the media card chip in the e-KTP is more sophisticated than that have applied for driver's license. Fingerprints are not only printed in the form of images (jpeg format) such as driver's license, but also be identified through the chip installed on the card. The data stored on the card is encrypted by a particular algorithm. The process of taking fingerprints from the population to be recognizable from the chip card can be seen in Figure 1 below:

Recording using the fingerprint scanner conducted in the next sub-districts then they transmit fingerprint data to Automated Fingerprint Identification System (AFIS), which is in Adminduk Data Center, Jakarta, complete with digitalized biographical data, photographs and signatures is conducted through private data communications network from the districts to the Central Government.

AFIS system will do the encoding resulting in the formulation of each minutiae fingerprint and be the equivalent of the entire recording fingerprints stored in the database matching center or 1: N to determine the identity of a person's singleness.

If AFIS server in Datacenter found no fingerprints double, then AFIS returns OK status (single fingerprints) to the AFIS client in the District. Digitalized Biography, photographs, fingerprints and signature is then written into the e-KTP chip that has been done on the front of the biodata personalized e-KTP.

Recording fingerprints stored on the chip are two fingerprint minutiae index in accordance with international standards and NISTIR 7123 Machine Readable Travel Documents ICAO 9303 (plain two index fingerprints) as well as EU Passport Specification 2006. Once data is written to the e-KTP chip, then do 1:1 ID card compulsory right index fingerprint with tape on the chip matching. If the fingerprint verification is declared fit, the e-KTP is given to those persons.

Conditions above are ideal conditions if the nationally integrated population database is ready to use. In current conditions, printing process and data entry into the chip is conducted by Adminduk in Jakarta as they relate to the financing and the efficiency of e-KTP target.

From the seventh steps of e-KTP processing, there is a vulnerability opportunity. The vulnerabilities is in the form of illegally entering fingerprint data and other desired information into the e-KTP. Thus a person who is not the owner of E-KTP enables for falsifying his identity because fingerprints stored in e-KTP can be manipulated. The solution is a way to implement encryption algorithms when data writing on the chip. When the data written in e-KTP is required, it is necessary to the process of decryption. When data is entered by force does not implement the same algorithm, then when the decryption process is done, it cannot read the data.

The structure of the e-KTP itself is made up of nine layers which will increase the security of the conventional ID card. Chip is planted between white and transparent plastic on the top two layers (viewed from the front). The chip has an antenna in it that would create waves when swiped. Wave is to be recognized by the e-KTP detection device that can be known whether the ID is in the hands of the right person or not. To create the e-KTP with nine layers, the steps of manufacture quite a lot, including:

1. Hole punching, the punch card as a place to put the chip

2. Pick and pressure, it is putting the chip in the card

3. Implanter, the installation of antenna (repeated circular pattern resembling 4. Spiral)

5. Printing, the printing of cards

6. Spot welding, pressing the card with electricity

7. Laminating, covering a plastic card with a safety closure

Encryption technologies is applied to the storage of data on the chip which consists of fingerprint data along with biodata, photographs and signature images and digitally signed. Card reading and writing are conducted through the process of two-way authentication between the card reader and electronic devices to enhance the security of ID cards from counterfeiting and duplication. The chip also stores the SIN, name and other data. Security is also enhanced by relief text, Microtext, image filters, invisible and color inks that glow under ultraviolet light and anti-copy design.

The storage of two index fingerprint in chip meets to International Standards and NISTIR 7123 Machine Readable Travel Documents ICAO and EU Passport 9303 Specification 2006. The form of electronic ID cards meets to ISO 7810 with the 53.98 mm x 85.60 mm size of a credit card.

Figure 1: The process of e-KTP Compulsory fingerprint input to be confirmed from chip

Economic analysis

The existing systems / devices should be economically produce information that costs can be reduced and the service could be improved. Economic value can be achieved by seeking available records that do not require a long time, using a data storage medium and maintenance that requires a low cost, and seeking databases in a short time.

Fingerprints recorded from each compulsory ID cards are all fingers (of ten), but the data included in the chip only two fingers, the thumb and forefinger of the right hand. The fingerprint is selected as authentication for e-KTP with the following reasons:

The least expensive, more economical than other biometric

Form may be maintained unchanged because streaks fingerprints will return to its original shape even scratched the skin

Unique, there is no possibility of double despite of twins.

Electronic ID card as ID papers has a validity period of 5 years. ID card has always carried and used by residents in the diverse conditions as well as a variety of activities such as agriculture, trade, travel and office building with a high frequency of the use. This situation requires physical endurance in the use of the card and its components are frequent and long periods of time.

Although the biomterik system or AFIS fingerprint biometric systems are cheaper than others, the process of making e-KTP costs more expensive than similar types of electronic cards. Credit cards are usually made of polyvinyl chloride (PVC) because it is expected to be used for three years. But the validity of ID cards for five years requires stronger material such as polyester terephthalate (PET) which has a resistance of up to ten years. The chip can be attached on a card with contact or nirkontak interface. Electronic card with the contact interface has been widely launched for telephone cards, credit cards and health cards (APSCA 2007). Nirkontak card is often used for the needs of public transport due to the ease and convenience of the use with enough glue to the card reader device without inserting the card into the reader slot.

Card nirkontak is not directly rubbed with the reader which can cause erosion of the protective layer chip. Nirkontak card also has a high durability for it is protected from the environment direct contact such as air, water and other liquids. It is also protected from rust due to humidity and water especially in tropical regions such as Indonesia. Therefore, e-KTP using nirkontak interface.

Simplicity analysis (Ease of system)

The operation of the existing system or device should be easy for users, in other words it does not require long time and high costs training, so that it can support to generate information better.

From the results of these measurements indicated that the biometric technology being used despite the use of advanced technology but can be implemented in a way that is simple and relatively easy to operate.

Simplicity here is a quick and not too complicated. Users will feel bored if the use of the generated information is too long.

Biometric system used to the implementation of e-KTP service is quite effective and efficient both to the handling of security and to the execution of government services. Besides biometrik system allows the integration of services based on a prepared database.

Factors effecting the implementation and e-KTP Service

Bandung City is one of the districts / cities in West Java that is at step II in e-KTP implementation and they must complete e-KTP's target in October 2012. However, based on the evaluation, achieving the target was extended to December 2012. The successful implementation of e-KTP depends of many factors both supporting and inhibiting factors and how to overcome any obstacles encountered.

Supporting factors

• The publication of Law No. 23 of 2006 implies a strong desire from all parties to support the information system based on SIN. President Regulation

• Availability of Mayor Regulations and Mayor Decisions related to the implementation of e-KTP

Inhibiting factors

There are several issues related to the inhibiting factors of the implementation of e-KTP in Bandung. With the 1,980,856 of compulsory ID card, the data recording target for 6 (six) months is predicted that it will not be achieved. Based on a comparison of the record target with the capacity rate of data recording / tools / day, it can be seen in Table 3 as follows:

From the calculation above, the ideal number of tools that should be available is around 96 (ninety-six) sets with the calculations: Monthly Target: the capacity rate of the tool per day: 25 days=330 143: 137: 25=96.3. There are 37 sets of shortage of tools.

The implementation of e-KTP in Bandung is still lack of data recording devices, especially in the districts where they have a lot of ID card compulsory (>60 000). If there are no additional tools, 1.9 million persons ID card compulsory data recording in the city of Bandung will not be achieved as targeted.

Based on the interview with the Head of the Department of Population and Civil Registration (Disdukcapil) of Bandung, Mr. Krisnan Meivy Adha at his Office in Jalan Buah Batu Cijawura, on Thursday (26/8), " There are 1.9 million persons ID card Compulsory in Bandung that must be completed in October 2012, based on the evaluation of the implementation of ID cards in the past two weeks, there are incomplete things as the target of 300 people in one day. It almost every day until the evening, they should record e-KTP, even on Saturday.

In the early step of the implementation of e-KTP in Bandung, it is not run as expected. It turns out in actual problems, one of them is the time. The same thing happened in the district of Coblong, Batununggal and other districts. Dozens of people had to queue all day to get turn data recording. They hoped that the process of recording data for e-KTP card can be run faster.

Disdukcail was seeking additional tools for each districts, there

No.	Target Achieving	Information
1.	Monthly Target (25 days)	330.143 persons
2.	The number of Tools	59 set
3.	Monthly/Tools target	5.596
4.	Daily/Tools target	224
5.	The capacity rate of Tools/Day	137

Table 3: Target achieving and the rate capacity of device in the implementation of e-KTP in Bandung
*) The capacity rate of the evaluation of data recording process for 46 days from 16 April – 11 June 2012

were also planned mobile devices. Large resident districts get 3 more data recording device for e-KTP, into five pieces and they get a mobile recording device, so that the personnel could come in to persons who are sick or unable to record data without having to come to the district office.

Another problem is the broken of the tools, broken tools should be taken to Jakarta for replacement, this causes a lack of data recording during these tools has not been replaced, and it would directly affect the achievement of the target recording data either monthly or daily.

Equipment availability is limited and inadequate, it is anticipated by borrowing equipment from other districts which had already completed the recording of data. Bandung city loans 10 sets devices of data from Garut where has >60,000 persons ID card compulsory. This commitment is learned from the District / Municipality which had already implemented e-KTP.

Citizen participation especially in urban as in Bandung also be a problem because of the diversity of backgrounds and their large activities. The achievement of the target in Bandung Wetan District, Bandung City is still low, because a lot of people do not come in to do the recording photograph, signature, fingerprints, and iris, the realization results of e-KTP data recording through ID card compulsory ID cards presence of the target load in each district. To make the recording efficient, the district immediately asked a number of neighborhoods in Tamansari Village to bring their citizens come in to the district office. Tamansari is known as dense settlements in the city of Bandung, while Citarum Village is known as an office area, school, and factory outlet (FO).

Conclusion and Recommendation

Conclusion

From the overall analysis of the previous chapters of this study, it can be taken several conclusions, they are:

1. The effectiveness of the use of biometric systems on a single number-based national database access in the process of e-KTP in Bandung is quite effective if it is measured based on indicators of quality systems, such as: Relevant (as needed), capacity (of the system), timeliness (in yield), accessibility (ease of access), Flexibility (flexibility of the system/device), Accurate (accuracy the value of the information generated by the device/system), reliability (the reliability of the system/device), security (of the system/device), economic (economic value of the system/devices) and simplicity (ease of system /device).

2. The efficiency of the use of biometric system to e-KTP service in Bandung is quite efficient if it is as measured based on: biometric systems (AFIS and Iris scan) that have an efficient character (The testing recording results can be done faster and automatically), Biometric systems (finger-scan and Iris scan) that improve productivity and efficiency (the amount of data increases with the recording device specifications) and Biometric systems (AFIS and Iris Scan) that reduce job turnaround time in checking data compliance with the card owner.

3. The supporting and inhibiting factors in the use of biometric systems in the implementation of e-KTP are:

a. Supporting Factors

The availability of laws, government regulations and regulation

The availability of Mayor Regulation and Mayor Decision on services and implementation of e-KTP

The commitment of the leadership and the involved ranks in providing services and completing the achievement of the e-KTP target.

The availability of human resources specifically allocated to support the services and the implementation of e-KTP.

b. Inhibiting Factors

There is inadequate information technology tools and infrastructure services supporting

Dissemination of the implementation of e-KTP is not optimal

Human Resource performance is not optimal

There is inadequate information technology systems

Leak of Community participation

Suggestions and recommendations

The Central Government should be more serious to build and to refine a national database system as the forerunner of a single identity number (SIN). The Central Government should develop an architecture design of open technology-based, network-based population administration information system with a modular structure that can be incrementally implemented in a bottom-up according to schedule of the availability of resources.

Online SIAK is designed as a centralized application that will be accessed from TPDK (The Population Data Recording) based in the districts throughout Indonesia. Therefore, supporting infrastructure such as a network connection should be the main focus to make it faster (due to accessing data directly from the district to the center).

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