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Is It True? Performance Management Can Evaluate Through RFID?

Ignatius Prasetya Aji Wibowo[1], Lukertina[2], Elwisam[3], Nunu Nurjaya[4]
[1](*Economic and Business Faculty, Universitas Mercu Buana, Indonesia)*
[2](*Economic and Business Faculty, Universitas Mercu Buana, Indonesia)*
[3](*Economic and Business Faculty, Universitas Nasional, Indonesia)*
[4](*Economic and Business Faculty, Universitas Nasional, Indonesia)*

Abstract: *Based on the E-Government program by the World Bank, the Provincial Government of DKI Jakarta applies E-Kinerja as a benchmark in providing dynamic allowance to the Civil Servants/Aparatur Sipil Negara (ASN) in DKI Jakarta. Data on daily activities of ASNs are entered manually into the E-Kinerja system and carried out after hours. This is a Pilot Study on the adoption of RFID (Radio Frequency Identification) hardware which is integrated with the SIKDA (Regional Health System/Sistem Informasi Kesehatan Daerah) GENERIK that is connected to the E-Kinerja System by online (internet). The researcher applied this technology to three Puskesmas/health centers in Kebon Jeruk Subdistrict of West Jakarta that still use manual methods to input their daily activity data into the E-Kinerja website system. This research is expected to be developed to help the implementation of research (including feasibility studies) next and can simplify the process of determining policy.*

Keywords: *Management Productivity, Performance Management, Database Management, RFID Technology, E-Government, Hospital Management.*

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I. Introduction

The implementation of E-Government in Indonesia is following the Presidential Instruction of the Republic of Indonesia Number 3 of 2003 concerning E-Government concerning the implementation of electronic or computerized based government to improve the quality of public services effectively and efficiently. One form of E-Government implemented by the Regional Government of DKI Jakarta Province is E-Kinerja. E-Kinerja is an electronic or computerized performance appraisal system used as the basis for granting the Regional Welfare Allowances/Tunjangan Kesejahteraan Daaerah (TKD). The assessment in this system is based on performance and the allowance is given to all DKI Jakarta Regional Government employees every three months.

In the Pre-survey, the researcher found that civil servants in DKI Jakarta Provincial Government had to manually input their activities into www.etkdbkd.jakarta.go.id. It causes problems, especially in the regional work unit (SKPD) service units such as the Sub-District Office, Sub-District Office, health centers, etc. Manually inputting various and random activities is difficult to do. It can reduce efficiency and increase input errors that complicate the audit process. There is a need for technology that is integrated and synergized with E-Kinerja.

The integration process can be carried out through the use of barcode and RFID (Radio Frequency Identification) hardware on the GENERIC SIKDA system. SIKDA GENERIK is an application used to assist the operational process of health services. It is being tested nationally in the public health service unit under the Ministry of Health of the Republic of Indonesia. This research applies RFID as a barcode successor technology (Gondohanindijo, 2012) in the public health units of the West Jakarta City Government, namely health centers in Kebon Jeruk, South Kedoya, and South Sukabumi Sub-Districts. The respondents of this study consisted of the leaders or those in charge of each health center.

Research by Wang et al. (2005) and Tzeng et al. (2008) regarding the use of RFID in a hospital in Taiwan; and Wessel (2007) and Swedberg (2008) who applied the technology in hospitals in the Netherlands, Italy, etc., showed that this application can reduce operating costs, improve patient safety, and improve the quality of medical services. This study aims to eliminate manual input. Civil Servants in the Health Service Unit of Kebun Jeruk District, West Jakarta, are expected to be able to utilize RFID technology to improve work effectiveness and avoid manual input problems.

In line with research by Vanany and Shaharoun (2009) with the title The Application of RFID Technology in Indonesian Hospitals; Benefits and Obstacles, this study also investigates the benefits and

obstacles of applying RFID technology. The application of this technology is fairly slow, especially in the health center of Kebun Jeruk District, West Jakarta. This study is the same as previous research by Vanany and Shaharoun (2009), but with a smaller scope of research.

II. Literature Review

The definition of E-Government

E-governance is the administration of information technology-based governance to improve the performance of government to the community, business community, and other related groups towards good government (World Bank, 2001). Performance is the result or output of a process (Nurlaila, 2010). According to the behavioral approach in management, performance is the quantity or quality of the results of a job (Luthans, 2005). According to Heizer and Reinder (2009), performance can be measured through the process of changing resources into outputs (goods and services). It means that the more efficient the effort, the more productive and the higher the value of the output produced. Productivity is the ratio between output (goods and services) divided by input / resources (labor, capital, machinery, and technology). Good Corporate Government is able to create conducive work environment and is able to trigger employee job satisfaction and improve employee performance (Riyanto and Lukertina, 2019). The application of E-Government is expected to increase efficiency and maximum output (services and goods). Efficiency is a measure of actual output with effective capacity.

E-government (World Bank, 2001) can be described as a government that uses technology, especially web-based internet applications to improve access and delivery of services to the public to the public, business partners, employees, and other governments. A process of reform in the way government works, shares information, and provides services for the benefit of the government, the community, and business people. The use of information technology such as wide area network (WAN), internet, world wide web, computers aims to improve services to the community and the business and industrial world, empowering people through easy access to knowledge and information, and increasing the effectiveness and efficiency of government performance. Through the 2003 Presidential Instruction, the Government of Indonesia requires the implementation of E-Government in the central and regional governments. DKI Jakarta Provincial Government applies E-Kinerja as one form of E-Government implementation.

System E-Kinerja and Sikda Generic

The activities of the employees are expected to be able to play a role in achieving a target and be able to overcome all the problems that exist in the organization. Employees are social people who get rich for every organization. They become planners, implementers, and controllers who always succeed actively in realizing organization goals. Many research consider employee performance as the dependent variable (Butts et al., 2009; Chuang and Liao, 2010; Lukertina, 2018; Beltrán-Martín and Bou-Llusar, 2018). An electronic or computerized performance appraisal system is the basis for providing dynamic incentives or benefits (based on performance) of all DKI Jakarta Regional Government employees that are paid every 3 months. The E-Kinerja website display (11/26/2017) is as follows.

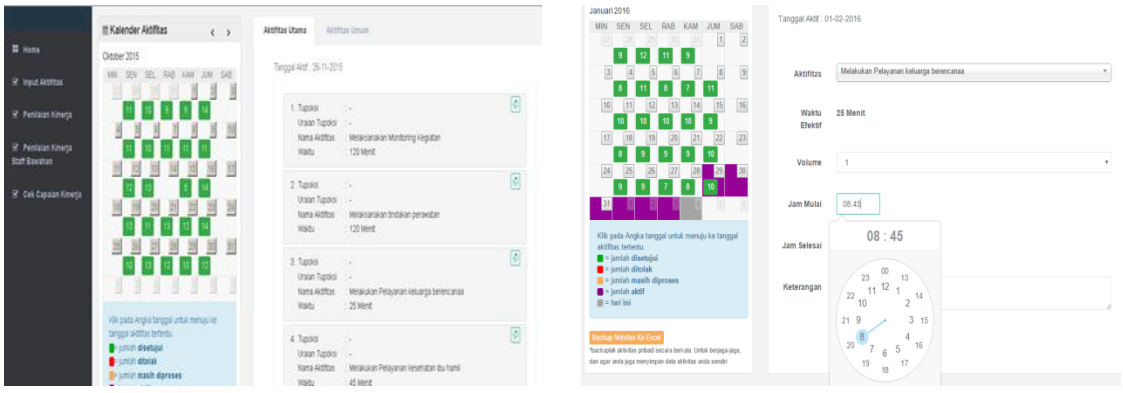

Figure 1. E-Performance Website Display

Through pre-survey, the problems of users in using the website (Dennis et al., 2005) are:

1. The software produced does not match the user's requirements. For example, a school needs a system that can increase the effectiveness of admission of new students but instead gets an attendance or library systems.

2. The software does not solve the problem. For example, companies need effective and efficient reporting software to reach leaders who travel frequently. Unfortunately, the company will get desktop-based applications that can only be accessed by leaders when they are in the office.
3. Software does not suit the company conditions. For example, an agency with multiple computers without a network gets a client-server based system that requires connectivity between computers.
4. The software produced is not user-friendly or even more complicated than existing software. It will be difficult for users so they tend to use the old way.
5. The resulting software is built with high technology but is not appropriate. For example, the application of SMS Gateway in a grocery store whose customers come from the surrounding environment.

Problems that are appropriate with the research object in the implementation of E-TKD in this study are: Lack of efficiency in recording E-Performance data due to manual input, after hours rules, input errors causing data mismatch which complicates the audit. The input system on the E-Kinerja website also changes frequently. From the problems above, the researcher offers RFID technology that can integrate and synergize E-Kinerja especially in health services and health administration.

The Generic SIKDA application is a national-scale application that connects all health centers, health services, and the Ministry of Health online and integrated. The Generic SIKDA application was developed to improve services in health care facilities and to improve the availability and quality of health management data and information through the use of information technology. Following is the process flow of the SIKDA GENERIC system (Figure 2.3) and the SIKDA GENERIC application (figure 2):

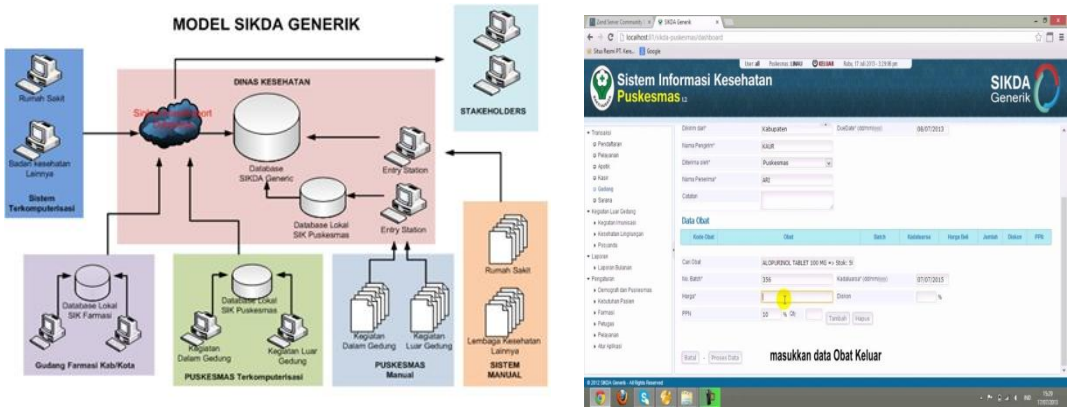

Figure 2. Process Flow and Display of SIKDA GENERIC applications on PC

The definition of RFID

RFID is a data capture technology that works electronically to identify, track and store information stored in tags using radio waves (Supriatna, 2007). RFID technology is not a new information technology (IT). This technology was discovered in the 1950s when Harris patented a radio transmission system and began researching RFID technology on a laboratory scale (Hunt et al., 2007). However, the commercialization of this technology began in early 1984 when General Motors (GM) used RFID tags in its cars (Juban and Wyld, 2004). Here are the figures for RFID hardware such as cards, bracelets, stickers, plastic wrapping, rice-sized microchips, and tag readers.

Figure 3. Types of RFID Hardware

The use of RFID technology in the healthcare industry is something new. Business Wire Market Research (2008) predicts that the use of RFID tags, readers, and systems in the healthcare industry will increase dramatically from USD 85.24 million to USD 2.05 billion in 2017. There are three main drivers of the increased use of this technology, namely government regulation, demand by the health industry (including hospitals), and social external conditions. Broadly speaking, an RFID system consists of three main components, namely tags, readers, and databases (Supriatna, 2007).

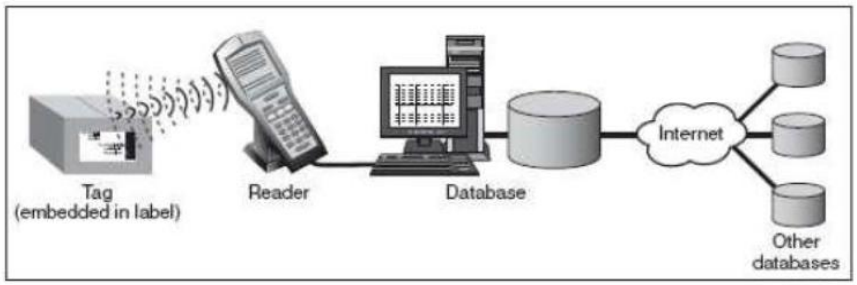

Figure 4. RFID Workflow

In summary, the RFID system works using a radio frequency reader that scans the data stored in the tag and sends the information to a database that stores the data contained in the tag.

Benefits and Areas of Application of RFID

Vanany and Shaharoun (2009) explained that Wang et al. (2005) successfully explored the potential application of RFID technology in a hospital in Taiwan. The results showed that RFID increased the effectiveness of the use of technology, medical services, and patient safety. Tzeng et al. (2008) showed that the use of RFID can improve business processes in five hospitals in Taiwan. On the other hand, RFID makes it easy for medical staff to identify patients and search for needed medical equipment. It will increase the productivity of medical staff especially nurses. Generally, the use of RFID increases the efficiency of hospital performance and increases patient satisfaction. Patients do not need to wait too long to complete the administrative process or wait too long to do the surgery due to medical equipment constraints. RFID will turn manual activities into automatic to reduce costs and time.

The government requires the provision of RFID tags on certain types of drugs to reduce the number of theft and counterfeiting of drugs. The tags also make it easier for hospitals to find out the availability of drugs they have. This technology increases the morale of medical staff because it can reduce the possibility of medication errors and the difficulty of monitoring patients and medical equipment. Wang et al. (2005), Tzeng et al. (2008) and FDA (2006) identified that the use of RFID can reduce drug theft and counterfeiting, improve patient safety and satisfaction, improve the morale of medical staff, improve cost and time efficiency, and increase productivity.

The constraints on applying RFID

Vanany and Shaharoun (2009) showed several variable barriers to the application of RFID in Indonesia. The researcher then chose some of these obstacles according to their relevance to this study and the object of research at the time of survey. Some barriers to the application of RFID that are relevant to this research include the complexity of RFID, the absence of complete and valid information, the radical change from existing systems to RFID, internal resource support, the need for training, and rumors about the low security of RFID

III. Method

Research design

It is a pilot study to test several items of research variables and find out the initial conditions of the use of RFID in health centers in Kebon Jeruk District, Kedoya Selatan Village, and South Sukabumi. This study is in line with research conducted by Vanany and Shaharoun (2009) who examined the initial conditions for the use of RFID in hospitals in Indonesia. The pilot study, according to van Teijlingen and Hundley (2001) is a study conducted to sharpen the direction of the main study. Preliminary studies carried out due to unclear eligibility of procedures for several other matters related to the main research. Preliminary studies can change the direction of research that has been compiled in the proposal. Preliminary studies may change the research procedures, improved measurement, increased confidence in assumptions, and a more robust primary pellet design. The preliminary study is a miniature of the main study that tests some instruments that will be used in the main study.

The definition and Operationalization of Variables

Based on the problems identified in the pre-survey and in previous studies conducted by Vanany and Shaharoun (2009), the researchers chose several variables from previous studies, those are: 3 (three) problems from the E-Kinerja system, 6 (six) Benefits of using RFID, and 5 (five) obstacles in using RFID.

Population and sample

To examine some items of the research variables and determine the initial conditions of the use of RFID in health centers in Kebon Jeruk district, West Jakarta, this research variable is based on the problem of inputting E-Kinerja and the benefits and obstacles of using RFID. The sample in this study was obtained using Purposive Sampling. According to Margono (2004), purposive sampling classifies subjects on certain characteristics that are considered to have a relationship with population characteristics that have been known previously. In other words, the sample has certain criteria that fit the purpose of the study. The respondents of this study were 50 (fifty) respondents consisting of the leaders and responsible persons of several health centers. 30 respondents came from Kebun Jeruk District health center and another 20 came from the South Kedoya and South Sukabumi Health Centers (10 respondents each).

Data collection technique

This research uses primary and secondary data. Primary data retrieval is carried out using the semi structured interview method that is tailored to previous research and the object of research. The scale of the research was carried out through the ranking scale because of the low RFID information in the pre-survey. Brain Storming was given to determine the variables following the research of Vanany and Shaharoun (2009). However, the researcher chooses which variables are more relevant to the object of research. The ranking scale is used to compare objects, events, or people to find out the level of liking and ranking (Sekaran, 2006; Indriantoro, 2008). The efficiency of using RFID in the input process is measured using a 1-5 Likert-scale. Likert-scale is used to measure the attitudes, opinions, and perceptions of a person or group about symptoms or phenomena (Djaali, 2008). Secondary data is supporting data in the form of literature/theory that underlies each variable used. Secondary data is data that has been studied and collected by other parties (Supranto, 2003).

The problems of E- Kinerja

Broadly speaking, the respondents stated that there was inefficiency in the recording process of E-Kinerja which was carried out manually and outside working hours. It ranks first with an average value of 1.45. The second rank (audit difficulty due to mismatch between data in the database and data in the field) has an average value of 2.17. The last ranking is occupied by frequent changes to the input method with an average value of 2.26. The difference in value between the second and third problems is 0.9. It means that the two problems are not the most dominant. The ranking of problems is shown in the following table:

Table 1. problems in manual input

PROBLEMS	AVERAGE VALUE	RANK
Inefficient input of data on the E-Kinerja website because it is still done manually and outside working hours.	1,45	1
Errors and mismatches of data entered make it difficult for the Audit.	2,17	2
Change in input method	2,26	3

IV. Result and Discussion

The benefits of the use of RFID

In general, respondents believe that the use of RFID can increase cost and time efficiency (ranked first with an average value of 2.66) due to integration and connectivity between RFID and SIKDA. This research examines the use of both software on PC and Smart-Phone. Automatically, the stored data can be considered as a medical record and forwarded to the E-Kinerja system. Respondents believe that the use of this technology can increase productivity, increase time efficiency, maximize work hours and save costs (second rank with a value of 3.06).

The third rank with an average value of 3.15 is an increase in patient satisfaction. Respondents believe that the digitization of health services will facilitate the operation of health services. It requires a gadget such as a Smartphone that will later be integrated with RFID and used as a medical record aid. However, the second and first benefit is placed at ranks 4 and 5. It is caused by the low confidence of respondents in the security of this technology due to a lack of information. To overcome this, respondents need training and workshops. The last ranking (six) is the moral improvement of medical staff. Most respondents think that if the previous variables can be met then their level of morality will also increase. The benefits of using RFID are shown in the following table:

Table 2 The benefits of the use of RFID

THE BENEFITS AND THE AREA OF THE USE OF RFID	AVERAGE RANK	RANK
Anti-theft and counterfeiting	3,91	5
Improved patient safety	3,89	4
Increased patient satisfaction	3,15	3
Improving the morale of medical staff	4,34	6
Cost and time efficiency	2,66	1
Increased productivity	3,06	2

Constraints of the use of RFID

Lack of internal resource support and the need for training ranks first with a value of 2.87. It shows that respondents need training and workshops on the use of this technology. The second ranking is the lack of information caused by the background of researchers and enumerators (lecturers and students of the Faculty of Economics and Business) who are not too well-versed in RFID technology. In addition, references to the use of RFID in Indonesia are still limited. The complexity of RFID technology is ranked third. This complexity is due to the need for socialization and training regarding this technology. Besides, the use of SIKDA GENERIC system features in the administration process by health workers is still not optimal. The change from the existing system to RFID was ranked 4. Most respondents believe that adaptation time determines the number of problems arising from the use of this technology. The low level of technological security ranks last. Broadly speaking, respondents believe that this barrier will disappear/decrease along with the availability of Human Resources who know Information Technology and database systems. Table 3 below shows the constraints of the use of RFID:

Table 3 Constraints of the use of RFID

CONSTRAINT of the use of RFID	AVERAGE RANK	RANK
The complexity of RFID technology	2,89	3
Absence of complete and valid information	2,57	2
Radical change from existing systems to RFID	3,09	4
Internal resource support and training	2,26	1
Low security of the technology	4,15	5

UNDERSTANDING AND ASSURANCE LEVEL OF RFID ADOPTION

The researcher identified the level of understanding and confidence of the use of RFID technology in the GENERIC SIKDA system. Broadly speaking, the level of respondents' understanding and confidence in RFID technology is on a scale of 3 (Table 4):

Table 4. The understanding and confidence of the use of RFID

DESCRIPTIONS	RESULTS
Understanding	3,62
Confidence	3,53

V. Conclusion

From the data processing and findings in the research object it can be concluded that:

1. The problem of data input to the E-Kinerja website (first rank) is caused by the inefficient manual input processes that are carried out outside the working hours. The second and third problems are respectively ranked second and third. It can be concluded that the manual input process that is carried out outside working hours is a major problem that must be addressed first.
2. Problems with the adoption of RFID (first rank) variable resulted in an increase in the amount of money and time due to manual input. When working outside working hours, employees must spend more to buy a PC / Laptop because the data input is not carried out by mobile or Smart Phone. Input during peak hours (19:00 to 23:00) causes high E-Kinerja network traffic. The second place is increasing productivity. The use of RFID in SIKDA applications that are integrated with the E-Kinerja system can improve the quality of the variable adoption of RFID (ranking three to six).
3. The first rank in the adoption constraints of RFID is the lack of internal resource support and the need for training. The number of operational activities or items, both health and administrative services, which are not supported by the SIKDA GENERIC application features makes it difficult to integrate with the E-Kinerja system.

In this Pilot Study, the researcher tries to obtain data that can be used as a guide to carry out further research, feasibility studies, and determine policies related to cross-cutting scientific research on the use of RFID. Respondents' suggestions are:

1. Respondents stated that the use of this technology requires reliable socialization, training, workshops and consultants in their fields.
2. Future studies can measure the estimated productivity of the efficient use of time and cost for the use of the technology. The SIKDA application which later can also be integrated with RFID technology and applied to gadgets or personal computers as well as integrated with the E-Kinerja system displays detailed items of work (and activities) carried out by health care workers. This technology can also be used as medical records and facilitate the operation of the SIKDA application.
3. As a benchmark in the provision of Dynamic Regional Welfare Allowances, the technology should be able to specify and distinguish between high-risk and non-work. For example, the possible risk of contracting an infectious disease such as HIV, tuberculosis, hepatitis, etc.
4. RFID technology is expected to be integrated with inventory control and logistics management especially in equipment, health equipment, and medicines. The respondents thought that each officer had a Personal Computer, gadgets, smartphones etc. that supported the use of RFID and had their own login id.
5. There are two suggestions for calculating the performance of Non-ASN (contract) employees and ASN Candidates. First, Non-ASN Candidates and ASN Candidates are also included in E-Kinerja to find out the performance of employees and measure the adequacy of their benefits. This calculation allows workers to receive the same dynamic benefits, but with the same basic salary and static allowances. Another opinion suggested that non-ASN and ASN employees be made their own E-Kinerja facilitate the calculation of performance.
6. Administrative Staff do not yet have a GENERIC SIKDA application to assist daily operations which can later be integrated with RFID.
7. The administrative process is adjusted to the initial input from the researcher and the development of the respondents, especially those who mostly work in administration. Physical reports are automatically included in the E-Kinerja system. RFID will record every detail of the report, from the author to the analyzer (evaluator).
8. The SIKDA application should be able to be used to download patient data that was previously read by an RFID tag reader, for example by optimizing the E-KTP. On the other hand, there needs to be a temporary storage time (on the server of health centers) before it is forwarded to the GENERIC SIKDA system within a certain period. This is needed to reduce high traffic on the SIKDA system network.
9. This technology is expected to be used by all Regional Work Units in DKI Jakarta Province and other regions to realize the GOOD GOVERNMENT program in Indonesia.

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