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IMPLEMENTATION OF SURABAYA DIGITAL GOVERNMENT SERVICE (DGS) WITH E-HEALTH SERVICES TO SUPPORT SUSTAINABLE DEVELOPMENT GOALS (SDGS) IN INDONESIA BASED ON CHI-SQUARE METHOD

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ABSTRACT

E-Health is the use of information and communication technologies (ICT). It's applied within the health sector development of Surabaya government services to improve public service. One indicator of good health achievement to support SDGs in Indonesia is the optimization of health services using strategies to improve access and quality of health services. The goal of e-Health system is to provide patients a facility of e-Health through online registration i.e. without having to come to healthcare facilities before receiving health services. As the result, estimation of patient check-in and queue for registration can be reduced. This research uses descriptive statistics and *chi-square* as the methods of data analysis. The data collection uses questionnaire to e-Health users and secondary data from literature. The research sample focuses on healthcare and general hospitals in Surabaya. The result shows our population were not familiar with e-Health. The analysis is reviewed based on gender and occupation. The unfamiliarity with or lack of knowledge about e-Health became an issue to evaluate the health service to achieve and improve access to good health-quality in Surabaya, like improving the socialization. If this application could be improved and received the attention from other government, it could be applied in Indonesia.

INTRODUCTION

The development in science and technology pushes man to change rapidly that oriented to the realization of improving government services for the public. Good governance is one of government's program revolutions in all aspects within the public service sector through the application of online

system to improve integrated public services, especially in the health sector. One indicator achievement of good health to support the Sustainable Development Goals (SDGs) in Indonesia is the optimization of health services with strategies to improve access to health services implementation of a new system in a hospital will require the support from Human Resource Management (HRM) and Organizational Performance (OP). Puteh's (2017) review on the studies of Human Resource Management (HRM) shows a positive link between good HRM practices and Organizational Performance (OP) which is strongly linked to employee skills, employee commitment, absenteeism and turnover, and consequently leads to higher productivity, as well as enhances quality and efficiency (Bohlander & Snell, 2013). Continued Professional Development (CPD) suggests that a continuous lifelong learning has helped develop and ensure up-to-date knowledge, skills and abilities among professionals (Adanu, 2007; Udin, Manaf, Ishak, & Rusniza, 2012).

Surabaya government is one of the local governments that responsive and most innovative in realizing good governance through the development of e-Government (Setianto, 2016). Electronic Health system or e-Health is one of the health service pioneered by the Government of Surabaya. The system become one of the reference development of Digital Government Service (DGS) or e-Government, a part of the big concept development of Surabaya Cyber City that makes Surabaya a modern city that uses information and communication technology, especially in health service.

One of the service innovations that receives adequate appreciation is the innovation of health services through e-Health. According to the WHO, e-Health is the use of information and communication technologies (ICT) for health. Examples of e-Health include treating patients, conducting research, educating the health workforce, providing or exchanging information, tracking diseases and monitoring public health with the use of ICT (European Patients Forum, 2016). According to E-Health (2016), e-Health application is a leading innovation in the sector of public services that selected as the "Top 25 Public Service Innovation on National Level" city category by the Ministry of Administrative and Bureaucratic Reform in 2015. The e-Health system makes it easier for patients to use health services to solve patient stretching in long queues. Patients only need to register online without having to come to the healthcare facilities or hospitals to take a queue number. They can sign up anywhere with internet connection or at e-Kiosk that are available in all urban villages, sub-districts and healthcare facilities in Surabaya. Subsequently, patients can come on time based on estimated checking time. This is more efficient especially for poor people, illiterate, disable, and the elderly who have limited access to healthcare and health information. Such patients usually visit the nearest sub-district office from their home to contact officers who help them with the register through the e-Health application. With the e-Health, the file processing services become faster and more efficient. It is also environmentally friendly due to the reduction of paper usage.

Previous research of e-Health in Romania (Moisil & Elena, 2006) shows an e-Health that has been realized and fully supported by the government, but the system focused only on internal diseases such as cardio

vascular disease (CVD), cancer, infectious diseases, high score on mortality and morbidity, and low score on natality. Some European countries also applied this system (Quaglio, Dario, Stafylas, Tiik, McCormack, Zilgalvis, et al., 2016). Research in East Asian countries (Holliday & Wai-Keung, 2004) such as Japan, Hong Kong, Singapore, South Korea and Taiwan shows that the development of e-Health in the region is less advanced than might have been expected. One of the studies in e-Health status in Saudi Arabia (Alsulame, Khalifa, & Househ, 2016) explain that knowledge on e-Health in Saudi Arabia is still lacking due to some weaknesses such as limited number of studies and studies limited to only certain health organizations. Such lack of knowledge creates a challenge to healthcare professionals, healthcare information professionals, and diverse healthcare organizations in Saudi Arabia to improve the benefits of e-Health in Saudi Arabia. Kristianto (2013) explains that Indonesia has a vast potential to implement e-Health as the electronic media faster to reach many islands in Indonesia than non-electronic media although there are area which disconnected to electricity and internet. The e-Health service has been running well, facilities and infrastructures are available and accessible, but socialization of the service is lacking. In other journal about e-Health in Surabaya, Sa'idah (2017) explained that characteristics patients in healthcare in Surabaya that influenced to e-Health is experience, knowledge and skill IT, but many of patients lack in a few things and the socialization is less held and too simply so that some groups of society difficult to understand the purpose of socialization of e-Health program.

In the previous research, the limitation of the research focus on a few healthcare in Surabaya, so it cannot describe the number health service in Surabaya that implements e-Health services. Thus, the authors are interested to discuss further about the implementation of e-Health services at healthcare in Surabaya by analyzing the effect of socialization on the use of e-Health, the relation of e-Health service with easily access and effectiveness at healthcare also the relation of quality improvement e-Health services with satisfaction of patients in healthcare. It expected to describe the strategy to improve access and quality of health services so that can be added the insight society about e-Health system and give the information about rating of user health service especially in e-Health system. Furthermore, it can be applied in Indonesia to support SDGs and as an evaluation for the Surabaya City Government in the health sector. If the application in Surabaya is good and gets the attention of other Regional Government and Central Government, then e-Health service will be applied in Indonesia.

LITERATURE REVIEW

Digital Government Service (DGS) is one of the technology utilization by government which adopted from United Kingdom. Now, DGS is part of the cabinet office in United Kingdom which began in 2010 and its job is digital transformation of government. DGS is a development of the e-Government concept with more emphasis on society's participation in data collection and data usage. For the government, DGS may be considered to help the performance of the system government. The government only needs to coordinate and monitor society through a digital system without more in

cost and a good level of data validity that capable on increasing public trust to the government.

The benefit of DGS is the public can get the service from the government so well, easy and fast. One of the innovations of e-Government in Indonesia is called e-Health. In Indonesia the development of e-Government has been setted by the government through Presidential Inecard No.3 in 2003 about National Policy and Strategy. According to that Presidential Inecard, the development of e-Government is one of the government's efforts in improving the quality of public services and effective in many public sectors. Surabaya City as one of Local Government which is famous with various e-Government innovation supported by Mayor of Surabaya Regulation No.5 of 2013 about Information and Communication Technology in local government administration. Recorded there are 64 healthcare belonging to Local Government of Surabaya City which has joined in e-Health system Surabaya e-Health Service. Based on E-Health (2016), the problems make the emergence of e-Health are the volume of the queue at the healthcare and the hospital is crowd every working day, take a long time for once registration at the health center and hospital. After applying e-Health system, volume of the queue decrease until 1/3 of the total patients because the speed of registration services when using conventional methods takes an average of 90 seconds, meanwhile with e-Health only need 30 seconds. Furthermore, patients who can be treated more than a third of usually because of the speed of service by using e-Health. In other side, patient service less maximally in terms of time because of administrative issues such as patient data, and data validation. Monitoring and evaluation on e-Health continues to be done by the Government of Surabaya City with monitoring system by the Surabaya Health Office through the application collaborate with the Office of Communications and Informatics is tasked to receive complaints of people who enter the Media Center. Creative innovation in e-Health services is a communication aspect with e-Health users. The e-Health application has three languages for communicating with patients using text and audio services, such as Indonesian, Javanese, and Madurese. The selection of these three languages is based on fact that many ethnic group in Surabaya.

In the other side, Indonesia has implemented SDGs (Sustainable Development Goals) aimed at improving people's welfare in 2030. Before the existence of SDGs, Indonesia applied MGDs to improve people's welfare. But in fact until the end of of MGDs, some targets still cannot be implemented. Based on report of the Ministry of National Development Planning about MGDs in 2014, from total of 18 MDGs, Indonesia only able to realize 8 targets. MGDs indicator that has not been reached will be continued on SDGs 2015-2030. According to the Ministry of National Development Planning (2017), SDGs were selected to refine the MGDs (Goals prior to SDGs) because SDGs is more comprehensive, broader funding sources, human rights are emphasized, inclusive, involving the full stakeholders, zero goals and contains ways of implementation. SDGs in Indonesia has a foundation which the integration of national development. Based on SDGs, there are 17 targets that should be implementing by Indonesia government in future. From the targets, in the health sector there are 4 targets that must be implemented before the end of the SDGs include

zero problem in hunger, good health, sex equality and clean water and sanitation.

MATERIALS AND METHODS

This research uses qualitative data which measured in numerical scale. The data is the primary data of e-Health user from survey at health facilities and Surabaya regional government hospital via google form and direct survey. The research started from February until April 2018. The population in this research was all patients at the five highest user health facilities in Surabaya with 5.338 patients, with the number of sample are 117 patients using convenience sampling. Convenience sampling is one method of sampling technique non probability that the sampling method is with asking for respondent data that is easy to find in the all situation and any condition, making it easier to obtain data. There are advantages when using convenience sampling, such as can save costs and time, sampling unit (respondent) can be accessed, easily measured and very helpful (Sugiarto, 2001).

The identification of the variables in this research is used to measure respondent's perception and to know what variables are related to e-Health services at health facilities and hospital in Surabaya. The variables used in this research are: gender, occupation, knowledge about e-Health program, level of user satisfaction of e-Health which is divided into points and sub points, including Socialization of e-Health Service (consisting of the maximum of e-Health socialization, the influence of e-Health services socialization to use e-Health services, the expectation of user to continue e-Health in the future); E-Health Services (to access e-Health easily, design of e-Health website, e-Health role in reducing the queue, e-Health System efficiency in time and energy, tolerance to emergency patient); The Quality of e-Health Services (consisting of improving the quality of medical personnel in treatment, outpatient or inpatient with e-Health system, e-Health system to reduce the queue at clinic, order and take medicine, satisfaction of e-Health in Surabaya). In this research used Chi-square methods to know how well the relation between the observed frequency (O_i) with the expected frequency (E_i) based on the distribution to be hypothesized.

Data collection procedures in this research by using library study and supported by secondary data on other e-Health research such as e-Health website. The literature study was conducted with the intent to obtain a relevant theory used to answer hypothesis proposed. This study was done by searching for information and studying various literatures such as journals, papers and reports which is related to the research being conducted.

RESULTS AND DISCUSSIONS

Characteristics of Respondents

Using descriptive statistic, we analyze the data collected for this research on e-Health implementation in Surabaya. The survey results show that 39.32% of the 117 patients knew about the e-Health services from their family, friends, mass media, social media, or from the health centers that implement the service, while the other 60.68% didn't know e-Health prior to this questionnaire.

Based on gender, **Figure 1** shows that 57.26% of our respondents are female and 42.74% are male. Based on occupation, **Figure 2** shows that 55.56% of our respondents are students, 27.35% are either government employees, private employees, or entrepreneur, and 17.09% chose other (occupations).

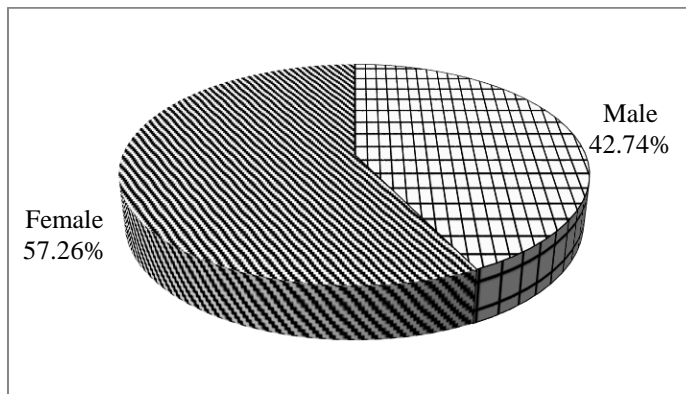


Figure 1. Percentage of Respondents in Surabaya Healthcare Based on Gender

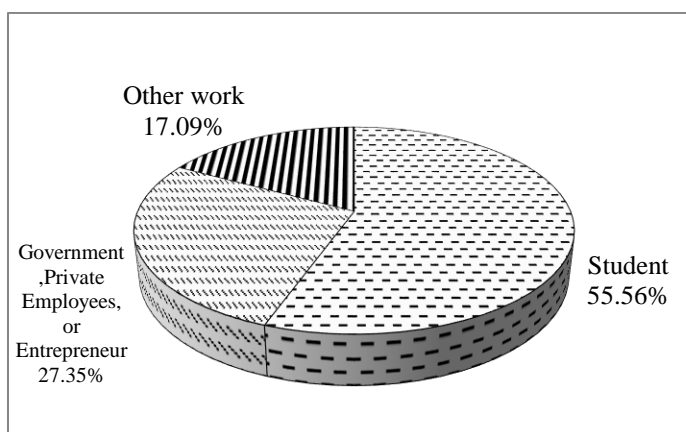


Figure 2. Percentage of Respondents in Surabaya Healthcare Based on Occupation

Validity and Reliability Test

The validity test was performed to find out the number of valid and invalid attributes. We calculate test validity of the questionnaire using 11 questionnaire items that consist 3 questions on respondents' perceptions of the socialization of e-Health services, 5 questions on e-Health access service, and 3 questions on improving the quality of e-Health services. An instrument is said to be valid if Spearman correlation $< \alpha = 0.05$. Based on the result of data analysis, all 11 items on e-Health service questions are valid. After we confirmed that the items were valid, we continued with the reliability test. An instrument is said to be reliable if Cronbach's Alpha coefficient ≥ 0.7 (Johnson & Christensen, 2012). The value of Cronbach's Alpha in this reliability test result is 0.848 therefore it can be concluded that all of the question items are reliable. In this research, we used internal reliability test of Cronbach's Alpha because our data instrument used the likert scale from 1 to 4.

Chi-square Test

The chi-square test is used to see the correlation between variables. In this research, we used 6 contingency items presented as follows:

1. Based on Gender

- a. The first objective is to find out the level of socialization on e-Health services based on gender. We set the result as follows: the row shows respondents' gender and the column shows respondents' perception on the socialization of e-Health services. The hypothesis test in this research H_0 is $P_1 = P_2$, and H_1 is $P_1 \neq P_2$; P_1 represents the proportion of male respondents who agree with statement of socialization on e-Health services, while P_2 represents the proportion of female respondents who disagree with the statement. The test was conducted using chi-square distribution with significance level 5% and degree of freedom 1 so the critical region rejects the null hypothesis if the P value is less than or equal to the significance level. Based on the test output, the results is P value 0.217, higher than 0.05. Therefore, the hypothesis test result accepts the null hypothesis. The proportion of male respondents who agree with socialization on e-Health services is equal to the proportion of female respondents who disagree.
- b. The second objective is to find out e-Health access service based on gender. We set the followings: the row shows respondents' gender and the column shows respondents' perception on e-Health access service. In this research, P_1 represents the proportion of male respondents who agree with the statement on e-Health access service, while P_2 is the proportion of female respondents who disagree with the statement. The test was conducted using chi-square distribution with significance level 5% and degrees of freedom 1 so the critical region rejects the null hypothesis if the P value is less than 0.05. Based on the test output, the results of P value is 0.002 i.e. lower than $\alpha=0.05$. Therefore, the hypothesis test result rejects the null hypothesis. Accordingly, the proportion of male respondents who agree with e-Health access service is not equal with the proportion of female respondents who disagree.
- c. Finally, we want to find out the improvement of e-Health services quality based on gender. We set the followings: the row shows the respondents' gender and the column shows the respondents' perception on improving the quality of e-Health services. In this research, P_1 is the proportion of male respondents who agree with the statement on improving quality of e-Health services, while P_2 is the proportion of female respondents who disagree with the statement. The test was conducted using chi-square distribution with significance level 5% and degrees of freedom 1 so the critical region rejects the null hypothesis if the P value is less than 0.05. Based on the test output, the result is P value 0.827, higher than $\alpha=0.05$. Therefore, hypothesis of the test result accepts the null hypothesis. Accordingly, the proportion of male respondents who agree with the statement on e-Health access service is equal to the proportion of female respondents who disagree with the statement.

2. Based on Occupation

- a. The first objective is to find out the socialization on e-Health services based on occupation. We set the following: the row shows respondents' occupation and the column shows respondents' perception on the socialization of e-Health services. The test hypothesis in this research H_0 is $P_1 = P_2 = P_3$, and H_1 is at least 1, P_i is not equal, P_1 is the proportion of students who agree with the statement on socialization of e-Health services, while P_2 is the proportion of government employees, private employees, or entrepreneur/businessman who agree with the statement, and P_3 is the proportion of respondents who chose other occupations and agree with the statement on socialization of e-Health services. The test was conducted using chi-square distribution with significance level 5% and degrees of freedom 2. Accordingly, the critical region rejects the null hypothesis if the P value is less than 0.05. Based on the test output, the results shows P value 0.001, lower than $\alpha=0.05$. Therefore, the result of hypothesis test rejects the null hypothesis. Accordingly, the proportion of students, government employees, private employees, entrepreneur or businessman, and other occupation who agree with the statement on socialization of e-Health services is not equal.

- b. Next, we want to find out the e-Health access service based on occupation. We set the followings: the row shows respondents' occupation and the column shows respondents' perception on the e-Health access service. In this research, P_1 is the proportion of students who agree with the statement of e-Health access service, while P_2 is the proportion of government employees, private employees, or entrepreneur/businessman who agree with the statement, and P_3 is the proportion of respondents who chose other occupations and agree with the statement on e-Health access service. The test was conducted using the chi-square distribution with a significance level 5% and degrees of freedom 2 so the critical region rejects the null hypothesis if the P value is less than 0.05. The test results shows P value 0.005, lower than $\alpha=0.05$. Therefore, hypothesis test result rejects the null hypothesis. Accordingly, the proportion of students, government employees, private employees, entrepreneur/businessman, and other occupations who agree with e-Health access service is not equal.

- c. Finally, we want to find out opinions on improving the quality of e-Health services based on occupation. We set the followings: the row shows respondents' occupation and the column show respondents' perception on improving the quality of e-Health services. In this research, P_1 is the proportion of students who agree with improving the quality of e-Health services, while P_2 is the proportion of government employees, private employees, or entrepreneur/ businessman who agree with the statement, and P_3 is the proportion of respondents who chose other occupations and agree in the statement of improving the quality of e-Health services. The test was conducted using a chi-square distribution with significance level 5% and degrees of freedom 2. Accordingly the critical region rejects the null hypothesis if the P value is less than 0.05. The test results shows that the P value 0.043, lower than $\alpha=0.05$. Therefore, the hypothesis test result rejects the null hypothesis. Accordingly, the proportion of students, government employees, private

employees, entrepreneur/businessman, and other occupation who agree with the statement on improving the quality of e-Health services is not equal.

CONCLUSIONS

Based on the above results and discussions, the majority of our respondents were not aware of the e-Health service thus indicates that most of the people in our population were not familiar with the system. Therefore, this is an issue for evaluation and improvement health service to achieve good health and improve access to good healthcare service in Surabaya, by for example improving the socialization system through the social media, mass media, healthcare websites, or direct counseling in community forums. People of all ages should be able to relate to this service, including the senior citizens. They can keep up with the development of technology and use the system directly. Furthermore, there is a relation between the uses of e-Health services with respondents' occupation. Employees prefer to use e-Health services due to limited free time. It takes less time using the e-Health services for registration at the healthcare center or hospital. In reality, the implementation e-Health system in Surabaya is still not in adequate mainly because there are many people who don't know about this system. When the e-Health system runs well, the community's satisfaction with the health services will increase. Therefore, this system can be applied in Indonesia if runs adequately and receives the attention both from other local governments and central government.

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We are aware that the paper needs feedback, therefore we welcome any comments or feedback to improve our research.

REFERENCES

- Adanu, T.S.A. (2007). Continuing professional development (CPD) in state-owned university libraries in Ghana. *Library Management*, 28(6/7), 292–305.
- Alsulame, K., Khalifa, M., & Househ, M. (2016). E-Health status in Saudi Arabia: A review of current literature. *Journal of Health Policy and Technology*, 5, 204–210. doi: 10.1016/j.hlpt.2016.02.005.
- Bohlander, G., & Snell, S. (2013). *Principles of human resource management*. Mason, Ohio: South-Western.
- E-Health. (2016). East Java Public Service Innovation Network. Retrieved from <http://jipp.jatimprov.go.id>

- EPF (European Patients Forum. (2016). *EPF Position Paper on e-Health*. Europe: European Union.
- Holliday, I., & Wai-Keung, T. (2004). E-Health in the East Asian tigers. *Journal of Medical Informatics*, 73(11–12), 759-769. doi: 10.1016/j.ijmedinf.2004.08.001.
- Johnson, B., & Christensen, L. (2012). *Educational Research (4th ed.)*. Los Angeles, CA: Sage
- Kristianto, E. (2013). E-Health in Indonesia. *Journal of Technic and Computer science*, 2(6), 167-171. (Text in Indonesian)
- Ministry of National Development Planning. (2017). *Arahan Terkait Pencapaian Pelaksanaan TPB/SDGs*. Semarang: Socialization Preparation RAD TPB/SDGs.
- Moisil, I., & Elena, J. (2006). E-Health progresses in Romania. *Journal of Medical Informatics*, 75(3-4), 315-321. doi: 10.1016/j.ijmedinf.2005.08.013.
- Puteh, F. (2017). Continued Professional Development and Organisational Performance: A Structural Equation Modelling (SEM). *Journal of Pertanika J. Soc. Sci. & Hum*, 25, 13-28. ISSN: 0128-7702.
- Quaglio, G., Dario, C., Stafylas, P., Tiik, M., McCormack, S., & Zilgalvis, P. et al. (2016). E-Health in Europe: Current situation and challenges ahead. *Health Policy And Technology*, 5(4), 314-317. doi: 10.1016/j.hlpt.2016.07.010
- Sa'idah, N. (2017). Analysis the Use of e-Health Based on Unified Theory of Acceptance and Use of Technology (UTAUT). *Journal of Indonesia Health Administratio*, 5(1), 72-81.
- Setianto, W.A. (2016). E-Health innovation in health office Surabaya. *Journal of communication science*, 14(3), 151-164. (Text in Indonesian)
- Sugiarso, E. A. (2001). *Teknik Sampling*. Jakarta: PT Gramedia Pustaka Utama.
- Udin, N.M., Manaf, N.A.A., Ishak, Z. & Rusniza, A. (2012). Tax Professionals' Views on Continuing Professional Development (CPD) Programs in Malaysia. *6th Knowledge Management International Conference (KMICe)*, Universiti Utara Malaysia, Johor Bahru, Malaysia, pp. 429–434.