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The analysis of digital divide in mastery of ICT in Palangka Raya city

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Abstract – This paper aimsto measurethe digital inequalityin Palangka Raya City which is performed by analyzing the factors that influence the gap and the effectiveness ofInformation and CommunicationTechnology (ICT) public services.Statistical Indicators Benchmarking The Information Society(SIBIS) method was used in this study for measuring the digital divide. Those indicators are used for analyzing and comparing different indicators and adapted to environmental conditions. Furthermore, we investigate the proper indicator such as the availability access of ICT , ICT utilization, and levels of ICT and e-government capability. The population in this study was the people of Palangka Raya City with a sample of 399 respondents. The results of digital divide measurement in this study informed that the digital divide level from some aspects such as access availability, utilization, and level of ICT capability was at a medium category, while the level of the digital divide as viewed from the element of e-government was in a low category.

Keywords – digital divide, SIBIS, ICT, e-government, Palangka Raya City

Introduction

The rapid and broad development of Information and Communication Technology (ICT) spreading have some effect on social life and social change worldwide (Warschauer & Matuchniak, 2010). These changes have some impact on the way people communicate with each other in sharing information globally for economic, political, cultural, governmental, health and other purposes.To date participating in advance of information and communication technologies evolve, we need a social facility for accessing digital technology(Lloyd, Kennan, Thompson, & Qayum, 2013).

The ability to access digital technology in the community is different. The most common aspects includethe quality of their knowledge. Furthermore, the people which able to learn and use ICT resources fullyis not much(Pedrozo, 2013). In the government, the ability to access ICT becomes more critical when it is associated with the implementation of e-government that is currently being undertaken by the government to realize public services through internet media. E-government is the government's effort in utilizing information and communication technology to improve efficiency, effectiveness, transparency, and accountability in providing services to society (Suaedi & Wardiyanto, 2010). e-Government is the use of ICT which purposes to improve the performance of government. It is performed by simplifyingtheprocesses in order to make more responsive, accurate and efficient(Gupta & Debashish, 2003). There is a need for capable human resources in accessing and using ICT correctly so that the provision of public services through the internet media can be realized.

Different levels of capability in accessing ICT will produce a different utilization that can increase access divide (Park & Kim, 2014). This condition will disturb public services and ICT control in the government sector, thereby creating a digital divide within the government and in the community. The digital divide is redefined by (Lu, Meng, Guo, & Huang, 2013), as a concept focused on the inequality of Internet use, called the "second level of digital divide". The digital divide is also defined as the gap in accessing and using computers and the Internet, which is distinguished by socioeconomic status, gender, level of life, ethnicity, and geographic location that describe the gap between communities, both for those

who have and do not have the resources to participate in an the informational era (Pati, 2017). According to (Mark, 2011), a digital gap is defined to describe unequal access to computers and the internet. The term digital divide is the gap between the access and use of digital technology(International Telecommunication Union (ITU), 2011).

This research was conducted to find out the level of the digital divide that happened in Palangka Raya City seen from aspects of ICT availability, ICT utilization, level of ICT capability, e-government, and demography.Digital divide research, seen from the perspective of the e-government web portal in Nigeria by comparing the profile and views of Nigerians living inside and outside Nigeria using the Multi-Dimensional Digital Divide Model (MDDDM), shows that there are significant digital differences between users in inside and outside Nigeria and among those living in rural and urban Nigeria (Okunola, Rowley, & Jhonson, 2017). Park and Kim's (2014) study examined digital divide policy in South Korea and investigated how Korea is one of the world's most networked nations addressing the digital divide since the advent of broadband by using the Digital Divide Index (DDI) method. This study shows a gap in certain parts of the population, such as women, the elderly and those with low incomes, low education and rural populations, who are using technology less optimally.

SIBIS is the most populartoolsmethod for measuring the digital divide. An example, (Gabriel, 2018) reported that the digital divide could be viewed on some aspects such as internet usage behavior, the use of internet and e-government which have some effects on the level of inequality. Moreover, the role of government is needed by providing socialization to the public. This role is aimed to increase knowledge in using the internet for searching for information. (Tyas, 2016), who conducted a study on the digital divide community in Pekalongan City, suggested that the digital divide can be minimized by strategizing for reducing the gap with equalization of digital access.(Yulfitri, 2008), stated that there was a relationship between the availability of ICT access facilities and the achievement of ICT mastery, the level of ICT mastery and the use of ICT.(Hidayatullah, 2013), conducted a study in South Tapanuli Regency at Plantation and Livestock Services. The results of this study indicated that the divide rate based on age group, income, education factors had a significant effect on the level of the digital divide between human resources, while gender did not have the significant effect on the level of the digital divide. (Windasari & Surendro, 2011), argued that the variables of ICT skills, the achievement of ICT capability and the inhibition of ICT adoption collectively had the significant effect on the digital divide caused by the lack of training and efforts on ICT achievement.

Based on previous studies, the SIBIS method is the most appropriate method to measure the digital divide in the community in Palangka Raya City. Moreover the indicator could be customized. Hence, the purpose of this study is divided in two (2) goals i.e. to select indicator which will be used to measure the digital divid. Analyzing of the influencing factors, and the effectiveness of ICT public service implementation will be performed also.

Materials and Methods
Research Method
Survey performs this study, and the investigation approach is adopted from to SIBIS instruments (Statistical Indicators Benchmarking The Information Society) as a reference to analyze the digital divide by determining the variables that are appropriate to the conditions in Indonesia.(SIBIS, 2003)

Data Collection
The population in this study was the people of Palangka Raya City in Central Kalimantan Province (Figure 1), aged 17 - 58 years old, divided into 5 sub-districts, namely Jekan Raya, Pahandut, Sebangau, Bukit Batu and Rakumpit sub-districts with a total of 252.105 people, consisting of 128.949 men and 123.156 women (Administrator, 2017). The sample of this study was taken from the population of as many as 399 respondents using Proportionate Stratified Random Sampling. The used variables in this study refer to the SIBIS GPS indicators, were the availability access of ICT, ICT utilization, the degree of ICT capability of e-government.(Administrator, 2017)
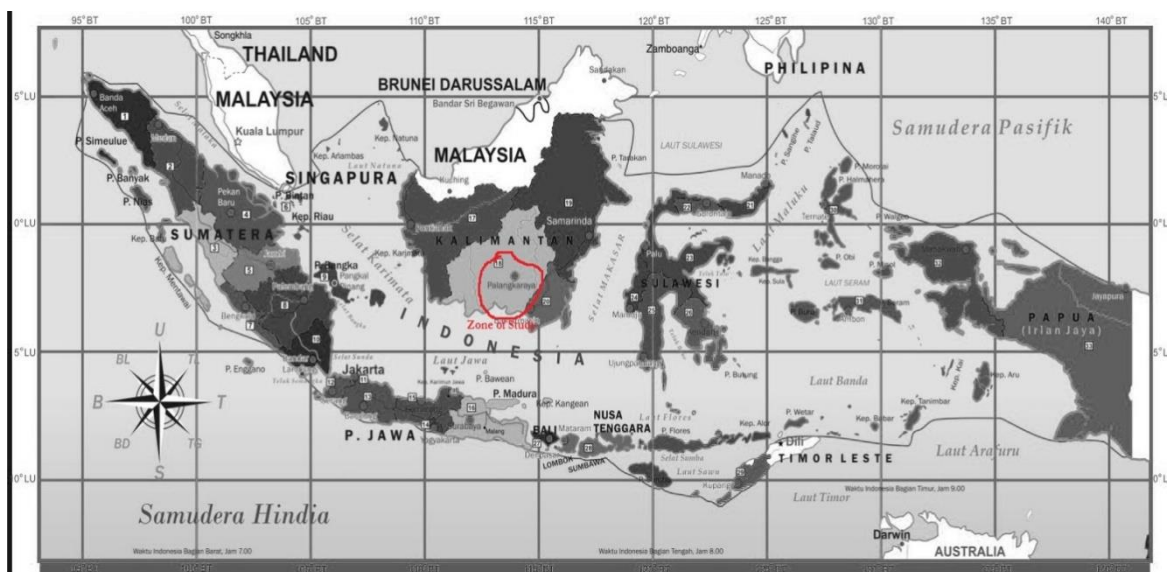
Figure 1. Indonesian map

Data Analysis

Before processing the research data, there were validity and reliability tests conducted. The research data were then processed and analyzed in the form of descriptive statistics along with the digital divide assessment index categories. Furthermore, there will be the results of digital divide assessment in the Palangka Raya City obtained based on the proper indicator i.e. the availability access of ICT, ICT utilization, the degree of ICT e-governmentwhich were categorized into the followings: (Hidayatullah, 2013)

a) Very Low   : Index ≥ 80.00%
b) Low   : 60.00% ≤ index< 80.00%
c) Medium   : 40.00% ≤ index< 60.00%
d) High   : 20.00% ≤ index< 40.00%
e) Otherwise : Very High

Results

Level of digital divide seen from the aspect of the availability of ICT, ICT utilization, ICT capability, and E-government

There are three indicators of the availability of ICT access which are calculated from 399 respondents. The first is obtained from sub-indicator the device used by respondents to access the internet is 55,01%. The second sub-indicator accessing ICT is represented by different locations, and its value is 61,89%. The last sub-indicator ICT is about ownership of ICT respondents at home is 54,83%. It shows that the average percentage of the availability of ICT access of 57,25%. Furthermore, it indicates that the digital divide seen from the aspect of the availability of ICT access in Palangka Raya City is in the medium category as can be seen in Table 1.

Three (3) sub-indicator presents the condition of ICT utilization. Sub-indicator duration and intensity in using internet is 54,31%, sub-indicator utilization termination is 52,79%, and sub-indicator e-mail utilization is to 58,73% calculated from 399 respondents, resulting in the average percentage of ICT utilization of 55,28%, indicating that the digital divide seen from the aspect of ICT utilization in Palangka Raya City is in the medium category as can be seen in Table 2.

The level of ICT capability is a medium category. It can be viewed from the average percentage of the level of ICT capability of, i.e., 57,35% as figured in Table 3.

The percentage obtained E-Government sub-indicators is from E-Government availability of 67,61%, from E-Government utilization of 62,10%, and from E-Government assessment of 66,42%, as each sub-indicator is calculated from 399 respondents, resulting in the average percentage of E-Government of 65,37%, indicating that the digital divide seen from E-Government in Palangka Raya City is in low category as can be seen in Table 4.

Table 1. Level of digital divide seen from the aspect of the availability of ICT

Indicator	Sub-Indicator	Percentage
Availability of ICT Access	The devices used	55,01%
	Accessing from different locations	61,89%
	ICT owned at home	54,83%
Average		57,25%

Table 2. Level of digital divide seen from the aspect of ICT utilization

Indicator	Sub-Indicator	Percentage
ICT Utilization	Duration and Intensity 54,31%	
Utilization Termination 52,79%		
E-mail Utilization 58,73%		
Average		55,28%

Table 3. Level of digital divide seen from the aspect of the level of ICT capability

Indicator	Sub-Indicator	Percentage
ICT Capability	Having communication through the internet 63,58%	
Installing software	46,82%	
Using the search engine	61,65%	
Average		57,35%

Table 4. Level of digital divide seen from the aspect of E-government

Indicator	Sub-Indicator	Percentage
E-government	E-government available	67,61%
E-government utilization 62,10%		
E-government assessment	66,42%	
Average		65,37%

Level of digital divide seen from the aspect of demographics

Demographic aspects of this study include gender, age, educational background, and occupation. The generated value is a description of the digital divide rate measured from the demographic aspects that can be seen in figure 2 (a, b, c, and d).

Based on gender, the digital divide index obtained on the male was 58,85% from 192 male respondents who are a moderate category, whereas the digital divide obtained from a female was 63,28% from 207 female respondents who are in the low category. Based on the measurement of the digital divide as seen from gender, there is a range of 5% and is in the low category between male and female respondents. (See Figure 2 (a))

Based on the age of respondents, the digital divide index obtained in the age range of 31-37 years old was 73,33% of 45 respondents, 38-44 years old was 69,56% of the 46 respondents, 52-58 years old was 69,44% of 36 respondents and 24-30 years old was 62,28% of 114 respondents which is in low digital divide rate. Meanwhile, the age range of 45-51 years old obtained a percentage of 57,44% of 47 respondents and 50.49% of 111 respondents in the age range of 17-23 which is in the moderate category. There was a range between 23% to 50-73%. (See Figure 2 (b))

The value of digital divide index based on the educational background of the respondents can be seen in figure 2 (c). Master level is 71,42%, obtained from 15 respondents; Diploma level is 65,38%, obtained from 52 responders; Bachelor level is 61,60%, obtained from 112 respondents; and Senior High School level is 60,09%, obtained from 213 respondents; as based on the educational background of Master, Bachelor, Diploma, and Senior High School levels, it is in the low category. The Junior High School level is in the moderate category, with a percentage of 53,33%, obtained from 7 respondents. (See Figure 2 (c))

The digital divide index based on the occupation of each respondent can be seen in Figure 2 (d). The digital divide level seen from the occupation as civil servants is 71.79%, obtained from 78 respondents, as students are 71,87% obtained from 32 respondents, as private employees are 64,51% obtained from 155 respondents and as students are 61,53% obtained from 39 respondents, as all fall into

the low category. While the respondents with an occupation as an entrepreneur have 50% digital divide as obtained from 30 respondents and as unemployed have 40% digital divide as obtained from 65 respondents, all fall into the moderate category. (See figure 2 (d))

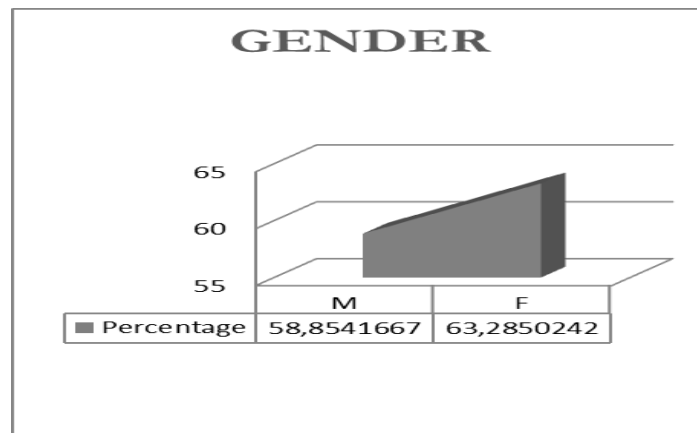Figure 2 (a).Digital Divide based on Gender
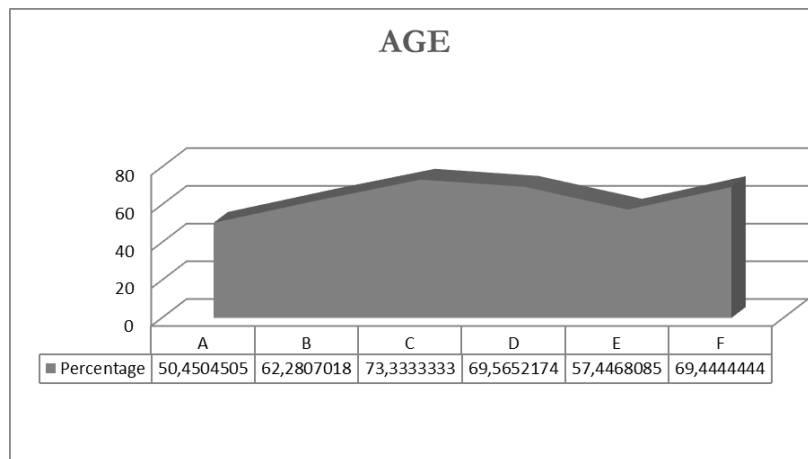

Figure 2 (b). Digital Divide based on Age

Information:
A: 17-23 years old   D: 38-44 years old
B: 24-30 years old   E:45-51 years old
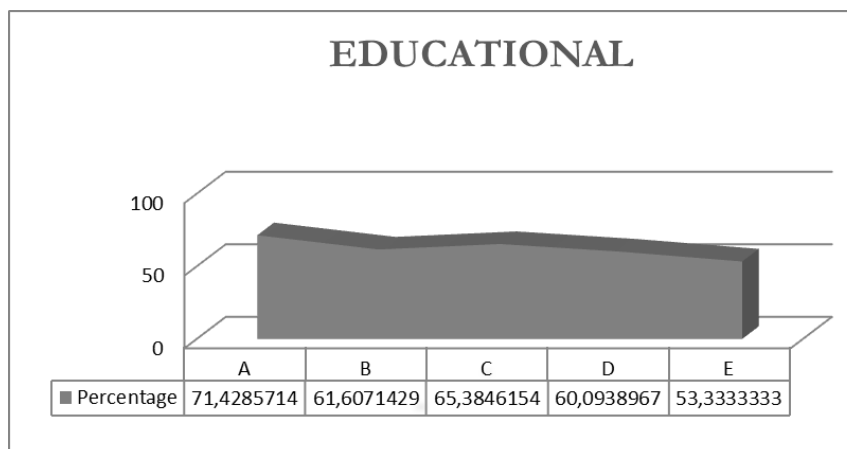C: 31-37 years old   F: 52-58 years old

Figure 2 (c). Digital Divide based on Educational background

Information:
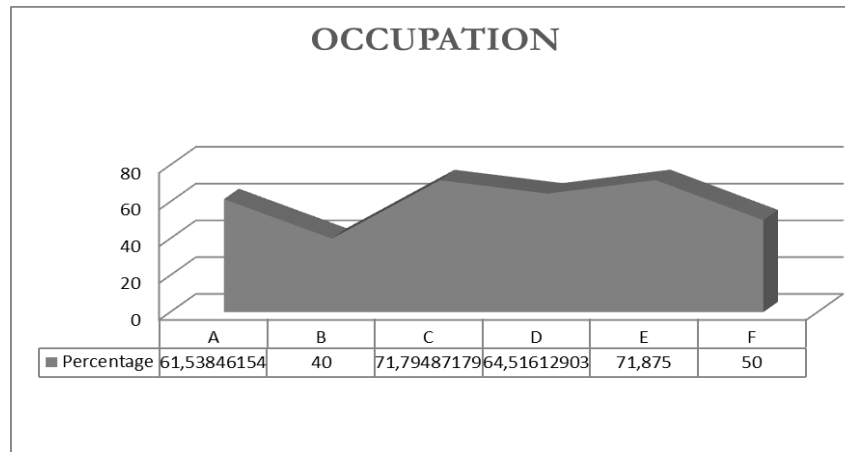A: MasterB: BachelorC: Diploma 1-3D: Senior High SchoolE: Junior High School

Figure 2 (d). Digital Divide based on Occupation

Information:
A: Student   D: Private Employee
B: Unemployed   E: College Student
C: Civil Servant   F: Self-Employed

Discussion

Previous studies have explained that the digital divide is may be due to several factors such as ICT infrastructures, social, culture, demographics, and economy which contribute having some effect on the occurrence of the digital divide in a particular country or region. The findings in this study verify that there is a conceptualization of the multidimensional natures of the digital divide (Zhao, Collier, & Deng, 2014).

The findings of this study support the argument above, concluding that the ICT infrastructure and demographic factors have some effect on the degree of the digital divide in Palangka Raya City and on the development of government service, namely e-government. In addition to e-government and demographic element, there are aspects of the availability of ICT access, ICT utilization and level of ICT capability examined in this study.

The study conducted by (Antonio & Tuffley, 2014)suggests that gender and age are two demographic characteristics that have been extensively studied by previous studies about access and use of ICT. Regarding gender, there is evidence of studies showed that women use more ICT facilities than men and this is often the case in developing countries. Opinions in the review apply to this study as shown in Figure 2. above. The divide rate of a female is lower than on male. In the age range of 24-44 years old, the divide is in the low category with the support of educational background and occupation as that age is the productive age in working and utilizing ICT in general. In general, the educated and working respondents have greater access and use to ICT facilities and lead to higher levels of Internet experience. As the findings in previous studies have proven that educational background has a significant effect on the measurement of divide and access to ICT (Puspitasari & Ishii, 2016).

The practical implications of this research are that the digital divide and the development of e-government services are interrelated because they share the same factors and dimensions as the measurement results that are in the low gap category. The findings of this study are expected to help the local government of Palangka Raya City focuses on developing a uniform policy and infrastructure development strategy to address the digital divide and improve e-government development to achieve maximum service. The government needs to provide training and education for the poor people and those who lack knowledge of technology so that the community realizes the usefulness of e-government services. The trust in government services will have some effect on the perceived value of e-government utilization to reduce the level of the divide in utilizing e-government services.

Conclusions

From the measurement of the digital divide in this study, it can be concluded that demographic aspects have some effect on the level of the digital divide in society in Palangka Raya City with the difference of ICT access between male and female, woman, age, educational background, and occupation. ICT public service in Palangka Raya City runs effectively and efficiently with the results of research on the aspect of e-government is in a low category.

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