

The Effects of Human Resources Quality, Infrastructure, Leadership, and Communication on E-Government Implementation: A Case of Indonesia Local Government

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Abstract

This research aimed to examine the effects of human resources quality, infrastructure, leadership, and communication on e-government implementation. It used statistical methods and multiple regression analysis to figure out the relationships between variables. Data collection was conducted through observation, questionnaire survey, and literature study or documentation. By applying Slovin's formula to determine the sample size, 245 respondents were obtained from a population of local public officers in the Yapen Islands Regency of Papua. The results show that human resources quality and communication had significant effects on e-government implementation, while infrastructure and leadership did not affect e-government implementation.

Keywords

human resources quality;
infrastructure; leadership;
communication; e-government



I. Introduction

In the 21st century, or the era widely referred to as the digital era, the most developed information technologies are web- or Internet-based (Sethuraman, 2017). Internet technologies amongst the community can meet the information needs instantly, precisely, and accurately (Setiawan, 2017). This current phenomenon makes information technologies necessary that every individual, group, company, or government institution must fulfill (Cui et al., 2015).

In general, every local government strives to run the government wheel well to realize a good government through better public services (Akib et al., 2016). To this end, both central and local governments have started to implement an electronic government system commonly called e-government (Salsabila & Purnomo, 2017). To implement this e-government system, local governments are expected to apply care in seeing and analyzing the factors that can influence its success in a government environment (Stefanovic et al., 2016).

Lee (2009) states that e-government implementation in numerous countries falls short of expectations. Heeks's research (2003) revealed that 35% of e-government projects in developing countries experienced total failures, 50% experienced partial failures, and only 15% were considered successful. Heeks (2003) argued that some factors contributed to e-government implementation failures in developing countries; for example, the public administration system, internal rejection by the government, a lack of plans and strategies, partial, unsystematic e-government introduction, and the insufficient number of human resources. The other factors are an absence of investment plans, the insufficient number of information system and technology vendors, technological immaturity, too much emphasis on technology and technology-based implementation, and hurried implementation without adequate preparation and testing.

E-government implementation in Indonesia is governed under Presidential Instruction No. 3 of 2003 on National Policies and Strategies, which mandates that ministries or state, provincial, regency, and city institutions across Indonesia must implement e-government in delivering services to the community. Local governments are obliged to provide public services as mandated by Article 22 of Law No. 32 of 2004. There are a total of 15 obligations local governments must exercise, as follows: to protect the public and maintain the national unity, integrity, and harmony, and the Republic of Indonesia; improve the public's quality of life; improve essential educational services; provide health service facilities; provide decent social and public facilities. The above mentioned are part of public services that must be made available by the government, including the government of the Yapen Islands Regency. The government of the Yapen Islands Regency of Papua Province is among the government institutions that have started implementing the e-government system since the launch of the Corruption Eradication Commission action plan of 2017.

The Yapen Islands Regency government has developed information technologies, with the continuous development of various e-government applications in each local government agency (OPD). This process starts with e-planning and e-budgeting implementation, with the support from Regulation of the Minister of Home Affairs No. 90 of 2019 on Classification, Codification, and Nomenclature Regional Planning, Development, and Finance. The local government has also implemented the TPB (supplemental conditional income) application with the backing of Regent Regulation No. 26 of 2019 on Payment of Supplemental Conditional Income to Public Officers in the Yapen Islands Regency Government. This application implementation has generally been in place, but it faces some problems, one of which is the absence of application integration due to unavailable sufficient Internet network.

The other problem was the budget for information infrastructure development in the Yapen Islands Regency, not the priority. It could be seen in the allocated budget for information technology development was relatively small for the last five-years local budget. (APBD – local budget of 2017, 2018, 2019, and 2020). Furthermore, information technology development initiatives are still scattered in each local government agency, leading to the formation of information system cells, lack of complete integration, perceived wasted of the budget that is allocated for information technology devices in a considerable amount in each local government agency, and the generation of outcomes which are not on par with the budget disbursed (Abdiyanto & Warokka, 2015).

The research by Novita (2014) on the inhibitory factors in e-government development showed that human resources issues inhibit e-government development. Nevertheless, previous research by Dewi and Haryanto (2013) indicated that the education level of the community (human resources) did not significantly influence e-government implementation.

Numerous factors contribute to the problems in e-government implementation in the environment of the Yapen Islands Regency government. Therefore, the researchers conducted a preliminary survey on 40 respondents who came from a couple of local government agencies to determine the factors that influence the success of e-government implementation in the environment of the Yapen Islands Regency government. The survey was conducted via Google Forms, whose link was disseminated to each respondent's WhatsApp contact. This survey involved ten independent variables: organizational culture, organizational structure, policies, human resources, leadership, communication, infrastructure, application, information technology standards, and awareness. Of the ten variables, the researchers extracted the four most voted variables, namely, human resources, infrastructure, leadership, and communication.

Based on the phenomena and research gap described above as well as the observation of some earlier works, coupled with the results of the preliminary survey of the factors that influence e-government implementation in the Yapen Islands Regency, the researchers took an interest in reinvestigating the effects of human resources quality, infrastructure, leadership, and communication on e-government implementation. This research aimed to analyze and describe

the effects of human resources quality, infrastructure, leadership, and communication on e-government implementation in the Yapen Islands Regency.

In this study, the researchers set a scope for the variables information and communications infrastructure and leadership to prevent too broad a discussion. The discussion of information and communications infrastructure was restricted only to Internat/Intranet/LAN network, while leadership was restricted to Echelon II.b and Echelon III local government organization leaders.

II. Review of Literatures

2.1 E-Government

E-government by Khalil *et al.* (2002) is defined as the use of information technologies, such as a wide area network (WAN), by a government agent. The Internet with mobile computing can transform relationships with the community, businesses, and government institutions. According to Indrajit *et al.* (2005), e-government is a novel interaction mechanism between the government and the community and other interested parties with information technology (especially the Internet) use for service quality improvement.

2.2 Human Resources Quality

As posited by Sedermayanti (2009), quality is a measure that states the extent to which various requirements, specifications, and expectations are fulfilled. Meanwhile, human resources or employees in an organization play an essential role in the organization's success. Human resources quality, according to Matindas (2002), is the willingness of every employee to complete his/her work, develop him-/herself, and encourage his/her colleagues' self-development.

Human resources are one of the factors that affect e-government implementation success (Surdin, 2017). Organizations are in grave need of competent human resources with high knowledge for accurate, practical e-government system use (Choi *et al.*, 2016). Previous research by Ariana *et al.* (2020), Multama *et al.* (2018), Probowulan (2016), Novita (2014), and Lee (2009) showed that qualified human resources influence e-government implementation. Hence, referring to previous empirical findings, the first hypothesis to be proposed is as follows:

H1: Human resources quality affects e-government implementation in the environment of the Yapen Islands Regency government.

2.3 Infrastructure

The American Public Works Association in Kodoatie (2005) defines the infrastructure as the physical facilities developed or needed by public agents to serve government functions in the provision of water, electrical power, waste disposal, transportation, and similar services to facilitate social and economic purposes. Meanwhile, Presidential Regulation No. 38 of 2015 defines infrastructure as the technical, physical, and hardware and software facilities needed to provide the community with services and to support structural networks for the community's profitable economic and social growth.

Infrastructure directly influences e-government implementation, and the infrastructure quality determines how successful or failed an e-government program is (Gyamfi *et al.*, 2019; Sami *et al.*, 2011). E-government success needs an appropriate information technology infrastructure to support the systems and applications was developed before the e-government program is implemented (Sirat & Komputer, 2013). Besides, previous research by Choi *et al.* (2016), Sorn-In *et al.* (2015), Novita (2014), Al-Shlboul *et al.* (2014), and Sirat (2013) showed that infrastructure influences e-government

implementation. Hence, referring to previous empirical findings, the second hypothesis to be proposed is as follows:

H2: Infrastructure has an effect on e-government implementation in the environment of the Yapen Islands Regency government.

2.4 Leadership

Northouse (2003) says that leadership is an individual's endeavor to control a group for his/her interests. Meanwhile, Dubrin (2015) states that leadership is about instilling belief to win members' support to attain an organization's goals. It also has characteristics of originality, anti-establishment, the acknowledgment that responsibility is in the leader's hands, and commitment to the right things (Rizanuddin, 2020).

Strong leadership is needed to accelerate the e-government implementation process and to deal with the problems that frequently arise due to the involvement of coordination with a variety of sectors (Rante & Warokka, 2016; CP & Susanto, 2019). Strong leadership is also vital for ensuring the success of e-government success as an effective leader will influence his organization's employees (Al-Azri *et al.*, 2010). Previous research by CP and Susanto (2019), Al-Shboul (2014), Sirat (2013), Al-Kaabi (2010), and Al-Azri *et al.* (2010) showed that leadership influences e-government implementation. Thus, referring to previous empirical findings, the third hypothesis proposed is as follows:

H3: Leadership has an effect on e-government implementation in the environment of the Yapen Islands Regency government.

2.5 Communication

As stated by Mulyana (2012), communication can be discerned in three manners: communication as one-way action, communication as interaction, and communication as a transaction. Tubbs and Moss, as quoted by Mulyana (2005), further explain that communication is a process of meaning construction between two people or more. Lasswell (2017) defines communication as a one-way message delivery process that may generate an effect.

Communication has a significant effect on the implementation success of a policy because good communication will smoothen the policy implementation according to the goals that have been set when the policy was made (Suriyani, 2018; Hartati, 2020). Ziadi *et al.* (2016) and Al-Kaabi (2010) showed that communication influences e-government implementation. Thus, referring to previous empirical findings, the fourth hypothesis to be proposed is as follows:

H4: Communication has an effect on e-government implementation in the environment of the Yapen Islands Regency government.

The four hypotheses proposed are then summarized in the following research model (Figure 1).

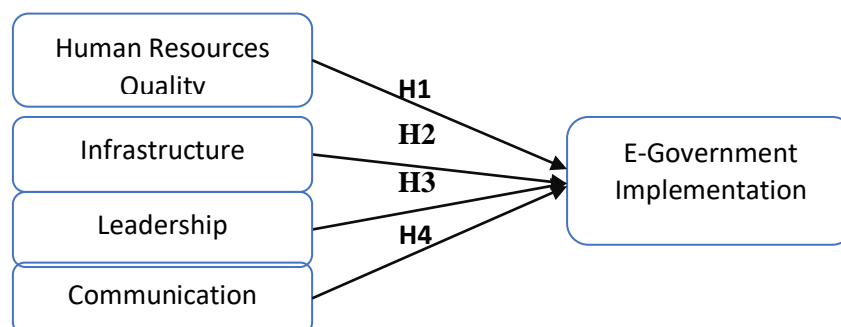


Figure 1. Research Model

III. Research Methods

This research used quantitative methods, which included data collection and analysis with statistical testing methods. The population of this research was 650 state civil officers in several local government agencies in the Yapen Islands Regency in Papua. Slovin's formula was used to determine the sample size. From the returned 246-questionnaires, only 245 questionnaires were used for the next process.

The data analysis methods used in this research consisted of descriptive statistical analysis, research instrument test, classical assumption test, multiple regression analysis, and hypotheses testing. In this research, data were processed with the SPSS version 22. The variables in this research consisted of independent and dependent variables. The independent variables were human resources quality, infrastructure, leadership, and communication, while the dependent variable was e-government implementation.

IV. Results and Discussion

In this research, the respondents were public officers who worked in the Yapen Islands Regency. Some selected local government agencies served as representatives. These local apparatus organizations were the ones that used e-government the most. The respondents' characteristics were focused on gender, age, latest education level, number of years worked, and position (see Table 1).

Table 1. Respondents' Characteristics Description

Categories	Answer Alternatives	Number of Respondents	Percentage (%)
Gender	Male	154	62.86%
	Female	91	37.14%
Age	20–30 Years	0	0%
	31–40 Years	50	20.4%
	> 40 Years	195	79.6%
Education	Senior High School/equivalent	5	2%
	D3	18	7%
	S1	193	79%
	S2	19	12%
	S3	0	0
Position	Echelon II	23	15.33%
	Echelon III	51	34.00%
	Echelon IV	20	13.33%
	Staff	56	37.33%

Based on the respondents' characteristics data, the majority of the respondents were male (62.86%), aged older than 40 years (79.6%), in possession of a Bachelor's degree (79%), and Echelon III position (34%).

Descriptive analysis was used to describe the conditions and characteristics of the respondents' answers for each construct/factor or variable studied. The analysis results were used to identify the tendency of the respondents' answers regarding each variable

studied. The variable human resources quality consisted of eight indicators, infrastructure five indicators, leadership 14 indicators, communication nine indicators, and e-government nine indicators.

The respondents' answers were categorized with an interval calculated by dividing the delta of maximum and minimum scores by five. The calculation yielded an interval of 0.80. According to Sugiyono (2013), with an interval of 0.80, the categorization system was as follows: 1.00–1.80 (very low); 1.81–2.60 (low); 2.61–3.40 (fair); 3.41–4.20 (high); and 4.21–5.00 (very high).

Table 2. Respondents' Opinions Distribution

Items	Opinion Alternatives					Total	Means	Categories
	SA	A	N	D	SD			
	5	4	3	2	1			
X1.1 The staff members are always healthy	26	148	59	11	1	245	3.76	High
X1.2 The staff members work throughout the working hours	29	155	41	19	1	245	3.78	High
X1.3 The staff members' education is equal to undergraduate level	18	163	32	26	6	245	3.66	High
X1.4 The staff members' education matches their main tasks and functions	7	154	54	25	5	245	3.54	High
X1.5 The staff members belong to the information technology staff	10	155	44	33	3	245	3.56	High
X1.6 The staff members' placement in the information technology staff is appropriate	11	120	57	53	4	245	3.33	Fair
X1.7 The staff members participate in technical coaching on information and communications technology	21	115	44	60	5	245	3.36	Fair
X1.8 The staff members are certified information technology staffers	16	94	67	59	9	245	3.20	Fair
Mean							3.52	High
X2.1 A working space is provided	36	173	30	6	-	245	3.97	High
X2.2 A desk and a chair are provided	38	178	24	5	-	245	4.01	High
X2.3 A computer is provided	11	161	42	30	1	245	3.61	High

X2.4	Connection to LAN & the Internet is available	8	136	56	43	2	245	3.42	High
X2.5	A server room is available	14	164	52	15	-	245	3.72	High
Mean								3.75	High
X3.1	A strong relationship is built with staff members	47	191	7	-	-	245	4.16	High
X3.2	The leader always motivates the staff members	66	172	5	2	-	245	4.23	Very High
X3.3	The leader is able to work extra time	49	158	19	15	4	245	3.95	High
X3.4	The leader requests subordinates to complete the work on time	40	188	12	5	-	245	4.07	High
X3.5	The leader is present on time	38	177	22	8	-	245	4.00	High
X3.6	The leader makes decision through deliberations	37	181	25	2	-	245	4.03	High
X3.7	The leader solves problems accurately	28	193	24	-	-	245	4.02	High
X3.8	The leader is able to examine problems	22	186	32	5	-	245	3.92	High
X3.9	The leader supports information technology developers	43	174	26	2	-	245	4.05	High
X3.10	The leader is directly involved in e-government implementation	35	171	37	2	-	245	3.97	High
X3.11	The leader always inspects the information and communications technologies' conditions	36	149	35	21	4	245	3.78	High
X3.12	The leader involves subordinates in technical coaching on information and communications technologies	44	175	21	5	-	245	4.05	High
X3.13	The leader puts broader interests first	22	136	30	40	17	245	3.43	High

X3.14	The leader is able to complete tasks both individually and in groups	17	182	12	25	9	245	3.71	High
Mean								3.95	High
X4.1	The organization's vision and missions	36	194	14	1	-	245	4.08	High
X4.2	SOP on main tasks and functions is in place	33	203	9	-	-	245	4.10	High
X4.3	Clear instructions are in place	27	212	5	1	-	245	4.08	High
X4.4	Information regarding policies and rules is available	45	187	13	-	-	245	4.13	High
X4.5	Reports on work outcomes are available	36	198	10	1	-	245	4.10	High
X4.6	Support information openness	39	185	18	3	-	245	4.06	High
X4.7	Communication between units runs effectively	31	194	19	1	-	245	4.04	High
X4.8	There are coordination and collaborations between work units	40	186	19	-	-	245	4.08	High
X4.9	There are exchanges of information between local government agencies	52	170	20	3	-	245	4.10	High
Means								4.08	High
Y.1	Regional regulation on e-government is in place	3	30	97	72	43	245	2.50	Low
Y.2	There is coordination between local government agencies regarding e-government implementation	9	182	39	14	1	245	3.75	High
Y.3	Local apparatus organizations support e-government implementation	19	192	26	8	-	245	3.74	High

Y.4	Support the <i>satu data</i> program	26	186	29	4	-	245	3.95	High
Y.5	Local government agencies can access regional government data	25	184	31	5	-	245	3.93	High
Y.6	Local government agencies have an e-government application related to main tasks and functions	14	115	68	39	9	245	3.31	Fair
Y.7	Local government agencies understand and keep an update on information technology development	16	174	34	16	5	245	3.73	High
Y.8	Local government agencies have reliable admins/operators in running e-government application	13	159	49	21	3	245	3.64	High
Mean								3.56	High

Note: SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree; X1 = Human Resources Quality; X2 = Infrastructure; X3 = Leadership; X4 = Communication; Y = E-Government.

Based on the respondents' opinions distribution presented in Table 2, the respondents had an overall judgment that human resources quality, infrastructure, leadership, and communication had strong effects on e-government implementation. This finding is seen in the mean scores generated—3.52, 3.75, 3.95, 4.08, and 3.56, respectively which belonged to the high category (within the range 3.41—4.20).

Table 3. Results of Validity and Reliability Tests

Items	R Count	Cronbach's Alpha
X1.1	0.298	0.737
X1.2	0.501	
X1.3	0.482	
X1.4	0.470	
X1.5	0.618	
X1.6	0.766	
X1.7	0.711	
X1.8	0.797	
X2.1	0.722	0.718
X2.2	0.748	
X2.3	0.780	

X2.4	0.686	
X2.5	0.525	
X3.1	0.585	
X3.2	0.527	
X3.3	0.444	
X3.4	0.565	
X3.5	0.409	
X3.6	0.433	
X3.7	0.524	0.857
X3.8	0.739	
X3.9	0.735	
X3.10	0.701	
X3.11	0.728	
X3.12	0.720	
X3.13	0.690	
X3.14	0.684	
X4.1	0.689	
X4.2	0.570	
X4.3	0.628	
X4.4	0.651	
X4.5	0.670	0.849
X4.6	0.726	
X4.7	0.702	
X4.8	0.731	
X4.9	0.698	
Y.1	0.432	
Y.2	0.455	
Y.3	0.576	
Y.4	0.534	0.633
Y.5	0.441	
Y.6	0.752	
Y.7	0.576	
Y.8	0.517	

A validity test is aimed to indicate the level of validity of an instrument (Ridwan & Sunarto, 2013). Validity testing was conducted with the Pearson Product Moment test. The result shows that all the statements had r-statistic values more significant than the t table of 0.125, meaning that all the statements were valid. Other than the validity test, a reliability test was also conducted to examine whether the instrument had a high-reliability level. The result shows that all the variables had Cronbach's alpha values greater than 0.6, meaning that all the variables were reliable.

Table 4. Results of Classical Assumption Test

Normality Test		Multicollinearity Test			Heteroscedasticity Test	
Kolmogorov Smirnov	Asymp. Sig	Variables	Tolerance	VIF	Sig. Value	Sig. Limit
0.905	0.386	X1	0.690	1.449	0.110	0.05
		X2	0.765	1.307	0.938	0.05
		X3	0.442	2.263	0.993	0.05
		X4	0.469	2.134	0.523	0.05

The classical assumption test is one of the requirements that must be fulfilled before conducting multiple regression analysis. This test consists of the normality test, multicollinearity test, and heteroscedasticity test. A normality test was conducted to examine whether the variables in the regression model had normally-distributed data or not. The result shows that Asymp. Sig obtained was 0.386, which was greater than 0.05. Thus, it can be said that the data were normally distributed.

A multicollinearity test was conducted to figure out whether in the regression model a correlation between independent variables was present. The result shows that all the independent variables had tolerance values > 0.10. This finding means that no problem was found in the multicollinearity test. Besides, from the VIF calculation, all the independent variables had VIF values < 10. It can be concluded that no multicollinearity was present between the independent variables in the regression model. Then, a heteroscedasticity test was conducted to figure out whether there was a similarity in the variability of residuals across different observations. A regression model meets the requirement if it has the same variability of residuals from one observation to another.

Table 5. Results of Multiple Regression Analysis and Hypotheses Testing

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	2.944	1.976			1.490	.137
	Human resources quality	.306	.042	.406		7.207	.000
	Infrastructure	.102	.069	.079		1.477	.141
	Leadership	.020	.039	.037		.520	.603
	Communication	.385	.074	.356		5.201	.000
	Adjusted R Square	0.466					

Dependent Variable: E-Government Implementation

Based on the heteroscedasticity testing with the Glejser test, the result of which is presented in Table 4, it can be concluded that each independent variable had a sig.-value greater than 0.05. In other words, no heteroscedasticity was present.

Based on the result of the SPSS- (Statistical Product and Service Solutions) aided multiple regression analysis as shown in Table 4.5, the following regression equation was obtained:

$$Y = 2.944 + 0.306X_1 + 0.102X_2 + 0.020X_3 + 0.385X_4$$

Based on the regression equation calculated above, the effects of human resource quality (X1), infrastructure (X2), leadership (X3), and communication (X4) on e-government (Y) can be explained as follows:

1. The constant = 2.944 denotes that if human resources quality (X1), infrastructure (X2), leadership (X3), and communication (X4) were held constant, e-government (Y) would have a value of 2.944.
2. The coefficient of the variable human resources quality was 0.306. The positive mark of the coefficient would mean that for every increase of the quality of a human resource (X1) unit, e-government (Y) would increase by 0.306, with the assumption that the variables infrastructure (X2), leadership (X3), and communication (X4) had constant values.
3. The coefficient of the variable infrastructure was 0.102. The positive mark of the coefficient would mean that for every increase of an infrastructure (X2) unit, e-government (Y) would increase by 0.102, with the assumption that the variables human resources quality (X1), leadership (X3), and communication (X4) had constant values.
4. The coefficient of the variable leadership was 0.020. The positive mark of the coefficient would mean that for every increase of a leadership (X3) unit, e-government (Y) would increase by 0.020, with the assumption that the variables human resources quality (X1), infrastructure (X2), and communication (X4) had constant values.
5. The coefficient of the variable communication was 0.385. The positive mark of the coefficient would mean that for every increase of a leadership (X3) unit, e-government (Y) would increase by 0.385, with the assumption that the variables human resources quality (X1), infrastructure (X2), and leadership (X3) had constant values.

To examine the effects of independent variables on the dependent variable, a t-test was conducted. The t-statistics of the variable human resources quality was 7.207, which was greater than the t table 1.651, and the sig.-level was 0.000. It could be concluded that human resources quality (X1) significantly affected e-government implementation in the Yapen Islands Regency. Thus, the first hypothesis saying that human resources quality affects e-government implementation in the Yapen Islands Regency, was accepted.

This result is in line with the research by Ariana *et al.* (2020), Multama *et al.* (2018), Probowulan (2016), Novita (2014), and Lee (2009), which stated that human resource quality affects e-government implementation. This finding means that when human resources quality is improved, e-government implementation will become easier. In the context of the quality of the human resources of public officers (ASN) in the Yapen Islands Regency government, the role of human resources was central in the effort to achieve the regency's vision and missions. Human resources quality was highly influential to e-government implementation. With human resources of quality, the existing e-government applications in local government organizations will be operable.

The variable infrastructure had t-statistics of 1.477, which was smaller than the t-table of 1.651, and the sig.-level was 0.141. It could be concluded that infrastructure (X2) had no effect on e-government implementation in the Yapen Islands Regency government. Thus, the second hypothesis saying that infrastructure affects e-government implementation in the environment of the Yapen Islands Regency, was rejected.

This result is not in line with the research by Choi *et al.* (2016), Sorn-In *et al.* (2015), Novita (2014), Al-Shlboul *et al.* (2014), and Sirat (2013), but it agrees with that by Riyadh *et al.* (2019). Infrastructure had no significant effect on e-government implementation because of the challenges the government was facing in information technology infrastructure development (Riyadh *et al.*, 2019).

Referring to the descriptive analysis results, the statement “Connection to LAN & the Internet is available” had a mean value of 3.42. The statement in the indicator X2.4 was perceived as the lowest among the five statements (indicators). This low score came from the fact that only a few local government organizations were connected to LAN and Internet networks. Based on the fact in the field, the e-government of the Yapen Islands Regency had featured the Corruption Eradication Commission program through the Corruption Eradication Commission Action Plan of 2017. However, to date, information and communications technology infrastructure have yet to become a priority in the development program of the Yapen Islands Regency. The local government was still dependent on central government aids, which were only aimed to stimulate local governments. This fact is as evident in the smaller amount of budget allocated for information and communications technologies than to other sectors. The 2020 activity programs in the Local Information and Communications Office, which was assigned with main tasks in information and communications technology infrastructure development, were allocated with an infrastructure fund of no more than Rp1.5 billion, equal to USD 100,000 (DPA Dinas Kominfo 2020).

The t-statistics of the next variable, leadership, was 0.520, which was smaller than the t table of 1.651, and the sig.-value was 0.603. It could be concluded that leadership (X3) had no partial effect on e-government implementation in the Yapen Islands Regency. Thus, the third hypothesis saying that leadership affects e-government implementation in the Yapen Islands Regency was rejected.

This result is not in line with the research by CP and Susanto (2019), Al-Shboul (2014), Sirat (2013), Al-Kaabi (2010), and Al-Azri *et al.* (2010), but it agrees with the research by Husain and Fauziati (2018) and Wicaksono (2013). Based on the respondents’ opinions distribution, the statement “The leaders put broader interests first” had a mean value of 3.43. In other words, the statement in the indicator X3.13 was perceived as the lowest among the 14 statements (indicators), with a mean value (3.43) belonging to the neutral category. This finding is attributed to the leaders’ differing leadership styles, in which case there were some who were focused more on broader interests and there were some who focused more on the internal interests of their respective local government agency or on doing something according to their main tasks and functions.

The t count of the variable communication was 5.201, which was greater than the t table of 1.651, and the sig.-level was 0.000. It could be concluded that communication (X4) had a significant effect on e-government implementation. Thus, the fourth hypothesis saying that communication affects e-government implementation in the Yapen Islands Regency, was accepted.

This result is in line with the research by Ziadi *et al.* (2016) and Al-Kaabi (2010), which stated that communication affects e-government implementation. The fact in the field indicates that communication in the environment of the Yapen Islands Regency government had a central role, especially in the *satu (one) data* program or the data center of the regency. Communication is critical for improving coordination between local apparatus organizations, particularly in data exchange or processing. For instance, the Regional Development Planning Agency (Bappeda) of the Yapen Islands Regency established good communication for smooth collection of local government agency’s work planning data to draft the regional planning documents (RKPD) available in the E-Planning application. The implementation of e-government should be supported by good communication between local apparatus organizations. In other words, the better the communication established, the better the e-government implementation. Thus, it can be

said that communication significantly influenced e-government implementation in the Yapen Islands Regency.

Lastly, the R^{squared} (coefficient of determination) test was conducted to measure the ability of the variables human resources quality (X1), infrastructure (X2), leadership (X3), and communication (X4) to explain the variation in the variable e-government implementation (Y). The adjusted R-squared value obtained from the test was 0.466. The interpretation for this value is that 46.6% of the dependent variable e-government implementation was influenced by the independent variables human resources quality, infrastructure, leadership, and communication. The remaining 53.34% was influenced by other variables unexplored in this research.

V. Conclusion

This research examined the effects of human resources quality, infrastructure, leadership, and communication on e-government implementation in the Yapen Islands Regency. Based on the results of the tests conducted, the following conclusions were drawn. First, human resources quality affected e-government implementation. This finding means that if the human resources' quality is improved, e-government implementation in the Yapen Islands Regency will become easier. Second, infrastructure and leadership did not influence the success of e-government implementation in the Yapen Islands Regency. Finally, communication had an effect on e-government implementation in the Yapen Islands Regency. The better the communication, the better the e-government implementation.

The results of this research have several critical implications. First, the local government agencies in the Yapen Islands Regency should continuously improve the quality of their public officers through both improved education and training to enhance their ability to run e-government successfully. Then, better and improved-communication networks and platforms should be established among local government agencies in the Yapen Islands Regency to ensure a better and coordinated e-government implementation.

It is also expected that leaders of local government agencies play a greater role in e-government implementation, giving a more significant force to their leadership role in influencing e-government implementation. Concerning infrastructure, the Yapen Islands Regency, through local government agencies' main tasks and functions, are expected to continuously improve and give priority to network infrastructure development for the e-government implementation to operate as designed.

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