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-RESEARCH ARTICLE-

THE EFFECT OF E-GOVERNMENT ON LOCAL GOVERNMENT PERFORMANCE ACCOUNTABILITY IN INDONESIA

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─Abstract─

There are very few studies on the effect of e-government on public sector accountability, particularly in developing nations. Using Indonesia as a case study, this study aims to address a research vacuum by analyzing the effect of e-Government on district government performance accountability. The accountability variable is measured using grades ranging from 1 to 3 (low to high)v from the Government Agency Performance Accountability Report (Laporan Akuntabilitas Kinerja Instansi Pemerintah/LAKIP), which reflects the performance achieved by local government institutions over implementation activities funded by the public budget. We used cross-sectional data in 2020, and due to insufficient data for some districts, we employed the purposive sampling technique to observe 435 sample districts out of Indonesia's 515 administrative governments. The sample size exceeds the Fisher formula's recommended minimum

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Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

value. For quantitative testing, we employ ordered logit regression and classify our results based on the features of each significant independent variable. A standard deviation increase in e-Government-related variables (online system and information and communication technology adoption), with all other factors, held constant, increases local government accountability by 0.301 and 0.313 standard deviations, respectively. Nevertheless, based on marginal effect results, we find that when the online system implementation score in local district government increases by one unit, the probability of reaching the high accountability category increases by 0.8%, while the probability of reaching grade B (moderate accountability) increases by 6.1%. Similarly, we find only 0.9% to be in the category of high accountability, while 7% are in the category of medium accountability if the ICT utilization score increases. In addition, we reveal that an increase in opinion-based audit scores for local government financial reports may contribute to obtaining a greater level of accountability performance in the public sector.

Keywords: Accountability, e-Government, Online implementation system, Information and Technology, Local Government

1. INTRODUCTION

Accountability is a notion that was created to provide a connection between individuals who receive responsibility for something and others who must evaluate how well the task was carried out (Guerin et al., 2018). In the context of the literature on public economics, accountability is an aspect of institutional quality that motivates the government and the general public to achieve the desired outcomes from the policies chosen (Morozumi et al., 2016). There are four indicators of a robust accountability climate: (a) clarity of accountability, (b) appropriateness of control, (c) sufficient information, and (d) clarity of penalties (Guerin et al., 2018). Moreover, accountability has become a crucial element of the government environment, particularly in nations with democratic regimes (Guerin et al., 2018). In society, accountability is linked to political accountability, characterized by public aspirations for democratization necessitating openness between the administration and the legislative. The executive is accountable to the community, represented by the legislature. Samaratunge et al. (2008) highlighted that public monitoring of the quality of public services demonstrates the transparency dimension (which becomes a vital element of accountability).

Some proxies exist at the national level to monitor the degree of institutional quality that captures aspects of government accountability to the people. According to World Governance Indicators (WGI) data, voice and accountability are among the most critical dimensions to assess. Figure 1 displays the average voice&accountability scores between 1996 and 2020 for a selection of Asian nations, illustrating disparities in the quality of accountability among nations (scores range from -2.5 (meaning weak accountability) to 2.5 (representing strong accountability)) (strong accountability).

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

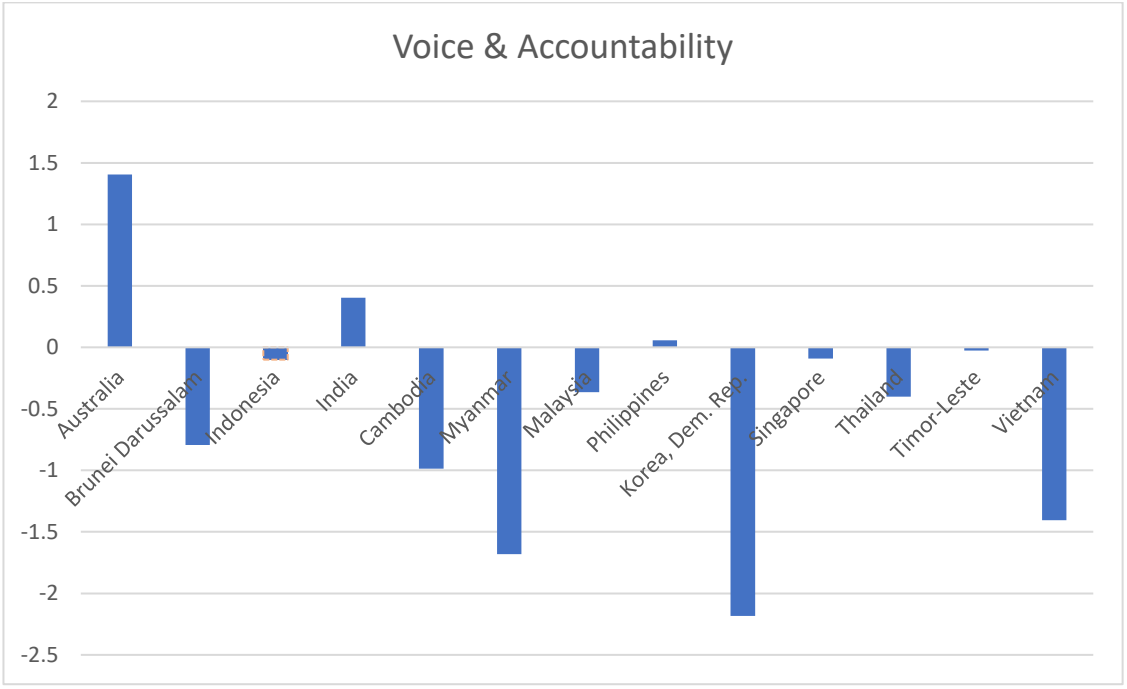

Figure 1: Average Score of Voice and Accountability Dimension in WGI for Selected Asian Countries (Source of data: https://info.worldbank.org/governance/wgi/)

As seen in Figure 1, most Southeast Asian economies did poorly regarding low voice and accountability (the average score was -0.49), demonstrating limitations in the degree of democracy throughout the period analyzed. Australia has the highest score, over 1.5, followed by India, which performs remarkably better than most developing nations in ASEAN. However, although these data represent key accountability measures, they cannot reveal the performance of local government inside the country.

Surprisingly, empirical research on government accountability performance in growing nations, such as Southeast Asia, is limited, particularly in Indonesia. Due to Indonesia's nearly two decades of experience with a decentralized system, it is reasonable to pay attention to the country. In 2019, the Indonesian government began holding direct elections for provincial and district executive government leaders and legislature (house of representatives) members, signaling the maturation of its decentralized-based democracy. In this setting, the demands for government accountability are increasing because the people elect their leaders. Nonetheless, there are indications that local administrative government service quality and accountability have suffered during decentralization (Lewis, 2017). Figure 2 depicts the patterns of Indonesia's national voice and accountability score from 1996 to 2021, which deteriorated before 2010 but improved significantly till 2020.

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

Figure 2: Indonesia's Score of Voice and Accountability (Source of data: https://info.worldbank.org/governance/wgi/)

As accountability is essential in government institutions, some studies have constructed the role of information flows in the digital era, which was proxied by the development of electronic-based government (eGovernment) system implementation, in enhancing accountability in the public sector environment (Amegavi et al., 2018; Halachmi et al., 2013; Jun et al., 2014; Zhao et al., 2015). The influence of e-Government deployment on local government accountability has not yet been tested using quantifiable empirical evidence. The rapid global development of internet-based ICT encourages countries to construct e-government service platforms (Sells, 2020; Sutopo et al., 2017; Tejedo-Romero et al., 2022; Wong et al., 2004). According to these theories, the acceleration of online-based public services due to the rapid growth of Internet technology may benefit the acceleration of accountability.

This study contributes to the investigation of "quantitative empirical" findings about the impact of e-Government elements on the local public sector's accountability. Ours is the first study to statistically assess the effect using the ordered logit approach, which applies to Indonesia's ordinal scale-based accountability measurement. In general, we find that the online system and the application of information technology-based work systems improve the quality of local government to be more accountable in implementing programs funded by regional budgets for the public interest; however, the probability of reaching accountability at the medium level (rather than the high level) is only greater if e-Government is implemented rapidly. This article continues with a discussion of the literature review and the direction of the hypotheses used to evaluate the model's influence, followed by an explanation of the data and statistical estimating

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

methodologies employed in this study. The subsequent section will offer the statistical results and discussion, which the conclusion will follow in the final section.

2. LITERATURE REVIEW

2.1 Accountability Concept and the Role of e-Government

Theoretically, the concept of accountability is grounded in the principal and agent theory, which is centered on the relationship between the government and its constituents. The government is a political manager tasked by its principal (the community). Due to the assigned obligations, the government is obligated to be accountable to the people who place their trust in it. Samaratunge et al. (2008) highlight two essential aspects of accountability: the ability to answer (answerability) and the ability to comply (enforceability) in both traditional and contemporary forms. Traditional forms of responsibility mirror a nation's political, regulatory, and institutional governance structures. This traditional view begins to be mixed with dynamic and sometimes perceptive informal public interests as it evolves (Samaratunge et al., 2008).

Accounting provides information to external users who do not have access to internal information in connection with this notion. In addition to the principal-agent theory, institutional theory believes that companies respond to environmental constraints by adopting structures and practices that are socially acceptable among other organizations in their area (Tejedo-Romero et al., 2022). This theory's fundamental premise is that organizations' tendency to conform to norms, traditions and dominant social forces in the external environment will result in structural and practice uniformity among firms. Wong et al. (2004) propose two methods for gauging accountability: direct quantification and indirect interaction. Other approaches involve domestic households or the size of the nation's economy (e.g., Gross Domestic Product (GDP) per capita). However, according to Wong et al. (2004), these variables can typically only account for a slight variance in accountability. For the empirical study, the following strategy employs indirect interactions that refer to a combination of political, economic, and social factors in the home setting.

According to Okeke et al. (2016), accountability is conceptually defined as the process of being accountable on behalf of the public mandate for every action, activity, and decision. While accountability is commonly described as the government's ability to deliver information and answers (answerability) to the public, the notion of New Public Management (NPM) has integrated the principles of accountability and transparency in the public sector during the last few decades. The government evaluates the credibility of its actions based on the procedures of openness, transparency, and accountability efficiency. There are at least three aspects of accountability within the public sector: (a) horizontal accountability from the authority of local government with elected

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

representatives; (b) downward accountability of elected representatives and local government authorities to the community; and (c) upward accountability from local government to the central government (Kituyi et al., 2021). To be effective, all of these types of accountability depend on the amount of information that flows to and can be accessed by the public.

2.2 The Role and Implication of E-Government on Government Accountability

The function of e-Government in enhancing the performance of public sector organizations has been the subject of recent research. Implementing e-government makes administrative activities more effective, responsive, transparent, and legitimate, which are all essential parts of accountability (Kettani et al., 2014). The primary advantage of e-government-related operations is to deliver better services to residents in an efficient manner while simultaneously facilitating better-focused development programs that continuously enhance the quality of government. The global proliferation of digital technology has hastened the adoption of e-government service practices. Zhao et al. (2015) discover a reciprocal relationship between the implementation of e-government and the digital economy. According to Jun et al. (2014), e-government usage patterns include the frequency with which the public visits, collects, uses, and provides feedback on the e-government platform (e.g., website). The more the community's access to and quality of information, the greater the likelihood that the community will perceive increased public sector accountability (Halachmi et al., 2013; Kessy, 2020; Paschke et al., 2018). Previous research has also identified elements that influence the implementation of e-Government, such as electronic service delivery (Dias, 2020) and information and communication technology (ICT) literacy (Amegavi et al., 2018).

Recent studies have focused on the effect of e-Government on the level of corruption using country-level data (Lupu et al., 2015; Park et al., 2020); (Nam, 2018; Zhao et al., 2015), but there is a lack of quantitative empirical evidence examining the effect of e-Government practices on the quality of accountability at the sub-regional level, particularly at the district level in emerging countries. Halachmi et al. (2013) discuss the use of computerized information and communication technology (ICT) to improve the transparency of electronic information. ICT probably facilitates improving public services, increasing their efficacy (e.g., reducing public service time). Halachmi et al. (2013) link the function of e-government implementation to the expansion of activities in public sector organizations, which are at least split into three domains: First, to expedite government sector work processes. Second, to connect it to the local community and foster interaction with the outside world. In the meantime, Yigitcanlar (2003) finds that ICT enhances public participation in decision-making to improve government efficiency.

Tejedo-Romero et al. (2022), using a case study of financial accountability in local governments in the European Union and descriptive analysis, conclude that e-government does not increase financial responsibility beyond what is required by law.

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

However, in some instances, such as the United Kingdom, the introduction of e-government has fostered financial responsibility and supported the reform of public sector administration. Regarding policies backed by the application of technology, Kudo (2008) concludes that ICT policies may increase government sector transparency and minimize corruption in developing economies. In the context of countries employing a decentralized system, Sells (2020) examines the influence of this form on local responsibility in Brazil. Decentralization has been considered a mechanism that strengthens democracy and boosts citizen engagement in politics. This objective, however, is contingent on the quality of local government institutions and the budgetary discipline that serves as the cornerstone of a strongly decentralized system, as determined by qualitative research conducted by Sells.

Based on the literature mentioned above evaluation, it is possible to construct the research hypothesis that e-government adoption, as shown by the degree of online-based system utilization and ICT enhancement, may increase accountability performance.

2.3 Accountability and Some Other Determinants

Lewis (2017) concentrates his research on Indonesia's public sector decentralization program, which he deems to be suboptimal in terms of delivering quality public services. Lewis suggests numerous components, including allocating incentive grants from the center to the regions based on output, strengthening local government's budget management capacities, and enhancing civil society's capabilities. Sutopo et al. (2017), using data for the period 2012-2014 and measuring the performance of local governments using data from the Ministry of Home Affairs based on a score between 0 and 4, found a positive correlation between the e-government system and the performance of local government administration, despite not directly using an accountability variable.

Moreover, accountability is frequently correlated with audit results generated by governmental auditors. At the provincial level in the Solomon Islands between 1998 and 2017, study Brown (2021) examines the relationship between auditor opinion and institutional accountability. This analysis concludes that the provincial government's lack of improvement in financial reporting requirements is the root cause of the accountability problem. Previous research has also examined the relationship between investigative auditing and responsibility (Brenninkmeijer et al., 2018; Thomas et al., 2019). Thomas and Purcell (2019) stress the significance of the audit process, particularly the audit committee, in enhancing the financial responsibility of local governments. Based on a national survey sent to municipal managers, a favorable correlation was observed between audit operations and the improvement of public responsibility as expressed by the indicators of ethics and professionalism. Limiting the scope to the case of the village government in Pujon Kidul Village, Indonesia, Imawan et al. (2019) note that implementing a computerized accounting system and increasing

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

village representative consultations are crucial factors in achieving village government accountability.

Samaratunge et al. (2008) examine the setting of the new public management reform (NPM) and compare public accountability in many Asian nations (Singapore, Malaysia, Sri Lanka, and Bangladesh). State accountability is comparable in the first two countries, as evidenced by their relatively capable corporate capability, administrative efficacy, and legislative frameworks. Several contextual factors, such as robust economic development, political commitment, quality of public leadership, and mutually beneficial state-market connections, influence this condition. In Sri Lanka and Bangladesh, for instance, there is a lack of accountability, poor quality of government institutions, inefficiency, and law enforcement. These are impacted by the adverse degree of economic development, the patron-client relationship between the state and the market, and political leadership deficiencies. Their research concludes that political history, patterns of economic growth, political leadership styles, the quality of administrative systems, the institutional capacity of government, and the state of civil society are the most influential contextual factors in accountability practices in these nations.

According to the discussed practical explanations, we hypothesize that:

H1: Better financial report audit results could improve accountability performance in various sectors.

H2: The economic and political dimensions may affect a country's accountability performance.

3. RESEARCH METHOD

3.1 Data

This study uses a quantitative approach by taking official secondary data from Indonesia's government. Primarily, data are taken from the Ministry of Home Affairs of the Republic of Indonesia (publicly accessed at https://indeks.inovasi.litbang.kemendagri.go.id/). The accountability variable is based on Government Agency Performance Accountability Report (*Laporan Akuntabilitas Kinerja Instansi Pemerintah*/LAKIP) score that is ordinally rated from 1 to 3. Meanwhile, for our key independent variables that capture the e-Government dimension, the data for online and ICT implementation are adjusted by dividing those scores by 100. The data are taken from the Central Bureau of Statistics of Indonesia for our control variables. There are 514 administrative districts in Indonesia as of 2020. Due to incomplete information for some districts, we applied a non-probability sampling technique and purposively tested 435 district governments, including districts with municipality status. The investigated sample data comprises around 84,63% of the total

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

population representing almost all district governments. This sample size is more significant in number than the threshold sample size recommended by Fisher's formula, 290 districts.[1] Therefore, the sample data can represent the situation in Indonesia regionally.

4. METHODOLOGY

To evaluate the effect of e-Government dimensions on local government accountability, we begin by estimating the "online system implementation" parameter as the e-Government-related primary independent variable. Due to the ordinal structure of our dependent variable, we utilize ordered logit regression to achieve this. As local government accountability is judged ordinarily on a scale of 1 to 3 (low to high rates), our model is formulated as follows:

$$Accountability = \alpha_i + \beta_1 Online_i + \sum_{i=1}^{n} \gamma_i X_i + \varepsilon \quad \text{.....(1)}$$

Here *accountability* captures accountability performance from district government and has three categories: low (score 1 or having a grade between D and C), moderate (score 2 or having grade B), and high (score 3 or having grade A). For clarity, districts having accountability scores categorized in high grades mean that these local governments are highly accountable for performing activities for public interest as funded by the regional government budget. The probability in each outcome category will be conditional on the independent variable. In other words, changes in each outcome category are driven by changes in the predictor variables in the model and are non-linear with a standard normal cumulative distribution function. *Online* variable stands for "online system implementation" score across district *i*.

The score assesses the quality of the information provided by local government, whether it is based on web applications and mobile applications, website information, or social media. The parameter will capture this effect $\hat{\beta}$. Here we expect the positive direction of $\hat{\beta} > 0$, as obtained empirically by Yigitcanlar (2003), Sells (2020), Paschke et al. (2018), Kudo (2008), Tejedo-Romero et al. (2022), also Halachmi et al. (2013), and Kessy (2020). However, as the coefficient value generated by ordered logit regression cannot be interpreted directly, the marginal effects of each independent variable on each categorical outcome are calculated, as well as the value of the marginal change coefficient of the accountability variable with the interpretation of a unit standard deviation change in our independent variable. This means changes in the standard deviation of accountability. For this calculation, we follow the method recommended and developed by Long et al. (2006).

[1] Calculation can be done automatically using sample size calculator developed by GeoPoll (see https://www.geopoll.com/blog/sample-size-research/)

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

Our control variables (X i) comprise many covariates. Several researchers (Brown, 2021), Thomas and Purcell (2019), and Wong et al. (2004) predict that the direction of the parameter will be positive based on audit-based views provided by the Auditor Board of the Republic of Indonesia. This audit variable is in dummy form, where 1 represents districts that receive a "Qualified" opinion (WTP) and 0 otherwise (for example, "with an Exception" (WDP) or a "Disclaimer Opinion" (TMP)). The average per capita income in the district/city area (AverGRDPpercap) is also included as a control (Samaratunge et al., 2008), and the parameter is again assumed to be non-negative. According to Samaratunge et al. (2008) the average per capita income (from 2013 to 2020, with 2010 as the base year) assesses economic development as a predictor of responsibility. We also include additional dummy variables to assess the influence of Indonesian districts with municipality status and impoverished districts.

Additionally, as a robustness check, we also use an alternative e-Government dimension using information, computer, and technology (ICT) utilization measured based on whether the job environment is manual/non-electronic or based on ICT.

$$Accountability = \gamma_i + \delta_1 IT\_utilization_i + \sum_{i=1}^{n} \rho_i X_i + \varepsilon \quad \text{.....(2)}$$

Again, we expect that the parameter δ_1 is positive. The Stata program tests all models and finds the estimated coefficients. To obtain standardized effects (to interpret as standard deviation change) of each independent variable on the dependent variable (in the form of an ordinal scale), we use the standardized coefficients using the "listcoef" stata command as presented by Long et al. (2006).

5. RESULTS AND DISCUSSION

All the variables examined in this study are summarized statistically in Table 1. Due to the ordinal location of the result, the accountability variable in Table 1 is meaningless. Table 2 tabulates the frequency of each category to determine the make-up of categorical variables. After adjustments, the critical predictor variable, Online Implementation, has an average score of 0.940, with 0 being the lowest and 20.620 being the greatest. The standard deviation calculated for IT UTILIZATION is more significant than for online implementation, but the average score is still 1.313.

According to our sample, these two scores indicate that district-level e-Government deployment is often reasonably poor. However, the average value of audit-based opinions is 0.92, which is quite near 1 (the highest grade for audit opinion). According to the National Auditor Board, there has been an improvement in financial management overall at the local government level. At the district and city levels, the average per-capita income is 17.077, with the highest value of 19.579. (the income value here has been transformed as a natural logarithm).

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

Table 1. Statistics Summary

Variable	Obs	Mean	Std. Dev.	Min	Max
Accountability	435	1.722	0.524	1	3
Online Implementation	435	0.940	1.891	0	20.620
ICT Utilization	435	1.313	2.274	0	20.620
Audit-based opinions	435	0.912	0.282	0	1
AverGRDPpercap	435	17.077	0.618	14.782	19.579
Municipality	435	0.202	0.402	0	1
Underdeveloped district	435	0.069	0.254	0	1

Source: author's calculation

Table 2. Frequency Tabulation of Accountability Performance

Accountability	Freq.	Percent
The low score (grades D and C)	137	31.49
Medium score (grade B)	282	64.83
High score (grade A)	16	3.68
Total	435	100

Source: author's calculation

Each outcome of the ordered logit regression-based estimations is displayed in Table 3. All variables on the right-hand side concurrently impact accountability performance since all of the models' chi-square p-values are 0.000. All of the variables employed have low standard error values, indicating that our data's variability is low. Since the dependent variable is categorical, the coefficients produced by each predictor in each model (Ordered Logit 1 and 2) are expressed in log-odds units. As a result, each coefficient can only be used to determine the direction of an effect, and its significance will also be noted (with the two-tailed test). Almost all predictors have p-values under 0.05, indicating that they significantly affect the accountability performance indicator.

Online implementation, our primary predictor, shows a positive coefficient and is statistically significant at the 1% level. This implies that the probability of receiving a better outcome in accountability performance grows, ceteris paribus, as the score of online implementation improves. This finding is consistent with empirical work by Yigitcanlar (2003), Sells (2020), Paschke et al. (2018), Kudo (2008), Tejedo-Romero et al. (2022), Halachmi et al. (2013), and Kessy (2020) that was done to test the proposed hypothesis (H1). Figure 3 details the specific change in probability for each area of local government performance accountability based on modifications to the implementation score for the online system.

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

Table 3. The Direction of Influence (and significance) of e-Government Dimension (Online Systems and IT Utilization) on Accountability

	(1)	(2)
VARIABLES	Ordered Logit 1	Ordered Logit 2
Online Implementation	0.329***	
	(0.069)	
Audit-based Opinions	0.786**	0.776**
	(0.381)	(0.382)
AverGRDPpercap	0.373**	0.382**
	(0.190)	(0.190)
Municipality	0.328	0.317
	(0.282)	(0.283)
Underdeveloped district	-1.880***	-1.823***
	(0.503)	(0.500)
/cut1	6.462**	6.658**
	(3.246)	(3.247)
/cut2	11.045***	11.290***
	(3.289)	(3.292)
ICT Utilization		0.286***
		(0.054)
Prob > Chi2	0.000	0.000
Observations	435	435

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 1 shows that there is little chance that outcome 1 (a low local government performance accountability score) will occur (or close to 0). As the online implementation score rises from 10 to 20, the probability of outcome 2 (medium accountability score) decreases. In contrast, as the quality of online implementation improves, so does the likelihood that local government performance will be held to a high standard. As an illustration, the district government performance accountability variable is expected to increase by 0.301 standard deviations for a rise in the standard deviation of the online implementation score, providing all other predictor variables remain constant (see Table A in Appendix 2 for complete statistical results). As indicated in Table 3, we also discover that the likelihood of obtaining better accountability is significantly increased by an increase in the audit score of district government financial reports.

Once more, this result is consistent with the original research hypothesis and past empirical findings (Ali et al., 2019; Brenninkmeijer et al., 2018; Luna Nur et al., 2020; Sutopo et al., 2017; Thomas et al., 2019). We also discover evidence that supports the

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

idea that a district has a better chance of achieving higher accountability standards the more economic development it has attained (higher scores).

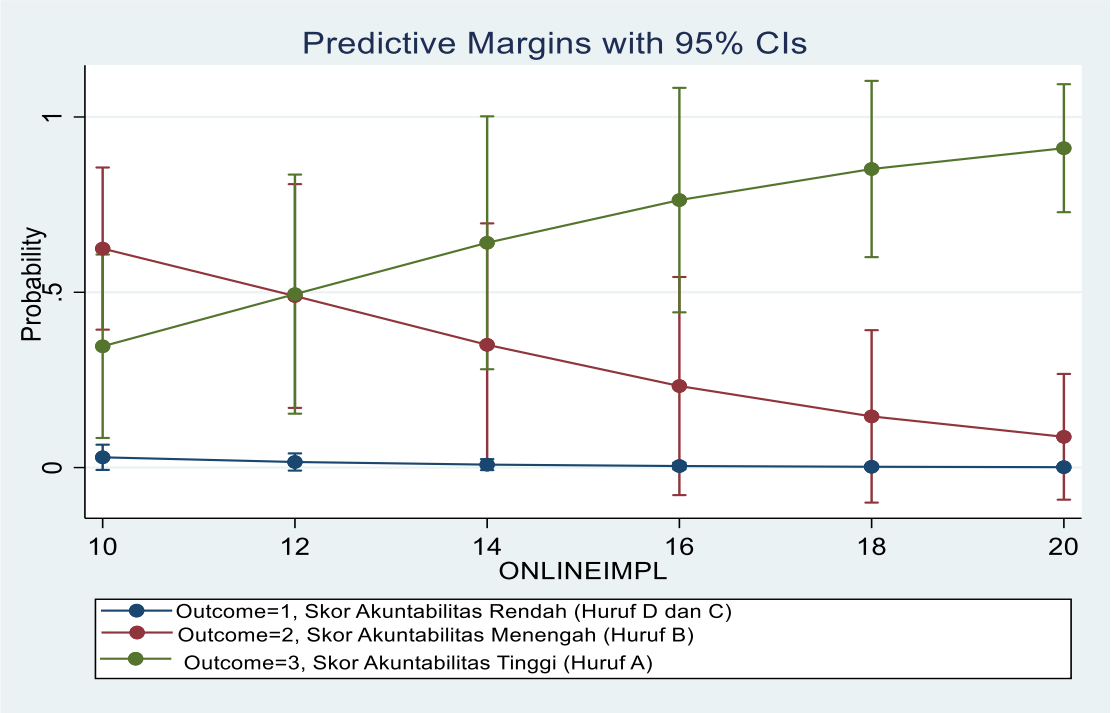

Fig 3. Predictive Probability According to Accountability Category and Predictor Variable
Source: Stata's graphic result

Using the same control variables in column (1) of Table 3, we compare and perform a robustness check in column (2) using a key independent variable. We are specifically interested in ICT utilization, which shows positive trends and is statistically significant at the 1% level. According to Figure 4, based on the Ordered Logit results, local governments with the highest scores for information and technology implementation are more likely to receive the highest accountability classification (outcome 3), as opposed to the other two categories. On average, the probability for each category in the accountability variable also experiences a similar change. In most situations, the effect of an increase in one standard deviation from the ICT utilization score is anticipated to increase the accountability of local government performance by 0.313. At the same time, other parameters are maintained constant, as confirmed in Table A, Appendix 2.

Table 4 displays the marginal effects of each predictor variable on each outcome in the ordered logit model (see marginal coefficients in column dy/dx). The marginal effect values for the online implementation factors are -0.068, 0.061, and 0.008 for outcomes 1, 2, and 3, respectively. Suppose the online system implementation score increases by one unit. In that case, these can be translated as being 6.8 percent less likely to fall into

Vol: 14 **No:** 2 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 126-147) **Doi:** 10.34109/ijebeg. 202214150

the accountability category with a score of 1 (grades C and D), 6.1 percent more likely to be included in the accountability category with a score of 2 (grade B), and only 0.8 percent more likely to fall into the category of grade A (score 3). Furthermore, we discover that the marginal effect on the audit score—for instance, a change from a score of 0 to 1 (or from a "With an Exception" to a "Qualified" audit opinion)—is 1.8 percent less likely to fall into the low category, 16.7 percent more likely to fall into the medium category, and 1.4 percent more likely to fall into the high category.

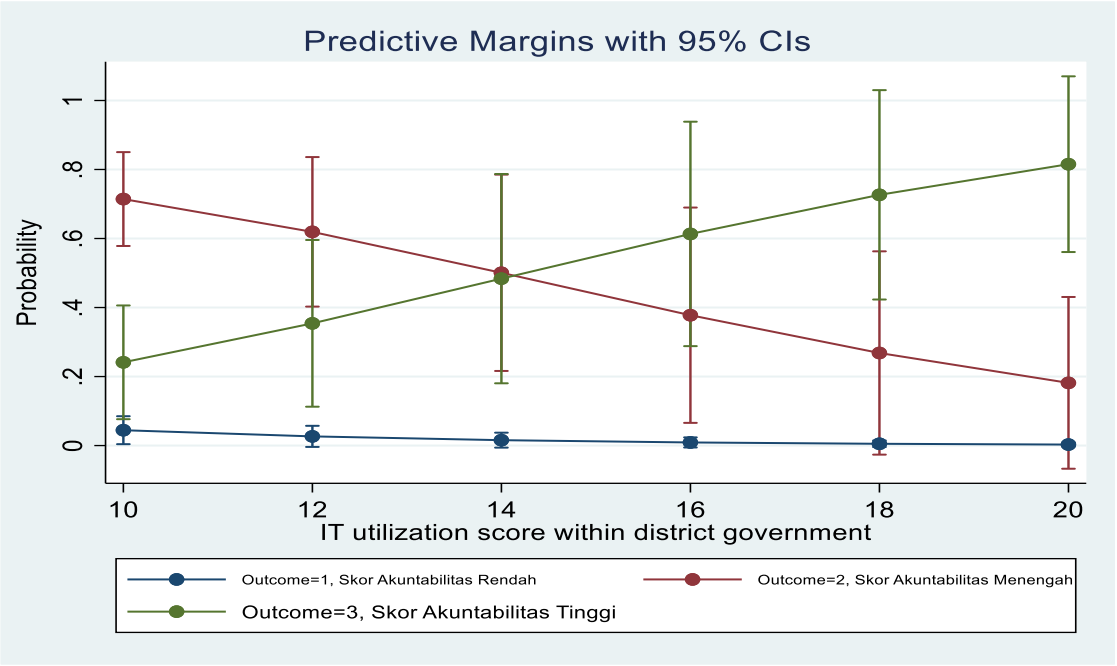

Fig 4. Predictive Probability Based on Accountability Category and Predictor Variable
Source: Stata's graphic result

The results of the marginal impacts of our alternative key predictor (ICT utilization) on accountability are shown in Table 5, which we will now turn to. We discover that as the ICT implementation score rises, 5.9 percents are less likely to fall into category 1 (accountability with grades C and D). However, only 0.6 percent are more likely to fall into the first category, whereas about 5.3 percent are more likely to fall into the intermediate accountability category (high local government performance accountability). When taking into account how audits affect accountability, we find that an increase in the local government financial audit score increases the likelihood of the district government of Indonesia's performance accountability outcome moving to the second category by 7% (significant at the 10% level), as opposed to only 0.09 percent moving to the third category (significant at the 10% level).

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 2146-0744 (Online) **(pp.** 1-17) **Doi:** 10.34109/ijebeg. 202214101

Table 4. Marginal Effects of Online Implementation on Accountability

Variable	**dy/dx**	**Std. Err.**	**z**	**P>z**	**[95%**	**CI.]**	**X**
Outcome 1: Scores of C and D for Accountability							
Online Implementation	-0.068	0.01399	-4.88	0.000	-0.096	-0.041	0.940
Audit-based opinions	-0.180	0.09323	-1.93	0.053	-0.363	0.002	0.913
AverGRDPpercap	-0.077	0.03934	-1.97	0.049	-0.155	0.000	17.077
municipality	-0.065	0.05339	-1.22	0.223	-0.170	0.040	0.202
Underdeveloped district	0.438	0.10422	4.2	0.000	0.234	0.642	0.069
variable	**dy/dx**	**Std. Err.**	**z**	**P>z**	**[95%**	**CI.]**	**X**
Outcome 2: Score B for Accountability							
Online Implementation	0.061	0.01328	4.56	0.000	0.034	0.087	0.940
Audit-based opinions	0.167	0.08855	1.88	0.060	-0.007	0.340	0.913
AverGRDPpercap	0.069	0.03515	1.95	0.051	0.000	0.138	17.077
municipality	0.057	0.0456	1.24	0.214	-0.033	0.146	0.202
Underdeveloped district	-0.415	0.102	-4.07	0.000	-0.615	-0.215	0.069
Variable	**dy/dx**	**Std. Err.**	**z**	**P>z**	**[95%**	**CI.]**	**X**
Outcome 3: Score A for Accountability							
Online Implementation	0.008	0.00221	3.48	0.000	0.003	0.012	0.940
Audit-based opinions	0.014	0.00614	2.25	0.024	0.002	0.026	0.913
AverGRDPpercap	0.009	0.00492	1.78	0.075	-0.001	0.018	17.077
Municipality	0.008	0.00821	1.03	0.302	-0.008	0.025	0.202
Underdeveloped district	-0.023	0.00688	-3.34	0.001	-0.036	-0.010	0.069

Source: author's calculation

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 1-17) **Doi:** 10.34109/ijebeg. 202214101

Table 5. Marginal Effect of the ICT Utilization on Accountability

variable	**dy/dx**	**Std. Err.**	**z**	**P>z**	**[95%**	**CI.]**	**X**
Outcome 1: Scores of C and D for Accountability							
ICT Utilization	-0.059	0.011	-5.41	0.000	-0.080	-0.038	1.313
Audit-based opinion	-0.177	0.093	-1.9	0.057	-0.360	0.005	0.913
AverGRDPpercap	-0.079	0.039	-2.01	0.044	-0.156	-0.002	17.077
municipality	-0.063	0.053	-1.18	0.240	-0.167	0.042	0.202
Disadvantaged district	0.426	0.106	4.01	0.000	0.217	0.634	0.069
variable	**dy/dx**	**Std. Err.**	**z**	**P>z**	**[95%**	**CI.]**	**X**
Outcome 2: Score B for Accountability							
ICT Utilization	0.053	0.011	4.99	0.000	0.032	0.073	1.313
Audit-based opinion	0.164	0.089	1.85	0.064	-0.010	0.338	0.913
AverGRDPpercap	0.070	0.035	2	0.046	0.001	0.139	17.077
municipality	0.055	0.046	1.2	0.232	-0.035	0.145	0.202
Disadvantaged district	-0.404	0.104	-3.88	0.000	-0.607	-0.200	0.069
variable	**dy/dx**	**Std. Err.**	**z**	**P>z**	**[95%**	**CI.]**	**X**
Outcome 3: Score A for Accountability							
ICT Utilization	0.006	0.002	3.61	0.000	0.003	0.010	1.313
Audit-based opinion	0.013	0.006	2.22	0.027	0.002	0.025	0.913
AverGRDPpercap	0.009	0.005	1.81	0.071	-0.001	0.018	17.077
municipality	0.008	0.008	1	0.318	-0.008	0.023	0.202
Disadvantaged district	-0.022	0.007	-3.28	0.001	-0.035	-0.009	0.069

Source: author's calculation

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 1-17) **Doi:** 10.34109/ijebeg. 202214101

6. CONCLUSIONS

The effectiveness of accountability in Indonesia's district government is examined empirically in this study. We use online systems and information and technology usage within local government environments to observe internet-based work habits. Following that, we evaluate responsibility using ordinal categories (low, medium, and high accountability). We discovered that e-Administration matters in increasing the accountability of the district government in Indonesia by utilizing ordinal logit regression. According to our calculations, when e-Government scores rise by a standard deviation, accountability is projected to rise by 0.301 and 0.313 standard deviations. At the 1% alpha level, this effect was statistically significant. Additionally, we found that if e-Government dimensions improved, there was a higher possibility that districts that had previously been in the lower accountability level would move up to the upper accountability category. However, moderate responsibility (marginal impacts of about 7-8%) has a higher probability than the high category (0.8 – 0.9 percent). Additionally, we discover evidence of greater accountability in districts with better outcomes in audit-based National Audit Board opinions. The findings of this study, which included data from practically all districts in Indonesia, offer suggestions for boosting the use of digital technology in government systems, which has demonstrably improved accountability performance.

7. RESEARCH IMPLICATIONS, LIMITATIONS, AND FUTURE DIRECTIONS

This study has successfully utilized cross-sectional data at the sub-regional level in Indonesia, one of Southeast Asia's prospective developing nations. The findings of this study provide evidence in favor of the concept that, in Indonesia's situation, the adoption of e-Government promotes district government performance accountability. According to this analysis, the most significant coefficients were seen for e-Government-related standard deviation variations (see Table A in Appendix 2) compared to other controls. The results of this study also demonstrate how changes in e-Government score scores affected the probabilities of each outcome (poor, medium, or high local government performance accountability). Additionally, compared to government areas located in disadvantaged districts, the effects of other chosen independent variables, such as higher income per capita, higher opinion-based audit scores, and municipality district status, implicate increased probabilities for greater accountability in local government performance (remote areas, for example).

The findings of this study have implications for policies being made at the local government level, particularly in Indonesia, as well as for strategies that have been successful in developing nations and prioritize the accelerated, expanded, and optimized use of electronic-based systems promoting public service delivery. When e-Government

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 1-17) **Doi:** 10.34109/ijebeg. 202214101

is implemented more effectively, which results in improvements in local government institutional governance focused on public convenience, the quality of government accountability may be run more credibly as Indonesia implements political decentralization. The study has limitations since the cross-sectional (across districts) nature of the data used in the research does not take changes in time into account. Suppose data is available over a long period. In that case, we suggest that future studies focus on testing the consistency of the results using a panel data technique and data at the country level in ASEAN to see if the results consistently yield similar conclusions.

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Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 2146-0744 (Online) (**pp.** 1-17) **Doi:** 10.34109/ijebeg. 202214101

Appendix 1:

Table A. Predicted Average Probability for Each Accountability Category (Ordered Logit Model 1)

		Delta-method				
	Margin	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
1	0.3155	0.0206	15.34	0	0.2752	0.3558
2	0.6476	0.0216	29.93	0	0.6051	0.6900
3	0.0370	0.0089	4.18	0	0.0196	0.0543

Table B. Predicted Average Probability for Each Accountability Category (Ordered Logit Model 2)

		Delta-method				
	Margin	**Std. Err.**	**z**	**P>z**	**[95% Conf.**	**Interval]**
1	0.3154	0.0205	15.4	0	0.2752	0.3555
2	0.6478	0.0216	29.98	0	0.6054	0.6901
3	0.0368	0.0089	4.14	0	0.0194	0.0543

Vol: 14 **No:** 1 **Year:** 2022 **ISSN**: 2146-0744 (Online) **(pp.** 1-17) **Doi:** 10.34109/ijebeg. 202214101

Appendix 2:

Table A. Coefficients Based on Marginal Change

Model 1	**b**	**z**	**P>z**	**bStdX**	**bStdY**	**bStdXY**	**SDofX**
Online Implementation	0.329	4.787	0.000	0.622	0.159	0.301	1.891
auditBPK	0.786	2.062	0.039	0.222	0.38	0.107	0.283
AverGRDPpercap	0.373	1.963	0.050	0.231	0.181	0.112	0.618
municipality	0.328	1.162	0.245	0.132	0.159	0.064	0.402
Disadvantaged district	-1.880	-3.74	0.000	-0.477	-0.91	-0.231	0.254
Model 2	**b**	**z**	**P>z**	**bStdX**	**bStdY**	**bStdXY**	**SDofX**
IT Utilization	0.2862	5.251	0.000	0.651	0.138	0.313	2.274
auditBPK	0.7763	2.017	0.044	0.219	0.374	0.106	0.283
AverGRDPpercap	0.3821	1.905	0.057	0.236	0.184	0.114	0.618
municipality	0.3169	1.151	0.25	0.127	0.153	0.061	0.402
Disadvantaged district	-1.8225	-3.417	0.001	-0.462	-0.878	-0.223	0.254

b = raw coefficient; z = z-score for test of b=0; p>|z| = p-value for z-test; bStdX = x-standardized coefficient; bStdY = y-standardized coefficient; bStdXY = fully standardized coefficient; SDofX = standard deviation of X

Appendix 3:

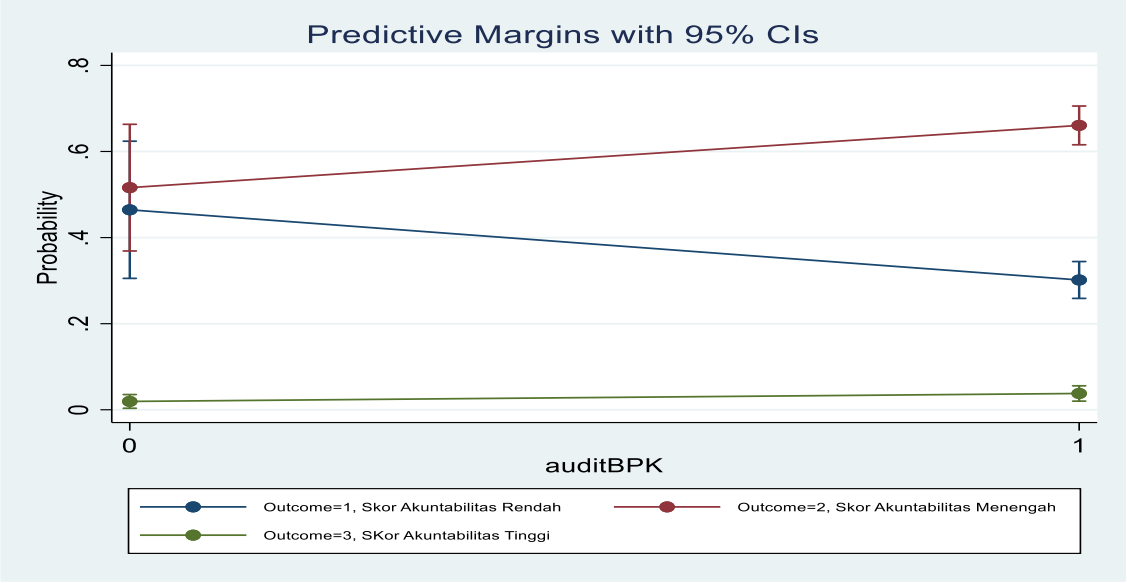

Fig A. Predictive Probability Based on Accountability Category and Audit-based Opinion

Source: Stata's output result