

# Unlocking Government Effectiveness: The Interplay of Bureaucratic Quality, Information Technology, Voice and Accountability

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## ABSTRACT

A high unemployment rate, poor quality service, rampant corruption cases and low economic growth characterise an ineffective government. In contrast, an effective government is a fundamental element of global economic development. The role of bureaucratic quality towards government effectiveness has generated a growing interest in the modern world. Bureaucratic quality evaluates public bureaucracy on transparency of political leaders and the letter of law to strictly agree with the rules. This study examined the role of bureaucratic quality on government effectiveness by examining the intervening effects of information technology and voice and accountability. We collected 25 years of data (1996 -2021) from eight ASEAN countries. Using the Generalised Method of Moments estimator, we estimated a panel data dependence model to overcome heterogeneity and endogeneity issues. The results showed that bureaucratic quality explained government effectiveness through the intervention of information technology and voice and accountability. This study contributes to how bureaucratic quality and the use of information technology can make government work better, but this can only be done fully if there are also ways for people to get involved and be held accountable.

**Keywords:** bureaucratic quality, government effectiveness, information technology, voice and accountability

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## **INTRODUCTION**

Government effectiveness is a measure of the quality of public services, civil services, the formulation and implementation of policy as well as the commitment of the government to provide these qualities for societies' wellbeing (Theworldbank, 2018). According to Tarnoff (2009), Government Effectiveness (GE) of a country is based on some factors. Firstly, GE is applied to the expertise of the civil service, efficient execution of government policies, and susceptibility of the public sector to political pressure; ability to manage political transitions without significant regulatory changes or public service delays; Agility, learning, and invention in the political leadership; the capacity to coordinate competing goals into clear policies; effectiveness of revenue collection and financial management; the condition of the transportation systems, telecommunications, electrical supply, public health care, and public schools; the availability of online government services; Policy stability; the degree to which new governments fulfil prior agreements; Red tape prevalence; the extent to which bureaucratic delays restrict corporate activities and availability of a taxpayer services and information programmes and an efficient and effective appeals procedures.

There are some determinants and convergence of government effectiveness (Duho, Amankwa, & Musah-Surugu, 2020; Ibrahimy, Norta, & Normak, 2022). Their study aimed to evaluate government effectiveness's causes and convergence, especially in African and Asian countries. The study looked at information from 100 African and Asian countries from 2002 to 2018. The panel-corrected standard error regression was used for the regression analysis, and both beta-convergence and sigma-convergence between the countries were tested. The study found that Asia outperforms Africa on all metrics except for press freedom, voice, and accountability. Government effectiveness was significantly boosted by the Corruption Perception Index, government size, voice, and accountability, regulatory quality, and economic affluence. Press freedom negatively impacted government efficacy, indicating that while freedom is important, it is not sufficient in the presence of political players whose activities subvert it (Kristensen & Andersen, 2023; Tyagi & Goyal, 2021). Similar to the checks and balances index, the political constraint index is required but insufficient to improve government effectiveness, particularly in Asia.

Government effectiveness is significantly boosted by the Corruption Perception Index, government size, voice, and accountability, regulatory quality and economic affluence (Drury, Krieckhaus, & Lusztig, 2006; Francis, 1993; Pande & Udry, 2005). Government efficacy is negatively impacted by press freedom, indicating that while freedom is important, it is not sufficient in the presence of political players whose activities subvert it. Similar to the checks and balances index, the political constraint index is required but insufficient to improve government effectiveness, particularly in ASEAN. This statement suggests that several factors have been found to be significant drivers of government effectiveness in the studies conducted. These factors include the Corruption Perception Index, government size, voice and accountability, regulatory quality, and economic affluence. By reducing corruption, limiting government size, promoting citizen engagement and accountability, improving regulation and increasing economic prosperity, governments can increase their effectiveness and better serve the needs of their citizens. It's important to note that the impact of these factors may vary depending on the context, and further research is needed to understand their relative importance and how they interact.

Another determinant of government effectiveness is the existence of information technology (Darusalam, Janssen, Sohag, Omar, & Said, 2021; Darusalam Darusalam, Said, Omar, Janssen, & Sohag, 2019; Sohag, Shams, Darusalam, & Devalle, 2021). Information technology development improved government effectiveness, efficiency, transparency, and accountability (Theworldbank, 2006) through reducing cost, improving services, bringing transparency, and accountability to the government. For example, the mobile phone is one of the tools for the diffusion of information for better governance in Sub-Sahara Africa (Asongu & Nwachukwu, 2016; Lin, Chen, & Jhang, 2023). Furthermore, open Government Data enhances government transparency and accountability and can improve citizens' participation in governing activities. According to Popelyshyn, Tsap, Pappel, and Draheim (2019), Open Government Data has the opportunity to enable more effective government bodies, improve the quality of public service and lead to enhance policy formulation. Open Government Data contributes to sustainable development and strengthens good governance.

This study investigated how bureaucracy quality, information technology and voice and accountability enhance the government's

effectiveness by using the ASEAN region as a sample. First, this paper explored the literature on related variables. Secondly, hypotheses development and research framework are discussed on part two. After that, the research method is presented. The findings and discussion are discussed in part four. Finally, this paper concludes and discusses future work.

## **LITERATURE REVIEW**

Bureaucratic quality refers to the efficiency, competence, and impartiality of government employees, and is related to the overall effectiveness of a government (Dahlström & Lapuente, 2022; Van de Walle, 2006). Prior literature argues that the relationship between bureaucratic quality and government effectiveness are critical determinants of a country's economic and social development (Busse & Gröning, 2009; Dahlberg & Holmberg, 2014); Duho et al. (2020); (Kraay & Tawara, 2010). This group of scholars found that information technology, voice and accountability and political stability could improve government effectiveness. Information technology, voice and accountability, and political stability are interrelated factors that can work together to improve government effectiveness. Information technology can enhance transparency and accountability, improve the quality of institutions, promote policy innovation and attract investments, while voice and accountability can ensure that the government is responsive to the needs and concerns of citizens and strengthen democratic governance. Political stability can create a predictable and stable environment in which governments can effectively serve the needs of their citizens. By working together, these factors can create a positive cycle of improvement in government effectiveness, leading to more responsive, transparent, and effective government institutions.

It is commonly believed that bureaucratic quality positively affects government effectiveness (Dahlberg & Holmberg, 2014). High-quality bureaucracy is a key factor in promoting good governance and improving the performance of government institutions. An efficient, competent, and impartial bureaucracy is more likely to produce effective and efficient policies and programs, foster public trust, and enhance administrative efficiency. Improved bureaucratic quality can also lead to better implementation of policies and programs and improved voice and accountability. This

can result in greater public participation and responsiveness, and better outcomes for citizens. However, it is important to note that the relationship between bureaucratic quality and government effectiveness is complex and multi-faceted (Nzama, Sithole, & Kahyaoglu, 2023). Other factors, such as political stability, leadership, and the availability of resources, can also play a role in determining government effectiveness. Further research is needed to fully understand the impact of bureaucratic quality on government effectiveness and how best to improve both.

In the context of the ASEAN region, bureaucracy quality, information technology, and voice and accountability are seen as important factors that can enhance government effectiveness. ASEAN governments are increasingly focused on improving the quality of their bureaucracies' to enhance government effectiveness. This includes initiatives aimed at improving government employees' efficiency, competency, and impartiality, as well as measures to address corruption and improve transparency in the public sector. Two factors are crucial to the understanding of bureaucratic quality and effectiveness, i) information technology and, ii) voice and accountability. First, information technology has the potential to transform the way governments in the ASEAN region operate, making them more efficient and effective. For example, e-government initiatives can improve access to public services, streamline administrative processes, and increase transparency and accountability. Second, voice and accountability refer to the opportunities for citizens to participate in decision-making and hold their governments accountable for their actions. In the ASEAN region, there have been efforts to promote greater public participation and transparency, such as through public consultation processes, social media and other digital technologies, and the development of civil society organizations.

By improving bureaucracy quality, leveraging information technology, and increasing voice and accountability, ASEAN governments can enhance their effectiveness and better serve the needs of their citizens. However, each country in the ASEAN region faces unique challenges, and a one-size-fits-all approach may not be effective. Further research is needed to understand the specific drivers of government effectiveness in each country and how best to address them.

## **CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT**

Following the detailed discussions of the literature review in part Three, this section explains the study's research framework and hypotheses development. This study examined the influence of bureaucratic quality on government effectiveness by implementing the Intervening of information technology and voice and accountability.

### **Information Asymmetry and Social Contract Theory**

From the perspective of information asymmetry, the Social Contract Theory states that an involved party has private information which is unknown to others due to confidential information (or adverse selection). Therefore, when others cannot perfectly monitor an involved party's behaviour, it leads to an adverse selection. The Theory explains that if the form of contracts is in less than ideal worlds it leads to a hidden action (or moral hazard). The public regulators are often subject to an informational disadvantage with respect to the regulated utility. Consider a regulator concerned with protecting consumer welfare and attempting to force a natural monopoly to charge the competitive price. The difficulty is that the regulator does not have full knowledge of the firm's intrinsic cost structure.

The underlying theories enable this study to develop the empirical framework concerning the influence of IT, bureaucratic quality and voice and accountability on government effectiveness. Many prior studies considered IT as the proxy of information availability. A higher diffusion of IT indicates the information symmetry of an economic agent. Thus, the existence of symmetric information enables the government service providers to be more accountable and loyal to their duties in serving the people. In a democratic government structure, the people appoint the political leaders or bodies of government through elections. Each parliament members take an oath to conduct the right action for the sake of the country and people. Likewise, through the social contract obligation, all public and private sector employees promise to do their level best in carrying out their duties and responsibilities. In reality, such social contract promises may not be fulfilled either deliberately or consequently.

Thus, this study argues that the availability of symmetric information makes the citizen more aware of their rights and civic sense, which eventually function as a force for the government's betterment of public service.

## **Hypotheses Development**

This part provides an overview of how bureaucracy quality, information technology, and voice and accountability can be used as an influence to enhance government effectiveness. The subsequent sub-sections explain the development of the five hypotheses for the study.

## **Bureaucracy Quality and Information Technology**

In studies by Janssen and Zuiderwijk (2012) and Janssen, Brous, Estevez, Barbosa, and Janowski (2020), IT development can improve a country's bureaucracy (Chang, 2023; Ibrahimy et al., 2022). The authors posit that data sharing through open data platforms can improve the government delivery system's accuracy, speed, and transparency in their studies. Implementing such an initiative was expected to positively impact a country's economic growth, social well-being, and environment, thereby improving its competitiveness in its digital transformation. The Ukrainian government's use of IT through open data initiatives has improved the country's accountability from 62 to 44 in 2016 (Popelyshyn et al., 2019; Sadeghi, Mahmoudi, & Deng, 2022). The successful open data initiative in Ukraine is called Prozorro<sup>1</sup>. The world-renowned e-procurement uses an open data system to ensure the openness and accountability of Ukraine's public tenders. It was established in 2016 as a hybrid system of centralised public and decentralised private markets. Prozorro saves about 10% of public and private expenditures as a result of improved transparency and competition. It strengthens procurement, increases transparency, and triggers equal competition between companies. The same study by Popelyshyn et al. (2019) also highlighted the success stories of using open data technologies such as OpenBudget<sup>2</sup> and Rada4you<sup>3</sup>, which resulted in a better bureaucracy quality in the country. Information technology can improve the quality of a country's bureaucracy by making it more efficient

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1 <https://prozorro.gov.ua/>

2 <https://mof.gov.ua/en/spending-gov>

3 <https://rada4you.org/>

and transparent (Darusalalam, Omar, Janssen, Said, & Sohag, 2021; Lin et al., 2023; Talebzadehhosseini & Garibay, 2022). This can be done through better record-keeping, reducing red tape, and streamlining processes. When done properly, IT can lead to better public administration and better serve citizens. Based on these arguments and to achieve the first objective of the study, the first hypothesis was stated as follows:

H1: There is a positive relationship between Bureaucracy Quality and Information Technology

## **Bureaucracy Quality and Government Effectiveness**

A study by Chen and Aklikokou (2021) examined how political bureaucracy facilitates the implementation of government effectiveness and control of corruption. The government's effectiveness and control of corruption is a key principle in the public sector. The study used cross-national secondary data from 191 countries to examine how political bureaucracy influences government effectiveness. The empirical result found a positive and significant relationship between political bureaucracy through e-government to enhance government effectiveness. This finding also support by Bertot, Jaeger, and Grimes (2010) argue that political stability through social media applications and ICT technologies such as Facebook, Twitter, Youtube, and Instagram can encourage openness, transparency, accountability among users and this can lead to significant changes in implementing the rule of law by the government and its citizens. In addition, these findings are supported by a research report published by GSDRC<sup>4</sup>. The report suggests that social media has a lot of potential to be used for governance purposes especially government effectiveness but has not been capitalised in most contexts. For example, many governments are using e-government strategies and disseminating information through the online channel, but they have not solicited citizen feedback. The report further noted the use of mobile phones to support e-governance. Mobile phones are increasingly used as a means to access the internet, which has increased the usage of social media sites. A good bureaucracy leads to better government effectiveness (Abdou, 2021; Jun, Peidong, Zhang, & Chang, 2021). When bureaucracy is efficient and operates transparently, it improves public administration and builds trust between citizens and the government (Cohen, 2022; Davidovitz & Cohen, 2022). On the other hand,

<sup>4</sup> Governance, Social Development, Humanitarian and Conflict online Portal [www.gsdr.org](http://www.gsdr.org)



a low-quality bureaucracy can harm government effectiveness (Afonso & Rodrigues, 2022; Ramesh & Vinayagathan, 2023). Improving bureaucracy quality can therefore enhance government effectiveness. In tandem with the first objective of the study, the second hypothesis was stated as follows:

H2: There is a positive relationship between Bureaucracy Quality and Government Effectiveness

### **Bureaucracy Quality and Voice and Accountability**

A recent study by Raffler (2022) and Dahlström and Lapuente (2022) examined how bureaucracy quality impacted on voice and accountability of the country. This study takes place in Uganda across 260 local governments (Raffler, 2022). The study aimed to empower local politicians to freely participate in government selection, with the support of freedom of expression, association, and media. The results showed that local politicians can establish effective governance and increase political accountability. Furthermore, Dahlström and Lapuente (2022) investigated how public bureaucracy is accountable to other politicians. In addition, this study also examines how bureaucracy letter of the law strictly agree with the rules which are guided by the head of government. However, they found that there are pros and cons to four types of quality bureaucracy, for instance, legalistic (accountability and law), populistic (accountability and management), Weberian (autonomy and law), and liberal (autonomy and management) and how its related to voice and accountability but not overlap with the concept of the tradition of rules and roles. Also, Besley, Burgess, Khan, and Xu (2022) studied the role of bureaucracy on voice and accountability through technology such as the internet. Their study was related to bureaucracy in politics, citizens, firms and non-governmental organisation. Thus, the third hypothesis was stated as follows:

H3: There is a positive relationship between bureaucracy quality and voice and accountability

### **Information Technology and Government Effectiveness**

Prior research argues that IT development through e-government can enhance a country's Quality of Governance (Singh & Sahu, 2008).

IT development can improve government effectiveness, efficiency, transparency, and accountability (Theworldbank, 2006). E-government can enhance governance quality by reducing costs, improving services, and bringing transparency, and accountability to the government. For example, the mobile phone is one of the tools for the diffusion of information for better governance in Sub-Sahara Africa (Asongu & Nwachukwu, 2016). A study by Singh and Sahu (2008) was supported by Popelyshyn et al. (2019) where IT development through open government data (OGD) can improve government effectiveness. Open Government Data will enhance government transparency and accountability and can improve citizens' participation in governing activities. According to Popelyshyn et al. (2019), Open Government Data has the opportunities to enable more effective government bodies, improve the quality of public service and lead to enhance policy formulation. Open Government Data contributes to sustainable development and strengthens good governance (Bhatnagar, 2003). Based on these arguments and to achieve the fourth objective of the study, the fourth hypothesis was stated as follows:

H4: There is a positive relationship between Information Technology and Government Effectiveness

### **Voice and Accountability and Government Effectiveness**

Voice and accountability through technology such as E-government enhance the government's transparency and accountability. Also, there are several ways ICT can be utilized to help strengthen government transparency and increase anticorruption (Bertot et al., 2010). ICT development improved and expanded public access to government information across various collaborative such as internet connection through multiple media. E-government allows connecting people who otherwise can not find details of government information, such as government spending and public services. In addition, through ICT, society can participate in reporting the corruption practice in their country. A study by Hodzic, Ravselj, and Alibegovic (2021) examined the task of the government, particularly during the Covid-19 pandemic, to offer good services to the citizens to maintain economic order. They argued that public administration should deliver their tasks by using ICT development to maintain responsiveness and efficiency in the government. To overcome the challenge is the implementation of

e-government in the public sector, especially in European Union EU-28. The empirical result from their study is that e-government positively and significantly influenced government effectiveness in the EU-28. In tandem with the fourth objective of the study, the fifth hypothesis was stated as follows:

H5: There is a positive relationship between Voice and Accountability and Government Effectiveness

## Research Framework

The research framework for this study was formed based on the Social Contract and Information Asymmetry theories. The Social Contract Theory depicts that the responsibility to maintain the government effectiveness for a country or a region such as ASEAN lies with both the government and the citizens. While the government is responsible for setting up rules, laws, regulations, and suitable environments to increase the government's effectiveness, citizens must follow and implement such rules or regulations. Enforcement of the rules, laws, and regulations must be made effective. High Quality of Government Effectiveness is achieved when, for example, both the government and the citizens work collaboratively towards achieving political stability, minimizing internal and external conflicts, and ensuring the law rules are consistently abided.

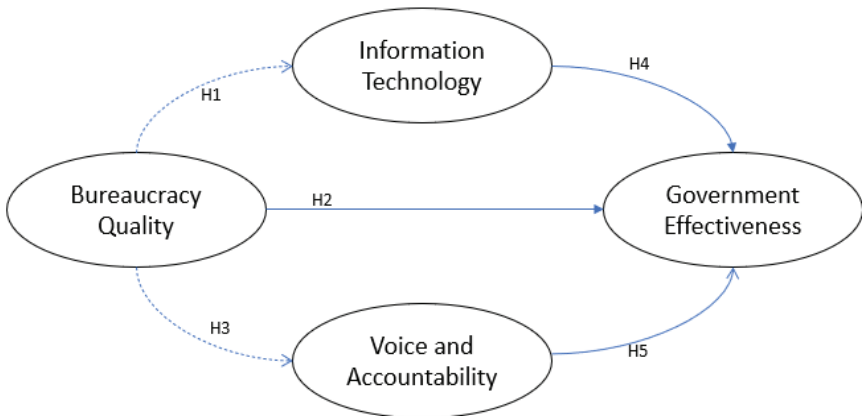


Figure 1: Research Framework

For this study, a research framework was proposed, as illustrated in Figure 1. This framework focussed on how bureaucracy quality, information technology and voice and accountability influence government effectiveness in the ASEAN region.

## METHODOLOGY AND DATA

In this section, an empirical analysis based on the GMM technique was conducted on panel data to examine the role of bureaucratic quality on government effectiveness.

### Data Description

Our analysis was based on 25 periods covering from 1996 to 2021 and eight countries in the ASEAN region. The independent variable was bureaucratic quality taken from the world development indicators (WDI-WorldBank). The intervening variables, such as voice and accountability, were also taken from the world development indicators (WDI-WorldBank). In addition, the second intervening variable was information technology (IT) is taken from KOF Swiss Economic Institute. The measurement for IT development was sourced from KOF Index. Axel Dreher conceived the KOF Index at the Konjunkturforschungsstelle of ETH Zurich in Switzerland. It was first published in 2002 and covered the period from 1970 to the present. Finally, government effectiveness was also taken from the world development indicators (WDI-WorldBank).

**Table 1: Variable Definition and Measurement**

Variables	Data source	Definition	Measurement
Bureaucracy Quality	WDI-WorldBank	Bureaucracy quality measurement assesses the performance, efficiency, training and skills, transparency, speed and fairness of decision-making, and level of corruption within a government bureaucracy to identify areas for improvement and ensure it serves citizens effectively and efficiently	1 to 5
Information Technology	KOF Swiss Economic Institute	Information technology refers to the use of computers, software, networks, and other digital technologies to process, store, and transmit information	0 - 100

Voice and Accountability	WDI-WorldBank	Voice and accountability refers to the degree to which citizens can freely express their opinions and hold public officials accountable through democratic institutions and processes.	1 to 5
Government Effectiveness	WDI-WorldBank	Government effectiveness refers to the ability of a government to effectively and efficiently implement policies, make decisions, and allocate resources to achieve its goals and serve the needs of its citizens.	1 to 5

### **Regression specification**

We examined the role of bureaucratic quality on government effectiveness in a formal extended model. The specification was based on combining the Public Administration Theory proposed by (Frederickson, Smith, Larimer, & Licari, 2018; Vandenabeele, 2007). The empirical studies on bureaucratic quality government effectiveness by Dahlberg and Holmberg (2014), Duho et al. (2020) and (Akhtari, Moreira, & Trucco, 2022). Our specification was based on a study by Wang, Awan, and Ashraf (2020) and AKINLO and OKUNLOLA (2021).

Our panel data comprised 8 countries over the period 1996 –2021. The subscript “ $t$ ” represented one of these 25- year periods. In contrast,  $i$  represented a country,  $\gamma$  is the variable of bureaucratic quality,  $I$  stood for government effectiveness, while  $X$  represented the set of other explanatory variables,  $\epsilon$  Represents the error term.

Table 2 presents the descriptive statistic of the variables included in the model. Descriptive statistics provide the initial picture of data; for instance, it gives minimum, middle, or mean values and maximum values for each data indicator. This also provides the standard deviation value that shows the data spread. The descriptive statics of BQ (Bureaucratic Quality), Information Technology (IT), Voice and Accountability (VnA) and Government Expenditure (GE) of of 8 ASEAN countries for 1996 – 2021.

**Table 2: Descriptive Statistic**

Variable	Obs	Mean	Std. dev.	Min	Max
BQ	207	2.573279	.9689781	1	4.400433
IT	207	.8959609	1.098582	.0013	5.9137
VnA	207	-.5865148	.6932846	-2.233271	.8796968
GE	207	.3053322	.9974553	-1.622868	2.426029

The magnitude of the BQ index in this study ranged from 1 to 5. The maximum value was 5 indicating a high level of BQ in the country. The minimum amount was 1, meaning a very poor BQ of the country. The study found that the mean score (mean =2.57) for BQ in eight ASEAN countries was above the mid-point (2.5 out of 5). This implies that an average ASEAN Countries had a stable bureaucratic quality, a stable government, good socio-economic conditions, an adequate investment profile, democratic accountability, and bureaucracy quality.

Table 3 shows the correlation analysis and the level of significance (p-values) of all variables. This table shows a strong and significant positive relationship between all variables with BQ.

**Table 3: Correlation Analysis**

Variable	BQ	IT	VnA	GE
BQ	1.0000			
IT	0.4435	1.0000		
VnA	0.5079	0.1398	1.0000	
GE	0.8865	0.5743	0.5229	1.0000

The sign of all variables included in the model was according to our expectations. However, this matrix only provides the initial indication of the independent variables’ possible effect on the dependent variable.

**GMM dynamic panel estimation methodology**

GMM-based estimation is a statistical technique that uses the Generalized Method of Moments (GMM) to estimate the parameters of a model with instrumental variables. This approach is advantageous when there is heteroskedasticity, meaning that the variability of the residuals is not constant across observations. In this case, the Arellano-Bond linear dynamic panel estimation was used, which involves taking the first-difference of the dependent and independent variables. With robust standard errors, the one-step Arellano-Bond estimator was used to account for the presence of

heteroskedasticity and to avoid a potential downward bias in the standard errors due to small sample size or outliers. GMM-based estimation is a robust and efficient way to estimate the parameters of a model with instrumental variables in heteroskedasticity (Arellano & Bond, 1991; Arellano & Bover, 1995).

$$\begin{aligned} \gamma_{it} - \gamma_{it-1} = & \lambda_1 (\gamma_{it-1} - \gamma_{it-2}) + \lambda_2 (I_{it} - I_{it-1}) \\ & + \lambda_3 (x_{it} - x_{it-1}) + (\epsilon_{it} - \epsilon_{it-1}) \end{aligned} \quad (2)$$

The GMM estimator is based on the concept of moment conditions, which are equations derived from the theoretical model that describe the expected relationships between variables. The GMM estimator seeks to find the values of the parameters that make the sample moments of the data match the theoretical moments as closely as possible. The estimator can be used with different weighting matrices, which determine how the different moments are weighted in the estimation process.

There were three equations model run in this study. The influence of Bureaucracy Quality (BQ), Information Technology (IT), and Voice and Accountability (VnA) on Government Effectiveness (GE) were tested using the multiple linear regression equation, as follows.

$$IT_{it} = \alpha + \beta_1 BQ_{it} + \epsilon \quad (3)$$

$$GE_{it} = \alpha + \beta_1 BQ_{it} + \beta_2 IT_{it} + \beta_3 VnA_{it} + \epsilon \quad (4)$$

$$VnA_{it} = \alpha + \beta_1 BQ_{it} + \epsilon \quad (3)$$

Description:

Y	=	Government Effectiveness (GE)
X <sub>1</sub>	=	Bureaucracy Quality (BQ)
X <sub>2</sub>	=	Information Technology (IT)
X <sub>3</sub>	=	Voice and Accountability
α	=	Constant
β <sub>1</sub> , β <sub>2</sub> , β <sub>3</sub>	=	The regression coefficient of each variable affecting the prevention of fraud
εt	=	another factor (non-research)

This study conducted a PLS test and GMM) to prove the research hypotheses.

One advantage of the GMM estimator is that it can handle a wide range of sample sizes and degrees of heterogeneity, making it a useful tool for a variety of empirical applications. It also allows for the estimation of models with endogenous variables and models with lagged dependent variables, which can be difficult to estimate using other methods. However, the GMM estimator can be sensitive to the choice of weighting matrix, and the results can be sensitive to the choice of instruments. It is also more computationally intensive than some other estimation techniques, and can be subject to bias if the moment conditions are misspecified. Despite these limitations, the GMM estimator remains a widely used and valuable tool for empirical research in economics and other fields. Finally, the difference GMM estimator was designed for time dimension and large cross sections, which suited this study. In this case, time is equal to 25 years while cross sections are 207.

## **FINDING AND DISCUSSION**

The finding of the relationship between bureaucratic quality and government effectiveness can be divided into two types: multiple regression and partial. Multiple relationships refer to the relationship between bureaucratic quality and government effectiveness when both variables are considered simultaneously. In this type of relationship, both bureaucratic quality and government effectiveness affect each other at the same time. Partial relationship, on the other hand, refers to the relationship between bureaucratic quality and government effectiveness when the effect of one variable on the other is isolated. In this type of relationship, the effect of bureaucratic quality on government effectiveness or vice versa is studied while controlling for the influence of other variables.

The distinction between multiple and partial relationships is important in understanding the complexity of the relationship between bureaucratic quality and government effectiveness and how this relationship is affected by other factors. By considering both types of relationships, researchers can gain a more comprehensive understanding of how bureaucratic quality and government effectiveness are related in the ASEAN region.



## Simple and Multiple Regression Finding

This part discusses **Hypothesis 1**; hypothesis one posited there is a positive relationship between Bureaucracy Quality and Information Technology.

**Table 4: Simple Regression with PLS**

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Hypotheses
BQ	0.502833	0.070971	7.085071	0.0000	Reject $H_0$
C	-0.397969	0.195088	-2.039949	0.0426	
R-squared 0.196703					

As noted in Table 4, the R-squared for the relationship between information technology and bureaucracy quality in this analysis stood at 0.196. The probability test was 0.000, which means that hypothesis one was accepted. The R-squared value of 0.196 indicated that 19.6% of the variance in bureaucracy quality can be explained by information technology. The probability test (p-value) of 0.000 means that the relationship between the two variables was statistically significant ( $p < 0.05$ ), meaning that it is unlikely to be due to chance. In other words, the study's results provide strong evidence that the independent variable had a meaningful impact on the dependent variable. A p-value of 0.00 generally indicates strong evidence against the null hypothesis and in favor of the alternative hypothesis. In this case, a p-value of 0.00 suggested a significant positive relationship between bureaucracy quality and information technology.

The relationship between bureaucracy quality and information technology can be complex and multifaceted. Bureaucracy quality refers to a government bureaucracy's efficiency, effectiveness, and fairness in carrying out its tasks and fulfilling its responsibilities. On the other hand, information technology refers to the use of computers and digital systems to store, process, and communicate information.

In general, a high-quality bureaucracy can benefit from using information technology in several ways. For example, IT can help streamline bureaucratic processes, improve decision-making, and increase transparency and accountability. On the other hand, adopting IT can also create new challenges for bureaucracies, such as security concerns and the need for ongoing training and technical support. Ultimately, the relationship between

bureaucracy quality and information technology is likely to be shaped by various factors, including the specific context, the type of technology being used, and the goals and objectives of the bureaucracy in question.

In the case of the ASEAN region, the relationship between bureaucracy quality and information technology can vary widely depending on the country and the specific bureaucracy in question. However, the adoption of IT in the ASEAN region is not without its challenges. In some cases, there may be a lack of technological infrastructure or human capital to implement and utilize IT effectively. Additionally, cultural and institutional barriers can sometimes impede IT adoption and effective use in the bureaucracy. Despite these challenges, the ASEAN region is working towards building a more technologically advanced and efficient bureaucracy, with a focus on improving the quality of governance and public services

Table 4 explains Hypotheses 2, 4 and 5. As seen in Table 5, Hypotheses 2 and 4 were rejected. Hypothesis two evaluated the relationship between government effectiveness and information technology. In this study, government effectiveness and information technology were positive and not insignificant. The results indicated that in the ASEAN countries (Indonesia, Malaysia, Myanmar, Vietnam, Singapore, Brunei Darussalam, Thailand, and the Philippines), there was a positive relationship between government effectiveness and information technology, and this relationship was statistically not insignificant. The reason for insignificant relationship between government effectiveness and information technology in ASEAN was not specified in the information provided. Further analysis and research would be required to determine the factors that contributed to this relationship. Possible factors could include investments in information technology infrastructure, government policies that promote the use of technology, and the adoption of technology by citizens and businesses.

Similarly Hypotheses 4 was also rejected. Hypotheses four examined the relationship between Voice and Accountability on Government Effectiveness. In this study, the relationship between Voice and Accountability on Government Effectiveness was positive and not insignificant. The results suggest that there was no significant relationship between voice and accountability and government effectiveness in the ASEAN countries. This means that changes in voice and accountability do

not appear to be associated with changes in government effectiveness. This could be due to a variety of factors, including limitations in the measures used to assess voice and accountability or government effectiveness, or the presence of other variables that have a stronger impact on government effectiveness. Further analysis and research would be needed to determine the reasons for this lack of relationship.

**Table 5: Multiple Regression Finding**

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Hypotheses
ICT	-0.033492	0.027823	-1.203744	0.2301	Fail to Reject $H_0$
VNA	0.138921	0.103396	1.343582	0.1806	Fail to Reject $H_0$
GE	0.770284	0.067767	11.36664	0.0000	Reject $H_0$
R-squared 0.77					

As noted in Table 4, R-squared for this analysis stood at 0.77 and the relationship between bureaucracy quality and government effectiveness was significant at the  $p < 0.01^{***}$  level, implicating that a positive relationship between bureaucratic quality and government effectiveness in the case of the ASEAN region indicated that an increase in bureaucratic quality leads to a corresponding increase in government effectiveness. The R-squared value of 0.77 in this analysis indicated that 77% of the variation in government effectiveness can be explained by bureaucratic quality. R-squared is a statistical measure that indicates the proportion of the variance in the dependent variable (government effectiveness) that is predictable from the independent variable (bureaucratic quality). Thus, base on this explanation the hypotheses 5 is accepted.

A high R-squared value indicates that the model fits the data well, meaning that the independent variable (bureaucratic quality) was a good predictor of the dependent variable (government effectiveness). In this case, an R-squared value of 0.77 suggested that the model captured 77% of the variation in government effectiveness, leaving 23% of the variation that is not explained by bureaucratic quality. The R-squared value is useful in determining the model's goodness of fit and evaluating the strength of the relationship between bureaucratic quality and government effectiveness in the ASEAN region. A high R-squared value suggests that the relationship between bureaucratic quality and government effectiveness is strong, while a low R-squared value suggests that the relationship is weak.

Bureaucratic quality refers to the characteristics and behaviors of public servants, including their professionalism, impartiality, and responsiveness to the public. When bureaucratic quality is high, public servants are more likely to carry out their duties effectively and efficiently, leading to better outcomes for the public. Government effectiveness refers to the ability of a government to achieve its goals and implement policies effectively. When government effectiveness is high, it is likely that the government is delivering services effectively, making sound decisions, and implementing policies that improve the well-being of the population. Therefore, a positive relationship between bureaucratic quality and government effectiveness suggests that improving the quality of the bureaucracy leads to a corresponding improvement in government effectiveness. This can have important implications for policymakers in the ASEAN region, as they seek to improve the performance of their governments and deliver better outcomes for their citizens.

**Table 6: Simple Regression of Hypothesis 3**

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Hypotheses
BQ	0.363412	0.043045	8.442545	0.0000	Reject H <sub>0</sub>
C	-1.521675	0.118325	-12.86015	0.0000	
R-squared 0.257990					

Table 6 describes an R-squared value of 0.25 meaning that 25% of the variation in the dependent variable (government effectiveness) can be explained by the independent variable (voice and accountability). This suggested that changes in voice and accountability explained 25% of the variability in government effectiveness. The higher the R-squared value, the stronger the relationship between the two variables. A value of 1 would indicate a perfect fit between the two variables. In this case, with an R-squared value of 0.25, the relationship between voice and accountability and government effectiveness is relatively weak.

The results suggest that there was a positive and significant relationship between voice and accountability and government effectiveness in the ASEAN countries. This means that changes in voice and accountability are associated with changes in government effectiveness, and the relationship is statistically significant. A positive relationship indicated that government effectiveness also increased as voice and accountability increase. This result suggested that enhancing voice and accountability in the ASEAN countries may improve government effectiveness.

## **CONCLUSION**

The role of bureaucratic quality on government effectiveness in ASEAN countries like Indonesia, Malaysia, Myanmar, Vietnam, Singapore, Brunei Darussalam, Thailand, and the Philippines can be influenced by the intervening factors of information technology and voice and accountability. Bureaucratic quality refers to the efficiency and effectiveness of government bureaucracy in delivering public services and implementing policies. Government effectiveness refers to the ability of the government to carry out its policies and achieve its goals effectively. Information technology (IT) can improve bureaucratic quality by increasing the efficiency of government processes, making it easier for citizens to access government services, and enhancing the quality of bureaucracy by improving communication and collaboration within the bureaucracy and between the bureaucracy and the public. Voice and accountability can also help to improve bureaucratic quality by providing citizens with new channels for participation and engagement and making it easier for them to access information and hold the government accountable.

At the same time, bureaucratic quality can positively impact government effectiveness. A well-functioning bureaucracy can help to support the implementation of policies, reduce corruption and improve the delivery of public services. This, in turn, can lead to higher levels of citizen satisfaction, increased trust in government institutions, and a more stable and effective political system. In conclusion, to enhance government effectiveness, it is important to focus on improving bureaucratic quality while considering the role of IT and voice and accountability. These factors can help create a more efficient and effective government that can better respond to citizens' needs and concerns, and deliver high-quality public services.

There are several ways in which voice and accountability in the ASEAN countries may improve government effectiveness. First, enhancing public participation: Voice and accountability can increase public participation in decision-making, enabling citizens to hold their leaders accountable and promoting transparency and responsiveness in government. Second, improving the quality of institutions: Greater voice and accountability can help to improve the quality of institutions, such

as the judiciary and civil service, by reducing corruption and promoting the rule of law. Third, fostering a culture of accountability: When citizens have a voice and the ability to hold their leaders accountable, it can create a culture of accountability in which leaders are more likely to act in the public interest. Lastly, encouraging policy innovation: By enabling citizens to provide input and feedback, voice and accountability can promote policy innovation and lead to more effective solutions to public problems. Overall, voice and accountability are key components of democratic governance, and can help to strengthen democratic institutions and processes in the ASEAN countries.

Further research is needed to explore the specific mechanisms through which voice and accountability influence government effectiveness in ASEAN countries and to identify effective strategies for promoting citizen participation and accountability, such as strengthening civil society organizations, promoting access to information, and increasing transparency in government decision-making processes. Additionally, comparative studies across different ASEAN countries could provide insights into the contextual factors that affect the relationship between voice and accountability and government effectiveness.

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