THE IMPACT OF E PROCUREMENT IMPLEMENTATION ON PUBLIC PROCUREMENT'S CORRUPTION CASES – EVIDENCES FROM INDONESIA AND INDIA

DAMPAK PENERAPAN *E-PROCUREMENT* TERHADAP KASUS KORUPSI PENGADAAN PUBLIK INDONESIA DAN INDIA

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ABSTRAK

Besarnya belanja pemerintah di bidang pengadaan barang/jasa, terutama sektor belanja modal menyebabkan pengadaan barang/jasa pemerintah sangat rentan untuk terjadinya korupsi. Pemerintah di seluruh dunia termasuk Indonesia mengadopsi dan menerapkan *Electronic Procurement* (*E-Procurement*) untuk meningkatkan transparansi dan akuntabilitas serta mengurangi angka kasus korupsi pengadaan. Pemerintah Indonesia menerapkan *E-Procurement* sejak 2008, sedangkan Pemerintah India sejak tahun 2012. Meskipun *E-Procurement* telah cukup lama diterapkan di kedua negara tersebut, tidak banyak studi yang meneliti dampak penerapan *E-Procurement* terhadap kasus korupsi pengadaan. Dengan menggunakan kombinasi antara metode kuantitatif dan kualitatif, penelitian ini menganalisis sejauh mana dampak dampak penerapan *E-Procurement* terhadap kasus korupsi pengadaan barang/jasa di Indonesia dan India. Hasil penelitian menunjukkan bahwa provinsi-provinsi dengan rasio belanja modal yang tinggi lebih rentan terjadi korupsi pengadaan dan penerapan *E-Procurement* berdampak dalam mengurangi angka kasus korupsi pengadaan di provinsi-provinsi tersebut. Sedangkan di India, *E-Procurement* tidak cukup berhasil mengurangi sejumlah besar korupsi pengadaan di pemerintah negara bagian karena implementasi *E-Procurement* di tingkat negara bagian terhambat oleh rendahnya kompetensi dan profesialisasi staf dan juga tingginya campur tangan politik dalam penyelenggaraan negara.

Kata Kunci: Belanja Modal; *E-Procurement*; Electronic Procurement; Korupsi Pengadaan; Pengadaan Publik/ Pemerintah.

ABSTRACT

The huge spending on public procurement, mainly on capital expenditure makes it is highly prone to corruption. Many governments across the world including Indonesia have adopted Electronic Procurement (E-Procurement)

to increase transparency, improve accountability, and reduce corruption with variable success. Government of Indonesia adopted E-Procurement in 2008, while Government of India introduced E-Procurement in 2012. Even though E-Procurement has been implemented for quite a long time in those two emerging countries, only limited research exist on the impact of E-Procurement in reducing procurement corruption. By using the combination between quantitative and qualitative methods, this study attempts to assess the extent to which the impact of E-Procurement implementation on procurement corruption cases in Indonesia and India. The findings suggest that Indonesian provinces with high capital expenditure ratio, are more vulnerable to corruption and implementation of E-Procurement was impactful on reducing the number of procurement corruption cases in such provinces. Meanwhile in India, the effect of E-Procurement was not impactful enough to reduce a notably large number of procurement corruption at the state governments because E-Procurement implementation at the state level in some degree was bothered by low competency and professionalization staff and also high political interference in state administrations.

INTRODUCTION

Information and communication technology (ICT) is considered as a tool to transform the traditional system of work processes to a modernized one (Neupane, Soar, Vaidya, & Yong, 2014). The potential of ICT has encouraged many governments to adopt and utilize ICT for E-Governance. Electronic Procurement (E-Procurement) was introduced and developed by Indonesian government in 2008 (Indonesia NPPA, 2012). Meanwhile, Government of India developed E-Procurement system called as Central Public Procurement Portal in 2012 (CPPP Government of India, 2020).

According to the National Public Procurement Agency (NPPA), Indonesian government spends more than 50 percent of total government expenditure each year for public procurement and this amount is expected to increase gradually in the coming years (Indonesia NPPA, 2018). However, huge spending on public procurement makes this sector is very vulnerable to corruption. The Corruption Eradication Commission (CEC) of Indonesia handled 887 corruption cases during 2005 to 2018[1] out of which 178 cases were from public procurement (Indonesia CEC, 2019). Thus, corruption in procurement took the second place after bribery cases during the same period. Similar to Indonesia, procurement corruption is also one of the most serious problems in public institutions in India. Kickbacks to public officials, collusion, bid rigging, and formation of cartels are some of corruption acts in tendering process in India (Express Pharma, 2013).

Many governments including India and Indonesian government believe that E-Procurement would become a tool to combat procurement corruption. This study examines to what extent the effect of E-Procurement implementation in reducing procurement corruption in Indonesia and India. By applying both quantitative and qualitative method, this research is expected

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[1]In handling corruption cases, Corruption Eradication Commission divides the cases into 7 (seven) categories, namely: (1) public procurement; (2) licensing; (3) bribery; (4) levies/extortion; (5) misuse of state budget; (6) money laundering; and (7) obstructing the Corruption Eradication Commission duties.

to thoroughly evaluate E-Procurement implementation and generate a comprehensive analysis in measuring the effectiveness of E-Procurement to reduce procurement corruption in Indonesia and India.

LITERATURE REVIEW

Public procurement refers to procedures which public or government institutions use to acquire goods and services, works, and other activities from third parties (Neupane et al., 2014). Governments around the world spend much of their state budget on public procurement, which typically accounts for 20 percent to 70 percent of Gross Domestic Product (GDP) in developing countries (GTN, 2003; UNDP, 2006) and 10-15 percent of GDP for developed countries (Kashap, 2004). In Indonesia, public procurement accounts for 11-15 percent of total GDP (Puspita, 2018). Hence, a number of governments including Indonesia attempt to utilize public procurement as a lever to boost economic growth.

Nevertheless, public procurement processes are highly prone to corruption because of an inaccuracy of procurement planning, a lack of monitoring and controlling system, a lack of transparency and accountability, and low levels of professionalism in bureaucracy (Del Monte & Papagni, 2007; Kolstad & Wiig, 2009; Pellegrini & Gerlagh, 2007). Organization for Economic Co-operation and Development (OECD) reported that in developing countries, procurement corruption generally occurs during procurement preparation, tender processes, contract awards, contract implementation, accounting, and auditing (Neupane et al., 2014).

Although the regulations of public procurement in Indonesia have been deemed to be strict and severe sanctions exists for procurement corruption but in fact procurement corruption had reached an alarming level as the second highest number of cases from 2005 until now (Indonesia CEC, 2019). Due to this fact, I assume that the regulations and sanctions which have been applied in Indonesia might be inadequate to fight procurement corruption and must be driven by other supporting factors. As Klitgaard (1997) suggests that laws and penalties are not sufficient to deter the corruption unless good governance is established and system is strengthened. Hence, applying E-Procurement system is used to foster accountability, enhance transparency and deter corruption in public procurement (Pathak et al., 2009; Vaidya, Sajeev & Callender, 2006).

The definition of E-Procurement is well established as information and communication technology (ICT) system that implemented by the government institutions to integrate and automate any parts of procurement processes (Davila et al., 2003; Leipold et al., 2004; Vaidya & Hyde, 2011). Neupane et al. (2014) reveals that the purpose of E-Procurement is to introduce anti-corruption factors in public procurement. The study identifies anti-corruption factors in E-Procurement as listed in Table 1.

Table 1. E-Procurement Anti-Coruption Factors

No.	Anti-corruption Factors
1.	Avoid unnecessary purchase/project
2.	Real-time access information or real-time bidding
3.	Automation of procurement process
4.	Increase competition among the bidders or suppliers
5.	Reduce human intervention in bidding process
6.	Standardization enactment (more consistency in procurement phase)
7.	Monitoring and tracking application
8.	Efficient and secure document transmission
9.	Managerial control and collaboration
10.	Transparency and accountability
11.	Make a procurement process faster and easier
12.	Obtain the best quality/price ratio

Source: Neupane, et al. (2014)

Nevertheless, implementation of E-Procurement system itself is not a guarantee for improvement in the public procurement operations. United Nation's research shows that a number of e-procurement programs faced failures owing to lack of leadership and poor technology. Other factors that cause failure of E-Procurement implementation are resistance to change, lack of awareness, bad coordination of functions and ineffective implementation programs (United Nation in Rotich & Okello, 2015).

Progress of E-Procurement

Implementation in Indonesia

Indonesia initiated E-Procurement based on Presidential Instruction Number 5 of 2004 regarding The Acceleration of Corruption Eradication that appointed Ministry of Economic Coordinator, Ministry of Finance and Ministry of National Development Planning to conduct studies and trials of E-Procurement system. The establishment of the National Public Procurement Agency on 6 December 2007 signified that E-Procurement was officially applied in Indonesia. The progress of the implementation of E-Procurement from 2008 to 2019 can be seen in Table 2.

Table 2. Progress of E-Procurement Implementation in Indonesia

Description	2008	2009	2010	2011	2012	2013	2014	2015-2017	2018-2019
LPSE (E-Procurement System and Service)	11	33	137	315	543	602	616	635	688
Province Coverage	9	18	28	31	33	33	34	34	34

Source: Neupane, et al. (2014)

Since 2008 as the first year of E-Procurement implementation, the number of E-Procurement System and Services (LPSE) have been growing rapidly from only 11 in 2008 and the next ten years become 688. The number of provinces which being covered by E-Procurement System and Services also increase steadily from only 9 provinces to 34 provinces. E-Procurement, as the initial mission of its establishment, is used as one of the instrument to prevent and reduce government corruption, especially in procurement.

As one of the economic crimes, government corruption generates bad implications for the nation in various aspects. Government corruption weakens public trust, depresses the economic growth, damages the rule of law, and triggers political instability (Armey & Melese, 2017). A normative definition of government corruption is the abuse of government/ public official for personal benefit or private interest (Svensson, 2005). Moreover, Klitgaard (1988) and Rose-Ackerman (1978) interpret corruption in public sector as a specific manifestation of the universal principal-agent problem where citizens are the principals, and public/government officers are the agents with discretion to carry out and/or authorize: government spending, licenses, taxes, quotas, and so on. As it is hard and costly for the principals to constantly monitor the agents, there is a risk that public officials would misuse their authorities and sacrifice the principal's objectives for their own interests/benefits.

However, an individual's decision to commit a crime is based on cost-benefit analysis of the crime itself as Becker (1968) suggests. If the expected benefit of doing a crime surpasses the expected cost, an individual as a rational economic agent will tend to commit an illegal action and vice-versa. Based on this theory of rational crime, government officials will decide whether they commit corruption or not by considering and evaluating the expected benefits (returns) and the expected costs (e.g. duration of punishment, probability of being caught, and instruments of prevention or control).

In addition to individual level perspective, corruption is also conceptualized at the organizational level. Pinto, Leana, & Pil (2008) conceptualized two kinds of organization-level corruption, which are Organization of Corrupt Individuals (OCI) and Corrupt Organization (CO). OCI is defined as the bottom-up phenomenon in which starts with individual corrupt behavior but goes over a critical threshold level at which organization is categorized as corrupt. For instance, procurement officials carry out corruption and that spreads easily from one official to others within the institution. As a consequence, the institution itself can be classified as corrupt. On the other hand, CO refers to a top-down phenomenon in which a certain group in organization - commonly, top managements or elite coalitions (core of the organization) organize corruption collectively for organization benefit (Pinto et al., 2008).

Primary beneficiary and collusion among organizational members are two essential dimensions to distinguish the type of corruption in organization. OCI is identical to personally corrupt behavior, in which individuals are the main beneficiary of doing corruption and there is no interaction/collusion among members in organization. Although individuals are the primary beneficiary, OCI is characterized as an organization-level corruption because corrupt behaviors have become so widespread that it represents the organization as a whole. On the other side, CO is closely related to corporate/organizational crime that involves a group of institution undertakes corruption in the name of the institution. Therefore, the collusion among organization members is necessary element for CO. Table 3 displays a brief summary of the comparison between OCI and CO.

According to Goel and Nelson (1998); Nitzan (1994); Scully (1991),

higher government spending will raise the probability of local capture, rent-seeking activity, or corrupt act. Thus, it can be assumed that greater development expenditure in public procurement will increase the potential for corruption. Moreover, as stated by Tanzi & Davoodi (1997), the amount of capital expenditure for infrastructure projects can trigger corruption; whereas, corruption mostly occurs in the infrastructure sector (Locatelli et al., 2017; Osei-Tutu et al., 2010; Kenny, 2009; Rose-Ackerman, 1996 in Tanzi & Davoodi, 1997). Referring to those findings, it can be assumed that the pattern of government spending influences the level of corruption so it can be expected that a high ratio of capital spending relates to a high level of procurement corruption.

DATA AND METHOD

The data for this study comes from the annual report of Corruption Eradication Commission (CEC), Republic of Indonesia,

Table 3. Comparison between OCI and CO

Attribute	OCI	CO
Actors	Individuals frequently; groups occasionally	Group(s) always
Primary beneficiary	Individuals	Organization
Victim	Organization	One or more entities outside the organization
Norms Violated	Organizational frequently; legal occasionally	Legal frequently; societal always
Consequences	Individual level	Organization level; sometimes ensnaring individual level
Collusion among actors	Not compulsory	Essential

Source: Pinto et al. (2008)

which covers both procurement corruption cases at the investigation level and cases with final and binding status from 2005 to 2018. I also use the data from Statistics Indonesia, such as total of public procurement spending, capital expenditure[2], Gross Regional Domestic Product (GRDP) per capita, and local own-source revenue for each province during 2005-2018. This research also uses the data of procurement certificates for each province from National Public Procurement Agency (NPPA) Republic of Indonesia and data of institution performance from Corruption Eradication Commission (CEC) Republic of Indonesia. In this study, I use negative binomial regression model to analyze the impact of E-Procurement in decreasing the number of procurement corruption. I compared the effect of E-Procurement on provinces that had high capital expenditure ratio (the treatment group) with provinces that had low capital expenditure ratio (the control group).

The dependent variable in this study is the number of procurement corruption cases that were handled by Corruption Eradication Commission (CEC) from 2005 to 2018 in 34 Indonesian provinces. It is a discrete variable with non-negative integers (0, 1 case, 2 cases, and so on). Procurement corruption cases that were handled by CEC may not fully describe the whole condition of procurement corruption throughout Indonesia because not only CEC but Indonesian National Police

also has duties and authorities to combat procurement corruption. However, the data of procurement corruption cases that were handled by Indonesian National Police is not publicly available, as could not be included in this research.

Despite this limitation, the data of procurement corruption cases handled by CEC are quite comprehensive and can be considered as representative of corruption acts in public/government procurement. Given that 60-67% of total government budget for procurement is using E-Procurement (Indonesia NPPA, 2020). Furthermore, Article 11 and 12, Law Number 30/2002 of Corruption Eradication Commission describes the conditions of corruption acts that can be investigated and prosecuted by CEC. These include corruption acts that (1) involve public/ government officials, legal officials, and/ or any other person related to a corrupt act conducted by a public or legal official; (2) has aroused public attention, and/or; (3) involve the state losses of at least IDR one billion Rupiah (Corruption Eradication Commission, 2002).

It is important to conduct a research that highlights procurement corruption cases were handled by CEC due to several reasons. First, given that this study focuses on corruption cases in public/government procurement, it would be appropriate to analyze the data from CEC because the cases involve public/government officials. Thus, it corresponds to the main feature of

this study, which is procurement corruption conducted by public/government official. Second, taking into account that corruption cases handled by CEC should involve state losses of at least one billion Rupiah, so the majority of actors who arrested by CEC were high level actors or "the big fish", for example minister, head of government agency, head of local government, member of parliament, judge, prosecutor, and other high public or legal officials. Thus cases investigated are like shock therapy and give a deterrent effect on government officials to commit corruption. This effect is in line with the main purpose of E-Procurement to eradicate corruption, especially in government sector. Third, considering that corruption cases handled by CEC have aroused public attention, and encourages public to participate in monitoring government officials. However, as the research focuses on procurement corruption cases were reported by CEC, it is also one of the limitation of this study. Since the data only comes from the annual report of CEC, so this study is unable to capture unreported corruption cases.

Moreover, the dependent variable in this research is the number of procurement corruption cases, which is as "count data" where the observations are non-negative integer values. Statistically, the distribution of data for the number of procurement corruption cases can be seen in the Figure 1.

The above graph shows that the number of procurement corruption cases are mostly at the low frequency of occurrence. Zero event counts are mostly dominant, while fewer counts of one or more than one that result in a skewed distribution. The data of procurement corruption cases is not normally distributed so this study cannot use linear regression analysis. Therefore, regression model that can be used to analyse dependent variable in the form of count data is Poisson regression model (Cameron & Trivedi, 2013).

In order to apply Poisson regression model should meet one of the assumptions, which is the variance of response variable Y is equal to the mean (equidispersion), Var $(Y|x)=E(Y|x)= \mu$. Nevertheless, response/dependent variable with count data may under-dispersed when having
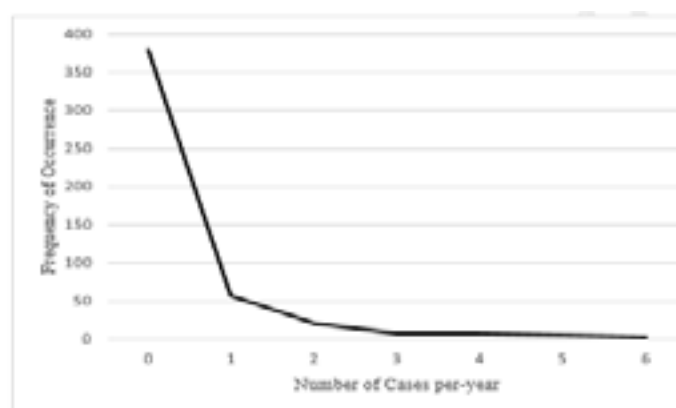

Figure 1 Distribution of Value in the Dependent Variable
Source: Indonesia CEC (2019

smaller variance value than mean value or over-dispersed when having bigger variance value than mean value (Cameron & Trivedi, 2013). The test result of equidispersion assumption which is shown in Table 4.1 reveals that the data of dependent variable is over-dispersed. Table 4.1 shows that there is over-dispersion in the data, with the variance of 0.89 that approximately thrice the mean of 0.37. In order to solve the over-dispersion, negative binomial regression model can be used on count data (Greene, 2008). The negative binomial can handle the "excess zeros" phenomenon and produce better prediction of counts which greater than zero (Cameron & Trivedi, 2013).

The second explanatory variable is the total of provincial government spending for public procurement. This total amount of public procurement spending consists of capital spending and non-capital spending. The next explanatory variable is a dummy of province that has high ratio of capital expenditure to total procurement expenditure. Government expenditure which can be classified as capital expenditure is the expenditure for payment of assets acquisition and/or increase the value of fixed assets/other assets that give benefit more than one accounting period and exceed the minimum capitalization limit of fixed assets (Ministry of Finance Indonesia, 2011). The

Table 4 Descriptive Statistics of the Number of Procurement Corruption Cases

Dependent Variable	Observations	Min	Max	Mean	Variance	Var/Mean
Number of Procurement Corruption Cases	476	0	6	0.3739496	0.8956568	2.39

There are several explanatory variables in this research. The first explanatory variable is a dummy of E-Procurement to examine the effect of E-Procurement on public procurement corruption cases. This dummy variable based on the initial implementation year of E-Procurement for each province, in which value of 1 is used for the first year of E-Procurement implementation and the following years. The value of 0 is used for the years before E-Procurement implementation. The dummy variable tries to represent the existence of E-Procurement practice in Indonesia.

term of high capital ratio in this study is the proportion of capital expenditure that is more than 50 percent of total procurement expenditure. In other words, more than half of total government budget in public procurement spent on capital expenditure.

Since this study attempts to thoroughly capture the effect/impact of E-Procurement on procurement corruption, two interaction variables are formed following the approach of Lucas and Mbiti (2012). The first interaction variable is the interaction between E-Procurement and procurement spending. This interaction variable functions to determine the

implementation of E-Procurement on the total of procurement spending, and how that affects number of corruption cases. The second interaction variable is the interaction of E-Procurement, total procurement spending and dummy provinces with high capital expenditure ratio.

This research also inserts several control variables, which are GRDP per capita, number of procurement certificates, the performance of CEC, and local own-source revenue to ensure the consistency of E-Procurement's impact on corruption. Gross Regional Domestic Product (GRDP) per capita as a proxy of GDP per capita in terms of the expected benefit/return that gained by legal activity (Becker, 1968). The majority of studies on corruption have found association between corruption levels and economic characteristics, most notably GDP per capita. Referring to such as, Treisman (2000), Fisman and Gatti (2002), Knack and Azfar (2003), Svensson (2005), Serra (2006), Iwasaki and Suzuki (2012). The most persistent finding throughout the literature, is that countries with high level of economic development as indicated by high income per capita generally experience less corruption. In the context of this research, provinces with high level of economic development (high income per capita), are expected to have a low level of corruption.

Improvement in skills, competencies, and professionalism of procurement officials is another factor that could diminish corruption. Asogwa (2013), Mutula and Mostert (2010), and Grimsley and Meehan (2007) revealed the relationship between high risk corruption and lack of competency and professionalization of civil servants. This refers to the degree of personnel knowledge and skills on procurement, and also to the extent they are ready to implement and manage E-Procurement. The quality of human resources in government procurement will affect the procurement process and output, and also the successful adoption and development of E-Procurement. In Indonesia, procurement certificate is given to procurement officials that have been trained and equipped with procurement knowledge and also have been taught about procurement principles and ethics. Getting this certificate also requires, pass the exam organized by National Public Procurement Agency. Therefore, the number of procurement certificate in each province represent the quality of human resource in government procurement.

Another control variables in the model is performance of the Corruption Eradication Commission (CEC). It is important to include CEC's performance in terms of fulfilling duty to arrest the person committing corruption because it will influence the number of corruption cases, the effect this study attempts to observe. As the performance of CEC is likely to affect the number of corruption cases, it should be added in the regression model as the control variable.

This research tries to measure the impact of implementing E-Procurement on procurement corruption by comparing the effect of E-Procurement on the provinces

with high capital expenditure ratio (the treatment group) and the provinces with low capital expenditure ratio (the control group). Therefore, it is expected to obtain the variation in terms of measuring the effect of E-Procurement on procurement corruption.

This study employs the negative binomial regression model to handle too many zeros. The negative binomial regression model addresses over-dispersion through adding the parameter α which indicates unobserved heterogeneity among observations (Long & Freese, 2014). The dependent variable in this research is the number of procurement corruption cases in 34 Indonesian provinces from 2005 to 2018. The independent variables consists of dummy of E-Procurement, total procurement spending, dummy of province with high capital expenditure ratio. The control variables in this study are GRDP per capita, number of procurement certificate, performance of CEC, and local own-source revenue.

Where, the number of procurement corruption cases in province i in year t as the dependent variable Y_{it}. For the dependent variables in this study, are variable $e\_procurement_{it}$ as a dummy of E-Procurement implementation, in which value of 1 for the initial year of E-Procurement implementation and value of 0 is for the years before E-Procurement implementation. Variable $procurementspending_{it}$ shows total procurement expenditure in province i in year t. Variable $highcapitalratioprovinces_{it}$ indicates provinces i in year t with high

capital expenditure ratio, in which more than 50 percent of total procurement spending for capital expenditure. Then, the interaction variable is formed between $e\_procurement_{it}$ and $procurementspending_{it}$ to examine the effect of E-Procurement on the total of procurement spending, and for the second interaction variable is formed between $e\_procurement_{it}$, $procurementspending_{it}$, and $highcapitalratioprovinces_{it}$ to examine the effect of E-Procurement, total procurement spending and high capital expenditure ratio on the number of procurement corruption cases.

$GRDP\ per\ capita_{it}$ as the control variable in which indicates GRDP per capita in province i in year t. The other control variables are $Procurement\ Certificate_{it}$ represents the number of procurement certificate holders in province i in year t, variable $Performance\ of\ Corruption\ Eradication\ Commission_{it}$ indicates the performance of Corruption Eradication Commission in year t, and variable $Local\ own\ source\ revenue_{it}$ shows the amount of local own-source revenue in province i in year t.

FINDINGS AND DISCUSSIONS

Descriptive Analysis of the Number of Procurement Corruption Cases

During more than a decade from 2005 to 2018, The Corruption Eradication Commission Republic of Indonesia has handled and investigated 887 corruption cases. In handling corruption cases, The Corruption Eradication Commission divides

the cases into seven categories, namely: (1) public procurement; (2) licensing; (3) bribery; (4) levies/extortion; (5) misuse of state budget; (6) money laundering; and (7) obstructing the Corruption Eradication Commission duties. Based on case categories, procurement corruption ranked second after bribery cases with the total number of cases were 178 cases from 34 provinces in Indonesia. Figure 2 displays the distribution of procurement corruption

Central Java, South Sumatera, East Java, and Papua are the provinces with a great number of procurement corruption cases. Several infrastructure projects and building constructions in Central Java, construction of athletes' village and renovation of stadium for the 2011 Sea Games and the 2018 Asian Games in South Sumatera, and also Trans-Papua Road project of the Ministry of Public Works in Papua.
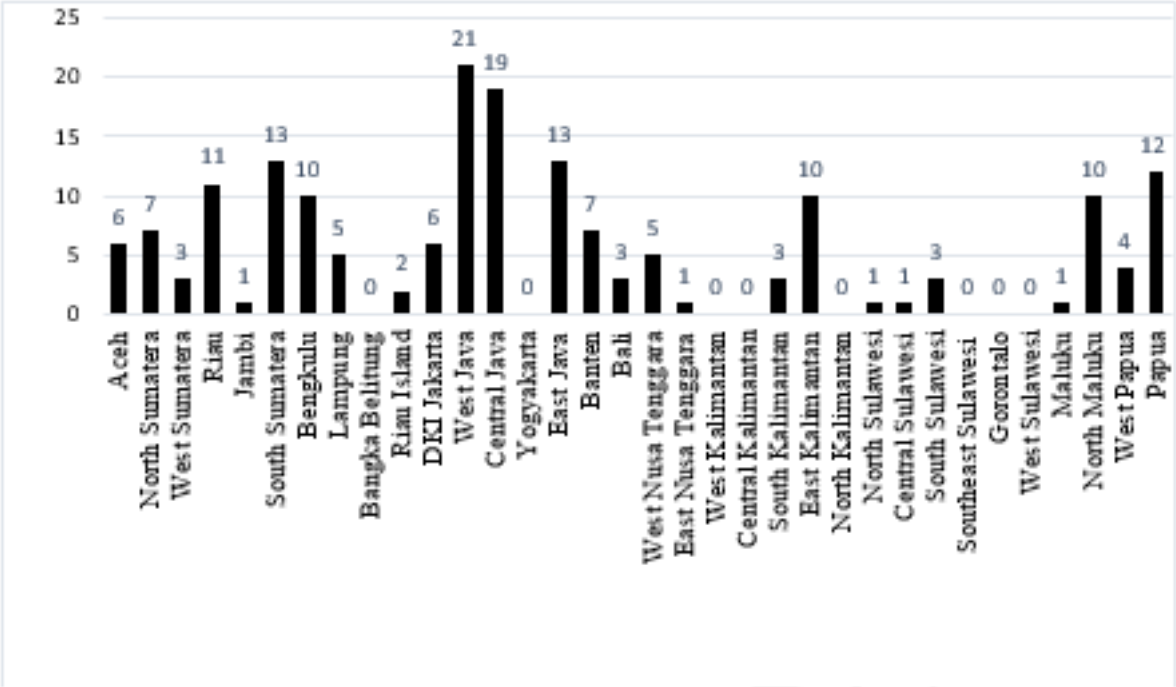
In addition, those infrastructure

Figure 2 Distribution of Procurement Corruption Cases per Provinces in 2005-2018

Source: Indonesia CEC (2019

cases in each provinces.

The above chart shows that West Java Province had the highest number of corruption cases. Many large-scale government projects located in West Java, such as several construction of government buildings, large public markets in Cimahi City, integrated fisheries center, provision of capture fisheries facilities, and so on.

projects and building constructions in such provinces also reflected on the proportion of procurement spending between capital and non-capital expenditure. As shown in the Figure 3, provinces which had a high number of corruption cases are the provinces which had a higher proportion of capital expenditure compared to non-capital expenditure. Bangka Belitung,
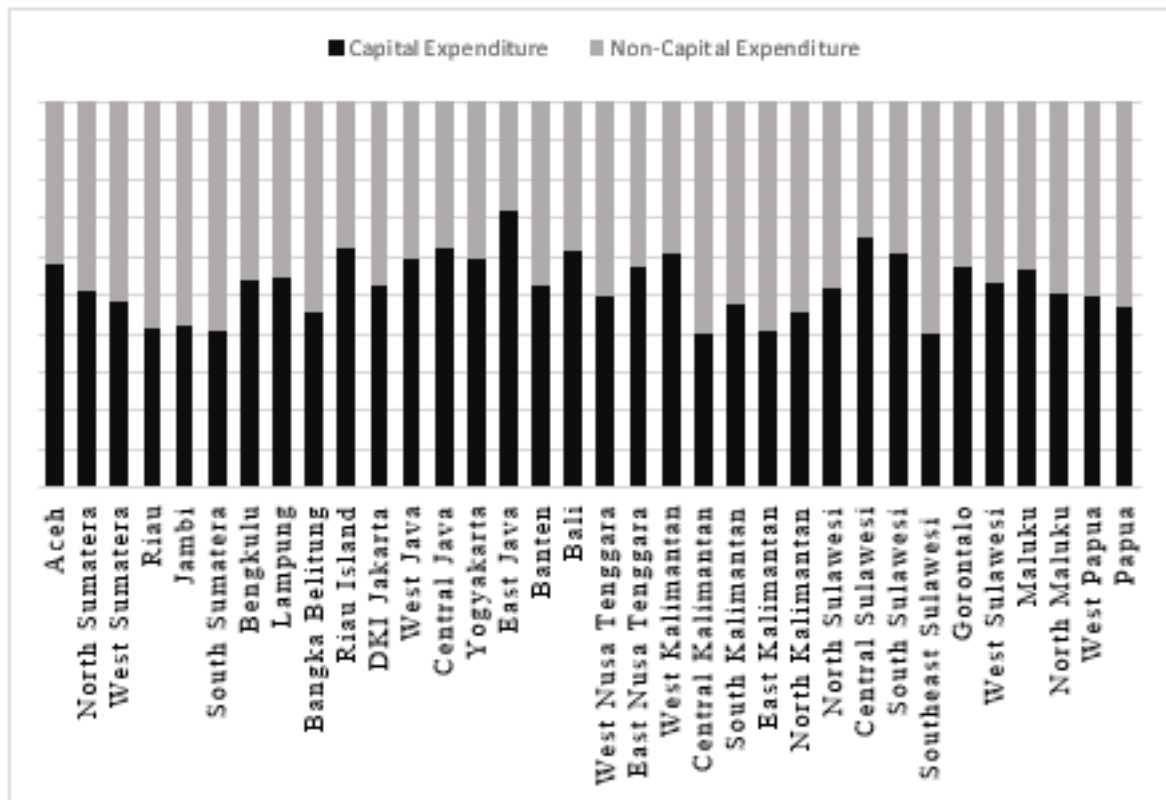
Figure 3 Proportion of Capital Expenditure and Non-Capital Expenditure during 2005-2018

Source: Statistics Indonesia (2019)

North Kalimantan, Yogyakarta, Central Kalimantan, Southeast Sulawesi, and Jambi are the provinces which had a low proportion of capital expenditure and few of these provinces are the results of local government proliferation.

The Results

The Table 5 presents the estimation results of negative binomial regression with control variables to examine the effects of E-Procurement, procurement spending, and capital expenditure ratio on the number of procurement corruption cases.

The above table shows that one million Rupiah increase in procurement spending increase the expected number of procurement corruption cases by a factor of 5.0178=exp (1.613), holding other variables constant. This finding is in accordance with the previous research Goel and Nelson (1998); Nitzan (1994); Scully (1991) that higher government spending will raise the probability of local capture, rent-seeking activity, or corrupt act. Therefore, the result shows a high proportion of procurement expenditure increases the probability of corruption.

The regression result also shows that the provinces even after implementing E-Procurement, it is expected that the number of procurement remains increase by a factor of 1110143=exp (13.92). This result is closely related to the study of Nurmandi & Kim (2015) that examined implementation of E-Procurement in

Table 5 Estimation Results for the Effects of E-Procurement Implementation on the Number of Procurement Corruption Cases

Variables	Parameter Estimates
Procurement spending$_{it}$	1.613*
	(1.214)
E_Procurement$_{it}$	13.92*
	(7.150)
High capital ratio provinces$_{it}$	1.464**
	(0.575)
E_Procurement$_{it}$xProcurement spending$_{it}$	-1.406*
	(0.781)
E_Procurement$_{it}$ x Procurement spending$_{it}$ x High capital ratio$_{it}$	-0.126**
	(0.0631)
GRDP per capita$_{it}$	-2.990**
	(1.371)
Procurement Certificate$_{it}$	-0.115
	(0.757)
Performance of Corruption Eradication Commission$_{it}$	0.993
	(2.797)
Local own source revenue$_{it}$	2.257**
	(0.847)
Observations	363
Wald chi2	44.32
Number of Provinces	26

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Indonesia CEC (2019

a decentralized procurement system in three cities in Indonesia. The study found that decentralization procurement system caused procurement to be much less transparent in one city and transparent but less accountable in other two cities. Given that over the last ten years, E-Procurement system in Indonesia ran and developed in a decentralized way.

As can be seen on Table 5, when the provinces having a high capital expenditure ratio (more than half of total procurement spending for capital) increase the expected number of procurement corruption cases by a factor of 4.3232=exp (1.464), holding other variables constant. This finding is as expected previously, in which the provinces with high capital expenditure ratio are highly prone to corruption. Thus, it is in line with the results of prior studies that the amount of capital expenditure can trigger corruption, so a high ratio of capital expenditure relates to a high level of procurement corruption (Locatelli et al., 2017; Osei-Tutu et al., 2010; Kenny, 2009; Rose-Ackerman, 1996 in Tanzi & Davoodi, 1997).

Table 5 also demonstrates the results of two interaction variables. The first interaction variables is between E-Procurement and procurement

spending. The result of first interaction variable shows that the province spends on public procurement and implements E-Procurement is expected to decrease the number of procurement corruption by a factor of 0.2451=exp (-1.406), holding other variables constant. Then, the second interaction variable is the interaction of E-Procurement, total procurement spending and dummy provinces with high capital expenditure ratio. The result of this second interaction variable shows that provinces with high capital expenditure ratio and implementing E-Procurement is expected to decrease a number of corruption cases by a factor of 0.8816=exp (-0.126), holding other variables constant.

These findings suggest the positive impact of applying E-Procurement in the provinces that have high capital expenditure and hold the large projects with high capital values, for instance infrastructure projects and building constructions. E-Procurement can minimize corruption through increased transparency, openness, and accountability by making the projects more accessible to suppliers and contractors to compete in tender process and also facilitating auditors, non-governmental organization, and civil society to monitor and supervise procurement processes.

Analysis the Effects of E-Procurement Implementation on Procurement Corruption in India
Central Public Procurement Portal (CPPP) as E-Procurement system in India facilitates a single and integrative point access for central government, Ministries and the subordinate offices, government agencies, and state governments to procure goods, works and services. The CPPP allows to improve transparency, minimize corruption, and provide real-time access information and auditing controls (CPPP Government of India, 2020). The CPPP minimizes corruption by reducing risk of fraud, corruption, and mismanagement of government's budget through openness and free access to the system. The system could curb corruption, enhance efficiency and accountability, and create fair competition among supplier by providing online announcement of tenders, bid awards along with contract documents, and easier access to bidders for tender register. It is easier not only for the supplier, but also for other parties like inspectorate and auditors to monitor and oversee tenders and contract documents (Bikshapathi et al., 2006).

Furthermore, in order to guarantee the security of E-Procurement system, government of India applies two-factor authentication with Digital Signature Certificates, role-based user access, usage of SSL, and bid-encryption to secure tender documents (CPPP Government of India, 2020). Unfortunately, although E-Procurement system has already offered secured and transparent procedures, risk is not eliminated completely as individuals search for loopholes in E-Procurement system to avoid detection, make the processes overtly complex and vague. Country Procurement Assessment Report of India published by The World Bank

(2003) showed that considerable number of corruption cases occurred, mainly in the state governments, even the CPPP has already been implemented.

Political interference happened massively in the state-level administrations in India and fraud/corruption practices have already at the level of Corrupt Organization (CO) in which the top managements (commonly the core of organization) arrange corruption collectively adversely affected the performance of E-Procurement to reduce corruption (Pinto et al., 2008). The corruption acts that initiated by the head of state government may lead to the ineffectiveness of E-Procurement implementation. CO in the state government would generate resistance to change and the lack of awareness to conduct good governance.

Moreover, India suffered a wide gap of competencies between central and state governments. Competent employees all gathered in the central government, and inequality of access to training opportunities worsened the condition. Procurement staff in the state governments who did not have sufficient coaching and training about procurement principles and ethics lead to poor sense of integrity and low awareness of good governance practice. As a consequence, it results in still high occurrence of corruption cases in the state government of India.

CONCLUSION

The potential of ICT in reducing corruption, motivated Indonesian government to adopt and utilize e-Governance in provision of public services, including E-Procurement in public procurement. Findings of this research show that the implementation of E-Procurement in Indonesia was impactful on reducing the number of procurement corruption cases, mainly in the provinces with high capital expenditure ratio. Even though E-Procurement was impactful on diminishing procurement corruption, but it requires a decent revamp and improvement of E-Procurement system as well as considerable supports from other related elements.

Referring to the research findings, decentralization procurement system caused procurement to be much less transparent and less accountable so development towards a centralized and integrated E-Procurement system should be well considered. Even so, risk of corruption might not disappear completely as individuals search for loopholes in E-Procurement system. Hence, government should continuously upgrade E-Procurement system to detect and deter corruption with upholding efficiency and effectiveness in its implementation.

E-Procurement system in India should be supported by the competencies, skills, and professionalism of procurement officials. The quality of human resources in government procurement will affect the procurement process and output, and also the successful of E-Procurement itself. It also refers to the degree of personnel knowledge and skills on public procurement, and also to the extent they

are ready to implement and manage of E-Procurement. The combination between great development of E-Procurement and high quality of procurement officials are expected to improve the effectiveness of the E-Procurement.

Furthermore, it is necessary to create mechanism that government employees feel able to speak up about inappropriate behavior and misconduct in the institution with adequate protection from reprisals by their bosses/superiors. It is also important to enforce the code of conduct in each state government institutions and also public servants should get an intensive training about the E-Procurement system before being assigned as procurement officials. In addition, every procurement personnel must attend regular refresher courses on public procurement regulations and ethics.

In addition, it would be great if the government of Indonesia and India can emphasize the collaborative approach with the key stakeholders, including Non-Governmental Organizations, civil society organization, and other strategic entities to generate good governance in public procurement and minimize as much as possible procurement corruption.

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