

# Accountability of Government Procurement of Goods and Services Through E-Procurement Approach to Competition, Efficiency, Value for Money, and Integrity

Estetika Mutiaranisa Kurniawati<sup>(⊠)</sup>, Khresna Bayu Sangka, Nur Chayati, An Nurrahmawati, Dian Perwitasari, and Saktiana Rizki Endiramurti

Universitas Sebelas Maret, Surakarta, Indonesia estetika\_mk@staff.uns.ac.id

**Abstract.** This study aims to examine how public supervision and disclosure of government goods and services procurement contracts are implemented in Indonesia. This study shows how opening procurement data can lead to more fair, efficient, value for money and integrity competition. This study uses data from Opentender.net on government procurement of goods and services in the Province of Central Java and the Special Region of Yogyakarta from 2016 to 2020. The study's results show that regencies/cities in Central Java and Yogyakarta have done well in planning, as evidenced by the decreased procurement of goods and services in the fourth quarter. However, it still lacks tight competition and efficiency in procuring goods and services.

Keywords: E-Procurement · Fraud · Accountability · Transparency

## 1 Introduction

Concerns about fraud in the procurement of goods and services have become practical due to the large amount of money spent on the procurement of goods and services and the lack of supervision in these public organizations [1]. In many countries, public procurement accounts for a sizable portion of the government budget used to procure goods and services and public services. Because of the volume and complexity of procurement activities, the ambiguity of market values for specialty goods, government politics, and the interdependence of political, bureaucratic, and business actors, the public is a prime target for corruption [2, 3]. Individual employees with authority in public procurement activities, as well as institutions serving as organizers, are vulnerable to allegations of fraud or corruption [4].

Since public procurement fraud has harmed many government contracts, transparent and accountable procurement practices are required to prevent fraud and corruption and to promote integrity [5]. The implementation of e-Government and e-Procurement, which aim to provide efficient bid evaluation by minimizing contact with other parties, is viewed as a "tool" for reducing public procurement fraud [6]. According to Gamal [7], the digitization of procurement systems aims to reduce costs, increase market transparency, and improve coordination and collaboration. Gardenal [8] demonstrated how to use e-procurement to measure organizational performance. Adopting an e-procurement platform in this context entails procurement activities in the electronic marketplace that use ICT (Information and Communication Technology) at all stages of the procurement cycle, including seller selection, control over inventory ordering, purchasing, payment, receipt, and post-procurement review. As a result, e-Procurement mechanisms that increase transparency and accountability for many government contracts should be designed to limit fraudulent and corrupt activity in mind.

The Indonesian government issued Presidential Regulation No. 54 of 2010 concerning the procurement of goods and services, also known as the Government PBJ, which regulates the implementation of the electronic procurement system (e-procurement). To date, millions of procurement data have been made available, and various improvements have been made in regulations and systems used. E-Procurement is a PBJ-automated process that increases competition among competitors [9, 10] and reduces the interference of other parties in the bidding process [11–13]. E-Procurement aims to increase transparency and openness in the procurement process, fair competition in providing public services and administering the government, and effectiveness and efficiency in managing the government procurement process. Because any supplier can monitor the bidding process online and at any time, automation over the internet opens up the competition. As a result, other parties' involvement in the bidding process is reduced.

Since 2011, and gradually becoming more systematic in 2014, 2018, and 2020, Indonesia Corruption Watch has launched a series of advocacy efforts to encourage the implementation of public oversight and transparency of government procurement contracts in Indonesia. This initiative is based on the findings of ICW's monitoring of the goods and services procurement sector, which is prone to corruption. According to ICW data from 2016 to 2019, an average of 40% of corruption cases involving the procurement of goods and services occurred each year. Even in 2019, the figure was 64%. Based on the Indonesia Corruption Watch (ICW) analysis with OpenTender.net, the media center renovation received a score of 18. This means that the project is vulnerable to irregularities or corrupt practices due to inefficiency and a lack of public participation. It also increases the likelihood of monopolistic practices.

Although many factors contribute to fraud, particularly corruption in the procurement sector, one crucial factor that cannot be overlooked is the public's lack of participation in procuring goods and services due to limited procurement information. In this case, disclosing procurement information is one option for reducing the possibility of fraud and corruption. Making procurement information available to the public makes it possible for the public to take part in oversight. Furthermore, disclosing information and data on goods and services procurement can improve public service quality, accountability, efficiency, and fair competition among private companies.

There is still few research on e-procurement in Indonesia. This research can help shape strategies for increasing public participation using procurement data and information to support a more transparent and accountable procurement transformation. This research aims to analyze and quantify the impact of the data disclosure approach on the procurement of goods and services, as well as to map the potential for increased data use. This study shows how opening procurement data can lead to more fair, efficient, value for money and integrity competition.

## 2 Literature Review

#### 2.1 Fraud Diamond Theory

The concept of fraud diamond theory was developed by the Association of Certified Fraud Examiners [14]. According to Wolfe and Hermanson [15], the fraud diamond theory is relevant to describing the issue of preventing corruption. Based on this theory, corrupt behavior (abuse) can occur due to four factors: (i) employee incentives to misuse money and institutional assets; (ii) circumstances that allow employees to abuse; (iii) employee mindset and ethics that allow employees to abuse; and (iv) employees' ability to conceal their crimes from the system. Related to this, according to Greyclar and Prenzler [16], corruption; (ii) reducing the causes that tolerate/allow corruption; (iii) increasing the risk of being detected; (iv) reducing incentives for corruption; and (v) Reducing provocation for corruption.

Procurement is the most vulnerable government activity to corruption and occurs worldwide [17], including in Indonesia. Statistical data on the Corruption Eradication Commission's or KPK's case handling is available in several annual reports (2012: 72) (2013: 83) (2014: 41); from 2004 to 2014, the KPK handled 411 corruption cases, with 131, or one-third, of the cases involving procurement of goods/services. After bribery cases, corruption is the second most common case handled by the KPK in this field.

The Indonesian government has attempted to reduce the space for irregularities and corruption in the goods and services procurement sector by issuing regulations governing the procurement process, namely Presidential Regulation No. 16/2018. Then, the government issued Presidential Regulation 12/2021 in February 2021, amending Presidential Regulation Number 16/2018 [18]. These changes, according to ICW [18], reflect the government's efforts to promote a more effective, efficient, accountable, and transparent procurement process, specifically through the Electronic Procurement System process, the Government Goods/Services Procurement Policy Institute, the Procurement Service Unit and Goods and Services Procurement Work Unit, E-tendering, E-purchasing, and E-catalogs, Application of Blacklist Sanctions, and the General Procurement Plan System. Several studies have found that electronic tenders reduce corruption [19–21].

Five procurement approaches that can be achieved through the application of best practices, according to OCDS, include:

**Competition and Market Opportunity.** Procurement competition aims to design procurement rules in such a way that it encourages maximum participation from providers of goods/services. The government will get the best value in terms of price, quality, contract terms, and conditions by increasing competition in procurement regulations [22]. The presence of competition will eliminate barriers that prevent providers of goods/services from entering the procurement market, for example, if they have never undergone complex procurement registration procedures. Best practices for ensuring maximum competition in procurement include: removing complex registration or pre-qualification procedures to lower entry barriers, publicizing the auction through widespread advertising in national or international media, and using the open bidding method in the procurement process. Competition is encouraged in the European Union (EU) society, for example, by announcing procurement through open advertising to the public, encouraging competition among providers of goods/services participating in government procurement tenders, and not excluding companies from participating in tenders or the auction process, except for justifiable reasons specified in the law [23]. The competition and market opportunity approach is used to understand the level of competition in an institution's procurement market and a highly concentrated market consisting of:

#### a. Market Concentration

This indicator is used to determine the concentration of providers in a procurement market. The formula used is the Herfindahl-Hirschman Index (HHI), whose indicators range from 0 to 10,000, where an HHI value of less than 1,500 means a competitive market, and 1,500–2,500 is said to be a market with moderate concentration (quite competitive). Those that exceed 2,500 indicate a level of high market concentration (less competitive).

b. Top Provider

This indicator is used to determine the most significant player in the procurement market based on two factors: top provider in terms of procurements won and top provider in terms of the contract value.

c. Percentage of the Number of Contracts Awarded to the Top 10 Providers

This indicator shows the percentage of the number of contracts won by the top 10 providers compared to the number of procurements carried out. A higher percentage of the number of contracts awarded to the top 10 providers may indicate a more closed market opportunity. This indicator can also explain how the concentration of government contracts is related to how inclusive and competitive the market is as a whole.

d. Number of Providers Winning Contracts for the First Time (New Providers)

This indicator determines the number of new providers entering the government procurement market. A greater number of new (first-time) providers may indicate greater system openness and competition potential. New providers can also show increased trust in the government procurement system.

e. Comparison between New Providers and All Providers

A higher percentage of new (first-time) providers may indicate greater system openness and competition potential.

A greater number of new (first-time) providers may indicate greater system openness and competition potential. New providers can also demonstrate increased trust in the government contracting system.

**Internal Efficiency.** Procurement efficiency has two sides. First, procurement is said to be efficient when it spends the fewest resources on purchasing goods and services required by the government [22]. As a result, administrative costs for procurement should

not be excessive or exceed the cost of the goods/services purchased. Procedural efficiency is the second aspect of efficiency. Best practices for increasing efficiency include adequate and mandatory procurement planning and regulations preventing procurement officials from delaying the procurement process. This can be accomplished by adhering to a strict timetable during the tender registration process, announcing the auction winner's decision, and executing the contract. The internal efficiency approach is used to identify institutions with short and long tender times, as well as those with the most canceled tenders, which include:

a. Percentage of Failed Tenders

The percentage of tenders canceled by the government is shown in this indicator. A high value for this metric may indicate inefficiency in government procurement.

b. The Duration between the Tender Announcement Date and the Winner Determination Date

This indicator wants to know how long each government tender lasts. A brief tender duration may indicate a limited time to submit bids and reduce competition, whereas a very long duration may indicate inefficiencies in the procurement process.

**Value for Money.** The Value for Money is defined as a policy to obtain the best price from Procurement activities involving public funds [22]. However, the best price is not always the lowest price because product quality or functionality considerations can mean that the cheapest product does not always provide the best value. The best price can be obtained by achieving the aforementioned objectives. For example, the need for competition will aid in obtaining the best price because a competitive environment ensures that the government has a list of providers of goods/services from which to choose, allowing it to obtain competitive prices and avoid price monopolies [24]. The Value for Money approach can be quantified as follows:

a. Percentage of Contract Value Above Owner Estimate (OE)

A higher percentage of costs on overbudget contracts may indicate an inefficient contracting process and a lower value for money. Cost overrun information is critical for determining overall efficiency.

b. Percentage of Contract Value Below OE (Savings)

A higher savings percentage may indicate better value for money. Value for money improves when the government can purchase the required quality goods/services at lower prices, generating savings. In general, the more competition there is, the lower the price and the higher the value for money.

**Public Integrity.** The realization of transparency in procurement activities will further encourage procurement system integrity. The presence of integrity indicates that rules govern the actions of public officials and government goods/service providers during the procurement process [22]. More specifically, integrity requires public officials to follow the rules and award contracts to the providers of goods and services who are most qualified to be chosen based on open contract appraisal criteria and that the companies providing goods and services will compete based on their abilities, not on their ability to influence public officials or decision-makers incorrectly. Procurement integrity will help to ensure fair competition because goods/services supplying companies will only

register Procurement tenders where they believe they will experience an honest and impartial procurement process.

Some of the best practices that can ensure procurement integrity are rules that prevent conflicts of interest in the procurement process; and the publication of procurement tender announcements, which will give the impression that the procurement process is not closed and discriminatory, but open and honest [25]. The approach to public integrity can be measured by:

a. Percentage Number of Tenders with Titles less than 20 Characters

The percentage of tenders with ambiguous titles may indicate a lack of integrity. Tender titles that are too short or vague make it more difficult for potential bidders to find and understand the announcement. As a result, fewer potential bidders may choose to bid.

b. Percentage of Tenders with Descriptions less than 60 Characters

A higher percentage of tenders with unclear descriptions could indicate a lack of integrity. Tender descriptions that are too short or vague make it more difficult for potential bidders to find and understand the announcement. As a result, fewer potential bidders may choose to bid.

In the Indonesian context, the type of procurement refers to whether the procurement is for goods, construction work, consulting services, or other services.

Red Flag. The red flag approach can be measured using the following:

a. Procurement with the Highest Contract Value

Large-value procurement typically has a higher risk of fraud.

b. Procurement in Q4

Procurement in the fourth quarter of a single fiscal year has the potential for a more significant deviation.

## 3 Research Methods

This study used quantitative methods. A quantitative approach is used to analyze procurement data sourced from Opentender.net over five years, from 2017 to 2021, to see the transformation of the quantity and quality of government goods/service procurement data in Central Java Province and Yogyakarta Special Region (see Table 1).

## 4 Result and Discussion

## 4.1 After 10 Providers with the Largest Contract Value

In the last five years, in Central Java Province and the Special Region of Yogyakarta, the highest contract value was Rp. 192,781,900,000 in Surakarta City. Most providers in Central Java Province and the Special Region of Yogyakarta Province are private companies (see Table 2).

No	Dimension	Indicator
1	Competition and Market Opportunities	10 Providers with the Largest Contract Value
		Number of Contracts awarded to Top 10 Providers
		Number of Providers Winning Contracts for the First Time (New Providers)
		Comparison between New Providers and All Providers
		Percentage of Growth of New Providers in Each Ministry/Institution/Regional Apparatus
2	Internal Efficiency	Percentage of Failed Tenders
		The duration between the Tender Announcement Date and the Winner Determination Date
3	The value of the currency	Percentage of Contract Value above Owner Estimate (OE)
		Percentage of Contract Value Below OE (Savings)
4	Public Integrity	Percentage of Number of Tenders with Titles less than 20 Characters
		Percentage of Number of Tenders with Descriptions less than 60 Characters
5	Red Flag	Procurement with the Highest Contract Value
		Procurement in 4th Quarter

Table 1.	Dimensions	and indicators.
I abit II	Dimensions	una marcatoro.

### 4.2 Number of Contracts Awarded to Top 10 Providers

Central Java Province and DI Yogyakarta, in the last five years, TB Mustakim has had the highest number of tenders by winning 12 tenders (see Table 3).

## 4.3 New Provider

The number of new providers increased significantly in Central Java Province and Yogyakarta Special Region Province between 2017 and 2021, with 2,518 new providers added in 2021. The growth in the number of new providers in the Surakarta and DIY government procurement systems has decreased from 2017–2020, this is understandable due to the development of procurement methods implemented by the Government where the Tender method is the last resort in the procurement process (see Table 4).

No	Regency/ City	Providers	Contract value	Number of Tenders
1	Surakarta City	PT.KARYA BISA	192.781.900.000	1
2	Semarang city	PT. MOHANDAS OELOENG	189.359.818.120	3
3	Semarang city	PT.SINAR CERAH SEMPURNA	169.253.228.219	2
4	Semarang city	PT.SINAR CERAH SEMPURNA	146.779.083.000	2
5	Magelang Regency	PT. ARMADA HADA GRAHA	115.050.036.000	8
6	Wonosobo Regency	PT. TIRTA DHEA ADDONNICS PRATAMA	114.439.742.000	1
7	Brebes Regency	PT. ISTAKA KARYA (PERSERO)	110.775.611.177	1
8	Purworejo Regency	PT. HUTAMA KARYA (PERSERO)	94.701.216.000	1
9	Blora Regency	PT. DWI PONGGO SETO	92.203.319.000	1
10	Karanganyar Regency	PT. MAM ENERGINDO	89.485.986.148	1

Table 2. The largest contract providers.

#### 4.4 Internal Efficiency

#### **Percentage of Failed Tenders**

In the province of Central Java and the Special Region of Yogyakarta, the percentage of failed tenders has remained relatively stable over the last five years. In 2021 (see Table 5), the percentage of tenders dropped significantly, with only 15% of tenders failing. The increase in failed tenders in 2020 resulted from the COVID-19 pandemic, which has caused the government to refocus its budget to mitigate the pandemic's impact. Failed tenders can be caused by several factors, including a lack of bids from providers, budget refocusing and changes to the Revised State budget and Revised Local Government Budget, changes in planning documents and specifications, and a lack of qualified providers.

No	Regency/ City	Providers	Contract value	Number of Tenders
1	Salatiga City	TB.MUSTAKIM	3.404.744.720	12
2	Wonosobo Regency	INTI SARANA WIJAYA	5.881.889.943	10
3	Surakarta City	PT. LANTAR ABYUDAYA PERKASA	13.836.034.000	9
4	Magelang Regency	PT. ARMADA HADA GRAHA	115.050.036.000	8
5	Grobogan Regency	PT. JAYA SEMPURNA SAKTI	25.301.714.000	8
6	Pati Regency	CV. TIMUR JAYA ABADI	15.106.000.000	8
7	Kudus Regency	PT. GELORA NUSANTARA ABADI	7.898.016.000	8
8	Pekalongan Regency	PT. INTI DELTA EKAPRANA	4.837.390.445	8
9	Demak Regency	PT. TUNAS HARAPAN JAYA BARU	38.979.650.000	7
10	Banjarnegara Regency	PT. REJO MANDIRI SEJAHTERA	33.714.606.000	7

 Table 3. Number of contracts awarded to top 10 providers.

## Table 4. The number of new providers.

YEARS	NUMBER OF NEW PROVIDERS
2017	1.423
2018	956
2019	640
2020	289
2021	2.518

Years	Percentage	Number of Tenders
2017	22%	2.161
2018	20%	2.137
2019	21%	2.184
2020	24%	2.194
2021	15%	2.137

Table 5. Percentage of number of failed tenders.

 Table 6. Duration of announcement and determination.

YEARS	Durasi	Durasi							
	0–25 days	26-35 days	36-45 days	46–70 days	>70 days				
2017	2.533	2.720	1.602	926	42				
2018	1.980	2.157	1.647	956	44				
2019	933	1.829	1.277	1.298	156				
2020	504	1.005	649	336	191				
2021	781	1.444	1.011	827	127				

#### The Duration Between the Tender Announcement Date and the Winner Determination Date

The duration between the announcement of the tender and the date of determination in the Province of Central Java and the Special Region of Yogyakarta has been quite good in the last five years (see Table 6). The duration of the tenders in 2017 and 2018 was relatively short, indicating that the competition was less intense due to the short timeframe. However, the duration of tender announcements is still greater than 70 days in districts/cities in Central Java and DIY, indicating inefficiencies in the procurement process.

#### 4.5 The Value for Money

**Percentage of Contract Value Above Owner Estimate (OE) and Savings.** In the last five years, most contract values in the province of Central Java and the Special Region of Yogyakarta have exceeded the Owner Estimate (OE). There are only nine tenders, five tenders, seven tenders, two tenders, and seven tenders with contract values less than OE from 2017 to 2021. This suggests that regencies/cities in the province of Central Java and the Special Region of Yogyakarta have yet to implement procurement planning properly. This is demonstrated by the number of tenders with higher contract costs. This indicates an inefficient contracting process that provides less value for money.

Years	Percentage									
	>=-20%	-16%	-12%	-8% s/d	-4%	-3%	-2%	-1%	0  s/d - 0  ord	>0%
		s/d – 19.99%	s/d – 15.99%	-11.99%	s/d – 7.99%	s/d – 3.99%	s/d – 2.99%	s/d – 1.99%	0.99%	
2017	725	605	586	673	1.241	494	604	1.127	1.813	9
2018	798	642	544	618	1.029	455	609	1.005	1.276	5
2019	653	476	458	527	954	443	566	743	961	7
2020	580	303	265	285	562	193	189	216	376	2
2021	847	357	348	383	763	350	512	374	472	7

Table 7. Contract value.

## 4.6 Public Integrity

**Percentage of Number of Tenders with Titles Less Than 20 Characters.** Tenders with titles of less than 20 characters have short and non-descriptive titles, which can reduce the chances of providers finding and understanding the tender, as well as the public conducting surveillance. Table 8 shows that the tenders with titles of less than 20 characters fell from 3.09% to 2.41% between 2020 and 2021. This means that there has been a slight improvement in integrity in publishing a more complete title. Furniture Procurement, Fence Construction, and Main Lobby Arrangement are examples of tenders with titles of less than 20 characters.

**Percentage of Tenders with Descriptions Less Than 60 Characters.** A tender description of fewer than 60 characters indicates a brief description of a government-conducted tender. Short tender descriptions can make it more difficult for potential bidders to find and understand the announcement. As a result, fewer potential bidders may choose to bid later. On the other hand, due to a lack of available information, it is difficult for the community to supervise. Table 9 shows a decrease in the percentage of tenders with descriptions of less than 60 characters from 2017 to 2021, with 72.63%, 72.86%, 77.09%, 68.15%, and 61.06%, respectively. This decrease in percentage indicates an improvement in transparency because the information conveyed is slightly more complete.

Years	0–20 characters		
	Percentage	Number	
2017	1,54%	106	
2018	7,06%	105	
2019	2,17%	364	
2020	3,09%	363	
2021	2,41%	366	

Table 8. Title of tender less than 20 characters.

Years	0–60 characters	
	Percentage	Amount
2017	72,63%	5.586
2018	72,86%	5.533
2019	77,09%	5.589
2020	68,15%	5.576
2021	61,06%	5.629

Table 9. Description of tender less than 60 characters.

#### 4.7 Red Flag

**Procurement with the Highest Contract Value.** Table 7 shows the procurement with the highest contract value in Central Java and DI Yogyakarta Provinces for each of the 2017–2021 periods. According to this data, construction work dominates large contract value procurement, with the majority of it won by SOEs, and all contracts with the highest value are in Banjarnegara Regency. Sino Road and Bridge Group Corporation (SRBGC), a Chinese company, won the tender with the highest contract value. SRBGC is not the first company to win a government tender in Indonesia. SRBGC's track record in other tenders is poor. In 2017, the Manado-Bitung Toll Road project in North Sulawesi was won, but the work done was not up to standard; the physical realization was only 13.47% when it should have been 26.06%. Furthermore, the toll road's construction is hampered by late payments to subcontractors. Given SRBBC's poor performance, it is unclear why the government continues to outbid this company for a similar job (see Table 10).

**Procurement in Quarter 4.** This indicator shows the number of tenders in the fourth quarter (October, November, and December) with a single year and not predipa tenders. Often, procurement in Q4 is associated with spending budgets and is poorly planned, with a higher potential for fraud. In 2017–2021, procurement in the 4th quarter in the Province of Central Java and the Special Region of Yogyakarta showed a significant decrease. This condition reveals that the Regency/City has done good planning (see Table 11).

No	Regency/City	Year	Tender	Contract	Score	Risk
1	Banjarnegara Regency	2019	CONSTRUCTION OF SERANG TOLL ROAD - PANIMBANG SECTION 3 (CILELES-PANIMBANG)	4.600.000	57	MEDIUM
2	Banjarnegara Regency	2019	Improvement of the Railway Signaling and Telecommunication System on the Jatinegara – Bogor, and Manggarai – Jakarta city MYC 2020–2022 (non-binding tender)	1.060.000	71	HIGH
3	Banjarnegara Regency	2019	Stadium Construction in the Sports Center Area (Multi years)	944.720	57	MEDIUM
4	Banjarnegara Regency	2019	Design Excise Ribbon Printing 2021 and 2022	810.380	82	HIGH
5	Banjarnegara Regency	2019	Rehabilitation and Improvement of Swamp Irrigation Network in Block A Working Area, Kapuas Regency	808.550	61	MEDIUM
6	Banjarnegara Regency	2019	Road Construction Kendari – Toronipa	799.260	61	MEDIUM
7	Banjarnegara Regency	2019	The construction of the Sepaku Semoi Dam, North Penajam Paser Regency	676.730	75	HIGH
8	Banjarnegara Regency	2019	TNKB 2020	671.560	68	MEDIUM
9	Banjarnegara Regency	2019	Flood Control at Bekasi River Package 1	666.900	75	HIGH
10	Banjarnegara Regency	2019	Airside Facility Work at Siboru Fakfak Airport	604.110	61	MEDIUM

 Table 10. Tender winners with the largest contract value.

Years	Amount		Score	Score		
	Number	Percentage	Value (in million)	Percentage		
2017	443	6,61%	560.563	5,55%		
2018	418	6,31%	557.238	5,08%		
2019	376	6,22%	463.054	5,04%		
2020	286	6,12%	363.807	4,94%		
2021	213	6,19%	306.127	5,04%		

Table 11. Number of procurements in quarter 4.

## 5 Conclusion

This research aims to analyze and quantify the impact of the data disclosure approach on the procurement of goods and services, as well as to map the potential for increased data use. Although many factors contribute to fraud, particularly corruption in the procurement sector, one crucial factor that cannot be overlooked is the public's lack of participation in procuring goods and services due to limited procurement information. Based on the dimensions of public integrity, there were changes in the 2017-2021 period regarding the title and description of procurement, although not too significant. The number of tenders with titles of less than 20 characters and 60 characters decreased. This means that there is an improvement in terms of transparency because the information submitted is slightly more complete, although not significant. The percentage of failed tenders has remained relatively stable over the last five years. In 2021, the percentage of tenders dropped significantly resulted from the COVID-19 pandemic, which has caused the government to refocus its budget to mitigate the pandemic's impact. The duration of the tenders in 2017 and 2018 was relatively short, indicating that the competition was less intense due to the short timeframe. However, the duration of tender announcements is still greater than 70 days in districts/cities, indicating inefficiencies in the procurement process. This research can help shape strategies for increasing public participation using procurement data and information to support a more transparent and accountable procurement transformation.

### References

- 1. Caulfield, T. O. M.: The anatomy of procurement fraud. Contract Management 54(4), 52–55 (2014).
- 2. Hawkins, Jeff, Ahmad, Subutai, Dubinsky, D.: Hierarchical temporal memory including htm cortical learning algorithms: Techical report. Numenta, Inc, Palo Alto (2011).
- Rose-ackerman, S., Palifka, B. J.: Corruption and Government Tecnologico de Monterrey. (2016).
- 4. Murray, J.G.: Procurement fraud vulnerability: a case study, EDPACS 49(5), 7-17 (2014).
- Azmi, K. S. A., Rahman, A. A. L. A.: E-Procurement: A tool to mitigate public procurement fraud in Malaysia? Proceedings of the European Conference on E-Government, ECEG, 361– 368 (2015).

- Neupane, A., Soar, J., Vaidya, K.: An Empirical Evaluation of The Potential of Public E-Procurement to Reduce Corruption. Australasian Journal of Information Systems 18, 21-44 (2014).
- Aboelmaged, M. G.: Predicting E-Procurement Adoption In A Developing Country: An Empirical integration Of Technology Acceptance Model And Theory Of Planned Behaviour. Emerald Group Publishing Limited, Bingley (2010).
- 8. Gardenal, F.: A Model To Measure E-Procurement Impacts On Organizational Performance. Journal of Public Procurement 2, 215–242 (2013).
- Mahmood, S. A. I.: Public procurement and corruption in Bangladesh confronting the challenges and opportunities, Journal of Public Administration and Policy Research 2(6), 103-111 (2001).
- 10. Thai, K.V.: Public procurement re-examined, Journal of Public Procurement 1, 18-35 (2001).
- Henriksen, H.Z., Mahnke, V., Hansen, J.M.: Public e-procurement adoption: economic and political rationality, Proceedings of the 37th Annual Hawaii International Conference on System Sciences, Hawai, 9–19 (2004).
- Khanapuri, V.B., Nayak, S., Soni, P., Sharma, S., Soni, M.: Framework to overcome challenges of implementation of e-procurement in Indian context, paper presented to International Conference on Technology and Business Management, Dubai, March 28–30, 234–256 (2011).
- Magrini, P.: Transparency in e-procurement: the Italian perspective, 1st high level seminar on e-procurement, Naples, January 30–31, available at: www.oecd.org/dataoecd/ 57/31/36238443.pdf. (2006).
- 14. Kassem, R., Higson, A.: The New Triangle Model, Journal of Emerging Trends in Economics and Management Sciences (JETEMS) 3(3), (2012).
- Wolfe, D.T., Hermanson, D.R., The Fraud Diamond: Considering the Four Elements of Fraud, The CPA (Certifed Public Accountants): http://myweb.ncku.edu.tw/~r16001205/w1.
   3\_Emba.Fraud%20Diamond.CPAJ.2004.pdf. (2004).
- 16. Graycar, A., Prenzler, T.: Understanding and Preventing Corruption. Palgrave Macmillan, Basingstoke (2013).
- 17. OECD.: Aktif bersama Indonesia. www.oecd.org/eco. (2007).
- 18. ICW.: Anti Korupsi. https://www.antikorupsi.org/index.php/id. (2021).
- Haryati, D., Anditya, A., Wibowo, R. A.: Pelaksanaan Pengadaan Barang / Jasa Secara Elektronik (E-Procurement) pada Pemerintah Kota Yogyakarta. Mimbar Hukum 23(2), 237–429 (2011).
- Djojosoekarto, A.: E-Procurement di Indonesia, Pengembangan Layanan Pengadaan Barang dan Jasa Secara Elektonik, Kemitraan Partnership dan LPSE Nasional, Jakarta (2008).
- Jasin: Memahami Untuk Melayani: Melaksanakan e-Announcement dan e-Procurement dalam sistem Pengadaan Barang dan Jasa Pemerintah, Komisi Pemberantasan Korupsi, Jakarta (2007).
- Schooner, S. L.: Desiderata: Objectives for a system of government contract law. Public Procurement Law Review, 103. https://www.wsj.com/articles/amazon-has-ceded-control-ofits-site-the-result. (2002).
- 23. Arrowsmith: The Law of Public and Utilities Procurement. 2nd edn. Sweet & Maxwell, London (2005).
- Beviglia-Zampetti: The UNCITRAL Model law on Procurement of Goods, Construction, Services, in B Hoekman and P Mavroidis (eds) Law and Policy in Public Purchasing: The WTO Agreement on Government Procurement, University of Michigan Press. (1997).
- 25. Allen, L. V.: The Art science, and Technology of Pharmaceutical Compouding, 304,309,310, American Pharmaceutical Association, Washington D. C. (2002).

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

