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Article

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Procurement governance in reducing corruption in the Indonesian public sector: a mixed method approach

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ABSTRACT

Implementing procurement governance to combat corruption in the public sector is challenging. This study investigates this implementation across several procurement phases. It proposes how governance based on state principles and global recommendations can reduce corruption during the procurement planning, preparation, and implementation phases. For this purpose, the study employs a mixed research approach, distributing questionnaires and conducting interviews with ministries, institutions, provincial governments, and suppliers. This study gathered primary data from 744 institutions and performed a multigroup analysis of the government and suppliers. Partial least squares structural equation modeling (PLS-SEM) was used to test the hypothesis. A sequential qualitative analysis with NVivo was performed to confirm the results. The results prove that procurement governance significantly negatively affects procurement corruption. The results imply that the state principles and dimensions of integrity, capacity, competition, fairness, as well as monitoring and control, are more correlated with the implementation of procurement governance. Moreover, the preparation phase of procurement is more related to corruption. This study contributes to Indonesian government procurement regulations and corruption prevention.

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1. Introduction

Public governance is critical for the government because it requires significant financial resources. Governance expenses significantly contribute to the Indonesian government's budget (Lewis & Hendrawan, 2019). Public governance is vulnerable to fraud and corruption due to the involvement of large sums of money, information asymmetry, and bureaucratic decision-making (Mugellini et al., 2021). Corruption in public procurement is a common issue in many countries, impacting finances, the environment, society, innovation, and trust in government (Kang et al., 2023). Corruption has gained global focus due to its perceived impact on a country's economic progress. In recent times, scholars have shown a strong interest in investigating the consequences of this phenomenon on a country-wide scale (Boateng et al., 2021).

The prevalence of corruption and the effectiveness of public governance have influenced the behavior in many countries. These observations emphasize the importance of national anti-corruption and governance systems (Faisal et al., 2023). The quality of corporate governance practices reduces the level of corruption (Boateng et al., 2021). Specifically, in public governance, a weak governance system is associated with high corruption (Boateng et al., 2024). Therefore, public governance is crucial for good governance and plays a role in preventing corruption (Owusu et al., 2019). The United Nations Convention against Corruption (UNCAC) reports that most corruption cases are related to public governance, resulting in losses of billions of dollars each year (United Nations, 2013).

According to Transparency International's financial reports, corruption affects the procurement of goods and services using funds allocated for non-essential purposes, leading to low state revenue. Inefficiency, powerlessness, and corruption in procurement functions result in substantial financial loss.

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Additionally, corruption in public governance has environmental, social, and innovation impacts, causing a decline in public trust and value in the government (Transparency International, 2014). Corruption in the governance of the procurement of goods and services is a serious global issue, including in the Asia-Pacific region. Transparency International (2023) indicates that the Asia-Pacific region will continue to stagnate on the 2022 Corruption Perceptions Index (CPI), with an average score of 45 out of 100 for the fourth consecutive year. This suggests that efforts to reduce corruption have not progressed significantly. Afghanistan, Cambodia, and North Korea rank lowest in Asia-Pacific, with a CPI below 25. Indonesia's situation in the 2022 CPI has also worsened, ranking as the 1/3 most corrupt country globally and well below the average CPI score in the Asia-Pacific region of 45. Transparency International Indonesia (2023) places Indonesia alongside Bosnia, Herzegovina, Gambia, Malawi, Nepal, and Sierra Leone with a score of 34. Indonesia ranks 7th out of 11 Southeast Asian countries, far below neighboring countries such as Singapore, Malaysia, Timor-Leste, Vietnam, and Thailand. The lowest score on Indonesia's corruption perception index in 2022 proves that Indonesia is experiencing severe challenges due to the declining quality of eradication of corruption.

Indonesia will experience significant financial losses due to corruption in the procurement process (Paranata, 2022). Corruption in public governance is a major concern for the Indonesian government. To address this issue, the government has issued presidential instructions on corruption prevention and eradication actions, as well as presidential regulations on national corruption prevention strategies. Indonesia also participates in the UNCAC and G20 Anti-Corruption Working Group (ACWG). According to data from Indonesia's Corruption Eradication Commission (KPK), procurement of goods and services is one of the country's most common types of corruption (Prabowo et al., 2018; Sabani et al., 2019). The 2018 annual report from the Audit Board of the Republic of Indonesia (BPK) states that issues and state losses due to procuring goods and services account for 49% of the total state losses. The 2021 annual report from KPK states that budget misuse and interventions in determining governance winners occur in government institutions. Indonesia ranks high in Southeast Asian corruption (United Nations, 2020).

There are several major reasons for the high rate of corruption in public procurement, particularly in Indonesia. First, KPK has established various modes of corruption in the procurement of goods and services, ranging from auction conditioning to procurement price manipulation. The acquisition of goods and services consumes more than 52% of the national budget. (Indonesia's National Government Internal Auditor; BPKP, 2021). In 2022 alone, the central and regional governments budgeted at least 1,200 trillion rupiah for this purpose (Indonesia's National Public Procurement Agency (LKPP), 2023). Second, corruption corrosively affects existing mechanisms by destroying systems that strive to maintain their integrity (United Nations, 2020). According to the 2023 Indonesian integrity assessment survey, the results of public procurement of goods and services were ineffective, with the highest level of corruption (KPK, 2023). As a result, the Indonesian government has made significant efforts to monitor public procurement.

Furthermore, every stage of the procurement process, including the planning, bidding, and evaluation stages, carries the risk of corruption (United Nations, 2013; Transparency International, 2014). Many forms of potential fraud in procurement are found at various stages, from budgeting to utilization, such as corruption, collusion, and tender fixation (Arief, 2016). Indonesia's Corruption Eradication Commission (KPK) 2022 reported corruption and state losses in procurement, including budget planning, preparation, handover, and payment stages. Various forms of potential fraud in procurement are found at different stages, from budget planning to utilization, such as corruption, collusion, and tender fixing (Jancsics, 2019). Public resource projects are exposed to corruption vulnerabilities at various stages, which can be manipulated by corrupt actors (Bhagat & Jha, 2023).

Good procurement governance is crucial to prevent corruption. Anti-corruption is a component of good governance, and governance serves as an anti-corruption platform (World Bank, 2018). Addressing public procurement governance is essential for combating corruption (Lucey et al., 2023; Kohler & Dimancesco, 2020). There is a need for global governance encouragement in all Asia-Pacific countries, including Indonesia. Good procurement governance is crucial in eradicating corruption. Indonesia has committed to implementing procurement governance principles in UNCAC and G20 and has followed the OECD recommendations for implementing governance in public procurement.

Procuring goods and services is frequently a major issue. Therefore, the government must adopt good governance (Jonathan, 2017; Adjei-Bamfo et al., 2019). Furthermore, implementing procurement

governance is difficult and has yet to be fully optimized to prevent corruption (ICW, 2018; Lisciandra et al., 2022; Zahra, 2021; Nurmandi & Kim, 2015; Maulidi, 2017). Dávid-Barrett and Fazekas (2020) empirical research demonstrates how data analytics can be used to observe public procurement at the system level to inform more adaptive and effective anti-corruption programming, reducing corruption risks due to low competition. Sharma et al. (2019) provide practical insights into strengthening organizational corruption control and improving procurement processes. On the other hand, Okafor et al. (2020) conclude that good government governance can help reduce the chances of corruption but cannot eliminate it entirely. Unfortunately, the above empirical research has not significantly concluded that procurement governance directly impacts corruption.

Starting in 2014, the Indonesian government implemented the principles of public procurement under presidential regulation. Besides, other procurement governance practices are not stated in the presidential regulations but have been recommended by the OECD (OECD, 2016) and implemented in Indonesia. However, these governance principles may not be fully implemented. Hence, corruption cases in public procurement remain high. The pervasive issue of corruption in public procurement and public works across Asia-Pacific nations has impeded the delivery of essential services and infrastructure, posing a significant challenge to governance standards (Sartor & Beamish, 2020; Knox & Janenova, 2023). Although reforms have been implemented in the region to combat corruption in public procurement, the impact remains significant in many states (Fazekas & Czibik, 2021). As a result, this study needs to dig deeper and reveal the dimensions of governance and corruption. The root cause of corruption must be identified through the procurement process.

The research question of the study is whether the implementation of procurement governance has a significant effect in reducing corruption. It includes the implementation of state principles and global recommendations of procurement governance in reducing corruption and how corruption occurs during the procurement phase. First, this research aims to test the implementation of procurement governance based on state principles and global recommendations. Dimensions correlating with governance and reducing corruption must be maintained and included as procurement principles in presidential regulations. The second is to reveal procurement phases that are related to corruption. By finding this out, the government can be more effective and focus on detecting, monitoring, and reducing corruption in particular procurement phases. The third is to test the effect of implementing governance to reduce procurement corruption.

This study seeks to make the following contributions. First, compared to previous research that used limited or partial variables of procurement governance, this study expands to more complete and comprehensive procurement governance based on state principles and global recommendations. Second, this study does not use the general corruption index; rather, it measures corruption specifically related to public procurement based on procurement phases. Third, unlike previous studies, which used secondary data or case studies in specific government institutions, this study uses primary data to obtain direct perceptions from procurement actors, yielding more general results. The data comes not only from internal government departments, institutions, and provincial governments but also from external or government suppliers in Indonesia, allowing for more objective perceptions. Fourth, this study employs a mixed-methods approach, with sequential qualitative analysis using interviews to provide in-depth analysis and strengthen quantitative findings.

2. Background

The United Nations Convention against Corruption (UNCAC) seeks to integrate good procurement practices into broader anti-corruption initiatives. Specifically, (UNCAC, 2013) requires that the government create an appropriate procurement system based on openness, competition, criteria for determining effective decisions, and integrity to anticipate corruption. Indonesia has committed to implementing these principles in UNCAC and the G20. In Indonesia, the role of procurement reform in the Indonesian public sector has been stated in the first and seventh agendas of the National Medium Term Development Plan (2020–2024), which refers to the need to maximize good public governance. (UNODC, 2020).

Fraud prevention and anti-corruption are components of good governance, and governance is an anti-corruption platform (IPW, 2008; WorldBank, 2018) where the process of procuring goods and

services becomes a big problem, so good governance must be created in government (Jonathan, 2017). Good procurement practices must be based on openness, competition, effective decisions, and integrity (Alfada, 2019) (Neu et al., 2015). According to Arifin (2017), government procurement of goods and services is the most fundamental part of good government governance. Corruption is a governance issue. It means that if governance is effective, the opportunity for corruption is reduced, allowing anti-corruption strategies to function optimally (KPK, 2017). The procurement stage or process consists of three major steps: planning, preparation, and implementation. Each process or step carries the risk of corruption. In other words, corruption in the procurement of goods and services in the public sector occurs through all procurement processes or stages (UNCAC, 2013; BPKP, 2019; OECD, 2009).

Good procurement governance is an essential factor in preventing corruption. Principles such as transparency, accountability, participation, integrity, and accessibility must be applied in public procurement (Bamfo, 2019; Concha et al., 2012). The governance of the Indonesian government's procurement of goods/services is regulated in Presidential Regulation No. 12 of 2021 to create suitable goods and services from each spending money and measurable through aspects of quality, quantity, estimated time, budget, provider, and location. This new regulation supports preventing and eradicating corruption through better and more controlled government procurement of goods and services. Since Presidential Regulation No. 54 of 2010, the government has determined that the principles of procurement of goods and services are efficient, effective, transparent, open, competitive, fair, and accountable.

Apart from presidential regulations or state principles, some principles or standards are recommended globally and have been implemented in the Indonesian public sector. Reports from (OECD, 2006; United Nations, 2009) state that good governance upholds eradicating corruption such as transparency, accountability, participation, and efficiency. The principles of procurement governance are also used to avoid corruption in public procurement, for example, the principles of integrity and accessibility (OECD, 2016; Gardenal, 2013; Khorana, 2015), control and monitoring (OECD, 2009; OECD, 2014).

3. Literature review

3.1. Agency theory

Agency theory focuses on the problem of corruption in the public procurement process in the Indonesian public sector. People are the ultimate principals, and the government acts not only as an agent of the people but also as a principal of parties involved in public procurement (Rustiarini et al., 2019). This theory helps to understand corruption in government procurement by considering information asymmetries in the public procurement process that can affect the relationship between the government and the procurement officer or system users as agents (Khan & Krishnan, 2021). According to Liu and Ma (2021), an agent's interests often deviate from the principal's, resulting from information asymmetry that benefits the agent for personal gain. Agency problems occur when procurement officers engage in corrupt transactions in their interests and to the detriment of the principals' interests. To limit agency problems, principals can design monitoring and supervision schemes to curb potential abuse.

This study uses agency theory to investigate the issue of corruption in the public procurement process, specifically in the Indonesian public sector. The government acts not only as a representative of the people but also as the principal of non-government parties involved in procurement. For example, as government agents, suppliers of goods and services must ensure that they act in the government's best interests when serving the people. This is related to the abuse of authority or power by a procurement actor, which can result in state losses and corruption.

3.2. Procurement process

Public procurement refers to all stages of the contracting process, including initial needs assessment, budget allocation, initial market research, tender preparation, application evaluation, and contract award. Contract execution and administration include the general practice of change orders as well as audits and evaluations (International, 2014). According to UNCAC (UNODC, 2013), the public procurement process has three phases: pre-tender, tender, and post-tender. The pre-tender stage includes decisions about

the scope of the government's needs, i.e., deciding which goods, services, or works will be purchased. The tender stage includes the invitation to tender, i.e., choosing which bidder will be the contract partner by evaluating the actual tender and awarding the contract based on the terms and conditions set for the goods, services, or work. The post-tender stage is often referred to as contract administration about contract administration to ensure effective performance.

Based on OECD (2009; 2016), the procurement cycle consists of three main phases: pre-tender, tender, and post-tender. As explained by IDFI (2020), procurement regulations relate to every procurement process. The pre-tender stage evaluates the regulatory transparency and accountability level of public procurement at the beginning of the process. The tender stage evaluates the regulations that apply to the procurement process, from issuing a procurement notification to deciding the results of the procurement process. Meanwhile, the post-tender phase evaluates legislative transparency and accountability in public procurement after the procurement process ends by selecting a contract winner.

In Indonesia, the process of procuring government goods and services consists of planning, preparation, and implementation. These procurement stages include identifying needs, preparing and implementing procurement either through self-management or suppliers, analyzing the market, reviewing providers, running tenders, evaluating providers, determining winners, executing contracts, and handing over (LKPP, 2018).

3.3. Procurement governance

Public procurement is an essential component of good governance. Procurement governance is a conceptual framework that is vital in preventing corruption (Stanica & Aristigueta, 2019). A review by Mohd-Rashid et al. (2023) revealed that curbing corruption in public procurement has been conducted specifically for the Asia-Pacific region, including Indonesia. The 2013 ADB/OECD Anti-Corruption Initiative for the Asia-Pacific region issued an anti-corruption action plan, recognizing that corruption is a widespread problem that undermines good governance. The action plan calls for the creation of an effective and transparent public service system that prioritizes integrity, transparency, and accountability. To combat corruption in public procurement, the OECD has developed principles and recommendations to promote good governance in public procurement. Integrity, transparency, stakeholder participation, access to public procurement contracts, and control are among the principles that have been implemented in various countries.

In 2014, Transparency International compiled practical guidelines for curbing corruption in public procurement. This guide provides directions for corruption in public procurement by outlining the principles of integrity, transparency, accountability, fairness, efficiency, and professionalism. Meanwhile, in Indonesia, public procurement governance is currently regulated in Presidential Decree No. 12 of 2021 under the procurement principles of goods and services, including efficiency, effectiveness, transparency, openness, competition, fairness, and accountability.

According to presidential regulations, the OECD, and other previous studies, transparency relates to open, clear procurement information, policies, opportunities, processes, requirements, and decisions. Accountability is the implementation of procurement according to procedures, clarity of functions, separation of responsibilities, public service obligations, and complaint mechanisms (Osei Afriyie, 2023). Effective means the clarity of roles, fit for purpose, and planning (Osei Afriyie et al., 2023; Al-Shbail & Aman, 2018). Efficiency is related to cost-effectiveness, time efficiency, and reduced duplication (Zhong et al., 2020). Fairs include equal opportunities, non-discrimination, and meeting requirements (Munzhedzi, 2016). Openness refers to SME participation, non-confidential offering prices, stakeholder engagement, and supplier participation (Mustapa et al., 2022). Competition includes fair competition, quality, competitive pricing, and selection criteria (Khorana, 2015). Integrity refers to moral values, professionalism, and compliance with a code of ethics (Ishak & Said, 2015). Capacity relates to institutional capabilities, skills, training, and achievements. Procurement skills should be utilized to enhance procurement activities in public companies. Public companies must ensure that procurement actor receives sufficient training to improve their abilities in procurement programs (Changalima & Mdee, 2023). Accessibility is real-time, relevant, up-to-date, anytime, and anywhere access to information, plans, documents, contracts, and reports. Monitoring and control include management oversight, assessment indicators, periodic

performance appraisals, internal and external controls, and audit procedures (Shakya, 2015). Risk management includes risk assessment and the promotion of risk management strategies (OECD, 2016). Participation comes from citizen and stakeholder involvement. Integration is the alignment of procurement processes, information, and principles across public services (OECD, 2016).

3.4. Procurement corruption

The definition of corruption in Indonesia is explained in Regulation Number 31 year 1999. Based on this regulation, types of corruption are grouped into seven criminal acts of corruption, namely loss of state finances, bribery, embezzlement in office, extortion, fraudulent acts, conflicts of interest in procurement, and gratification. In particular, conflict of interest in procurement means a civil servant or state administrator who, either directly or indirectly, deliberately participates in contracting, procurement, or rental even though they are assigned to manage or supervise it.

The corruption of public procurement occurs during procurement. The handbook curbing corruption in public procurement from Transparency International (2006) states that corruption exists in the phases of assessment, preparation, contractor and award, and contract implementation. According to the Guidebook on Anti-corruption in Public Procurement and Prevention of Corruption in Public Procurement (OECD, 2016), corruption exists in three procurement stages: pre-tender, tender, and post-tender. Meanwhile (Transparency International, 2014), in Practical Guide Curbing Corruption in Public Procurement, mentioned that corruption happens in procurement planning, bidding, bid evaluation, contract implementation, monitoring, and evaluation. Peltier-Rivest (2018) states that potential fraud in procurement takes many forms, such as corruption, collusion, and tender fixation, and is found in various phases, from budgeting to utilization. Decarolis and Giorgiantonio (2022) identified 18 red flags for corruption in the procurement cycle phase, where some indicators were significantly related to and predictive of corruption in public procurement.

Meanwhile, the Indonesia Procurement Watch published an anti-corruption toolkit for government procurement of goods and services (IPW., 2008). Ten forms of corruption related to public sector procurement, namely bribery, embezzlement, commissions, extortion, favoritism, abuse of authority, forgery, illegal donations, nepotism, and insider business. This toolkit mentions corruption activities in public procurement, where every step of government procurement, from planning to delivery, has the potential form of corruption.

An overview of guidelines and principles of public sector governance from local and international organizations state that procurement governance is almost the same as anti-corruption, such as transparency, accountability, efficiency, integrity, monitoring and control, participation, accessibility, competition, and capacity. Table 1 shows the overview.

Many previous studies also relate governance to procurement corruption (Chaitongrat, 2019; McCue et al., 2015; Rustiarini et al., 2019; Maulidi, 2017; Yustiarini, 2020). The example of previous studies is summarized in Table 2.

4. Hypothesis development

In Indonesia, public procurement governance is regulated by the Presidential Decree 2021 as the procurement principle of goods and services. This procurement regulation has a high level of compliance and is mandatory for government ministries and institutions to apply these state principles. It includes transparency in budget utilization, procurement criteria, information disclosure (Chaitongrat, 2019), accountability in clarity of procurement function and document requirements (Khorana, 2015), effectiveness in the achievement of goals and government needs (Munzhedzi, 2016), efficiency in optimal capability, cost, technical agreement, openness in price disclosure, fairness in social aspects (Shakya, 2015; Gardenal, 2013), equality and competition in quality, and reduced intervention. However, these state principles of procurement governance are yet to be maximized to reduce corruption. For example, weak and slow implementation, lack of transparency and accountability at the tender and post-tender stage (Nurmandi & Kim, 2015), poor quality and price, direct appointments, unclear standards and parameters, unfair competition (Mchopa, 2020), poor government openness and mismanagement (Titl et al., 2021), procurement that is not based on government needs and ineffective (Arifin, 2017). These may violate rules and lead to corruption.

Table 1. Procurement governance and corruption guidance.

Construct	Public sector procurement governance			Anti-Corruption procurement						
	Recommendations for goods and services procurement systems (ICW, 2018)	Recommendations for Public Procurement Principles (OECD, 2016)	Principles of government procurement of goods and services (President Regulation, 2018)	Preventing corruption in public procurement (OECD, 2016)	Good practices for integrity in public procurement (OECD, 2014)	Provision and practice to curb corruption in public procurement (ADB/OECD, 2013)	Principles of integrity in public procurement (OECD, 2009)	Anti corruption plan for Asia Pacific (ADB/OECD, 2008)	Anti corruption principles in public procurement (UN, 2013)	Anti corruption public procurement guide (Transparency International, 2014)
Transparency	v	v	v	v	v	v	v	v	v	v
Accountability	v	v	v		v	v	v			v
Integrity		v		v	v	v	v	v	v	v
Monitoring and control		v		v	v	v	v	v	v	
Participation		v	v	v				v		
Accessibility		v	v					v		
Competition	v		v	v					v	
Capacity		v								v
Efficiency		v	v							

Table 2. Sample of previous research: Procurement governance and corruption.

Author	Variables	Results
Chaitongrat, 2019	Morality, transparency, economy, predictability, equity, rule of law, accountability, effectiveness, efficiency, participation, decentralisation, fighting corruption, consensus	The model for good governance in government procurement had high construct validity in exploratory and confirmatory factor analyses.
Munzhedzi, 2016	Value for money, open and effective competition, ethics and fair dealings, accountability and reporting, equity	Solutions to tackle public procurement corruption with 5 behavioural pillars
McCue et al., 2015	Accountability and control, limiting fraud, increasing economic efficiency, business participation, open and transparent competition, best values, best practices, legal constraints.	The dilemma of placing public procurement within government reform efforts
Rustiarini et al., 2019	Public notice and transparency, training, good practices, internal control, redflag detection, reporting, teamwork, regulation and sanction, investigation, harmonization and cooperation.	Strategies to prevent, detect and control the causes of fraud
Maulidi, 2017	Close cooperation between government and private sector, integrity standards, effective control environment, competition law, contract performance monitoring, internal audit, fraud response, anti-fraud training programmes	Aspects that enhance procurement fraud prevention
Yustiarini, 2020	Transparency, accountability, and openness in gratification control principles	Aspects related to the potential for corruption in public sector procurement under Indonesian law.

Furthermore, global governance recommendations have been incorporated into the procurement process, though they are not officially regulated by the government (Overdevest & Zeitlin, 2018). It includes integrity in professionalism, morals, ethics, sanctions, monitoring and control in internal control, external audits, and performance appraisals, the capacity for people's competency, skills, and certification of procurement actors, and access to information and complaint mechanisms. The implementation of global governance standards does not eliminate corruption completely. Integrity has not been maximized due to weaknesses in monitoring and control (Prihanto et al., 2020), ineffective preventive procurement systems (Yazdani et al., 2018), a limited supervision process, procurement actors' lack of competency, a lack of solid rules and sanctions enforcement, limited access (IDFI, 2020), and a lack of auditing (Lisciandra et al., 2022).

From the explanation above, procurement governance may not have been appropriately implemented in Indonesia, so cases of procurement corruption remain high. The principles and recommendations have been in place for a long time but are yet to be fully implemented or significantly reduce corruption. Corruption is a form of high agency costs in the public sector. With many benefits and recommendations for using governance in public-sector procurement, it is expected to reduce excessive agency costs. Higher transparency, effectivity, efficiency, accessibility, monitoring, and control will reduce information asymmetry within principles and agents and adverse selection in procurement decisions to reduce corruption. Higher accountability, integrity, openness, fairness, competition, capacity, and participation will reduce moral hazard and abuse of authority within procurement actors, decreasing corruption (Figure 1). Therefore, the hypothesis is formulated as follows:

H1 Procurement governance has a negative effect on corruption.

5. Research design

For methodology, the stages of this study began with the creation of the first draft questionnaire. The focus group discussion was then held to solicit feedback or suggestions from participants representing the government, suppliers, and academics. The results were consistent with the procurement phases, corruption, research indicators, and the second draft of the questionnaire. Before finalizing the questionnaire, the first and second pilot tests were conducted using SPSS software to assess the validity and reliability of the indicators.

The study's independent variable is governance. Procurement governance is measured in terms of state principles and global recommendations. According to presidential regulations on public procurement, state principles include transparency, accountability, effectiveness, efficiency, openness, fairness, and competition. Meanwhile, the OECD's global recommendations include integrity, monitoring and control, capacity, accessibility, participation, risk management, and integration. The governance indicators are determined in accordance with Indonesian public procurement regulations, such as those issued by the

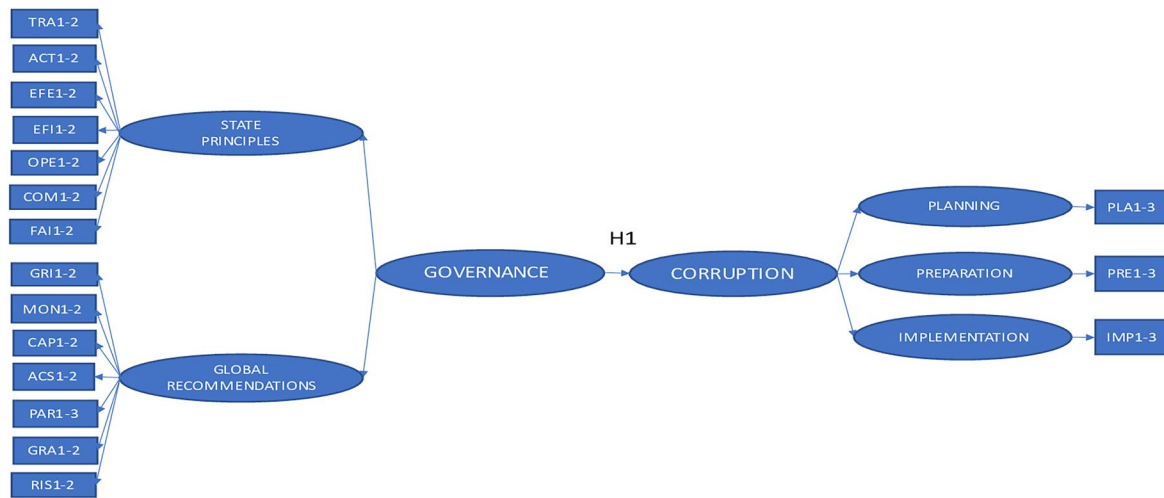


Figure 1. The research framework.

National Committee for Governance Policy (KNKG), the National Public Procurement Agency (LKPP), and the Presidential Regulation. The dependent variable is corruption, which is measured using dimensions from the procurement planning, preparation, and implementation phases. The corruption indicators are determined according to local and global guidelines, such as Indonesia Procurement Watch (IPW), National Government Internal Auditor (BPKP), OECD, and Transparency International. Furthermore, all indicators are in agreement with the FGD result. The operational variables, dimensions, indicators, and references are shown in [Table 3](#).

The questionnaire used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire indicators are the actual implementation of procurement governance and the existence of procurement corruption based on the respondents' perceptions. Each indicator is represented in the questionnaire. There are 38 measurable questionnaire indicators: 14 questions about state principles of governance, 15 questions about global recommendations of governance, and nine questions about corruption. Governance questions use positive statements, while corruption uses negative statements. The items of the questionnaire are displayed in [Table 4](#).

The study used primary data. It received Informed Consent for Participation from the respondents and Ethical Approval for research involving human subjects from the Research Ethics Committee of the University of Indonesia, number 027/UN2. F6.D2.LPM/PPM.KEP/2022. The requested letters to respondents are sent from request letters sent via mail, email, or direct visits to procurement units of the government and supplier's office. The questionnaires are distributed and filled out using the Google Form link.

The population and unit of analysis for this study are all Indonesian ministries, government institutions, provincial governments, and suppliers. The respondent's contact data for the government was obtained from the National Public Procurement Agency (LKPP) website. The government respondents are procurement officers from the procurement unit. The suppliers are the government's providers of goods and services. Their contact data were obtained from the Supplier Performance Information System (SIKAP) website. All potential respondents are filtered based on their qualifications as procurement actors with more than one year of experience in the procurement position. This study received 744 units of analysis respondents comprising 30 ministries, 33 institutions, 28 provincial governments, and 653 suppliers, or a total of 1024 people. [Table 5](#) shows the population and respondents.

Data was analyzed using SmartPLS software's Structural Equation Model (SEM), which was designed for predictive studies and theory development. SEM smart pls is appropriate for complex research models or second-order factors, i.e., a combination of factor analysis and regression analysis to test the relationship between variables and indicators, indicators and their constructs, or constructs themselves. With this software, path analysis can be performed in a single test based on the indicators. Furthermore, the data were descriptively analyzed across multiple groups of governments and suppliers using SPSS software. Supplier perception and development are critical to public procurement performance (Changalima et al., 2022).

Table 3. Operational variables.

Variables	Dimension	Indicator	Source
Governance	State principles	Transparency in the use of budget (TRA1)	KNKG, 2018
		Transparency in selection criteria and technical requirement (TRA2)	LKPP, 2018
		Accountability in function and responsibilities of the procurement unit (ACT1)	KNKG, 2018
		Accountability in procedures according to policy (ACT2)	LKPP, 2018
		Effectiveness by the target (EFE1)	BUMN, 2019
		Effectiveness in providing maximum benefits and results (EFE2)	BUMN, 2019
		Efficiency in the optimization of existing resources (EF1)	LKPP, 2018
		Efficiency by methods, costs, and schedules in the contract (EF12)	LKPP, 2018
		Openness in price estimation (OPE1)	LKPP, 2018
		Openness in conveying relevant information (OPE2)	LKPP, 2018
		Competition in quality and prices of goods and services (COM1)	LKPP, 2018
		Competition disruption will be intervened (COM2)	LKPP, 2018
		Fair for stakeholders' rights (FA1)	UUKIP, 2008
		Provide fair benefit for all parties (FAI2)	LKPP, 2018
	Global recommendation	Integrity pacts as a qualification requirement (GRI1)	LKPP, 2018
		Sanctions for integrity violations (GRI2)	LKPP, 2018
		Monitoring and control for internal evaluation and inspection (MON1)	Presidential Regulation, 2018
		Monitoring and control through reviews and whistle-blowing (MON2)	LKPP, 2018
		Access for complaint (ACC1)	LKPP, 2018
		Access limitation for the violator (ACC2)	LKPP, 2018
		Capacity in experience and educational requirements (CAP1)	LKPP, 2018
		Capacity in certification (CAP2)	LKPP, 2018
		Participation of SME (PAR1)	LKPP, 2018
		Participation from cooperatives (PAR2)	LKPP, 2018
		Participation of society (PAR3)	Presidential Instruction, 2015
		Integration in business process and application (GRA1)	PANRB, 2020
		Integration in service facilities (GRA2)	PANRB, 2020
		Risk management in detection and mitigation (RIS1)	LKPP, 2018
		Risk management in assessment and control (RIS2)	PANRB, 2020
Corruption	Planning phase	Budget overruns in terms of cost, quality, volume of government procurements (PLA1)	IPW, 2008; OECD, 2016
		Unrealistic government procurement schedules and announcements (PLA2)	IPW, 2008; Transparency International, 2014
		Procurement plans that are not in line with government needs (PLA3)	BPKP, 2019
		Technical specifications designed for specific products (PRE1)	BPKP, 2019
	Preparation phase	Non-standard or invalid government procurement documents (PRE2)	IPW, 2008; Transparency Int, 2006
		Direct selection procurement methods or systems (PRE3)	BPKP, 2019
		Declining supplier's rebuttals or complaints (IMP1)	IPW, 2008; OECD, 2016
	Implementation phase	Appointment of ineligible winners of procurement (IMP2)	IPW, 2008; Transparency Int, 2006
		Handover of goods and work that is not by the government contract (IMP3)	IPW, 2008; Transparency International, 2014; BPKP, 2019

This study applied an explanatory sequential design, a mixed-method design in which the quantitative study was conducted first, and the qualitative study was designed to follow up and explain the quantitative study. Therefore, this study places more emphasis on quantitative methods than qualitative ones. Meanwhile, the quantitative study identifies the results that require better understanding and further explanation (Creswell, 2011), and responses obtained from the interviews enrich the interpretation of the quantitative analysis results (Clark & Badiie, 2010). In other words, the results of qualitative studies are needed to expand or strengthen the results of quantitative studies.

Qualitative data were collected through one-on-one interviews with respondents after obtaining signed consent forms indicating their willingness to participate in the interview. Nine samples for the interviews were selected using purposive sampling, representing qualified and prominent figures in the

Table 4. Questionnaire.

No.	Governance questions	Strongly disagree				Strongly agree	
		1	2	3	4	5	
1	The use of government procurement budget is transparent						
2	Selection criteria and technical procurement requirements are transparent						
3	Functions and responsibilities in government procurement units are clear						
4	Procurement procedures are in accordance with applicable government policies						
5	Procurement has been planned by the objectives set by the government						
6	Procurement has provided maximum benefits and results to the government						
7	Procurement has optimised government resources						
8	Procurement has been carried out according to the method, cost and schedule in the contract						
9	The determination of the estimated price of goods and services by the government has been publicly disclosed.						
10	Procurement plans, terms and relevant information have been made publicly available						
11	The quality and price of goods and services in government procurement have been competitive						
12	The government has intervened against those who disrupt competition						
13	Stakeholder rights have been fulfilled fairly and equally						
14	Procurement has been carried out by not giving advantage to certain parties						
15	An integrity pact has been signed as a qualification requirement for procurement participants						
16	Sanctions have been imposed on procurement participants found to be in breach of integrity						
17	Internal control, evaluation and scrutiny of procurement have been implemented by the government						
18	Monitoring of government procurement has been done through reviews and whistle- blowing						
19	Procurement participants have been able to access procurement complaints						
20	Access has been restricted for those with a track record of procurement offences						
21	Experience and education qualification requirements have been met for procurement participants						
22	The capacity of procurement actors has been evaluated based on the possession of procurement certificates of expertise or certificates of competence						
23	SME participation in government procurement has been enhanced						
24	The participation of co-operatives in government procurement has been enhanced						
25	Indications of procurement irregularities can be reported by the public						
26	Government electronic-based business processes, data and applications have been integrated						
27	A one-stop shop in the public procurement system has been implemented						
28	Risk detection is in place to anticipate government procurement issues						
29	Risk assessments and controls are in place to minimise government procurement risks						
No	Corruption questions	Strongly disagree				Strongly agree	
		1	2	3	4	5	
1	Budget overruns in terms of cost, quality, volume of government procurement						
2	There are unrealistic government procurement schedules and announcements						
3	There are procurement plans that are directed or not in line with government needs						
4	There is an engineered drafting of technical specifications for certain products						
5	There are non-standard or unauthorised government procurement documents						
6	There is a directed selection of government procurement methods or systems						
7	There was a provider rebuttal that did not receive a response						
8	Appointment of ineligible winners of government procurement occurs						
9	There is a handover of goods and work that is not in accordance with the government contract						

Table 5. Population and respondents.

Unit of analysis	Population	Respondent (unit)	Respondent (people)
Ministries	33	30	106
Institutions	46	33	108
Provincial Government	34	28	113
Subtotal Government	113	91	327
Supplier	10838	653	697
Total		744	1024

Table 6. Respondent profile.

	Frequency	Percent
Actor		
Government	123	12
Supplier	901	88
Gender		
Man	768	75
Woman	256	25
Age		
<30 years	174	17
30–50 years	307	70
>50 years	133	13
Education		
High school	318	31
Bachelor	604	59
Master	102	10

procurement units or general bureaus of ministries, institutions, and provincial governments, as well as management-level employees from suppliers. To ensure the reliability of the qualitative analysis, audio recordings, and transcripts were checked using an application and manually interpreted by determining the codes and grouping answers (Parameswaran et al., 2020). NVivo software was used to code and group the transcripts. Discussions with the research team and peer reviews were conducted to enrich the validity and reliability of the qualitative analysis. Finally, the study interprets the results of the combined analysis. The final interpretation is that following up with qualitative data provides a better understanding than using only quantitative results (Creswell, 2011).

6. Results and discussion

6.1. Descriptive results

The study received a total of 1024 respondents from 744 units of analysis, representing 91 governments and 653 suppliers. 75% of respondents were male. Most are between 30 and 50 years old and hold a bachelor's degree. Table 6 presents the respondents' profiles.

Of the government respondents, 74% came from the procurement unit, and the rest came from the general bureau. The majority of positions were in the selection working group and procurement officer. Among the supplier respondents, 68% were company owners. 36% of the suppliers provided goods to the government, 19% offered other services, and 11% were construction companies. Table 7 is the descriptive statistic. It shows that the average respondent most agrees with integrity and capacity governance as well as corruption in the procurement planning phase.

6.2. Dimension level measurement model evaluation results

The measurement model explains the causality between the variable and the item that measures it, namely the extent to which the measurement item or indicator can reflect the measurement of the variable. The measurement model for procurement governance and corruption variables is a second-order factor. Sarstedt (2019) states that model estimation in PLS with second-order factors can be carried out using the embedded two-stage approach method, namely a two-step evaluation where the first evaluation is at the dimension level and the second evaluation is at the variable level. The initial stage of evaluation is the evaluation of the dimension-level measurement model, which assesses

causality between the dimensions and measurement items. Table 8 displays the results of data processing.

The processing results show all the items that measure the dimensions. There are 9 (nine) measurement items are used to measure the three dimensions of the corruption variable measurement, where the processing results show all the outer loading values above 0.70 or valid. All measurements of procurement governance had an outer loading above 0.70, meaning that the measurement items were valid and could be used to explain or represent the dimensions (Hair et al., 2019). The results indicate that fair and effective governance is most related to state principles, while risk management and monitoring control governance are most related to global recommendation. Besides, the implementation phase is most related to corruption.

After obtaining the validity level of the measurement items, the next step was to check the level of reliability of the two measures: Cronbach's Alpha and Composite Reliability. The results are presented in Table 9.

The level of reliability of the two dimensions of governance and three dimensions of corruption is measured by Cronbach's alpha and composite reliability, where the results show satisfactory results above 0.70 or reliable (Hair et al., 2019) (Ringle et al., 2023). These results indicate that the measurement dimensions are reliable in measuring dimensions and have a good level of internal consistency. Furthermore, as measured by AVE, convergent validity has a value above 0.50, indicating that the variation of measurement items in the dimension state principles, global recommendations, procurement plan, preparation, and implementation is more than 50%, so convergent validity is accepted.

6.3. Variable level measurement model evaluation results

The variable measurement model explains the causality between variables and the dimensions that measure them (Mai et al., 2021). The second-order factor model uses the embedded two-stage approach method to evaluate variable measurement models using latent variable score dimensions, resulting in the first estimation of the dimension level (Sarstedt, 2019). The results are presented in Table 10. The two dimensions measure procurement governance, which is valid for measuring the procurement governance variable, as indicated by an outer loading value above 0.70. It proves that state principles are more related to procurement governance. Moreover, procurement in the preparation phase is more related to corruption.

The evaluation of the variable-level measurement model also showed reliability and convergent validity. Overall, the dimensions that measured the study variables of governance and corruption had very high levels of reliability. Table 11 is the result. Besides, the average variance extracted (AVE) value was above 0.50, meeting the good convergent validity criteria.

Table 7. Descriptive Statistic.

Variables	Dimension	Average	Standard deviation
Governance	Transparency	3,9079	0,91160
	Accountability	3,9671	0,84970
	Effectivity	3,9247	0,83721
	Efficiency	3,9388	0,81082
	Open	3,9194	0,89838
	Competition	3,6680	0,85093
	Fair	3,7137	0,90536
	Integrity	4,1048	0,74720
	Monitoring	3,8548	0,81649
	Accessibility	3,8360	0,82890
	Capacity	4,0356	0,77764
	Participation	3,8849	0,79968
	Integration	3,9509	0,83896
	Risk management	3,8468	0,84461
	Average	3,8967	0,8448
Corruption	Procurement planning	2,609	1,010
	Procurement preparation	2,571	1,071
	Procurement implementation	2,494	1,049
	Average	2,558	1,044

Table 8. Outer loading measurement items.

Dimensions	Measurement Item	Outer Loading	Description
State Principles (SP)	tra1 <- SP	0,789	Valid
	tra2 <- SP	0,813	Valid
	act1 <- SP	0,830	Valid
	act2 <- SP	0,820	Valid
	efe1 <- SP	0,839	Valid
	efe2 <- SP	0,821	Valid
	efi1 <- SP	0,834	Valid
	efi2 <- SP	0,816	Valid
	ope1 <- SP	0,817	Valid
	ope2 <- SP	0,836	Valid
	com1 <- SP	0,786	Valid
	com2 <- SP	0,719	Valid
	fai1 <- SP	0,842	Valid
	fai2 <- SP	0,797	Valid
Global Recommendations (GR)	gri1 <- GR	0,693	Valid
	gri2 <- GR	0,766	Valid
	mon1 <- GR	0,851	Valid
	mon2 <- GR	0,832	Valid
	par1 <- GR	0,771	Valid
	par2 <- GR	0,756	Valid
	par3 <- GR	0,819	Valid
	cap1 <- GR	0,785	Valid
	cap2 <- GR	0,765	Valid
	acs1 <- GR	0,798	Valid
	acs2 <- GR	0,738	Valid
	gra1 <- GR	0,791	Valid
	gra2 <- GR	0,804	Valid
	ris1 <- GR	0,840	Valid
	ris2 <- GR	0,857	Valid
Procurement plan	pla1 <- Plan	0,903	Valid
	pla2 <- Plan	0,932	Valid
	pla3 <- Plan	0,919	Valid
Procurement preparation	pre1 <- Prep	0,935	Valid
	pre2 <- Prep	0,936	Valid
	pre3 <- Prep	0,924	Valid
Procurement implementation	imp1 <- Imp	0,897	Valid
	imp2 <- Imp	0,948	Valid
	imp3 <- Imp	0,936	Valid

In addition to quantitative analysis, the model calculates discriminant validity by statistically determining whether dimensions and variables differ from one another. The Fornell and Lacker criteria are used to assess discriminant validity, which occurs when the AVE root of a dimension or variable on the diagonal axis is greater than the correlation with another dimension or variable. For example, the AVE roots of implementation phase dimensions were stronger than the correlations with planning and preparation phases. Table 12 shows the discriminant validity results at the variable level, where the root AVE of corruption (0,949) and governance (0,969) was greater than the correlation with other variables. Therefore, the discriminant validity was met.

Besides Fornell and Lacker criteria, Hair, (2021) also recommended the HTMT to measure and detect discriminant validity. The recommended value is < 0.90. HTMT explains the Heterotrait ratio or average correlation between items measuring different variables with the root of the geometric product Monotrait or correlation between items that measure the same variable. The test results show that the HTMT value is 0,374. Thus, discriminant validity was achieved.

6.4. Structural model evaluation results

Structural model evaluation is related to hypothesis testing of the influence between the research variables hypothesized in the research. Evaluation of the structural model consists of testing the path coefficient hypothesis, where the p-value of the test is less than 0.05 (significant), and the estimated path coefficient is within the 95% confidence interval (Hair et al., 2019). Research results also need to report the influence of variables at the structural level with an effect size of f square (Hair, 2021). Table 13 shows the results of hypothesis testing.

Table 9. Results of Reliability and Convergent Validity of the Dimensions.

Dimensions	Cronbach's Alpha	Composite reliability	Average variance extracted (AVE)
State principles	0,960	0,961	0,659
Global recommendations	0,957	0,959	0,628
Procurement plan	0,906	0,908	0,842
Procurement preparation	0,924	0,924	0,868
Procurement implementation	0,919	0,919	0,860

Table 10. Outer Loading Dimension.

Variable	Dimensions	Causality of dimensions with variables	Outer loading	Description
Governance	State principles	GOV -> SP	0,973	Valid
	Global recommendations	GOV -> GR	0,966	Valid
Corruption	Procurement plan	COR -> Pla	0,942	Valid
	Procurement preparation	COR -> Pre	0,963	Valid
	Procurement implementation	COR -> Imp	0,942	Valid

Table 11. Results of reliability and convergent validity of the variables.

Variable	Cronbach's Alpha	Composite reliability	Average variance extracted (AVE)
Governance	0,936	0,944	0,940
Corruption	0,945	0,950	0,901

Table 12. Discriminant validity Fornell lacker variable.

	COR	GOV
COR	0,949	
GOV	-0,354	0,969

Table 13. Hypothesis testing.

Hypothesis	Path coefficient	T Statistic	P values	95% confident interval path coefficient	
				Lower	Upper
Governance → Corruption	-0,354	7,871	0,000	-0,441	-0,266

The hypothesis that procurement governance affects procurement corruption is confirmed, showing a significant direct negative effect (path coefficient: -0.354, p-value: 0.000 < 0.05). The results prove that the increase in government procurement governance correlates with lower corruption levels.

In addition to hypothesis testing, the F-square measurement determines the effects of the variables at the structural level. The effect size f square value for direct effect can be interpreted as low influence (f square = 0.02), medium influence (f square = 0.15), and high influence (f square = 0.35) (Hair, 2021). The F-square of 0,143 indicates a high medium influence of procurement governance on corruption reduction at the structural level.

A multigroup analysis was also conducted as a continuation of hypothesis testing to determine whether there was a difference in the effect between the study variables when the study respondents were separated between the government and the supplier. In other words, it is necessary to see if there is a difference in the effect of governance on reducing corruption between the perception of the government and that of the supplier. There were 91 governments and 653 suppliers. According to the government respondents' perceptions, the effect of procurement governance on reducing corruption is -0.630, which is higher than the perception or assessment of suppliers of -0.387. Although, based on the test results with PLS Multigroup Analysis (PLS-MGA), the p-value was 0.067 > 0.05, there was no significant difference in influence between the two groups. The government and suppliers have relatively similar perspectives in that improving procurement governance reduces corruption.

6.5. Results of goodness evaluation and model fit

PLS is a variance-based SEM analysis with the aim of testing model theory that focuses on prediction studies. Therefore, several measures were developed to declare the proposed model acceptable, such as R square, Q square, and SRMR (Standardized Root Mean Square Residual) (Hair et al., 2019).

The R-squared statistical measure illustrates the variation in endogenous variables that can be explained by other exogenous or endogenous variables in the model (Figure 2). Based on the processing results, the effect of procurement governance on reducing corruption was 12.5%, and the remaining 87.5% was explained by other variables not included in the study model.

Besides, Q square describes a measure of prediction accuracy: how well each change in the exogenous variable can predict the endogenous variable. This measure is a form of validity in PLS to state the suitability of model predictions. A Q square above 0 states that the model has predictive relevance. Based on the processing results, the Q square value of the procurement corruption variable is 0.121 or above 0, indicating that the model has predictive relevance (Hair et al., 2019).

Moreover, SRMR is the Standardized Root Mean Square Residual. This value measures the model fit, showing the difference between the data correlation matrix and the estimated model correlation matrix. In Hair (2021), an SRMR value below 0.08 indicates a fit model. The results of this study show that the SRMR is 0,031, or the model fits the estimate.

6.6. Additional quantitative analysis

In addition to quantitative analysis using primary data, this study also conducted analysis using secondary data to strengthen the results. The unit of analysis in this additional test is the same as the primary test, namely ministries, institutions, and provincial governments. It includes a total of 114 government institutions and uses two years of governance and corruption data.

It proposed the same hypothesis that implementing procurement governance reduces corruption, and the research model is formulated as follows:

$$\text{probCOR} = \alpha + \beta \text{GOV}.$$

The following Table 14 shows the operational variables for additional analysis.

The data is tested using SPSS binary logistic regression. The result proves that the hypothesis is accepted. Governance has a significance value of 0.020 (<0.05) or significantly influences corruption. The

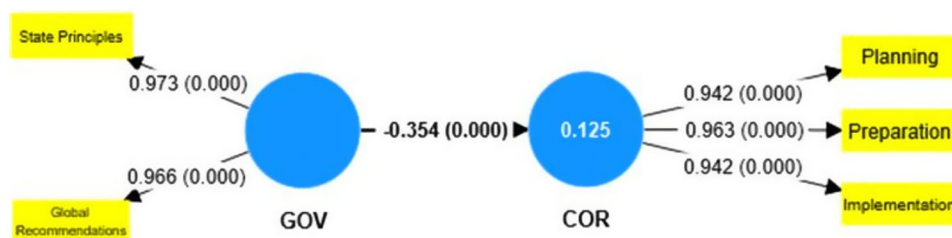


Figure 2. The measurement, hypothesis, and R-square results.

Table 14. Operational variable additional analysis.

Variables	Data	Year	Source	Indicator	Score
Independent	Governance (GOV)	2021–2022	LKPP	The use of information systems, qualifications of procurement human resources, maturity of procurement units	Number
Dependent	Corruption (COR)	2021–2022	KPK	Procurement case handling	0 = No case 1 = With case

coefficient value is negative, meaning that if GOVERNANCE increases, CORRUPTION will decrease. Based on binary logistic regression results, increasing procurement governance by 1 unit will reduce the chance of procurement corruption cases occurring by 0.485 times. These results indicate that the study results using secondary data are appropriate and support the results of the main test using primary data.

6.7. Qualitative analysis

The study used a mixed method with an explanatory or follow-up sequential approach. This means that qualitative data will be collected and analyzed after the quantitative results are obtained. The results of the quantitative analysis show that implementing procurement governance has a significant impact on reducing corruption. However, the findings require further explanation. To begin, perceptions differ between government groups and suppliers. The government believes that procurement governance is superior to suppliers. Meanwhile, suppliers evaluate corruption more frequently in the procurement process than the government. Second, different indicators show more correlation with governance and corruption. With the above identification, an interview must be conducted to confirm and interpret the findings. An interview session is required to gather opinions, challenges, and suggestions from qualified sources to enrich the study's findings (Creswell, 2011). Specifically, the interview process must ensure the important aspects of procurement governance and procurement phases that are critical in reducing corruption.

The interview sessions were conducted with nine qualified people, consisting of one person from the Ministry (SS1), five persons from government institutions (SS2–SS6), one person from provincial governments (SS7), and two persons from suppliers (SS8–SS9). The interviewees are chosen purposively from prominent figures whose offices relate to procurement institutions and are concerned with corruption. All interviews were conducted in the source speaker's office, with approximately one hour allocated for each interview. NVivo software was used to determine the codes or themes of the transcripts and to group each answer according to the code. Three questions were compiled based on the results of the hypothesis testing and measurement evaluations. Table 15 presents the qualitative results.

The first question asked the opinion on the hypothesis that procurement governance affects corruption reduction. Source speakers agree that implementing good procurement governance can reduce corruption. The second question asked which dimensions or indicators were most related to procurement governance, not limited to qualitative results. The source speakers answer any dimension or indicators related to procurement governance. The next question asked about different perceptions within the government and suppliers when assessing governance and corruption. The fourth question asked about the efforts of procurement actors to reduce corruption. The last question is concerned with the occurrence or existence of corruption at different stages of the procurement process. Overall, the qualitative analysis supported the hypothesis and enhanced the results of the quantitative analysis.

6.8. Discussion

This study provides input and recommendations for government regulations, policies, and procurement principles aimed at reducing corruption. Government effectiveness is measured by the quality of public goods and services, as well as the quality of policy or regulation formulation (Sebele-Mpofu, 2020). According to the descriptive analysis in Table 7, the average respondent agreed that procurement governance was well implemented, with a score ranging from 3.714 to 4.105. In general, respondents agreed on the implementation of governance integrity that demonstrates anti-corruption commitment and capacity among procurement actors. The average respondent agreed that implementing governance based on state principles was preferable to global recommendations. These principles are stated in presidential regulations and are mandatory for the Indonesian government. However, respondents agreed that competition and fairness are the least effective forms of governance. This situation concerns supplier competition as well as government involvement.

Furthermore, the questionnaire assesses good government procurement governance, which is also evaluated by suppliers as external procurement actors. Compared to suppliers, government respondents

Table 15. Qualitative results.

No	Question	Code	Answer	Source Speaker #
1	How does procurement governance affect reducing corruption?	Commitment	Leaders, as budget users, must have a commitment to corruption prevention that will be translated into governance that will be applied to all employees	1
			Recently, the implementation of governance is getting higher because it is precisely the awareness of the implementers themselves	4
			The government should emphasise the commitment of its officers to the procurement process	9
		Governance design	Governance is also influenced by the design of governance itself and its implementation. Corruption needs to be watched out for because it can come from anywhere."	3
			Governance is related to adherence to SOPs and clear procurement processes, so it is very influential in reducing the occurrence of fraud in the procurement process, from the planning stage to handover and payment	5
2	What dimensions or indicators reflect procurement governance?	Monitoring	Governance makes procurement more transparent and more ethical	8
			Government should manage suppliers and make them partners. The efforts that can be made are to evaluate procurement actors so the selection of supplier should become more objective. It will be easy for auditors to trace transactions and evaluate process from start to finish and find out anything suspicious	4
			In terms of controlling corruption, LKPP has launched an application to measure performance	7
			Ways of assessing suppliers need to be developed to be able to track and detect fraudulent behavior that leads to corruption earlier	5
			At this time, it can be monitored, if it is not in accordance with the procedure, it may raise suspicion	2
		Capacity	The problem is human resources, the test of competence or capacity of human resources is measured by certification	3
			Increased competence and capacity of procurement actors in selecting suppliers will increase competition and lead to better evaluation of suppliers	7
			The selection of procurement actors in each procurement process should be more rigorous and difficult. Higher competence among procurement officials can reduce the level of corruption. An influential factor is HR recruitment	4
			With the right human resources in place, there should be no loopholes for corruption	8
			Good governance can reduce procurement corruption, but human resources also need to be well qualified	6
		Integrity	Agreed, integrity is the ultimate form of governance	8
			Integrity is indeed the main point. An integrity pact is indeed a mandatory requirement in the procurement process	6
			Only the integrity of the procurement actors can reduce corruption in public procurement. Even if there is no good governance but the procurement actors have integrity, corruption should not occur	3
			The integrity pact is a mandatory requirement. In practice, integrity must be maintained with strong commitment	1
		Competition	Competition from suppliers needs to be maximised so that it can run flawlessly. There is still doubt about the level of competition in several procurement methods, especially in the negotiation process	5
			The more competition there is, the less corruption there will be because suppliers will compete to give the best price, and the government budget will be more effective	7
			Few suppliers assume that the government does not maintain healthy competition between suppliers because of direct appointments	4
		Transparent	It is transparent, even people who don't have access can see procurement participants, winners, and procurement schedules. All procurement transaction processes are recorded, and all information becomes more open and accessible to various parties	2
			The procurement process becomes much more transparent and recorded in the system	5
3	Why government assess better procurement governance than supplier?	Subjectivity	Governance is built from the perspective of the government so that design and other things follow the government's needs	3
			The government definitely feels that everything is safer and better	9
4	What efforts to further reduce procurement corruption?	System	Efforts that can be made are by optimizing the implementation of e-procurement and improving internal control of procurement actors	4
			Currently, the only role suppliers can play is providing offers in a neat administrative manner without loopholes to prevent collusion in appointing winners	8

(Continued)

Table 15. Continued.

No	Question	Code	Answer	Source Speaker #
5	What phase of procurement reflects corruption?	Supplier selection	Almost all stages have loopholes for corruption. In terms of price quotations and the appointment of certain supplier qualifications at the preparation stage, sometimes there are methods to direct to specific supplier	7
			The risk at the stage of appointing a winner is high	4
			Indications of corruption usually occur at the planning and preparation stage, namely in the preparation of certain specification requirements that can only be fulfilled by certain suppliers	1
			The preparation stage is the stage where the winning supplier is selected, so corruption tends to occur. Yes, the preparation stage is prone to corruption in terms of selecting the winning supplier	9
			Assuming that the perpetrators inflate the budget, but at the time of implementation, which is through a tender and is strongly influenced by market mechanisms, it is almost impossible unless there is a directed appointment of the winning supplier from the beginning	3
		Bid price determination	Bid pricing is open, but details are not	7
			The most influential stage is preparation when determining the bid price	4
			The most influential are at the planning and preparation stages. In the planning stage is the preparation of bid prices, while the review of bid prices is carried out in the preparation stage	3
		Handover	In the implementation stage, things can still happen, such as work that has been handed over but does not meet specifications	7
			At the implementation or handover stage, there were also many findings, such as inadequate work, inappropriate additions, and others	4
			The delivery of goods that are not in accordance with the contract is common	3
		Drafting of specifications	Indications of corruption usually occur at the planning and preparation stage, namely in the preparation of certain specification requirements that can only be fulfilled by certain suppliers and the possibility that the selection of suppliers compiling qualification requirements is an order from procurement officials. At the delivery stage, procurement officials and supervisory consultants will check whether there is a reduction in quality, among other things. If it does not meet the specifications, it will be returned or not even paid for	1
			There are various stages of implementation, some at the supplier selection stage and others at the time of contract execution, related to volumes and specifications	3

gave higher governance ratings. The average respondent disagreed that corruption occurred during the procurement process, with a score ranging from 2.494 to 2.609. Among the three procurement processes, respondents agreed that corruption occurred during the planning phase, which reflects the government's needs, while less agreed that corruption occurred during the implementation or delivery phase. Supplier respondents are more agreeable and objective about the existence of corruption in all procurement processes than government respondents.

In addition, according to the measurement results of [Table 8](#), all indicators or measurements relate to the dimension of governance. The highest measurement of the state principle dimensions is effectiveness and fairness governance. In the Indonesian public sector, effective means the procurement of goods and services based on planned needs and is useful according to targets (BUMN, 2019). One of the procurement pillars on which all government policies are based refers to cost-effectiveness in the procurement system by providing value for money on services, for example, avoiding unnecessary costs, and delays for departments or suppliers, and monitoring contracts to ensure that they provide the anticipated benefits (Munzhedzi, 2016). Fair refers to treating all prospective providers of goods and services reasonably if they have fulfilled the requirements (BUMN, 2019). Fairness also refers to fair transactions with all suppliers, elimination of prejudice, reduction of fraud and corruption, and non-acceptance of gifts or hospitality that could harm the reputation of the central or local government (Munzhedzi, 2016). Government regulations (Presidential Regulation, 2018) explain the fair treatment of prospective suppliers of goods and services without prioritizing the provision of benefits to certain parties.

The highest measurement of the global recommendation dimensions is monitoring, control, and risk management governance. Controls are a crucial tool for ensuring that procurement officials and vendors involved in the procurement process achieve government objectives (United Nations, 2013). The OECD

(OECD, 2016) recommends implementing monitoring and control mechanisms to support accountability throughout the public procurement cycle. The monitoring function for procuring government goods and services, such as observation, supervision, and control (OECD, 2009), must be closely monitored to prevent and detect irregularities and combat corruption by internal and external auditors (Rustiarini et al., 2019). Specifically (Shakya, 2015) states that it is necessary to supervise selected suppliers and direct procurement. The OECD for Public Procurement also recommends that risk management include risk assessment tools to identify and address threats for the proper functioning of the public procurement system and to promote risk management strategies. In light of the critical issue of procurement and the risks of fraud and corruption, it is essential to apply the OECD approach to establish procurement risk indicators. Meanwhile, as with governance, all results measuring corruption indicators on the corruption dimension show high outer loading. In detail, the indicators at the procurement implementation stage have the highest value, meaning they are most correlated with corruption.

The results of Tables 9 and 10 reveal that both state principles and global recommendations are highly correlated with the implementation of procurement governance in Indonesia's public sector. Nevertheless, the dimensions of state principles have higher outer loading values that reflect governance better. This is in accordance with previous studies that generally show that good governance consists of main factors such as transparency, accountability, and efficiency (Chaitongrat, 2019).

Moreover, corruption variables were measured in three dimensions, with all producing high results for outer loading above 0,70. However, the procurement preparation dimension had the highest outer loading (0.963) compared to the other two dimensions. This indicates that procurement in the preparation phase contributes to, or relates more to, corruption. This agrees with the findings of previous studies, where (Tuanakotta, 2010) described fraudulent acts in the procurement process of goods and services as divided into three categories: pre-tender fraud, bidding, and implementation. Each process exhibits certain characteristics. The study (Kohler & Dimancesco, 2020) also explained the manifestation of corruption and interventions from anti-corruption, transparency, and accountability in three procurement processes: pre-bidding, bidding, and post-bidding. According to Nayabarani (2018), government procurement activities require a long stage, from planning needs to completing all activities to obtaining goods/services. Ferwerda (2017) identified 18 red flags for corruption in the procurement cycle phases, where some indicators were significantly related and predictive of corruption in public procurement.

Furthermore, according to Table 13, the result of the hypothesis confirms that the better procurement governance is carried out, the lower the level of procurement corruption. The estimated reduction in procurement corruption will decrease to -0.354. In the 95% confidence interval, the estimated magnitude of the influence or path coefficient lies between -0.441 and -0.266. It aligns with the agency theory, indicating that good governance can mitigate agency costs, agent discretion, and information asymmetry, ultimately reducing corruption (Tahir et al., 2019). The results of this test also agree with the statement that governance is used to avoid corruption in public procurement (Recommendation on Public Procurement; OECD, 2016); (Principles for Integrity in Public Procurement; OECD, 2009); (Good Practices for Integrity in Public Procurement; OECD, 2014). The results also support Kohler and Dimancesco (2020) findings, emphasizing that good governance endorsed by international institutions and governments serves as a framework to prevent corruption. Governance is positioned as an anti-corruption platform and is instrumental in averting corruption in public procurement. Public procurement is a crucial element of good governance, and procurement governance plays a pivotal role in preventing corruption (Bosio et al., 2022). This aligns with Rich's (2023) assertion that there is untapped potential to maximize procurement governance to combat corruption, particularly by addressing weak and sluggish implementation issues. The results also agree with previous studies' findings, where Graycar (2019) described fraudulent acts in the procurement process of goods and services as being divided into three categories: pre-tender fraud, bidding, and implementation. Each process exhibits specific characteristics. Kohler and Dimancesco, (2020) also explains the manifestation of corruption and interventions from anti-corruption, transparency, and accountability in three procurement processes: pre-bidding, bidding, and post-bidding. According to Mohamad Azmi and Ismail, (2023), government procurement activities require a long stage, from planning needs to completing all activities to obtaining goods/services.

The qualitative results in [Table 14](#) provide an answer to the hypothesis and allow for further exploration. The source speakers agree that the Indonesian government implements procurement governance effectively. This is due to the reasonable governance design and commitment of procurement actors. The measurement model led the source speakers to agree that monitoring and control are closely related to procurement governance. Procurement governance also considers the capacity and integrity of procurement actors. It supports (Ishak & Said, 2015) that integrity refers to moral values with a code of ethics, whereas capacity refers to the capabilities and qualifications of procurement actors in carrying out procurement functions (Changalima & Mdee, 2023). With the implementation of an electronic procurement system in the Indonesian public sector, the process has become more transparent, open, and accessible. The source speakers also emphasize the importance of increasing competition in pricing, quality, and supplier selection (Khorana, 2015). These dimensions are incorporated into both state and global recommendations. In terms of corruption, the source speakers agree that it occurs most frequently during the preparation and planning phase, which includes activities such as selecting suppliers, determining price offerings, and selecting specifications for goods and services. Furthermore, corruption occurs during the implementation stage, when goods and services are delivered.

7. Summary and conclusion

Research has shown that better governance of public procurement can significantly reduce corruption. These findings indicate that improvements in public procurement governance substantially adversely impact corruption. This study supports the agency theory that procurement governance will reduce information asymmetry, moral hazard, and adverse selection in the procurement process. Therefore, improving public procurement governance is a continuous strategy for reducing corruption.

The study proves that both the dimensions of state principles and global recommendations are highly correlated with procurement governance. State principles measured by transparency, accountability, effectiveness, efficiency, openness, competition, and fairness are more related to procurement governance compared to global recommendations measured by monitoring and control, integrity, capacity, participation, accessibility, integration, and risk management. Therefore, all the state principles of public procurement should be maintained in the regulation and improved for implementation. Moreover, the result also shows that the preparation phase is more related to the existence of corruption. The study also proves that government respondents have higher perceptions of implementing procurement governance and lower perceptions of corruption than supplier respondents. Moreover, the use of mixed methods with qualitative analysis is very substantial in interpreting, confirming, and further explaining the quantitative analysis.

The findings of this study have significant practical implications for governments and other stakeholders. Overall, the findings support government regulation of state procurement principles and advocate for incorporating global recommendations into Indonesia's government procurement regulations and principles. The government should continue to improve public procurement governance by strengthening monitoring and control activities, as well as increasing competition and fairness among suppliers. Furthermore, the study emphasizes the importance of integrity and high capacity among procurement actors in running the procurement function. Furthermore, the government should focus more attention and effort on preventing corruption during the preparation phase, particularly when selecting a supplier. The study benefits anti-corruption institutions by resolving corruption issues in the public sector during procurement phases. This study's methodology can be used in future studies or by other countries to evaluate the implementation of government procurement of goods and services that are prone to corruption.

However, this study has limitations that warrant further investigation. First, it would be more complete if respondents were involved with local governments, allowing for a larger and more comprehensive sample of government respondents. Second, respondents can be selected based on the number of procurement actors in each institution or the size of the procurement transaction, enabling a more proportional number of respondents.

Authors' contribution

All authors contributed to the design of the study. IS contributed to data acquisition and analysis. HR, CD, and VD contributed to the interpretation of the data. IS drafted the paper and HR reviewed it critically for intellectual content. HR, CD, and VD approved the final version to be published. All authors agreed to be accountable for all aspects of the work.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author, IS. The data are not publicly available due to the privacy of research participants.

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