



Corruption Prevention Guide on **PROCUREMENT** for Public Bodies

5 DIGITALISED CORRUPTION PREVENTION FUNCTIONALITIES FOR PROCUREMENT

- 5.1 INTRODUCTION
- 5.2 SYSTEM CONTROL ENVIRONMENT
- 5.3 PROCUREMENT
- 5.4 CONTRACT ADMINISTRATION

5 DIGITALISED CORRUPTION PREVENTION FUNCTIONALITIES FOR PROCUREMENT

5.1 INTRODUCTION

In today's digital age, computer system becomes an integral part of procurement processes. With the use of the procurement computer system, it offers various functionalities that can help mitigate corruption risks and malpractice. These functionalities can reduce non-essential human interference or discretion, ensure compliance with laid down requirements, provide real-time monitoring and reporting, enhance transparency, and improve data accuracy. By leveraging these functionalities, public bodies can establish a more robust procurement system that is transparent, accountable and efficient, ultimately leading to better outcome for public bodies, their stakeholders, and the society at large.

To facilitate public bodies to fully unleash the benefits of utilising computer systems in procurement, this Chapter highlights major corruption risks arising from ineffective use of IT in the e-procurement processes, common inadequacies identified, and digitalised corruption prevention functionalities in relation to the system control environment, as well as procurement and contract administration processes.



Major Corruption Risks

- Manipulation of the e-procurement processes to favour colluded suppliers due to manual data processing across different computer systems/modules, inadequate segregation of duties in system workflow, or ineffective user account management.
- Leakage of privileged e-procurement information to potential bidders due to ineffective access control in procurement computer system.
- Corruption or other malpractice in the e-procurement processes being covered up due to lack of supervision or management oversight, ineffective IT risk assessment and audit, absence of reporting channel, or under-utilisation of digitalised functionalities in the e-procurement processes.



Common Inadequacies

- ✗ Heavy reliance on manual data processing that is inefficient, prone to human errors and non-compliance, due to lack of automatic data flow across different computer systems/modules.
- ✗ Leakage of sensitive e-procurement information (e.g. e-quotations/tenders received before the submission deadline) due to inadequate information security in computer system.
- ✗ Inadequate accountability and traceability of the procurement processes due to ineffective user account management (e.g. sharing of user accounts, no audit trail of access/changes to important data).
- ✗ Non-compliance in the e-procurement processes due to lack of supervision or management oversight (e.g. supervisors are not alerted when required steps are omitted, system-generated reports are not utilised for management review), or absence of reporting channel in computer system.
- ✗ Inadequate assurance of data/process integrity due to ineffective use of computer-aided audit tools, or lack of periodic IT risk assessment and audit.
- ✗ Under-utilisation of computer functionalities in various procurement and contract administration processes.

5.2 SYSTEM CONTROL ENVIRONMENT



Corruption Prevention Controls

5.2.1 Data Capture and System Integration

- Auto-capture the procurement-related data, steps, and outcome in the computer system to uphold accountability of the procurement processes.
- Integrate the procurement computer system/module with other business systems/modules (e.g. finance, human resources, supply chain management, asset management) to ensure seamless data flow and process alignment.

5.2.2 Information Security

- Build in security safeguards to protect the information in the computer system, for example –
 - adopt clear security classification of data/information and appropriate security measures for different classifications (e.g. access to bid information before the submission deadline should be strictly prohibited);
 - implement proper encryption to protect sensitive procurement data/information from unauthorised access;
 - build in audit trail function for tracking access/changes to important data/information, and review the audit logs on a risk-based approach or by way of exception reports to detect and deter any abuse (e.g. unauthorised access to privileged information, tampering of information); and
 - adopt blockchain technology, where appropriate, which upholds data integrity by recording transactions across multiple databases and making the procurement data/information tamper-proof.

5.2.3 User Account Management

- Assign user roles based on their procurement functions, granting each role specific permissions to perform certain actions and access on a need-to-know basis.
- Restrict the access to the procurement computer system/module to designated staff and governing members using unique login accounts and passwords.
- Promptly deactivate the user accounts when the staff or governing members have left the public body or were no longer involved in the procurement processes.
- Regularly review usage of individual user accounts to identify any irregularities or inactive user accounts warranting deactivation.
- Enforce a strong password policy which includes complexity requirements, password expiration and history.
- Implement strong authentication mechanisms such as two- or multi-factor authentication for procurement processes warranting a higher level of control (e.g. opening of tenders, approval of payments over a prescribed monetary threshold).
- Authorise the system administrator accounts only to the personnel who have a legitimate need to manage or configure the system (e.g. IT manager), as these accounts are typically granted with elevated privileges or access to all areas of the computer system.

5.2.4 Supervision and Monitoring Mechanism

- Build in automatic alerts and leverage data analytics to facilitate compliance checks and detection of irregularities, including red flags highlighted in this Guide, such that

supervisors or management could be promptly notified of any abnormal patterns or irregularities detected (e.g. suppliers' bid prices being significantly deviated from the average or previous bid prices).

- Generate periodic information or exception reports to facilitate management oversight and alert them of possible anomalies, for example –
 - manual removal of a supplier from the system-generated bidder list;
 - frequency and aggregate value of purchases of the same types of goods/services and those from the top patronised suppliers to detect possibility of split orders; and
 - non-compliance with the internal payment processing timeframe or contract payment terms.
- Implement data analytics, visualisation tools or dashboards to facilitate the monitoring of procurement activities, for example –
 - using data analytics to track procurement metrics such as supplier performance, contract compliance, price fluctuation, and duration of procurement cycle; and
 - adopting visualisation tools or dashboards to convert complex procurement data sets into easy-to-understand charts, graphs, or other visual formats to enable more informed decision-making.
- Use advanced techniques such as artificial intelligence (AI) to detect fraudulent behavior in the procurement processes, for example –
 - **anomaly detection** – train a machine learning (ML) model using procurement data/information of the public body (e.g. supplier details, item descriptions, invoice amounts) to learn what normal procurement activity looks like, and if a new transaction comes in that significantly deviates from the normal pattern, the ML model can flag it as an abnormal case or a potential fraud requiring attention; and
 - **text analysis** – AI can be used to analyse the text of documents involved in the procurement processes (e.g. contracts, invoices, and receipts) to detect unusual language or terms that may indicate fraudulent activities (e.g. flagging an invoice if AI detects the same exact amount billed twice in a short period of time, detecting potential bid rigging cases if identical uncommon typographical errors identified at the same part of different tender submissions).

5.2.5 Feedback and Fraud Reporting

- Establish in the computer system and/or web-based platform –
 - a feedback channel to facilitate the receipt of feedback from suppliers and staff on the procurement processes; and
 - a fraud reporting channel which provides a secure, confidential, and easy-to-use means for reporting suspected fraud or other malpractice.
- Enable a case management module in the computer system, and generate automatic system alerts to the staff responsible and supervisors at different key checkpoints (e.g. issuance of interim/final replies, reporting of investigation progress, case conclusion) before the due dates for monitoring the follow-up process.

5.2.6 Audit

- Build in computer-aided audit tools in the computer system to automate the audit process, enabling a more comprehensive, effective, efficient and accurate detection of anomalies and non-compliance.
- Conduct periodic IT risk assessment and audit on the computer system to ensure that the security measures, user access controls, and procedural workflow are aligned with the procurement policies and guidelines of the public body.

5.3 PROCUREMENT

5.3.1 Automation of Workflow

- Implement an automated workflow to guide staff through the whole procurement processes to ensure all necessary steps are taken (e.g. each completed action could trigger an automatic notification to the party responsible for the next process in the computer system via email).
- Ensure the automated workflow is consistent with the procurement policies and guidelines of the public body.
- Provide auto-validation functions to avoid or detect duplicating roles that are key to the procurement exercise (e.g. the person approving a purchase should not be the same person who requested it) to ensure adequate segregation of duties.

5.3.2 Management of Conflict of Interest

- Require all staff and governing members involved in particular tender exercises to indicate in the computer system whether they have or do not have any actual, potential or perceived conflict of interest before they are allowed to get involved in that particular exercises.
- Automate the workflow for forwarding a declared conflict to the designated authority to determine appropriate mitigation measures, and automatically capture such declaration in the tender report (📄 Chapter 3.8) submitted to the approving authority for information and consideration.
- Use auto-matching or AI to help match or analyse the key personnel and other particulars of bidders and those of the public body with a view to identifying potential conflict of interest situations and detect irregularities (e.g. the name of the owner, director or major shareholder of a particular bidder is identical to that of an evaluation panel member).

5.3.3 Purchase Requisitions and Quotation/Tender Documents

- Conduct automatic budgetary checking in the commencement of the purchase requisition process.
- Use AI or ML to automate the process of generating and advancing specifications for purchase requisitions and quotation/tender documents, for example –
 - checking whether all essential probity requirements have been incorporated;
 - analysing the item descriptions of previous similar purchases to identify appropriate specifications for inclusion;
 - advising the formulation of the evaluation criteria as well as corresponding technical and price weightings based on historical purchases of similar items; and
 - automatically checking the availability of goods/services in the market.
- Automate the workflow on vetting and approving process on purchase requisitions and quotation/tender documents.
- Utilise internet of things devices to track inventory levels and trigger reordering notifications when stocks fall below a specified level.

5.3.4 Managing Suppliers List

- Maintain a centralised suppliers list, which includes all relevant information about suppliers (e.g. contact information, goods/services offered, certifications obtained, procurement history, past performance, and response rate to quotation/tender invitation), in the computer system for use by procuring staff and user departments.
- Set out a web-based platform to facilitate interaction between public bodies and suppliers, for example –
 - receiving online applications for admission to the suppliers list;
 - obtaining the up-to-date information of the registered suppliers;
 - sending notifications on suspension or removal from suppliers list; and
 - disseminating guidance notes to suppliers for dealing with the public bodies, including the essential probity requirements.
- Automate the workflow for vetting and approving any application for inclusion of new suppliers to, or suspension/deletion of existing suppliers from, the suppliers list, or any alteration of information of registered suppliers.
- Leverage big data techniques to identify, manage and utilise supplier information available in the public domain to facilitate the supplier discovery process and enrich the supplier database, in particular for those goods/services categories with limited listed suppliers.

5.3.5 Inviting Bidders

- Automatically shortlist suppliers to bid from an appropriate category of the suppliers list adopting a fair basis (e.g. by rotation or random selection, and automatic inclusion of the last successful supplier if his performance was satisfactory), and require procuring staff to provide justifications and seek approval from the designated authority for any alteration to the system-generated bidder list, out-of-turn invitation of suppliers, or nomination of additional suppliers by users or other procuring staff.
- Build in analytics tools to facilitate intelligent sourcing where practicable, such as using AI to help identify, evaluate, and select the most suitable suppliers according to the public bodies' needs, including analysing the suppliers' goods/services specifications, past performance, financial information, and other related factors that may impact suppliers' availability and performance (e.g. litigations, supply chain disruptions).
- Provide the same information essential for quotation/tender preparation to potential bidders via the computer system or web-based platform to enhance transparency and uphold fairness of the procurement processes.

5.3.6 Communication with Bidders

- Log all communications with bidders (e.g. invitations to bid, tender/quotation addenda, queries raised by and responses to the bidders) in the computer system or web-based platform, and subject the communications to supervisory review to detect anomalies.
- For online briefing conducted for procurement exercises, put in place suitable controls to help alleviate possible collusion or other malpractice among bidders, including –
 - anonymising bidders' identities at the briefing (e.g. assigning a unique login account to each of them);
 - turning off the web camera function of bidders (or only enabling the host to view their camera image); and
 - disabling the private chat function among bidders (or only enabling messages to be sent directly to the host where necessary).

5.3.7 Receiving and Opening Quotations/Tenders

- Enable e-invitation and receipt of quotations/tenders in the computer system or web-based platform with automatic controls built in the process –
 - restricting access to proposals only after the submission deadline;
 - prohibiting opening of late submissions;
 - prohibiting opening of price proposals before completion of technical assessments in case two-envelope approach is adopted;
 - automatic capturing and recording of price offers;
 - safekeeping a control copy of all the proposals submitted;
 - disallowing any alteration of proposals after the submission deadline;

- maintaining audit trails over the receipt and opening process; and
 - analysing Internet Protocol addresses of bidders to detect possible bid collusion (e.g. submitting bids from the same Internet Protocol address or shared network).
- Assign quotation/tender opening team in the computer system by designated authority; and put in place suitable authentication mechanisms (📖 Chapter 5.2.3) against unauthorised access.
- If email is adopted in receiving quotations, put in the place suitable security features against tampering or leakage of quotations, including –
- using a secure email system with encryption connections;
 - setting up a dedicated email account for receiving e-quotations;
 - requiring the open of an email with two passwords which are separately kept by different staff not directly involved in the quotation process;
 - only releasing the passwords to the quotation opening team, which comprises more than one staff, for opening the bids after the submission deadline;
 - archiving all e-quotations received in a secure location to maintain a proper documentation on the process; and
 - refraining staff from using their personal email accounts (both official and private) for receiving e-quotations.

5.3.8 Evaluating Quotations/Tenders

- For procurement exercises adopting two-envelope approach, build in the following features to uphold accountability and facilitate unbiased assessment in the evaluation of technical proposals –
- capturing in the computer system all the scoring information over the technical assessment process, including the scores for each technical aspect given by individual evaluation panel members, any alteration to the scores (with justifications provided) after deliberation, and automatic calculation of the overall technical score; and
 - only releasing the price proposals to the evaluation panel after an independent staff has confirmed the completion of technical assessment in the computer system.
- Enable automatic calculation of the overall combined score (under two-envelope approach), and determination of the ranking of quotations/tenders.
- Generate a standard tender report (📖 Chapter 3.8) incorporating key features including the bid invitation and receipt status, assessment result, and any declaration on conflict of interest made and the corresponding mitigating measures being put in place, etc.

5.3.9 Quotation/Tender Negotiation

- Capture the negotiation process in the computer system where practicable (e.g. written correspondence with bidders via the computer system or web-based platform), and maintain audit trails on the actions taken during the process.
- Leverage AI to facilitate the formulation of negotiation agenda, sequence of points to be negotiated, arguments to be used, expected counter-arguments, suggested negotiation tactics, with a view to improving effectiveness and achieving better outcome.

5.3.10 Award of Contracts and Contract Management

- Build in computer-aided tools to facilitate the contract creation process (e.g. provision of contract templates and clause libraries, and customisation function to suit individual contracts' needs), and automate the checking on whether mandatory contract clauses (e.g. probity clauses, termination clauses) have been duly included.
- Automate the workflow on contract approval process (e.g. sending email notifications to the relevant parties when their endorsement or approval is needed).
- Maintain a centralised repository for storing all contracts to facilitate contract management (e.g. search and retrieval of contracts).
- Leverage AI to automatically extract key terms, clauses and obligations from contracts, keep track on milestones and deadlines, and generate alerts or reminders to the staff responsible for follow up as appropriate.

5.3.11 Petty Cash Purchases

- Utilise data analytics (e.g. by comparing with historical rates of similar purchases) to assess whether the rates in petty cash purchases are reasonable.
- Analyse petty cash purchases to detect split orders, as well as identify frequently required items and arrange term contracts for such items.

5.4 CONTRACT ADMINISTRATION

5.4.1 Ordering and Receiving Goods/Services

- Utilise internet of things devices (e.g. radio-frequency identification tags and sensors) to provide real-time and up-to-date stock level information.
- Build in stock management tools to generate, automatic alerts for replenishment when the stock level has dropped to a pre-set level, and purchase orders for review and approval by appropriate authority.

- Generate automatic system alerts to the staff responsible for follow up in case there are any delays in goods delivery or completion of milestones.

5.4.2 Managing Service Contracts and Conducting Inspections

- Digitalise the conduct and recording of documentary checks in the computer system, for example –
 - provide a system interface to the contractors for uploading the documentary records in accordance with the contract provisions (e.g. submission of contractors' Codes of Conduct, job completion reports, inspection records, payment records to contractors' staff such as cleaning workers and security guards); and
 - automate the checking process to identify any anomalies (e.g. failing to submit the required documentary records by the stipulated deadline or meet the prescribed frequency for inspections), and generate automatic alerts to the staff responsible for follow up.
- For service contracts that rely heavily on non-skilled workers (e.g. cleaning and security contracts), adopt digital attendance systems with biometric authentications (e.g. fingerprint or facial recognition) for staff monitoring and contract payment purposes.
- Utilise mobile devices and technologies during inspections to capture real-time, accurate and reliable data (e.g. time log, location tracking with the global positioning system, video recording or photo taking during inspections), and adopt video/photo analytics functions to automatically identify irregularities, so as to enhance accountability and information integrity, and facilitate supervisory monitoring.

5.4.3 Issuing Additional Job Orders or Contract Variations

- Automate the workflow on issuing additional job orders or contract variations with proper controls built in, for example –
 - require provision of justifications (with supporting documents where necessary) in the computer system for initiating an additional job order or contract variation;
 - automatically adopt the rates and terms if they are provided in the contract concerned, or benchmark the rates proposed against past additional service requirements (if any) and generate automatic alerts for any material deviations warranting a closer scrutiny;
 - send email notifications to designated authority to seek approval; and
 - maintain proper documentation to uphold accountability.

5.4.4 Processing Payments

- Digitalise the workflow for processing payments, covering receipt of suppliers' invoices, validation of invoices against corresponding purchase orders or contracts, certification of goods delivery or completion of services, and authorisation of payments.

- Build in automatic alert or bring-up function to remind the staff responsible and their supervisors to follow up on any delayed payment cases.
- Utilise robotic process automation to automate the repetitive tasks (e.g. capture information on physical or electronic invoices received from suppliers, match them with the corresponding purchase orders or contracts, and assign expenditure attributes based on previously processed invoices), to enhance efficiency, ensure accuracy and consistency, and deter possible irregularities (e.g. double payments, payment claims are not supported by purchase orders or contracts, certain unallowable expenditures are disguised as miscellaneous expenses).

5.4.5 Monitoring Suppliers' Performance

- Embed a suppliers' performance management module in the computer system to automatically track/capture the delivery timeliness, quality of goods/services provided, and adherence to contractual terms and conditions.
- Digitalise the suppliers' performance appraisal process, including –
 - using e-forms for assessment in the computer system;
 - mandating staff to enter their grading for individual assessment aspects (with justifications provided for those unsatisfactory aspects) before the e-forms can be submitted;
 - automatically generating reminders to users and their supervisors when performance assessments are overdue; and
 - maintaining a centralised database of contractors' performance records to facilitate on-going monitoring and subsequent retrieval (e.g. consideration of suppliers' past performance in upcoming tender exercises).
- Utilise AI to automate the evaluation of supplier performance by analysing various metrics, such as delivery timeliness, quality (e.g. substandard goods identified in acceptance), and customer satisfaction level (e.g. warning letters or default notices issued).