



Non-Binding Guidelines on the Adoption and Use of Technologies to Combat Corruption in Public Procurement

CONTENTS

| | |
|---|----|
| EXECUTIVE SUMMARY | 3 |
| INTRODUCTION | 3 |
| Aim & Target Audience | 5 |
| Who are the main stakeholders and users of public procurement data and technology? | 6 |
| Methodology | 8 |
| STEP-BY-STEP IMPLEMENTATION GUIDELINES | 8 |
| 1) Understand how well existing policy, regulatory and legislative frameworks and the technical context support ICT investment and encourage innovation | 8 |
| 2) Set clear goals and develop a strategic plan for the adoption of digital tools and solutions with an interdisciplinary approach to implement it | 12 |
| 3) Include and consult all user groups of the new technology to embed human-centered design principles into the process | 13 |
| 4) Establish a team to lead technology adoption and change management | 15 |
| 5) Prioritize data standards, quality and interoperability from the outset | 16 |
| 6) Assess existing capabilities to choose and procure the right technology | 18 |
| 7) Use analytics, BI & AI tools to expand and enhance corruption risk detection, enforcement and prosecution | 21 |
| 8) Ensure all relevant stakeholders know how to use the new technology and design for continuous feedback and improvement | 23 |
| 9) Establish clear, measurable indicators for monitoring the progress of technology integration in public procurement | 25 |
| 10) Secure the budget, prepare a roadmap and create an exit or upgrade strategy for long-term system sustainability | 26 |
| ANNEX I: COMMON TECHNOLOGIES USED IN PUBLIC PROCUREMENT | 27 |
| 1. Data standards | 28 |
| ANNEX II: FURTHER RESOURCES | 41 |

Executive summary

Public procurement remains one of the areas most vulnerable to corruption within government operations. In the two decades since the adoption of the United Nations Convention against Corruption (UNCAC), advances in digital technology and data use have enabled faster and more effective monitoring of integrity, efficiency and transparency throughout the public procurement cycle. The use of digital tools has also helped automate administrative tasks and reduce bureaucratic burdens.

These guidelines set out ten essential steps for governments to follow when adopting new technology to prevent and combat corruption. They provide an overview of six common technology applications in public procurement and include a list of resources offering further technical and legislative detail. The process begins with an assessment of the national context and legal framework, and emphasizes the importance of setting clear objectives for new technologies in order to avoid the pitfall of adopting innovations that may not be fit for purpose if strategic goals are not well defined.

The guidelines also highlight the importance of human factors and change management in the adoption of new technologies, as well as the expansion of data use to strengthen integrity in public procurement. Technology is a means to an end—dependent on high-quality, reliable data—to support governments in conducting business with suppliers in a strategic, transparent, efficient and low-risk manner.

Most modern technologies depend on a strong data foundation and sound data governance framework, including clarity on data ownership, data sovereignty and intellectual property rights related to source code. Whether a government is beginning to digitalize its public procurement systems or seeking to leverage advanced data analytics and emerging applications such as artificial intelligence (AI), these steps will assist decision makers in asking the right questions, assessing trade-offs and charting a path to technology adoption that aligns with institutional capacity and national needs.

Introduction

Public procurement represents a critical area of government operations. It accounts for [total spending of more than US \\$13 trillion](#)¹ in total global spending and touches every area of the 2030 Agenda for Sustainable Development. It is therefore essential to ensure that these domestic resources are safeguarded and used efficiently, effectively and with integrity.

Public procurement is also the point at which government and business most frequently interact—and it remains governments' leading area of corruption risk. It is estimated that [57% of foreign bribes](#)² are paid to secure public contracts. Corruption in public procurement undermines the effective use of public funds, fiscal discipline, transparency and accountability—leading to the erosion of public trust.

¹ *A Global Stock Take of Public Procurement*, World Bank, 2019.

<https://documents1.worldbank.org/curated/en/173331642410951798/pdf/Synthesis-Report.pdf>

² *OECD Foreign Bribery Report*, OECD, 2014.

https://www.oecd.org/content/dam/oecd/en/publications/reports/2014/12/oecd-foreign-bribery-report_g1g4d808/9789264226616-en.pdf

Corruption in public procurement also has a direct impact on the market and business environment. A [World Bank survey of 34,000 companies](#) in 88 countries³ found that competition was higher and kickbacks were fewer and smaller in places where transparent procurement systems, independent complaint procedures and external auditing mechanisms were in place.

Fraud and Corruption Terms: Understanding the most common and costly corruption and fraud risks in public procurement

The risks of fraud and corruption can arise at every stage of the procurement cycle:

- **Pre-tender:** during needs identification and planning, when manipulation or inaccurate forecasting may create opportunities for future fraud;
- **Tender:** when false bids from real or fictitious companies, connected companies, collusion, bid suppression, market division or discriminatory selection criteria may take place; and
- **Contract administration:** when schemes such as product substitution, cost mischarging or false invoicing may occur.

While **fraud**—the deliberate deception for personal or financial gain—may not always involve **corruption**, in practice the two frequently overlap. Corrupt acts such as bribery, kickbacks, abuse of functions and trading in influence often enable or conceal fraudulent behaviour. Addressing these intertwined risks therefore requires comprehensive integrity and compliance measures across the entire public procurement process.

By understanding the most common and costly corruption and fraud schemes in public procurement, and combating them with high-impact technology solutions, organizations can significantly reduce the prevalence and impact of corruption and fraud. The World Bank Report "[Finding Fraud: GovTech and Fraud Detection in Public Administration](#)" offers an in-depth look at fraud detection in public procurement and links this to IFMIS and human resources.⁴

United Nations Convention against Corruption (UNCAC) Resolution [10/9](#) "*Promoting transparency and integrity in public procurement in support of the 2030 Agenda for Sustainable Development*" consolidates existing good practices on legislative frameworks and the principles of UNCAC relating to public procurement.⁵ The resolution also reflects the latest approaches to using information and communications technologies (ICT) and data to transform public procurement from a compliance-oriented, paper-based process into an efficient, innovative and data-driven system. Such transformation seeks to deliver essential government services, mitigate corruption risks and ensure that public spending achieves value for money while remaining accountable and transparent.

³ *Deterring Kickbacks and Encouraging Entry in Public Procurement Markets Evidence from Firm Surveys in 88 Developing Countries*, World Bank, 2017.

<https://documents1.worldbank.org/curated/en/817871496169519447/pdf/WPS8078.pdf>

⁴ *Finding Fraud: Govtech And Fraud Detection In Public Administration*, World Bank, 2020.

<https://documents1.worldbank.org/curated/en/887311603104832916/pdf/Finding-Fraud-GovTech-and-Fraud-Detection-in-Public-Administration.pdf>

⁵ *Resolution 10/9 Promoting transparency and integrity in public procurement in support of the 2030 Agenda for Sustainable Development*, UN Convention Against Corruption, UNODC, 2023.

<https://www.unodc.org/corruption/en/cosp/conference/session10-resolutions.html#Res.10-9>

The integration of technology into public procurement processes offers substantial benefits, including greater efficiency, reduced reliance on paper-based procedures and enhanced oversight through the real-time publication and use of data. This means that records are generated and updated throughout each stage of the procurement cycle rather than being released only after its completion. Such real-time data enable governments to identify and address risks earlier and to strengthen preventive measures. Digitalization also promotes transparency by limiting discretionary human interaction and by enabling the tracking of outcomes and impacts of public spending. However, this transformation requires new skills, approaches and sustained support to realize its full benefits and to ensure that robust anti-corruption safeguards are fully integrated.

Although significant progress has been achieved in electronic government procurement (e-GP)—defined as the digitalization of procurement processes, procedures and workflows—and in broader digital transformation initiatives over the past decade, many existing systems still fall short of modern requirements. It is therefore necessary to move beyond the simple digitization of paper-based processes and instead focus on re-evaluating and enhancing current systems to meet contemporary needs. This includes integrating advanced functionalities such as:

- **Advanced procurement data analytics:** providing capabilities for analyzing and visualizing information;
- **Proactive red-flag mechanisms:** establishing tools for identifying and addressing risks and for detecting corruption; and
- **Online complaints management:** through e-complaint mechanisms that expedite dispute resolution, enhance transparency and build trust by allowing suppliers to track the status of cases.

The aim is not merely to replace paper-based systems but to fundamentally reassess and upgrade digital infrastructures so that they incorporate the latest functionalities required to enhance efficiency, transparency and integrity in public procurement.

Aim & Target Audience

The primary aim of the present document is to support the efforts of States Parties in using technology to address the most prevalent corruption risks in regular public procurement. Many of the principles and practices that prevent corruption also promote a fair, competitive, efficient market and wider diversity of suppliers, including small businesses, that contribute to economic growth and social impact, incentivizing the adoption of these technologies and approaches. These guidelines are designed to be broadly applicable at the national and subnational levels and are without prejudice to other context - or sector-specific guidelines.

These guidelines are primarily intended to support senior public procurement, data and IT professionals who will develop and oversee change strategies in public procurement policy and technology (procurement directors, commercial strategy leads, IT directors leading procurement ICT implementation) but may also be of use to legislative advisors when considering new public procurement legislation, senior government data management professionals, law enforcement and auditors, civil society actors and suppliers who use public procurement data to identify business opportunities.

The intention of these guidelines is to complement other resources such as the UNODC [Non-Binding Guidelines for Strengthening International and Multilateral Cooperation to Further Prevent, Identify, Investigate and Prosecute Corruption During Times of Emergency and Crisis Response and](#)

Recovery,⁶ the [UNODC Guidebook on Anticorruption in Public Procurement and the Management of Public Finances](#)⁷ and the [Guide to Enactment of the UNCITRAL Model Procurement Law](#)⁸ that focuses on the key considerations governments should have in mind when upgrading or adopting new technologies to prevent and detect corruption in public procurement. The Further Resources section at the end of these guidelines offers many more in-depth resources from multilateral institutions, development banks, academia, governments and CSOs that cover a broader range of technology uses and considerations than the scope of these guidelines, and we encourage readers to situate these guidelines within that broader body of work.

Who are the main stakeholders and users of public procurement data and technology?

Public procurement affects nearly every area of government and daily life, involving a very wide range of stakeholders beyond the target audience of the present guidelines. The following overview outlines these groups in greater detail and can be used as a reference to identify the various users of public procurement systems and data when upgrading or adopting new technologies.

Certain groups of stakeholders relevant to public procurement who use digital procurement tools regularly in their day to day roles, are also referred to as "core users", throughout the change management process, from strategic conception to implementation.

Some of the common internal government stakeholders may include:

- Public procurement teams
- IT teams
- Compliance and audit teams
- Law enforcement
- Anti-corruption agencies
- Policymakers
- Competition authority
- Project owners (for example the line ministry in charge of major roadworks, or local agency in charge of school meals)
- Representatives from all relevant agencies and ministries (these can vary by State party but may include ministries of finance, agencies focused on small business, economic development ministries, agencies overseeing company registers, commercial departments, ministries of justice, etc. who are data owners)

Some of the common external stakeholders may include:

⁶ *Non-Binding Guidelines for Strengthening International and Multilateral Cooperation to Further Prevent, Identify, Investigate and Prosecute Corruption During Times of Emergency and Crisis Response and Recovery*, UNODC, 2024. https://www.unodc.org/documents/corruption/Publications/2024/UNODC_Non-binding_guidelines_on_corruption_during_times_of_emergency_and_crisis_response_and_recovery_FEB24.pdf

⁷ *Guidebook on Anticorruption in Public Procurement and the Management of Public Finances*, UNODC, 2013. [UNODC Guidebook on Anticorruption in Public Procurement and the Management of Public Finances](#)

⁸ *Guide to Enactment of the UNCITRAL Model Procurement Law*, UNCITRAL, 2014. <https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/guide-enactment-model-law-public-procurement-e.pdf>

- Suppliers who may bid on public contracts
- IT vendors who supply digital solutions and data and cloud services
- Civil society and community organizations who monitor how funds are spent
- Media who report on major deals and monitor public spending
- Academia conducting research on public spending

All these stakeholder groups make use of public procurement data, but their roles, objectives, needs and use cases for the data differ. Robust change management and user-centered design ensures each stakeholder is consulted at the right time in ICT solution design and development, and that there are regular feedback loops for agile development, addressing “bugs” in ICT solutions and maintaining the proper functioning of digital processes and workflows for users internally as well as for external users.

It's important to note that the stakeholders relevant to each step in the adoption of new technology may differ, and to be clear about who they are and how their incentives and priorities may evolve in line with a country's procurement strategy and policy objectives.

For example:

- The primary objective of an anti-corruption agency is to prevent, detect and investigate corruption risks;
- A competition authority focuses on maintaining fair and efficient procurement markets;
- An information technology director prioritizes system security and data protection; and
- A procurement director seeks to secure goods, works and services in a timely manner and to achieve the best value for money.

These objectives are interdependent. Effective coordination across stakeholder groups ensures that their efforts are mutually reinforcing—for instance, by enabling the information technology leads to design solutions that meet the needs of all stakeholders, and ensuring that the procurement lead collects and shares data necessary to monitor competition, pricing and corruption risk indicators..

Each stakeholder group should be on-boarded at the appropriate moment once a new technology solution is ready for testing, and eventual deployment. For example, a government will want to consult internal legal and IT stakeholders to understand what technology can be adopted before asking public procurement officers for input on options, and before sharing the chosen option with external users like suppliers or civil society for feedback on its interface and the data fields to be published.

Tailored onboarding and training modules may be appropriate for government, suppliers and non-government data users monitoring public spending to speak to each of their needs and use cases for public procurement data and tools.

Methodology

The present document has been prepared following extensive input from States Parties in response to Note Verbale CU 2024/132(A)-(B)/DTA/CEB/TSS, inviting contributions on the prevention of corruption in public procurement and the effective use of information and communications technologies (ICT). The final guidelines integrate numerous contributions from governmental experts, representatives of the private sector and civil society organizations. These inputs were collected through online consultations, an expert meeting, and an analysis of case studies on electronic procurement, data management and technology implementation. The guidelines also draw upon a synthesis of international best practices, including those developed by the United Nations Commission on International Trade Law (UNCITRAL).

Step-by-step implementation guidelines

1) Understand how well existing policy, regulatory and legislative frameworks and the technical context support ICT investment and encourage innovation

When undertaking a digitalization strategy or adopting new technologies to fight corruption, increase competition and deliver value for money in public procurement, it is important to understand and situate such plans with respect to each state or jurisdiction's particular domestic context and legal frameworks.

The reforms and updates needed vary by country context, and usually require looking at not only laws, policies and regulations on public procurement but those concerning anticorruption, competition, data governance, digital technology, and potentially others that may be relevant depending on the jurisdiction. In some cases, states choose to undertake reform plans within existing legal frameworks. In others, states choose to update their procurement legislation or regulations to adapt to new technologies and make sure anti-corruption objectives are more strongly integrated.⁹

A legislative and regulatory review could reveal necessary modifications such as making sure legislation accounts for the digital nature of documents and data instead of paper based processes. This will establish legal grounds for one centralized rulebook and data standard for the whole cycle of public procurement, from pre-tender, to tender, award, and contract management.

Assessing the alignment between current legal frameworks and ICT applications involves reviewing whether public procurement systems support transparency, competition and objective criteria in decision-making in alignment with Chapter II, Article 9 of the [UNCAC](#).¹⁰ While legislative adaptation

⁹ Recent examples of procurement reforms include the Philippines' *New Government Procurement Act (RA-12009)*, 2024 <https://ngpa.gppb.gov.ph/New-Government-Procurement-Act-RA-12009.pdf>, the UK's *Procurement Act 2023*, <https://www.legislation.gov.uk/ukpga/2023/54/contents>, and South Africa's 2024 Public Procurement Act, https://www.parliament.gov.za/storage/app/media/Acts/2024/Act_No_28_of_2024_Public_Procurement_Act.pdf.

¹⁰ "Each State Party shall, in accordance with the fundamental principles of its legal system, take appropriate measures to promote transparency and accountability in the management of public finances." Article 9(2) of the UN Convention Against Corruption 2004. http://www.unodc.org/documents/brussels/UN_Convention_Against_Corruption.pdf

is not always necessary, depending on country situations, promoting flexible regulations that encourage digital adoption can foster innovation, enhance accountability, and improve public procurement outcomes. Policymakers and stakeholders may benefit from exploring best practices, technological trends, and regulatory refinements to create an environment where ICT-driven procurement solutions can thrive.

State parties to the UNCAC should align their national legislation with its provisions, specifically Article 9 paragraph 1 which provides for:

"Each State Party shall, in accordance with the fundamental principles of its legal system, take the necessary steps to establish appropriate systems of procurement, based on transparency, competition and objective criteria in decision-making, that are effective, inter alia, in preventing corruption. Such systems, which may take into account appropriate threshold values in their application, shall address, inter alia:

- (a) The public distribution of information relating to procurement procedures and contracts, including information on invitations to tender and relevant or pertinent information on the award of contracts, allowing potential tenderers sufficient time to prepare and submit their tenders;*
- (b) The establishment, in advance, of conditions for participation, including selection and award criteria and tendering rules, and their publication;*
- (c) The use of objective and predetermined criteria for public procurement decisions, in order to facilitate the subsequent verification of the correct application of the rules or procedures;*
- (d) An effective system of domestic review, including an effective system of appeal, to ensure legal recourse and remedies in the event that the rules or procedures established pursuant to this paragraph are not followed;*
- (e) Where appropriate, measures to regulate matters regarding personnel responsible for procurement, such as declaration of interest in particular public procurements, screening procedures and training requirements."*

The [UNODC guidebook](#) provides more detail on legal frameworks for implementation.¹¹

The United Nations Commission on International Trade Law (UNCITRAL) [Model Law on Public Procurement](#) (2011)¹², which contains procedures and principles aimed at achieving value for money and avoiding abuses in the public procurement process, supports the implementation of these principles. The Model Law implements the public procurement requirements of Article 9 of the UNCAC and UNCITRAL has drafted the Model Law so that it would enable the use of e-procurement.

The UNCITRAL Model Law is predicated on the familiar principles of: (a) achieving economy and efficiency; (b) widespread participation by suppliers and contractors, with procurement open to international participation as a general rule; (c) maximizing competition; (d) ensuring fair, equal and equitable treatment; (e) assuring integrity, fairness and public confidence in the procurement process; and (f) promoting transparency. It regulates, in detail, the elements provided for in Article 9 of UNCAC to establish the required appropriate systems of procurement.

¹¹ *Guidebook on Anti-corruption in Public Procurement and the Management of Public Finances*, UNODC, 2014. https://www.unodc.org/documents/corruption/Publications/2013/Guidebook_on_anti-corruption_in_public_procurement_and_the_management_of_public_finances.pdf

¹² *Model Law on Public Procurement*, UNCITRAL, 2011. https://uncitral.un.org/en/texts/procurement/modellaw/public_procurement

The accompanying [Guide to Enactment](#) of the UNCITRAL Model Law on Public Procurement provides background and detailed explanatory information, outlining the policy considerations reflected in the Model Law, including with respect to specific issues arising in the implementation and use of e-procurement (see Part One, C 3).¹³

The [Methodology for Assessing Procurement Systems](#) (MAPS) is a comprehensive tool for assessing the legal framework of country procurement systems and there is a dedicated [MAPS e-Procurement Assessment Module](#)¹⁴ that is of particular relevance to the focus of these guidelines.¹⁵ Countries that have conducted a MAPS assessment can use its findings to identify gaps in their legal frameworks or can choose to undertake an assessment as a starting point for wider reform.

As technologies have advanced since the adoption of the UNCAC, it is important to consider policies that can further strengthen the effective implementation of these Guidelines, including:

- **Legal Recognition of Electronic Transactions and Processes:** Enacting laws that recognize the legal validity of electronic bids, documents, and signatures, as well as enable the use of identity management and trust services, all of which are key to successful implementation of an eGP system. This may involve adopting or adapting principles from the suite of legislative texts prepared by UNCITRAL in the area of [electronic commerce](#) including, for example: (i) the (MLEC), which establishes rules for the equal treatment of electronic and paper-based information, as well as the legal recognition of electronic transactions and processes, based on the fundamental principles of non-discrimination against the use of electronic means, functional equivalence and technology neutrality; (ii) the [UNCITRAL Model Law on Electronic Signatures](#), which establishes criteria of technical reliability for the equivalence between electronic and hand-written signatures and may be relevant when presenting tenders through dedicated platforms;¹⁶ and (iii) the [UNCITRAL Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services](#), which provides a set of model legislative provisions that legally enable the use of identity management services for online identification as well as trust services to provide assurances as to the quality of data.¹⁷
- **Transparency Mandate:** Including a transparency mandate in relevant procurement regulation and/or legislation so that transparency and accountability are part of the procurement teams' responsibilities

¹³ *Guide to the Enactment of the Model Law on Public Procurement*, UNCITRAL, 2014.

<https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/guide-enactment-model-law-public-procurement-e.pdf>

¹⁴ *Methodology for Assessing Procurement Systems' e-Procurement Assessment Module*, OECD.

<https://www.mapsinitiative.org/en/methodology/supplementary-modules/e-procurement.html>

¹⁵ [Mauritius](#) and [Montenegro](#) have already piloted the MAPS e-Procurement Module for the assessment of their e-GP systems. See *Assessment of Mauritius e-Procurement*, MAPS Initiative, 2024.

<https://www.mapsinitiative.org/content/dam/maps-initiative/en/assessments/mauritius/maps-assessment-mauritius-e-proc-report.pdf> and *e-Procurement Assessment of Montenegro's Public Procurement System*, MAPS Initiative, 2024. <https://www.mapsinitiative.org/content/dam/maps-initiative/en/assessments/montenegro/maps-assessment-montenegro-e-proc-report.pdf>

¹⁶ *Model Law on Electronic Signatures*, UNCITRAL 2001.

https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_signatures

¹⁷ *Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services*, UNCITRAL, 2023. https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/mlit_en.pdf

- **Data Governance:**
 - **Collection & management:** Clear policy direction on which data the government needs to collect on public procurement, the intended uses and users of these data and how it will be hosted and kept secure from cyberattacks.
 - **Open Data Mandate:** Legislating the publication of procurement data in structured, open, accessible, and machine-readable formats. This includes data related to procurement planning, tendering, contract award, and contract implementation. The [Open Contracting Data Standard](#) (OCDS) is one free-to-use open standard that can provide guidance on which data to consider publishing.¹⁸
 - **Data Protection and Privacy:** Enacting laws to protect the confidentiality of commercially sensitive information, classified national security information and personal data while ensuring transparency in the overall procurement process.
- **Functional Interoperability & System Interconnectivity:** Ensuring that different e-GP systems and databases can communicate with each other, both within government and with external stakeholders such as suppliers, civil society, academia and the media. This may include an assessment of all data standards and languages used across relevant government systems, and making sure systems are joined up as needed to achieve the desired outcomes and process effectiveness.
- **System Security:** Establishing legal requirements for the security of e-procurement systems, including measures to prevent unauthorized access, data breaches, and cyberattacks, for example through cybersecurity standards such as ISO 27001
- **Legal Framework for e-Complaints:** Ensuring laws are in place that guarantee the right of stakeholders to file complaints, including electronically and without fear of reprisal, and that these complaints are investigated promptly and impartially.
- **Legal basis for red flags & electronic audit:** Ensuring there is a legal or regulatory basis mandating an electronic audit trail that provisions for the possibility of using red flags or corruption risk indicators by compliance and law enforcement professionals, so they have the mandate and power to do so.
- **Capacity Building:** Include provisions for training procurement officials, suppliers, and other stakeholders on the use of ICT systems and the relevant legal framework.

Beyond simply ensuring applicable legal frameworks are supportive of the use of ICT, governments should actively encourage innovation and the adoption of new technologies to further enhance transparency and combat corruption. This can involve:

- **Flexible Legal Frameworks:** Designing laws that are technology-neutral and adaptable to future technological advancements. Avoid overly prescriptive regulations that could stifle innovation.
- **Sandboxes and Pilot Projects:** Creating regulatory sandboxes or pilot projects to test new technologies, such as blockchain or artificial intelligence, in a controlled environment.
- **Public-Private Partnerships:** Encouraging collaboration between the public and private sectors to develop and implement innovative e-procurement solutions.
- **Incentivizing Transparency:** Providing incentives for suppliers and procuring entities to adopt transparent practices and utilize ICT systems effectively.

¹⁸ See *Open Contracting Data Standard*, Open Contracting Partnership, <https://standard.open-contracting.org/latest/en/>.

The [Open Contracting Partnership & Reuters TrustLaw Legislative Guide](#) contains useful recent examples of procurement reforms that accommodated the latest data and technology for further insight on this guideline.¹⁹

2) Set clear goals and develop a strategic plan for the adoption of digital tools and solutions with an interdisciplinary approach to implement it

Governments should develop a strategic plan for digital transformation in public procurement in consultation with key internal and external stakeholders (more detail on these in Guideline 3). This plan should consider the important metrics and milestones for the adoption of the new technology and highlight important decision points.

Technology offers enormous potential for improving public procurement, a complex function involving thousands of data points and transactions. Digitalization—whether adopting eGP for the first time or upgrading and expanding the government’s digital procurement capabilities—is an opportunity to rethink workflows, improve processes, update legal and regulatory frameworks, optimize spending and strengthen culture on a more fundamental level than simply digitizing paper-based processes.

Experience has shown that governments that adopt a broader perspective on digital capabilities and technology, as outlined in the use cases below in these guidelines, may achieve more substantial and sustainable results. This is why having a strategic plan that outlines clear goals and desired outcomes of the new technology to be used in procurement is fundamental.

Moving beyond simple digitization, governments should adopt a strategic vision that transforms public procurement. This means going beyond merely digitizing paper processes to improve workflows and processes of procurement systems for better spending and value for money and reduced corruption risk. eGP systems enhance efficiency, reduce human discretion, minimize paperwork, and increase transparency by providing open access to procurement data. Key benefits include greater transparency through the electronic publishing of tender notices and contract awards, which enhances accountability and reduces risks for corruption.

Identifying the full spectrum of relevant stakeholders is a critical part of the strategic planning process. This includes not only procurement professionals, but also anti-corruption authorities, law enforcement agencies, ministries that will provide data verification (revenue authorities, home affairs, business licensing, etc.), ministries of finance or economy and/or other line ministries and agencies who will be expected to use the new technology and adopt new processes or workflows. The leadership and influence of the ministry or agency that leads the technology implementation project—and their decision making power in the hierarchy of government—impacts its success, making the involvement of ministries of finance or economy particularly vital. Country procurement regulatory authorities should ideally be the business process owners, even if the technology is implemented by a different state institution.

Close collaboration between procurement authorities and law enforcement agencies is critical for effectively addressing corruption. Establishing formal communication channels allows for efficient information sharing and case management, ensuring procurement-related corruption cases are

¹⁹ *Open Contracting Legislative Guide*, Open Contracting Partnership and Reuters Trustlaw, 2021. <https://www.open-contracting.org/resources/open-contracting-legislative-guide/>

investigated and prosecuted promptly. Legal frameworks that support inter-agency communication will likely be necessary to facilitate collaboration and information sharing.

A new eGP system, implementation of an advanced analytics tool, or AI solution does not guarantee usable data for anti-corruption, particularly if systems focus more on transaction interactions than public transparency and market-level monitoring. To avoid this pitfall, governments must clearly define the goals of the adoption of any digital tool to include economic opportunity, transparency and integrity, not just compliance.

Once these goals are clearly established, governments can conduct a readiness assessment and cost-benefit analysis to select the most appropriate digital tools and systems for their gaps and needs (see Annex I, item 2 for further detail). [MAPS assessments](#) and previous UNCAC Country Reviews are a useful starting point.

While governments can implement a fully integrated financial management and information system (IFMIS), this is not always immediately feasible depending on resources and government capacity. In lieu of this, it's common for governments to use a modular, phased approach to digitalization, especially when implementing e-GP to allow governments to ensure each component is functioning effectively before expanding and iterating across the whole government.

Governments readiness assessments should also consider potential challenges and risks associated with adopting digital solutions:

- **Infrastructure and Capacity:** E-procurement requires reliable internet infrastructure, adequate IT systems, and staff skilled in both procurement and technology, including user-centered design and user testing.
- **Cost and Resources:** While e-procurement may streamline processes and reduce certain human errors, its implementation can be costly and resource-intensive, especially in regions with underdeveloped digital infrastructure.
- **Resistance to Change:** Resistance to change is likely, particularly among those less familiar with new technologies, so it is important to develop a technological and stakeholder roadmap that considers the team's digital skills and starting point.
- **Data Security and Privacy:** Addressing cybersecurity, privacy and data protection concerns is essential. Procurement authorities should implement regular cybersecurity audits and data protection protocols, including encryption and controlled access, to safeguard sensitive procurement data.

These challenges can be mitigated and overcome in the strategic planning phase, for example by starting with a modular approach to e-GP transformation, investing in the change management team and rollout or making sure adequate data protection safeguards are in place. Many of these strategies are covered throughout these guidelines, and should be included in the strategic plan.

3) Include and consult all user groups of the new technology to embed human-centered design principles into the process

This step emphasizes a human-centered design approach, directly engaging the diverse core users of public procurement systems and public procurement data to co-create processes and identify the most valuable data for their specific needs. This recognizes that new technology adoption is

not just an IT update, but a change that improves workflows, decision-making, and quality and efficiency of data and information exchange.

Proactive stakeholder engagement—from all actors who will use or be impacted by the new technology and processes—at the outset and throughout the change management process is essential for gaining broad support and securing buy-in, and to cultivate a sense of shared ownership among the technology's users so they are personally invested in its success.

Importantly, governments should establish a lead implementation team to coordinate change management (further detail in guideline 4) and establish robust feedback mechanisms with stakeholders throughout the entire process, not just at the first or the final stages. These feedback loops can take the form of calls, tech demos, in-person meetings or online consultations and should be established to allow stakeholders and end-users of the public procurement data and technology to continuously provide input on necessary adjustments. This allows governments to adopt an iterative approach that is an agile and adaptable strategy, tailoring the technology to local needs and contexts.

Prioritizing user-testing and user-centered design principles is fundamental to successfully implement any new technology. This means designing *with* users and not just *for* them: a common risk in developing any technology. Investing in comprehensive user discovery at the outset of a technology adoption process is essential, and for good reason; it defines the requirements of the system you will develop and the data you will collect, and for what use—so that the technology truly meets the objectives as set out in guideline 2.

It's crucial to extend this user-centric perspective beyond internal government users at this stage. The assumption that all or most companies want to do business with the government is often inaccurate. The reality is far more variable, and many potential suppliers, including Small and Medium-sized Enterprises (SMEs) and businesses owned by under-represented groups (e.g., women, youth, veterans, individuals with disabilities, other minorities), may hesitate to participate due to concerns about fairness or perceived corruption, do not bid because they are unsure the process is fair, assume it is corrupt or assume it will be unnecessarily bureaucratic or result in delayed payments.

A similar logic applies to the general public, communities and civil society actors. Transparency and accessibility of public procurement data are vital for the general public, communities, and Civil Society Organizations (CSOs). Without a clear understanding and access, negative assumptions about public procurement are often persistent.

By actively involving external public procurement data and tool users – including suppliers, IT vendors, CSOs, communities, and stakeholders across various government agencies and line ministries – along with the government in the implementation journey of adopting digital tools, the government can communicate the value of these tools and data. This fosters better utilization, so that new tools are used well, and demand for them is sustained over time.

Suppliers, CSOs, communities, and internal government stakeholders across different government agencies and line ministries should all be considered. Where relevant, governments can choose to focus on specific target supplier groups like SMEs or businesses owned by women, veterans, minorities or persons with disabilities, to ensure the government's approach encourages the suppliers' participation in the public procurement market. Tailoring the design and communication to address their specific concerns and needs can significantly enhance inclusivity.

To illustrate the value of this engagement, some of the approaches that can boost participation by SMEs include mobile apps and interfaces, electronic kiosks for small businesses in more remote

or rural areas, enabling translation into local languages, and geotagging of procuring entities to facilitate connections with local suppliers. Aside from public procurement opportunities themselves, online and mobile platforms can enable access to digital wallets or e-payment options for faster disbursements of payment from delivered and completed contracts of SMEs and suppliers from vulnerable groups or under-represented sectors.

The expertise and feedback of these diverse stakeholder groups will help governments shape their procurement technology to fit their expectations and needs, and define which data are the highest priority to collect along the public procurement value chain.

This inclusive approach also cultivates a "coalition of winners" who are invested in the success of digital transformation and the adoption or upgrade of new technologies, which reinforces the success of change management.

4) Establish a team to lead technology adoption and change management

Success is dependent on qualified personnel with expertise in procurement, user research, digital technologies, data and change management -- along with adequate funding to support the team's activities.

Why a change management approach? A multidisciplinary change management team must possess a blend of expertise in both public procurement processes and change management methodologies, which, backed by good user research and stakeholder input, supports leaders in preparing team members for change. This includes securing high-level political buy-in, support from the implementing line ministry or agency, input from IT vendors and technology experts, consulting suppliers and CSO users, and involving team members who will be affected by the change, conducting a skills assessment, outlining a clear plan, and creating a shared sense of ownership in the success of the change—in this case, the adoption of new procurement technologies and tools to combat corruption.

There are a number of change management models to choose from, each with their own advantages and approaches. The World Bank report, [Disruptive Technologies in Public Procurement](#), provides examples of the risk of not incorporating change management into the system development process.²⁰

Establishing a dedicated change management team can help mitigate resistance by managing the technical aspects of the transition and fostering engagement among key stakeholders, ensuring the reform is carried out smoothly and effectively. This team should proactively foster stakeholder engagement, address potential resistance, and advocate for the benefits of the new technologies and processes, thereby ensuring that the reform is implemented smoothly and effectively. Implementing digital solutions requires a high-performing team with sufficient capacity to prioritize the project and the ability to address both the technical and political dimensions necessary to achieve meaningful change.

This means that they have both the time and the technical skills to take on the project, and are empowered to make decisions and test approaches. It is not realistic, for example, to assign the implementation of a new e-GP system to a public procurement director on top of his/her day-to-

²⁰ *Disruptive Technologies In Public Procurement*, World Bank, 2021 .
<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/522181612428427520/disruptive-technologies-in-public-procurement>

day role running the public procurement agency, for example, so capacity and bandwidth considerations matter. Sufficient funding to support the change management is critical to ensure that there are sufficient resources to cover roll-out, training and adoption.

Appointing a dedicated Project Manager for specific technology deployments is essential. These coordination roles serve as central contact points who can organize and streamline communication among diverse stakeholders and effectively manage the product technology development process lifecycle. It is important that this person has access to a high level decision maker to support the process, which could be a minister, a ministerial advisor or a steering committee of senior decision makers to reinforce their mandate for change.

The successful deployment of technology hinges not only on technical readiness but also on a robust strategy for rollout and adoption. Evidence from recent implementation efforts underscores the critical importance of three interlinked pillars: mandated usage, adequate funding, and a strategic rollout plan.

- **Mandating System or Solution Use:** Mandating the use of technologies like an e-GP system across government entities is essential to ensure uniformity, transparency, and accountability in public procurement. Voluntary adoption often leads to fragmented usage and undermines the system's potential to generate savings and improve public procurement outcomes. For example, a clear policy directive requiring all ministries and agencies to transition to the e-GP system—backed by legal and regulatory frameworks—can accelerate uptake and institutionalize digital procurement practices.
- **Securing Adequate Funding:** Funding is a foundational enabler for successful technology adoption. Underfunded rollout activities lead to poor performance and low user confidence. Sustainable financing models—whether through national budgets, donor support, or public-private partnerships—must be established early in the project lifecycle. This ensures continuity and scalability, especially in contexts where public procurement volumes and complexity are expected to grow.
- **Strategic Rollout and Adoption Planning:** A strategic rollout plan must be tailored to the country's institutional capacity, digital maturity, and procurement landscape. A phased implementation—starting with high-volume agencies or pilot sectors—can build momentum and allow for iterative improvements. Moreover, integration with existing systems such as IFMIS (Integrated Financial Management Information Systems) must be carefully planned as confusion around integration pathways can derail implementation and dilute system benefits.

Training, change management, and stakeholder engagement are equally vital. The rollout must be accompanied by capacity-building initiatives and continuous feedback loops to refine system features and address user concerns (further detail in guideline 9). Adaptive management and responsiveness to field realities significantly enhance adoption rates and system effectiveness.

5) Prioritize data standards, quality and interoperability from the outset

Data is the bedrock upon which effective e-procurement and related digital tools are built. Every digital tool—whether an e-GP system, advanced analytics or an AI or BI tool—is only as good as the

data that it's utilizing. Data quality and completeness is essential to maximize the return on the investment in e-GP, analytics and digital tools. If the data quality is low (many missing fields, not collected in machine-readable formats, etc.) or the data collected is incomplete, then business intelligence, risk analytics and AI tools will not deliver at the expected level.

Recognizing this, governments should prioritize data standards, quality, and interoperability from the very beginning of any ICT initiative. Data ownership, accessibility and quality are also one of the most critical pieces to pull out and highlight when defining ICT system requirements.

Having clear strategic goals and consulting your internal and external stakeholders on which data they need and how they use it can help governments streamline which data they collect, for which purposes, and evaluate the trade-offs and cost:benefit inherent in determining this.

Critical questions include:

Assessing the current state of available data: What data is currently being collected? What are its strengths and weaknesses in terms of accuracy, completeness, and consistency?

Defining ideal data requirements: What data *should* be collected to support effective public procurement management, transparency, integrity, and long-term strategic goals? Annex 1 offers a starting point for choosing priority data fields and requirements when selecting a data standard.

Determining which data are public: There are a lot of advantages of making public procurement data publicly available, but some data may be used internally when balanced with security and privacy concerns. It is important to weigh these concerns in each context and have a clear rationale for which data will be disclosed as open data. The UNCITRAL Model Law's Enactment Guide gives a helpful overview of these considerations.

Evaluate the cost to collect this data: How easy or difficult, costly or inexpensive, is it to collect the data needed for stakeholders to reach their goals?

Bridging the gap: How can the current digitization project, including the e-GP system, effectively bridge the gap between the current data reality and the ideal data state? This includes identifying data collection gaps and developing strategies to address them.

It is also important to consider the overall value of collecting data. In other words, every item of data should serve a specific purpose, and all data should be collected from the best available and most reliable source. If users feel overwhelmed by the task of filling out constantly evolving forms, compliance - and the corresponding data quality - will be low.

We must consider what data is truly necessary to be structured and what data fulfills its purpose as a simple attached document. And as much as possible, governments should try to follow a "tell us once" principle, where repetitive data entry of the same information, for example the basic details of a supplier, are collected only once and not required for every bid or contract unless something has changed. This helps to simplify the design, streamline data entry, and reduce the possibility of user confusion; in addition to helping external users better identify and classify information when analyzing it.

A data standard ensures that all data collected and published is structured, interoperable and machine-readable, which allows it to be more quickly and effectively processed by a computer. Data standards also allow for unique identifiers (such as for each procurement, each buyer, each bidder, and each item being procured). In this regard, governments have a choice between

developing their own bespoke data standard or using an existing standard – subject to proprietary restrictions and possible fees.

It's advisable to choose a non-proprietary data standard to ensure interoperability, avoid vendor lock-in, and promote data sharing and reuse. Aligning legacy systems with existing open standards can reduce long-term integration challenges and improve overall system resilience. It is important to note that using an open data standard does not require publishing all data related to public procurement,

Currently, the [Open Contracting Data Standard](#) (OCDS), which is maintained by a global non-profit organisation, is the only global open source standard available free of charges or fees for any government to use and customize. Use of such widely used standards can also facilitate benchmarking, cross-jurisdictional comparisons, and broader data exchange.

Please see Annex I for more detail on data standards and data tools.

6) Assess existing capabilities to choose and procure the right technology

The five previous steps are vital groundwork before procuring any new technology and maximize its chance of successful implementation and impact.

The solicitation documents for any public procurement IT solution should start by articulating a problem statement or needs assessment. This means defining the existing environment and capabilities of the procurement system relative to the preferred organizational capabilities (Szuba et al. 2005). The solicitation document should articulate a shared vision of the system of internal and external stakeholders. A clear problem statement helps define outcomes-oriented functional requirements and prevents over-emphasizing technology. By prioritizing a problem-based approach over excessive requirements, vendors will be more able to offer solutions that match government needs.

It is important to have the expertise to write clear technical requirements at the outset based on early user discovery and stakeholder input, as IT providers rarely deviate from their prescribed requirements unless this is specified at the outset, and there can be additional costs for changes later on. This can be challenging in lower capacity environments where public buyers are less experienced in procuring technology. Options to address this can include hiring an independent consultant to advise on the terms of reference, pre-market consultation with potential suppliers, and support from multilateral development banks where relevant. Independent consultants can also assess the readiness of the existing IT infrastructure if the government is not able to do so internally.

Buying ICT goods and services has a number of particularities that are important to bear in mind when selecting the right government technology: for example, liability, licensing, data protection/processing and intellectual property considerations. Procuring the appropriate technology requires a thorough evaluation, and factoring in the total cost of ownership over time which factors in estimates for future upgrades and licensing.

Challenges that affect general procurement (risk aversion, inflexibility, over prescription, etc.) also affect procurement of digital solutions. Poor procurement of digital solutions and ICT for procurement might then compound the impacts of poor procurement across an entire economy. This can also apply to different levels of government, where national governments may be better resourced - both financially and in terms of digital skills - than their local counterparts who may need more support to procure technology locally or to adopt centrally procured technologies.

Governments that buy a solution off-the-shelf rather than building it in-house often draft solicitation documents that are either too vague or overly prescriptive (especially when such processes are imposed by international donors from afar without consideration of the local users of a system). Solicitation processes with too many specifications tend to stifle innovation and limit competition, and eventually create vendor “lock-in” or dependency.

There are a few procurement methods governments can explore to mitigate this, including competitive dialogue where the solution is proposed by the market of potential suppliers, iterative approaches that utilize a framework agreement to begin but allow for flexibility as the solution is tested and iterated, or a technical dialogue with suppliers (pre market engagement) before the solicitation is published. Each country's public procurement laws and regulations vary and will determine whether these approaches are viable in their context.

A few questions governments should ask when selecting the right technology for their needs include:

Does the system genuinely address the specific local context and needs of the procuring entities, suppliers, and the overall governance structure?

In contexts where there is a smaller pool of local tech talent, it is worth considering how the implementation of e-GP or other digital procurement tools might help stimulate local opportunities and be part of knowledge transfer from experts to local authorities and building a stronger local tech and data ecosystem by making subcontracting and partnership a part of the requirement, and ensuring support in the local language and timezone.

Instead of implementing a highly complex e-GP system with advanced features like reverse auctions in a country where many suppliers have limited digital literacy and internet access, a phased approach starting with better readying procuring entities and gradually rolling out to other graduating entities might be more suitable. In some cases, phasing in a module-by-module implementation may work better.

An e-GP system designed for a decentralized government structure needs to accommodate the specific workflows and approval processes of various regional and local authorities, unlike a system intended for a highly centralized administration. This might involve customizable user roles and access controls.

Can the e-GP system be sustainably maintained and supported using local resources and the existing technology market?

For example, choosing proprietary platform and enterprise solutions with limited public sector functions and processes—requiring constant support from an international vendor—might be unsustainable if local IT capacity is limited. Opting for a system built on open standards or one where local developers can be trained for maintenance and upgrades could be a more viable long-term strategy.

Before committing to a specific solution, assessing the local availability of skilled personnel for system administration, user training, and technical support is crucial to ensure the system's continued operation and total cost of ownership has been considered.

Should an end-to-end e-GP suite be purchased or is a modular approach more appropriate?

Investing in an end-to-end and comprehensive e-GP suite is usually a more expensive platform up front but with strong encryption and audit trails can offer better value in the long run by minimizing the risk of data breaches and manipulation, thus preventing corruption.

But not all governments are in a position to make this investment up front or take on the task of implementing such a broad IT systems upgrade in terms of their capacity, so they choose to go modular, testing and iterating digitalization of part of the system and expanding over time. This can reduce the up front costs and allow for piloting functions before expanding them, but it is important to ensure interoperability of each module and to note that it will not have all the functionality from day one. It also means a longer period of time during which upgrades and additions are made incrementally.

Is there clarity on ownership of the Intellectual Property (IP) and data?

Many services have become subscription-based—for example, software-as-a-service (SaaS) and cloud hosting services—which bring with them the issue of the jurisdiction in which the data powering digital technologies is processed and hosted. Many countries do not have adequate capacity in-country to host and process their own data. This is particularly important for artificial intelligence (AI) given that the outputs and results of these technologies are only as useful as the data they are trained on and that they process as they evolve.

Ownership of data is especially important for all government technology projects and is crucial to prevent vendor lock-in. To this end, it is important to put the requirements for interoperability, portability and use of open data standards into pre-market engagement, solicitations and contracts. Contractual requirements should cover the entire subcontracting chain and include exit strategies and end-of-service commitments (e.g. data export, deletion and retention). For further details, see the [UNCITRAL Notes on the Main Issues of Cloud Computing Contracts](#).²¹

Execution of Data Sharing Agreements (DSA) between the procuring entity as the customer and data source and the service provider (e.g. a cloud service provider) can help to lay down clear rights, obligations and responsibilities on the use, sharing and utilization of data between the parties, including an IP rights protection clause in the context of provider rights to customer data for the provision of services and other purposes, provider use of customer name, logo and other attributes and customer rights to cloud service-derived data.

Is the pricing model transparent, and are future costs for upgrades, updates, and maintenance clearly defined?

A vendor offering a seemingly low initial acquisition or license fee but charging exorbitant amounts for user training, data migration, or integration with other government systems can lead to significant hidden costs. The procurement process should demand a detailed breakdown of all potential expenses including ongoing license, support and maintenance cost.

What are the costs associated with regular software updates to incorporate new features, address security vulnerabilities, etc.? Negotiating a service level agreement (SLA) that outlines response times for technical support and the cost of maintenance packages is also important for budget predictability.

²¹ *Notes on the Main Issues of Cloud Computing Contracts*, UNCITRAL, 2019. <https://uncitral.un.org/cloud>

Cost-effectiveness should be assessed by factoring in both the initial implementation and long-term maintenance. Simultaneously, the potential for significant cost savings through automation, increased efficiency, and reduced manual effort should be carefully evaluated, though this can be done later depending on technological maturity.

How will we resource training, updates, upgrades and long-term sustainability?

Finally, make sure to think ahead to long-term sustainability (guideline 11 provides more detail on key considerations) to ensure that the vendor offers reliable support and training to assist with implementation and ongoing troubleshooting, and that the system will be fit-for-purpose over time.

There are a number of very good guides on better public procurement practices and agile methods of testing and adopting technology. In depth resources that cover this topic include:

- [Global Principles for Digital Development](#)²²
- The World Bank's 2021 [GovTech Procurement Practice Note](#)²³
- World Bank 2021 [Electronic Government Procurement Implementation Types: Options for Africa](#)²⁴
- The UK's [Global Digital Marketplace Guide](#)²⁵
- [Showcasing the efficiency and impact of open government procurement, 2024](#)²⁶

7) Use analytics, BI & AI tools to expand and enhance corruption risk detection, enforcement and prosecution

One of the advantages of having machine-readable public procurement data is that it offers the opportunity to scan and analyse patterns of risk across the vast number of transactions and interactions that take place in the public procurement market. This can be done at scale, and importantly, indicators also known as 'red flags' can be used to investigate risk in real-time, sometimes before major malfeasance takes place, referred to as ex ante case, and can be used by supreme audit institutions (SAIs), competitions authorities and law enforcement to investigate cases after the fact, or ex post.

Ex ante, early-warning systems use data analytics to monitor activities and detect risk indicators such as irregular bidding patterns, unusually short submission periods, or frequent contract

²² *The Principles for Digital Development*, Digital Impact Alliance (DIAL), 2014. <https://digitalprinciples.org/>

²³ *GovTech Procurement Practice Note*, World Bank, 2021.

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/832711611728574814/govtech-procurement-practice-note>

²⁴ *Electronic Government Procurement Implementation Types: Options for Africa*, World Bank, 2021. <https://documents1.worldbank.org/curated/en/822411643296037962/pdf/Electronic-Government-Procurement-Implementation-Types-Options-for-Africa.pdf>

²⁵ *Buying digitally, with social purpose*, UK Government Digital Services, 2020.

<https://gds.blog.gov.uk/category/global-digital-marketplace/>

²⁶ *The Efficiency of Open Government Procurement*, Open Data Institute and the Open Contracting Partnership, 2024. https://www.open-contracting.org/wp-content/uploads/2024/03/OCP_ODI_AWS_2024_The_Efficiency_of_Open_Government_Procurement.pdf

amendments. It's important to assess local capacity, as governments need a robust IT infrastructure and personnel trained in data analytics tools to establish an effective early-warning red flags system.

Ex post, these tools can strengthen accountability and enhance SAIs and law enforcement's ability to gather evidence and prosecute cases. It is important to include public procurement bodies, law enforcement, SAIs and civic monitors to secure all stakeholders' input and commitment to maximize the benefits of these analytics tools.

There are relevant risk indicators across the whole cycle of public procurement from planning to implementation. With so many indicators to choose from, it is important to decide at the outset which indicators to prioritize, based on the local context of which data are available and what the most common risks of corruption, collusion or fraud might be in each country. The next steps include identifying the sources for that data and checking its quality, completeness and timeliness.

Once the indicators have been agreed and the data assessed, a calculation methodology should be selected. Some flags might use more than one indicator: for example, high market concentration and bidders submitting with very similar prices. Once indicators are calculated and verified, it's also relevant to decide how to present the findings, how to prioritize them, how they will be investigated, and by whom.

It's important to refine and develop these objectives and specifications in the earlier stages of this guide through user-discovery and stakeholder engagement, and to include these user needs when tendering any IT solutions to this end, as well as testing and iterating these with users during implementation.

Of course, a flag is not proof of wrongdoing; it is an indication that further investigation or scrutiny may be needed, and false positives can occur. Action, investigation and follow-ups are vital to deliver any anti-corruption benefit.

As well as individual investigations, a pattern or concentration of red flags in one area of government or at a point in the public procurement cycle may point to wider institutional or procedural weaknesses, and are cause for investigation to understand what is driving the heightened level of risk.

As analytics tools and innovations develop and more AI based tools are available, it is important to have strong data and understand the risk of hallucinations and inference and control for these when new tools are adopted for risk analysis. Equally important is ensuring these algorithmic decisions are transparent and explainable, for example in case of arbitration or supplier complaints, to ensure the systems are trusted, accountable and accurate.

Various digital tools, including open-source and proprietary software, can analyze procurement data for signs of corruption. The Open Contracting Partnership, as mentioned earlier, maintains an [open-source library and methodological guidance](#) of over 70 indicators for governments to

consider²⁷ and a free-to-use digital tool [Cardinal](#) to apply some of the most common flags to standardized, open contracting datasets.²⁸

The World Bank's [ProACT](#) Procurement Anti-corruption and Transparency platform offers diagnostic indicators across procurement sectors to look at patterns of risk and inefficiency based on open data from national e-procurement systems from 46 countries and open data on World Bank and Inter-American Development Bank financed contracts for over 100 countries.²⁹

Beyond red flags early detection systems, governments can develop the business intelligence tools and e-complaints tools mentioned in the use cases of this guide in Annex I. Business intelligence systems may well have a set of indicators that are public and available to all users – for example, allowing for market research – and more sophisticated backend tools for control authorities.

8) Ensure all relevant stakeholders know how to use the new technology and design for continuous feedback and improvement

To maximize the impact of the new technology, it's essential to ensure all relevant stakeholders understand how to use it effectively, and understand its benefits so they are incentivized to use the new systems correctly. This is different from the training done to implement a new digital solution because it is about on-going learning and capacity building over time once the new digital solution has been implemented.

Successful procurement - like any system or process - doesn't only depend on the technology or platform but also on the people and the consistent, proficient implementation of the process and system utilization. This topic also links back to Guideline 4 on user centred design, training and adoption will be much easier if users have been consulted and their needs met in the new solution.

To ensure that public procurement officers are equipped with the necessary skills and knowledge, it is crucial to provide comprehensive and accessible training resources including in person workshops and user manuals. The training program should be specifically designed to address the specific needs of public procurement professionals, focusing on both technical aspects of the eGP system and the principles of efficient, transparent procurement practices.

Training should cover key topics such as system navigation, data entry, procurement workflows, compliance with legal and regulatory requirements, and procedures for how to handle and resolve technical issues. It is important to use a variety of learning formats, including online modules, workshops, manuals, and practical exercises, to accommodate different learning preferences.

Regular refresher courses and continuous support should also be available to keep public procurement officers updated on system upgrades and evolving best practices. A certification

²⁷ *Red flags in public procurement A guide to using data to detect and mitigate risks*, Open Contracting Partnership. 2024. <https://www.open-contracting.org/wp-content/uploads/2024/12/OCP2024-RedFlagProcurement-1.pdf>

²⁸ *Cardinal, an open-source library to calculate public procurement red flags*, Open Contracting Partnership. 2024. <https://www.open-contracting.org/2024/06/12/cardinal-an-open-source-library-to-calculate-public-procurement-red-flags/>

²⁹ See <https://www.procurementintegrity.org/>

program is an option to structure this. Governments may also choose to monitor key performance indicators set to gauge the level of professionalization of their teams.

Importantly, an on-going hotline or help desk function should be available to all users of the system whether public buyers posting a tender, suppliers entering their information, citizens looking up public records on contracts or other stakeholders mentioned in this guide. Chat bots can be used for some of this support, but expert human support to troubleshoot issues and create a strong feedback loop to improve the technologies used in public procurement is valuable and ensures these technologies evolve to meet real world needs, not just one static technical specification.

Governments can consider establishing a dedicated institution for procurement education and training. Such an institution or function can serve as the central coordinator for internal certification programs, specialized modules for categories or stakeholder groups, and long-term knowledge sharing. Institutionalized training can support continuous learning and innovation as digital tools evolve.

Additionally, training should not be limited to public procurement officers alone. Stakeholders from other departments such as finance, legal, and IT as well as law enforcement should also be included in relevant sessions to ensure smooth cross-departmental collaboration. Effective training should not only enhance technical proficiency but also promote a culture of transparency, integrity, and accountability in the public procurement process.

Training should also be offered to suppliers, community actors and civil society groups who are the primary non-government users of procurement technology and data, and primary users of e-complaints and reporting mechanisms. Doing so will ensure there is a stronger user base for public procurement data to support strong maintenance and sustainability of eGP systems, analytics and other digital tools.

Peer learning and regional exchanges also provide valuable opportunities for countries to share best practices and lessons learned in implementing e-procurement systems. These exchanges help accelerate the adoption of e-procurement practices and can foster stronger collaboration among regional partners.

Establishing regional networks and mentorship programs such as the [African Public Procurement Network](#) (APPN), [Asia Pacific Public Electronic Public Procurement Network](#) (APPEN) or the [Inter-American Network on Government Procurement](#) (Red Interamericana de Compras Gubernamentales RICG) can further support capacity building and improving public procurement practices. Technical assistance from international organizations helps address local capacity gaps, ensuring that public procurement systems are implemented and maintained effectively. Moreover, organizing joint training sessions and regular coordination meetings between public procurement officials and law enforcement representatives can further enhance the effectiveness of these formal channels.

Strengthen the cooperation and collaboration between civil society organizations and law enforcement authorities in overseeing public procurements as civil society plays an essential role in providing feedback and monitoring public procurement activities, enhancing both transparency and accountability. Engaging civil society organizations in monitoring public procurement can further complement the work of government agencies, as CSOs often provide on-the-ground insights, improving overall transparency and accountability.

Finally, suppliers are a critical part of providing feedback and insight into how well a public procurement function is performing, and how competitive the market is. Regular, transparent

consultations and feedback loops with suppliers, including complaints mechanisms, are a vital way to engage this group.

9) Establish clear, measurable indicators for monitoring the progress of technology integration in public procurement

A robust monitoring and evaluation (M&E) framework is essential to ensure that technology integration into public procurement systems achieves its intended outcomes and generates lasting value. Governments should define key performance indicators (KPIs) to track key metrics that encompass various dimensions of impact, including but not limited to:

- **Adoption and Usage:**
 - Percentage of procurement processes conducted through the new technology.
 - Number of active users (procurement officers, suppliers, other stakeholders) on the platform.
 - Frequency and volume of transactions processed through the system.
 - Time taken for user onboarding and proficiency levels.
- **Efficiency and effectiveness:**
 - Administrative efficiency improvements, reduction in delays and reduction in procurement cycle times (e.g., from tender publication to contract award).
 - Cost savings achieved through automation and streamlined processes.
 - Increased participation of suppliers, particularly SMEs.
 - Number of bids per tender, diversity of tenderers and diversity of winners increasing.
 - Improved accuracy and reduced errors in procurement documentation.
 - Enhanced transparency through real-time information disclosure.
- **Anticorruption & accountability:**
 - Number and nature of red flags or anomalies identified through data analytics.
 - Speed and effectiveness of corruption detection and investigation processes.
 - Increased public access to public procurement data and information.
 - Number of newly discovered procedures where suspicion of fraud is discovered and how many actions are taken to recover funds.
 - Levels of trust increasing, and perceptions of corruption, decreasing in public procurement.
 - Fix rate/actions taken to address specific challenges or concerns raised during or after public procurement processes.
- **Sustainability and resilience:**
 - System uptime and reliability.
 - Scalability and adaptability of the technology to future needs.
 - Cost-effectiveness of system maintenance and upgrades.
 - Data security and privacy measures.

Maintaining an effective M&E system requires a sustained investment in data collection, analysis, and reporting mechanisms. By using real-time data, open contracting tools, and advanced analytics tools governments can gain timely insights, identify trends, and ensure public procurement systems remain responsive to evolving challenges and are better equipped to adapt

to new risks or inefficiencies as they arise. It is also advisable to deploy real-time dashboards to provide continuous oversight and prompt intervention when needed.

The M&E framework should incorporate feedback loop mechanisms for regular review and adaptation of indicators based on performance data and emerging priorities. This iterative approach will ensure the framework remains relevant and effective in driving continuous improvement within the public procurement system. Engaging stakeholders in the M&E process, including suppliers and civil society organizations, can provide valuable perspectives and enhance the legitimacy and impact of the framework. The findings from the M&E process should be used to inform policy adjustments, training programs, and further technological enhancements, creating a virtuous cycle of improvement and accountability.

10) Secure the budget, prepare a roadmap and create an exit or upgrade strategy for long-term system sustainability

Every new adoption of technology encounters challenges and must be adaptable enough to evolve based on user feedback. From the outset when defining user and system requirements, governments should consider the long-term sustainability of their digitalization journey.

It is essential to develop a comprehensive strategy encompassing budgetary allocation, a phased roadmap for growth, and a clear exit strategy to ensure the long-term viability and adaptability of the digital procurement system.

- **Phased Roadmap for Scalability and Adaptation:** Define a clear, iterative roadmap that outlines the short-term evolution of the system following the delivery of a Minimum Viable Product (MVP), as well as the long-term vision for scaling its functionalities and user base. This roadmap should be flexible enough to incorporate user feedback, address emerging needs, and leverage technological advancements.
- **Sustainable System Maintenance and Evolution:** Develop a long-term plan for the ongoing maintenance, support, and adaptation of the system. This plan should detail processes for bug fixes, security updates, performance optimization, and the integration of new features to ensure the system remains effective, secure, and aligned with evolving procurement best practices.
- **Intellectual Property and Iterative Development:** Secure appropriate ownership and access of any IP and codebase, as well as a clear process for continuous iteration and improvement. This includes the capacity for in-house or locally contracted development teams to implement customizations, optimizations, and enhancements based on user feedback, system analytics, and evolving business requirements, thereby avoiding vendor lock-in and fostering local expertise. It's important to be clear who 'owns' the data used by any government system and how it will be used (i.e. will it be used to train other LLMs without informed consent). A government may not need to own all the source code that produces data but its decision on what level of ownership it will have over all the products and data from a procurement system should be intentional. Even if a government chooses to publish data on an open licence, it will need the rights to the data first to do that. This is also important if unique identifiers are to be used and shared for buyers, suppliers and contracts etc.

- **Strategic Exit and Transition Planning:** Develop a comprehensive exit strategy that anticipates the end of the initial vendor contract. This strategy should prioritize the development of local technical capacity to manage, maintain, and further develop the system independently. It should outline clear processes for knowledge transfer, documentation, and the potential transition to alternative support and development arrangements, ensuring business continuity and long-term system ownership.

For budgetary sustainability, some governments decide to charge a fee to register as a supplier or otherwise use the public procurement system. It is critical to ensure free access to all tender data and contract data after the fact for the purposes of transparency, accountability, fairness and oversight. But some states may choose to charge a small annual fee to register as a supplier and bid on tenders. These fees should be minimal so they do not create a barrier to entry for small businesses. Fees charged per tender have been known to distort incentives.

Annex I: Common technologies used in public procurement

These guidelines will provide an overview of five of the most common ways information and communication technologies are used to support the prevention and detection of corruption in public procurement. This is not an exhaustive list, and references for further reading on other ICT use cases are included.

It is frequently assumed that the use of technology and data in public procurement is equivalent to e-government procurement -- "e-GP" -- systems. While e-GP systems are a primary use case of technology in public procurement and serve as the basis for many more advanced tools, they are not the only one.

Here we will explore six use cases:

1. Data standards
2. e-Government Procurement (e-GP)
3. Procurement data analytics including "red flags"
4. Smart Request For "X" (RFX)
5. Artificial intelligence applications
6. e-Complaints

ICT solutions can be introduced as mandatory or optional policy tools depending on each State party's institutional requirements and policy goals.

It is vital to highlight that technology solutions cannot operate effectively in isolation, and governments must select technology solutions by defining a clear problem statement at the outset to avoid the pitfall of choosing what may be the latest trend or used by others but may not necessarily fit their context and needs. ICT solutions should be implemented based on detailed user research and a clear understanding of the needs of stakeholders using the system (see the introduction for an overview of common public procurement stakeholder groups).

The effectiveness of the systems and tools used depends on the quality of the data and information they contain, as well as the processes and people who use them. Poor quality data going into

solutions will mean poor analysis and results, so collecting and publishing high quality public procurement data is foundational to the success of these tools.

1. Data standards

Choosing and using a data standard is essential to all other digital procurement technology as it ensures the data related to public procurement is structured, machine readable, interoperable and high quality. The quality of data is essential to the quality of analytics, automation, algorithms, and advanced applications such as AI. By prioritizing data quality and data governance, governments can improve the value and impact of their digital applications.

While adopting existing standards is generally recommended, governments may need to customize or extend them to accommodate specific national or sectoral requirements. Any customization should be done in a way that maintains interoperability and adheres to the core principles of the standard. When considering a data standard and data quality, it is important to work towards making public procurement data interoperable with other relevant datasets like company ownership, beneficial ownership, land and asset registers, and conflict of interest registers or declarations. Doing so allows for a much more complete picture of corruption risks across government where procurement is involved.

What is the Open Contracting Data Standard?

The Open Contracting Data Standard (OCDS) is a non-proprietary, free to use, open-source data standard developed by more than 100 experts and now used in over 50 countries. Adopting the standard provides a schema to share the data a government chooses to publish, and makes sure the data is machine-readable, standardized, and easily analyzable.

The OCDS uses unique identifiers to track public procurement processes, buyers and suppliers across their commercial transactions, and is used to publish data and documents at all stages of the contracting process. It was created to support organizations to increase contracting transparency and enable deeper analysis of contracting data by a wide range of users.

The OCDS provides:

- A common structured data model;
- A set of recommended data fields and documents to publish;
- Guidance and tools to support implementation and data use;
- Profiles for Public Private Partnerships, the European Union, and the World Trade Organization's Agreement on Government Procurement;
- Toolkits such as the Open Contracting for Infrastructure Data Standard (OC4IDS) to connect contracts to project-level information and publish standardized data on infrastructure projects;
- An extension mechanism to add additional key national information to the schema, as well as data fields and profiles relevant to specific sectors or uses like medicines or beneficial ownership.

Using an open data standard not only enhances data transparency but also makes information more accessible to a broader range of stakeholders, including auditors and civil society. The use of

open data standards reduces the strain on IT infrastructure by enabling real-time data tracking and sharing. Moreover, it simplifies cross-platform data sharing, making the public procurement process more transparent.

Implementing OCDS requires technical expertise and alignment of existing data systems with OCDS specifications. While the use of open standards increases transparency and builds public trust, successful use will require staff training and technical support.

Table: Tools to help you structure and digitize data

| Step | Description | Tools/Standards | AI Applications |
|---|---|---------------------------------------|---|
| 1. Inventory & Mapping | Identify all paper records, procurement types, and document categories. | Manual cataloging, Excel logs | – |
| 2. Define Target Data Model | Select data fields relevant for fraud detection. | Open Contracting Data Standard (OCDS) | – |
| 3. Create Standardized Templates | Structure data capture templates with consistent formats. | Excel, Google Sheets, Access | – |
| 4. Digitization of Paper Records | Scan and extract text from documents. | OCR Tools | AI-based OCR: Enhanced text recognition, classification of document types |
| 5. Data Entry & Validation | Transcribe or extract structured data into templates. | Manual or dual-entry, OpenRefine | NLP models: Auto-extract fields from unstructured text (e.g. BERT for contracts) |

| | | | |
|---|--|--------------------------------------|---|
| 6. Structuring & Integration | Consolidate datasets, clean and normalize data. | FuzzyWuzzy, OpenCorporates API | AI for entity resolution: Match supplier names and addresses across datasets |
| 7. Enrichment with Contextual Data | Merge with external data (registries, sanctions). | Company registers, watchlists | Graph AI: Relationship mapping, detecting hidden links (e.g. Neo4j + ML) |
| 8. Format Conversion for Analysis | Export data to analysis-ready formats. | CSV, JSON, SQL, BI tools | – |
| 9. Fraud Detection & Pattern Recognition | Run risk rules, statistical tests, and machine learning models. | Scikit-learn, KNIME, SAS | AI/ML models: Anomaly detection (Isolation Forests, Autoencoders), fraud pattern clustering, predictive risk scoring |
| 10. Institutionalize Data Capture | Move toward fully digital procurement, ensure continuous structured data flow. | OpenProcurement, eForms, Procure2Pay | AI Assistants: Smart form completion, alerting on incomplete or illogical fields |

2. e-Government Procurement (e-GP) systems

e-GP systems refer to digitized procurement processes, procedures and workflows. Solutions can range from simple information portals for bidders, to websites that allow bidders to download documents and templates and forms, to fully integrated end-to-end procurement solutions across the whole public procurement cycle.³⁰ These systems support efforts to prevent and combat corruption by providing more information and detail throughout the public procurement cycle that

³⁰ At its best a comprehensive vision for the latter may be “the collaborative and interoperative use of digital technologies and services by government agencies, bidding community, regulatory, oversight agencies, other supporting service providers, and civil society in conducting ethical procurement activities of the government procurement process cycle for the procurement of goods, works and services, and management of contracts ensuring sustainability, good governance, and value-for-money in public procurement, and contributing to the socioeconomic development of a country.” *Good governance in public procurement: An evaluation of the role of an e-procurement system*, Rajesh Kumar Shakya, 2015.

https://www.researchgate.net/publication/281843758_Good_governance_in_public_procurement_An_evaluation_of_the_role_of_an_e-procurement_system

is machine readable and can be analyzed in bulk to identify risk factors and trends. The information and data collected and published gives governments the opportunity to better understand who they do business with, how money is spent and follow the ultimate impact and outcomes of that spending.

Many e-GP systems take a modular approach, selecting specific functions of the procurement ecosystem to start with and allowing themselves to upgrade or digitize in sections or stages over time. Planning and enabling interoperability for future integration, even if these cannot be integrated from the outset, sets governments up to work towards end-to-end processes, enhancing data accuracy and consistency across the government, reducing paper-based document exchange, reducing document uploads, and minimizing manual errors.

Ideally, the e-GP system can be integrated with other public e-services, such as integrated financial management information systems (IFMS), business registries, tax systems, inventory management systems, judicial case management services and so on. These are often managed by different government entities, so may not be fully integrated, but they should be interoperable so data and information can be shared across them.

Digitalization offers an important opportunity to rethink the workflow of business processes and procedures that underpin public procurement, rather than simply replicating paper-based processes in a digital format. Digital workflows can be updated to support compliance with legal frameworks, regulations and public procurement rules in the system's design and reduce the potential for discretionary or biased decision-making.

E-notifications, e-access, e-attestations and e-submission are the four most commonly digitalized functions in public procurement.³¹ The full spectrum of procurement functions that can be digitalized include:

Pre-tender

- Planning pipelines and project budgeting linked to available budget allocations
- Sourcing strategies including procurement goals on 'best value' which means considering factors beyond price such as sustainability, equity, local sourcing or other criteria which may vary by country situation
- Publication of applicable laws and regulations
- Notification of forthcoming procurement opportunities
- User registration, business certification and attestation (e.g. suppliers, procuring entities in centralized procurement or under framework agreements)
- Choice of a procurement method and preparation of bidding documents for a specific procurement opportunity (eligibility, qualification and evaluation criteria, technical specifications, etc.)

Tender (bid solicitation and award)

- Publication of invitations to participate
- Access to bidding documents (and any amendments thereto): – open through publication or restricted through individual access (e.g. upon payment or for classified procurement)

³¹ *Improving Public Procurement Outcomes: Review of Tools and the State of the Evidence Base*, World Bank, 2021. <https://openknowledge.worldbank.org/entities/publication/5e3f7d7c-dace-5ec5-8234-02320e116679>

- Eligibility, qualifications, technical specifications compilations and management, evaluation criteria
- eAuctions/Online marketplace
- Electronic distribution of bidding documents
- e-Notification of opportunities
- User registration and e-attestations: Suppliers, buyers and other stakeholders (and sometimes limited vetting and pre-qualification and business certification)
- Online clarification procedures such as questions and answers
- e-access to bidding documents (and any amendments)
- e-submission of bids
- Digital payments
- Tender securities
- Opening of bids
- e-Assessment of bids (pass/fail)
- e-Evaluations of bids (detailed review)
- Acceptance of the successful bid
- Adjudication of recommended bid and award
- Conclusion and entry into force of a procurement contract
- Complaint handling
- Publication of contract award notices (including notice standstill period)
- Possible post-award complaint handling
- Publication of contract award results
- Contract itself (or key terms)

Contract management and administration

- Vendor payments
- Contract performance monitoring (including delivery schedules and project milestones)
- Contract amendments and variation orders
- Governance and compliance data

The mandatory and automated publication of data and information at various stages—from the annual public procurement plan or pipeline to contract details and amendments, including draft contract and non-negotiable provisions thereto—fosters openness, allows for oversight and deterrence of illicit activities, and reduces the administrative publication burden on authorities.³²

The online submission of bids, eliminating person-to-person interaction before bid opening, reduces the opportunities for collusion or undue influence. It is still vital to control for analogue risk factors such as favoritism or distortion in specifications for example.

By mandating that all public procurements, regardless of value or sector, are conducted through the e-GP system, and by linking the procurement planning pipeline with the financial budgeting system and later stages of the procurement cycle, the platform supports fiscal discipline throughout the spending cycle and can help to keep development projects on track. An interoperable approach creates a standardized and transparent environment that significantly

³² 10 Success Factors for Implementing e-Procurement System, World Bank, 2024.
<https://blogs.worldbank.org/en/governance/10-success-factors-for-implementing-e-procurement-system>

curtails avenues for corruption across the entire spectrum of public spending and facilitates maintaining the mandatory record of public procurement proceedings. There may be a small number of exceptions - emergencies, rural remote suppliers for local goods - which may not need to go through the e-GP system, but these should be kept to a minimum to avoid corruption risk outside the system, and clearly explained and justified when they occur.

Furthermore, advanced features like integrated spend analysis and insights derived from data analytics, fraud detection and prediction using AI and machine learning, and the triggering of red flag alerts provide proactive mechanisms to identify and prevent corruption, strengthening the integrity of public procurement. Beyond the corruption use case alone, online tutorials to help suppliers and buyers navigate the system, annual procurement plans (APPs) for easier consolidation of requirements and a realistic projection of demand among procuring entities and linking APPs to the IFMIS are other advanced features that can add value to the system but appropriate safeguards should be in place against inadvertent consequences of those measures (such as collusion among bidders or between bidders and procuring entities in future procurement).

In short, e-GP systems enable better publication and promotion of procurement opportunities, increasing bids and supplier engagement, incentivizing competition to lower costs and reducing corruption. As a result, e-GP was identified as [one of the top investments](#) for sustainable development and calculated the return on investment with a cost-benefit ratio for an e-GP system of 8 to 58 for the average low income country, and as high as 142 to 473 for a lower middle-income economy.³³

Types of e-GP systems

There are three main types of e-GP system for governments to consider:

1. Custom software: Solutions that have been developed specifically for the needs of a given organisation and that are not packaged for resale.
2. Commercial-Off-The-Shelf (COTS): Software acquired from a software developer or open-source that is used as-is or with configuration, or that can be tailored with a layer of specific code on top of it.
3. Software-as-a-Service (SaaS): Software that is provided as a shared service made available over the web and that can be used as-is or with the addition of configuration without any specific coding.

A World Bank report: [Electronic Government Procurement Implementation Types: Options for Africa](#), provides a market analysis and a cost benefit analysis of implementing e-GP systems in Africa considering the various types (Custom, COTS and SaaS).³⁴

When selecting an e-procurement technology solution, it is essential to choose a system that aligns with organizational-specific needs, budget, and long-term goals. The possibility and feasibility of using a specific e-procurement technology may also depend on the procurement method to be

³³ *The Investment Case for E-Government Procurement: A Cost-Benefit Analysis*, Cambridge University Press, 2023. <https://www.cambridge.org/core/journals/journal-of-benefit-cost-analysis/article/investment-case-for-egovernment-procurement-a-costbenefit-analysis/1BC5D35109D488269F4C8F3E95C0B714>

³⁴ *Electronic Government Procurement Implementation Types: Options for Africa*, World Bank, 2022. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/822411643296037962/electronic-government-procurement-implementation-types-options-for-africa?deliveryName=DM126943>

used (see article 27 of the UNCITRAL Model Law on Public Procurement), which will be informed by the output sought in each case. Under the Model Law on Public Procurement, for example, open framework agreements, for example, are required to operate online.

Key factors to consider include scalability to accommodate future growth and evolving procurement requirements, as well as user-friendliness and standardization to ensure smooth adoption and improve workflows around procurement. Another important consideration for digitalization is also whether a government has centralized procurement, or takes a decentralized approach with each procuring entity responsible for its own buying.

Furthermore, the long-term sustainability of the system is critical. The responsible agency must have the technical capability to maintain and evolve the system platform, allowing it to analyze emerging needs and implement continuous improvements to the procurement process over time. Some governments will benefit from a modular approach.

Five key considerations for choosing the right type of e-GP system can guide decision-making.

1) The chosen system should be scalable and adaptable to accommodate future growth in procurement volume, evolving regulatory landscapes, and the nature of changing organizational needs over time. Thought should be given to making sure it can adapt to integrate emerging technologies and tools to prolong its shelf life in a fast-changing ICT environment.

2) Prioritizing user-friendliness is paramount. An intuitive interface and well-designed workflows are essential to ensure smooth adoption by all stakeholders (public procurement staff, suppliers, and internal users), minimizing disruption to existing processes and maximizing system utilization.

3) Recognizing the complexities of large-scale digital transformation, a modular approach on one part of the procurement cycle or starting with a cohort of higher capacity procuring entities is often the most pragmatic. Organizations can strategically select better prepared procuring entities for pilot implementation, or select and deploy specific e-GP functionalities based on immediate priorities and gradually expand the system's capabilities over time. A modular approach allows public procurement teams to demonstrate the value and success of digitizing one module to build political buy-in for further investment.

4) An adequately funded roll-out and adoption process that incorporates change management activities with stakeholders, including a plan for maintenance of the new system.

5) A consideration of whether there will be a charge for using the system to help defray its costs. Making the system free of charge for suppliers increases competition and the number of suppliers participating, but many procuring entities may be under pressure to recover their up front investment, so small nominal fees may be appropriate if at a level that does not discourage supplier participation. The data on tenders and contracts should remain free of charge for public monitoring, however.

3. Procurement data analytics including “red flags”

Once standardized, machine readable data on public procurement is being collected and published, governments can use this data to run analytics to conduct oversight and monitor for risk indicators, commonly known as “red flags”, and to gather insights on the public procurement market, referred to as “business intelligence”. It is important to carefully consider which data fields are necessary to calculate the most useful indicators when the e-GP is designed so that the right data are collected and available.

Both of these uses of analytics rely on the same technology and standardized data, but we will unpack each one - corruption risk analytics and business or market intelligence - separately. A healthy market is one that suppliers trust to be transparent and fair, treating all bidders equally. The positive economic value of public procurement data is often a helpful incentive to secure buy-in to collect and improve data quality and show that this data is not only useful for preventing and investigating corruption, but also has economic value and insights on policy effectiveness.

Analytics for corruption risk or "red flags"

e-GP systems offer analytical tools that can help identify potential irregularities in public procurement processes both ex ante and ex post. The system enables regulators, public procurement agencies and external stakeholders to track and monitor transactions, detect patterns of concern, and highlight inconsistencies such as unusual pricing variations, repetitive supplier selections, or deviations from standard public procurement procedures. By leveraging data analytics, reporting features, and automated alerts, public procurement entities can enhance monitoring and oversight to mitigate risks. While implementation of such tools remains optional, adopting e-GP solutions allows governments to strengthen oversight, improve efficiency, and support informed decision-making within public procurement activities.

Red flag indicators help governments and other stakeholders identify risks that may point to irregularities, corruption, waste or fraud. A red flag is not a definitive indicator of corruption or fraud, but a signal that a contract or procuring entity is a priority for further investigation due to the correlation of red flags and corrupt and fraudulent practices. It also allows authorities to be proactive in addressing market inefficiencies, distortions or patterns of suspicious activity instead of reactive, only after issues have arisen.

Advanced analytics empower governments to improve their corruption risk detection and investigation in several important ways. Analytics can process large volumes of data to identify anomalies that would be impossible to spot manually, in order to detect and investigate risks more swiftly and at scale. They reveal aggregate patterns and systemic weaknesses in the procurement process, rather than just reacting to individual cases of corruption. They enhance overall procurement performance by identifying and correcting inefficiencies leading to better outcomes and value for money.

For example, "red flags" may also include instances where the cost estimates or approved budget for the contracts appears significantly inflated for identical items and specifications, when compared to historical data from previously awarded contracts, whether within the same procuring agency or across different agencies. Thus, advanced analytics may also include internal controls within the e-GP platform that can automatically detect anomalies by cross-referencing item prices across comparable projects. Upon detection, the procuring agency can be promptly alerted to review the cost estimates/ approved budget amounts indicated in its procurement plans prior to actual publication of the bid opportunity.

This early warning mechanism enables the procuring entity to reassess the cost estimates and, if warranted, revise or cancel the procurement process before posting or bid submission begins.

These analytics are most effective when paired with traditional fraud detection and prevention methods to integrate them with analog or non-technical legal, policy or political requirements. The knowledge that procurement processes are being actively monitored serves as a powerful deterrent to potential wrongdoers. And demonstrating a commitment to transparent and accountable public procurement builds trust in government institutions.

The e-GP system can be interoperable and integrated in the wider Integrated Financial Management Information System (IFMIS) to enable detection for example of fraud linked to budget misallocation, company ownership and phantom vendors and other datasets that lie outside the public procurement data space itself. The World Bank Report "[Finding Fraud: GovTech and Fraud Detection in Public Administration](#)" offers an in-depth look at fraud detection in public procurement and links this to IFMIS and human resources (HR).³⁵

Another resource and example of a "red flags" methodology for public procurement is offered by the [Open Contracting Partnership](#), mapping 73 risk indicators that can be calculated using the Open Contracting Data Standard, including:

- **Lack of competition:** Single bidding, limited advertising
- **Unusual bidding patterns:** Suspiciously low or high bids, bid rigging
- **Conflicts of interest:** Related party transactions, undisclosed relationships
- **Contract irregularities:** Frequent contract amendments, unjustified extensions
- **Performance issues:** Delays, cost overruns, substandard goods or services³⁶

Procurement analytics for business intelligence

In addition to using data analytics for red flags and corruption risk monitoring, many governments are interested in business intelligence (BI) tools such as dashboards displaying real time pricing information or an overview of contract procedures in a particular ministry or region, that promote a healthy and competitive public procurement market. A [World Bank survey of 34,000 companies in 88 countries](#) found that competition was higher and kickbacks were fewer and smaller in places where transparent public procurement, independent complaint procedures and external auditing are in place.³⁷

Many corruption indicators are directly linked to a lack of competition and transparency. BI tools empower both government and economic operators by:

- **Providing comprehensive market insights:** Offering a clear overview of the market, enabling informed decision-making.
- **Facilitating market research and forecasting:** Supporting the development of accurate market forecasts for suppliers and enabling government buyers to better gauge market conditions. For example, there are automated tools that allow easy comparisons of market prices, adjustable based on month and year, with that of the set price estimate of a procuring entity and by generating pricing trends that help buyers and suppliers.
- **Promoting competitive bidding:** Informed suppliers are more likely to submit competitive bids—increasing the quality of proposals and leading to better value for money in the procurement of goods, works, and services. By providing a better overview of the market,

³⁵ *Finding Fraud: GovTech and Fraud Detection in Public Administration*, World Bank, 2020. <https://documents1.worldbank.org/curated/en/887311603104832916/pdf/Finding-Fraud-GovTech-and-Fraud-Detection-in-Public-Administration.pdf>

³⁶ *Red Flags in Public Procurement. A guide to using data to detect and mitigate risks*, Open Contracting Partnership, 2024. <https://www.open-contracting.org/resources/red-flags-in-public-procurement-a-guide-to-using-data-to-detect-and-mitigate-risks/>

³⁷ *Deterring Kickbacks and Encouraging Entry in Public Procurement Markets. Evidence from Firm Surveys in 88 Developing Countries*, World Bank, 2017. <https://documents1.worldbank.org/curated/en/817871496169519447/pdf/WPS8078.pdf>

conducting research, and producing market forecasts, BI tools help both suppliers and government buyers. For suppliers, this means they can plan better. For government buyers, they can increase the quality and competitiveness of bids they receive because the additional information provided helps inform tendering, inform suppliers' responses and increase credibility of the public procurement process to boost supplier interest in responding.

- **Detecting and deterring collusion:** By analyzing data such as procurement planning notices, bidding documents, and contract award information, BI tools can identify patterns indicative of collusion or other anti-competitive practices.
- **Measuring the effectiveness of anti-corruption measures:** BI can track key performance indicators (KPIs) related to transparency and competition, allowing governments to assess the impact of their anti-corruption efforts and make data-driven adjustments.
- **Enhancing accountability:** The availability of comprehensive market data increases transparency and accountability, making it more difficult for corrupt practices to go undetected.

These tools also assist policy makers in measuring the effectiveness of public procurement policies and future policy direction. Ideally, data standards should be integrated across regulatory bodies and agencies that are monitoring prices and historical public procurement data. Used in combination with a data standard, BI tools and dashboards simplify public procurement information which enables citizens and civil society to understand how funds are spent. It is possible to design tailored, customisable data reports and analysis for different users according to their priorities and needs. An example is the [APProch platform](#) developed by the French public procurement authorities, which publishes online public procurement plans and enables companies to consult them. It allows them to make themselves known to buyers, engage in dialogue with them and, for contracting authorities, to enlarge the pool of potential bidders.³⁸

4. Smart Request for “X” (RFX)

The digitalization of public procurement through e-GP systems offers a unique opportunity to leverage structured, machine-readable data for advanced corruption detection and prevention. While traditional e-GP systems focus on process integrity, the adoption of Smart RFX documents—digital forms that bidders fill out—enables the collection of granular, bid-level data in a machine-readable format. This shift is critical for combating corruption.

In practice, this means that rather than filling out a document template that is printed out, signed, and uploaded back online - a process that loses much of the data in - forms are digitally native, filled and filed online so that this valuable information is captured directly into the system and avoids duplicative data entry.

Corruption Prevention and Detection Benefits:

1. **Transparency and Auditability:** Every data point submitted by bidders is automatically captured and timestamped, creating an immutable audit trail. This reduces opportunities for manual manipulation or alteration of bids after submission—a common avenue for

³⁸ See <https://projets-achats.marches-publics.gouv.fr/>

corrupt practices. Machine-readable data also facilitates public disclosure of granular bid information, enabling greater scrutiny and deterring collusive behavior.

2. **Detection of Collusive Bidding and Fraud:** With structured bid-level data, authorities can conduct granular analysis to detect anomalies indicative of collusion, such as identical pricing patterns, unusual bid withdrawals, or consistent losing bids from certain suppliers. Advanced analytics and AI can further identify complex patterns of fraud or collusion that would be difficult for humans to detect.
3. **Reduced Human Intervention and Bias:** Automated evaluation of bids against predefined criteria minimizes subjective bias and manipulation during the evaluation phase, a critical vulnerability in traditional procurement. Standardized Smart RFX forms make it harder for bidders to obscure or misrepresent data.
4. **Enhanced Enforcement:** Structured data provides clear, verifiable evidence of suspicious patterns, making it easier for law enforcement and anti-corruption agencies to build cases and prosecute fraud or collusion. Machine-readable data can also be cross-referenced with external datasets to uncover hidden conflicts of interest or illicit networks.

Implementation Considerations:

- Standardization of RFX documents and bid submissions is essential.
- e-GP systems must support structured data input, validation, and storage.
- Training for public procurement officials and bidders is needed.
- Legal frameworks may require updates to mandate machine-readable submissions and clarify the use of automated analysis.
- Data quality and governance protocols are paramount.

By implementing Smart RFX and prioritizing machine-readable bid-level data, governments can move from reactive corruption detection to proactive prevention, fostering a more transparent, competitive, and trustworthy public procurement ecosystem.

5. Artificial intelligence (AI) applications

The increasing digitalization of public procurement, which involves collecting vast amounts of data from numerous documents and transactions across the entire procurement cycle, has paved the way for the application of disruptive technology like Artificial Intelligence (AI), among other emerging technologies: for example, those detailed in the World Bank Report "[Disruptive Technologies in Public Procurement](#)".³⁹ While still emerging, AI offers powerful tools to combat corruption by enhancing transparency, automating oversight, and detecting complex patterns that would be impossible for humans to identify.

³⁹ *Disruptive Technologies in Public Procurement*, World Bank, 2021. <https://documents1.worldbank.org/curated/en/522181612428427520/pdf/Disruptive-Technologies-in-Public-Procurement.pdf>

The decision to use AI in public procurement should be goal-driven rather than being seen as a goal in and of itself. There should be a clearly articulated problem or inefficiency that AI is being used to solve to make sure it is applied effectively.

AI can be applied in public procurement in several ways, including:

- **Aiding digitization:** Automating data entry, document processing, and other tasks to streamline the procurement process and reduce human error, which can be exploited for corrupt purposes.
- **Conducting advanced data analysis and generating risk indicators:** Going beyond traditional "red flags," AI can identify subtle anomalies and correlations in public procurement data to detect sophisticated corruption schemes.
- **Applying Large Language Models (LLMs) to extract information and meaning:** LLMs can analyze large volumes of unstructured data, such as bidding documents and contracts, to identify inconsistencies, hidden clauses, and other potential indicators of fraud or collusion.

It's important to distinguish between smart analytics, machine learning and generative or agentic AI, and choose the right technology solution for the policy objective and context at hand rather than jump into an AI "solution" because it is currently fashionable. Successful AI implementation requires reliable, high quality standardized data (please refer to guideline 5 for more information on data standards and data quality), strong data governance and management and a clear understanding of the technology environment where it will be applied. It will also require considerable training and testing - making sure the application is trained on data that are relevant to what the government wants to use it for - as well as regular review. By doing so, governments can leverage AI to:

- **Increase transparency:** AI can automate the publication of public procurement data, making it more accessible to the public and facilitating oversight.
- **Reduce opportunities for human intervention and bias:** Automating key processes minimizes the potential for officials to manipulate the system for personal gain.
- **Detect complex corruption schemes:** AI can identify patterns and anomalies that would be difficult for humans to spot, such as bid rigging, collusion, and conflicts of interest.
- **Improve efficiency and accountability:** AI can streamline procurement processes, reduce costs, and improve the tracking of transactions, making it easier to hold officials accountable.
- **Enhance risk management:** AI can provide early warnings of potential problems, allowing governments to take proactive measures to prevent corruption.

There are a number of emerging technologies that may have use cases in public procurement from cloud computing to robotic process automation to the internet of things and remote sensing and more. The World Bank's report [Disruptive Technologies in Public Procurement](#) gives more detailed information on these technologies, and many of the considerations discussed for adopting ICTs in these guidelines can be applied to new and emerging technologies that go beyond the scope of these guidelines.⁴⁰

⁴⁰ *Disruptive Technologies in Public Procurement*, World Bank, 2021.

<https://documents1.worldbank.org/curated/en/522181612428427520/pdf/Disruptive-Technologies-in-Public-Procurement.pdf>

Governments should ensure adequate use of AI safeguards, for example AI decisions made about public funds must be explainable and auditable, and there should be transparency around the training data used. Due care should be taken in utilizing AI in public procurement, as over utilization of AI tools may diminish decision-making capacity of procuring entities and other stakeholders. Further, infrastructure software support to AI generated reports must be considered in public procurement to prevent possible breaches, misuse, or unauthorized access to confidential data gathered from the entities of both the demand and supply sides.

6. e-Complaints

Given the size, diversity and scale of the public procurement marketplace, it is important for suppliers, civil society or other stakeholders to be able to file complaints to report tips on irregularities or suspicious activity or conflicts of interest and to request review and file complaints. These reporting mechanisms usually fall into two channels:

- Supplier led: Formal complaints filed by suppliers who argue they were not treated fairly during the public procurement process or that the process itself was flawed who will be party to a formal dispute that will proceed to resolution or arbitration
- Citizen led: Members of the public, communities or civil society organizations who suspect potential wrongdoing or have evidence of foul play in government contracts, but who are not suppliers party to a formal dispute

Effective e-complaint systems are a vital tool for promoting accountability, deterring corruption, and ensuring that public procurement processes are conducted with integrity. A core principle is that complaints of any kind can be filed without fear of reprisal—for example, by including confidentiality assurances for reporting persons.

Supplier disputes and irregularities should be investigated and adjudicated swiftly, and digitizing the complaints process supports this efficiency and adds transparency as suppliers can track the status of their complaint. This ensures that the public procurement process is not unduly delayed or stalled pending resolution of a dispute, which can have real world impacts on the timely delivery of essential goods, works and services that citizens expect - and major impacts on the businesses of suppliers.

Citizen complaints are more often referred to as “tips” or “referrals”. Some countries have created downloadable apps or portals for citizens to report suspicious activities including details of the case and evidence so that the relevant authorities can then investigate these formally. These cases are treated differently since an economic operator is not directly involved in the transaction and the case is being referred to by a third party. Civic monitors or small consultancies who analyse public procurement data to offer services to suppliers can be sources of these tips and reports, alerting law enforcement and anticorruption authorities to irregularities in public procurement transactional data for further investigation.

In both cases, these systems often include digital channels for responding to these complaints, tracking their status and notifications for when the cases are closed. The benefits include reducing red tape, saving time and money for both government and suppliers, and reducing the number of decisions that are challenged in court. Suppliers and citizens feel more confident when their tips and complaints are reviewed and they receive the results of these investigations, demonstrating that the authorities take these cases seriously and prioritize maintaining a fair and competitive

market, and these mechanisms have allowed governments to stop fraudulent procurements or recover funds quickly.

By providing accessible and secure channels for complaints, governments can:

- **Increase transparency and deter wrongdoing:** The knowledge that irregularities can be easily reported can deter potential misconduct by officials and suppliers.
- **Empower stakeholders:** e-complaint systems empower suppliers, civil society, and other stakeholders to act as watchdogs, providing an additional layer of oversight.
- **Facilitate timely investigation and resolution of complaints:** Digital systems can streamline the process of filing, tracking, and resolving complaints, ensuring that issues are addressed promptly and effectively.
- **Protect whistleblowers:** Secure and confidential complaint mechanisms encourage individuals to come forward with information about potential corruption without fear of retaliation. Providing tools to do this online and track the status of complaints improves trust in the process.
- **Improve public trust:** Demonstrating a commitment to accountability and responsiveness to complaints can enhance public trust in the integrity of the public procurement process.
- **Reduce opportunities for corruption:** By addressing irregularities promptly and transparently, governments can reduce the likelihood that they will escalate into more serious forms of corruption.

Annex II: Further resources

Selected United Nations resources:

UNODC Guidebook on anti-corruption public procurement and the management of public finances, UNODC, 2013.

https://www.unodc.org/documents/corruption/Publications/2013/Guidebook_on_anti-corruption_in_public_procurement_and_the_management_of_public_finances.pdf

UNCITRAL Model Law on Public Procurement, UNCITRAL, 2013.
https://uncitral.un.org/en/texts/procurement/modellaw/public_procurement

Guide to Enactment of the UNCITRAL Model Law on Public Procurement, UNCITRAL, 2014.
<https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/guide-enactment-model-law-public-procurement-e.pdf>

UNCITRAL electronic commerce texts <https://uncitral.un.org/en/texts/ecommerce>
Notes on the Main Issues of Cloud Computing Contracts, UNCITRAL, 2016.
<https://uncitral.un.org/cloud>

Selected World Bank resources:

- *Reaching the Potential for the Digital Economy in Africa: Digital Tools for Better Governance, Volume 1*, World Bank, 2023. <https://openknowledge.worldbank.org/handle/10986/40271>
 - o Background Paper: *Adoption of eGP in Africa*, World Bank, 2023. <https://openknowledge.worldbank.org/entities/publication/da40af89-fec2-49e3-b624-d71264211f10>

- o Background Paper: *Vulnerabilities of ICT Procurement to Fraud and Corruption*, World Bank, 2023. <https://openknowledge.worldbank.org/entities/publication/85336811-115a-4f3f-9164-4ce09686f487>
- o Background Paper: *ICT Procurement in Africa*, World Bank, 2023. <https://openknowledge.worldbank.org/entities/publication/ff958ae3-13e4-48ea-a0ac-fabfe854c5b3>
- *Institutional and Procurement Practice Note on Cloud Computing*, World Bank, 2023. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099114503072319732/p176603015f9a10a3084d00e4ce7e83a290>
- *Data Classification Matrix and Cloud Assessment Framework*, World Bank, 2023. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099114503072340316>
- *Disruptive Technologies in Public Procurement*, World Bank, 2021. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/522181612428427520/disruptive-technologies-in-public-procurement> and *Disruptive technologies can provide developing countries with a pathway to revamp their public procurement processes*, World Bank, 2021. <https://blogs.worldbank.org/en/governance/disruptive-technologies-can-provide-developing-countries-pathway-revamp-their-public>
- *GovTech Procurement Practice Note*, World Bank, 2021. <https://blogs.worldbank.org/en/governance/disruptive-technologies-can-provide-developing-countries-pathway-revamp-their-public>
- *Finding Fraud: GovTech and Fraud Detection in Public Administration*, World Bank, 2020. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/887311603104832916/finding-fraud-govtech-and-fraud-detection-in-public-administration>
- *Electronic Government Procurement Implementation Types: Options for Africa*, World Bank, 2021. English: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/822411643296037962/electronic-government-procurement-implementation-types-options-for-africa?deliveryName=DM126943> and French: <https://documents1.worldbank.org/curated/en/481171643296790388/pdf/Electronic-Government-Procurement-Implementation-Types-Options-for-Africa.pdf>
- *Using Data Analytics in Public Procurement: Operational Options and a Guiding Framework*, World Bank, 2022. <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099030105172217504>
- Global Public Procurement Database: <https://www.globalpublicprocurementdata.org/gppd/>
- ProACT: ProACT Procurement anti-corruption and Transparency platform <https://www.procurementintegrity.org/>

Selected resources and references from other organizations:

- *World Trade Organization Agreement on Government Procurement WTO*, 2012. https://www.wto.org/english/tratop_e/gproc_e/gpa_1994_e.htm

- *G20 Procurement Principles*, G20, 2015. https://www.unodc.org/documents/corruption/G20-Anti-Corruption-Resources/Thematic-Areas/Public-Sector-Integrity-and-Transparency/G20-Principles_for_Promoting_Integrity_in_Public_Procurement_2015.pdf
- *G20 anti-corruption Open Data Principles*, G20, 2015. <https://g20.utoronto.ca/2015/G20-Anti-Corruption-Open-Data-Principles.pdf>
- *Methodology for Assessing Procurement Systems (MAPS) Initiative* <https://www.mapsinitiative.org/>
- *Framework for the Classification of AI Systems*, OECD, 2022. https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/02/oecd-framework-for-the-classification-of-ai-systems_336a8b57/cb6d9eca-en.pdf
- *Working Papers on Public Governance: Public procurement for public sector innovation: Facilitating innovators' access to innovation procurement*, OECD, 2024. https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/12/public-procurement-for-public-sector-innovation_93d920fc/9aad76b7-en.pdf
- *Implementing the OECD Recommendation on Public Procurement in OECD and Partner Countries*, OECD, 2024. https://www.oecd.org/en/publications/implementing-the-oecd-recommendation-on-public-procurement-in-oecd-and-partner-countries_02a46a58-en.html
- *Public Governance Policy Papers: Digital Transformation of Public Procurement Good practice report*, OECD, 2025. https://www.oecd.org/content/dam/oecd/en/publications/reports/2025/06/digital-transformation-of-public-procurement_90ace30d/79651651-en.pdf
- *Open Contracting Legislative Guide*, Open Contracting Partnership and Reuters TrustLaw, 2021. <https://www.open-contracting.org/resources/open-contracting-legislative-guide/>
- *Red Flags in Public Procurement*, Open Contracting Partnership, 2024. <https://www.open-contracting.org/resources/red-flags-in-public-procurement-a-guide-to-using-data-to-detect-and-mitigate-risks/>
- *Fulfilling the promise of e-procurement reforms in Africa Report*, Open Contracting Partnership, 2022. <https://www.open-contracting.org/resources/africa-egp/>