Methodology report

March 2026

METHODOLOGY

for estimating financial savings resulting from transparency, accountability and participation

CoST Infrastructure Transparency Initiative

In collaboration with:

Government Transparency Institute

This Methodology for measuring financial savings resulting from the implementation of transparency, accountability and participation mechanisms in public infrastructure projects was commissioned by CoST- the Infrastructure Transparency Initiative. It outlines a tailored impact evaluation methodology developed by the Government Transparency Institute (GTI) in collaboration with the CoST International Secretariat.

Authors:
Mihály Fazekas, GTI
Ivana Rudinac, GTI
Isabelle Adam, GTI

Project Leaders:
Petter Matthews, Executive Director, CoST
Evelyn Hernández, Head of Members CoST

DISCLAIMER

The framework is based on publicly available administrative data and enables estimation of the direct and indirect impacts of transparency, accountability and participation interventions in public infrastructure investments through the CoST pillars. It is designed to identify its primary impact channels, enabling CoST Members and Partners optimisation in the given context and addressing any implementation gaps. The methodology was developed through desk research, interviews with stakeholders associated with CoST, and a systematic data mapping of available data across countries where CoST operates.

Table of contents

1. Introduction

BACKGROUND

This report presents a methodology for measuring financial savings resulting from the implementation of transparency, accountability and participation (TAP) interventions - in public infrastructure investments. It outlines a tailored impact evaluation methodology developed by the Government Transparency Institute (GTI) in collaboration with the CoST- the Infrastructure Transparency Initiative International Secretariat. The framework is based on publicly available administrative data and enables the estimation of the direct and indirect impacts of transparency, accountability, and participation through the CoST pillars: multistakeholder working, data publication, independent review, and social accountability. In addition, it is designed to identify its primary impact channels, enabling optimisation of CoST Members and Partners interventions in a given context and addressing implementation gaps. The methodology was developed through desk research, interviews with stakeholders associated with CoST, and a systematic data mapping of available data across countries where CoST operates.

This methodology report is accompanied by a practical guidance note. While this report provides a detailed elaboration of the conceptual framework, data requirements, and analytical steps, the guidance note presents these methods in a concise, user-friendly format. Together, they provide technical foundations and practical tools for the systematic application of the methodology across a wide range of countries.

PROBLEM STATEMENT

Roughly half of all fixed-capital investment by governments goes into public infrastructure - an essential driver of economic growth and social development, especially in developing countries (Pyman 2021). Yet, infrastructure projects frequently fall short of expectations, with mismanagement driving up prices and costs (Golden & Picci 2005; Fazekas & Tóth 2018), causing delays (Lewis-Faupel et al. 2014) and yielding poor-quality assets that distort public spending (Tanzi & Davoodi 1997).

While transparency and procurement reforms, such as those driven by CoST, are conceptually linked to cost savings and improved value for money, governments often implement them as part of broader governance agendas without the rigorous analytical frameworks needed to quantify monetary benefits in their specific contexts. Consequently, the absence of reliable data collection and impact evaluation methods has hindered effective advocacy, resource allocation and policymaking. Moreover, the technical complexity of infrastructure projects makes it difficult to measure reductions in corruption and value-for-money gains, leaving CoST and similar initiatives without the evidence base required to demonstrate their causal impact on outcomes and, ultimately, their public usefulness.

OBJECTIVES

This methodological report outlines a robust, replicable, and tailored impact evaluation methodology that compares quantitative data and indicators to measure the direct and indirect financial savings resulting from the implementation of CoST tools and standards. As qualitative methods are not suitable for achieving these objectives, the impact evaluation sets out quantitative methods for analysing public infrastructure investments and related public procurement data and indicators. In essence, the impact of CoST is established by comparing contracts subject to TAP interventions with those not subject to the initiative. The comparison can be made over time - examining contracts before and after CoST pillars implementation - and/or within the same period across comparable contracts that were or were not part of TAP interventions.

STRUCTURE OF THE REPORT

The structure of the report is as follows. First, it presents the conceptual framework, which defines the key concepts and theory of change behind CoST pillars. This framework then serves as the basis for measurement and analysis. The second part presents the methodology step by step, including data mapping, data cleaning and preparation, and the proposed measurement methods to evaluate the direct and indirect financial savings resulting from the implementation of TAP interventions through the CoST pillars. To showcase the methodology and demonstrate its wide applicability, it also presents detailed data-mapping results for countries where CoST currently operates.

2. Conceptual framework: Understanding the impact of CoST pillars

This section provides a conceptual framework for the methodology. It introduces the primary concept of value for money (VfM) and sets out a theory of change that articulates the expected impact pathways of TAP interventions. The literature review is organised around the key components of the theory of change: intervantions and their causal mechanisms, outcomes and impact.

UNDERSTANDING GOOD PUBLIC PROCUREMENT

The ultimate goal of public procurement is to improve value for money, i.e., cost efficiency in achieving predetermined outcomes. Value for money represents the optimal balance between the cost of a project or service and the benefits or outcomes it delivers. In infrastructure projects, it involves achieving economy and efficiency by minimising costs associated with delivering public services while maximising the benefits derived from those services. Economic efficiency ensures that public resources are used judiciously and that a project's benefits outweigh its costs. These comparisons typically consider not only the initial capital costs but also long-term operating and maintenance costs. By comparing various options, decision-makers can select the one that offers the best value in terms of performance, quality, and long-term sustainability.

Value for money in infrastructure procurement entails making informed decisions that balance costs and benefits across the infrastructure's entire life cycle while systematically addressing associated risks. This concept is essential for the efficient allocation of public funds, ensuring that infrastructure projects deliver the greatest possible value to society. It requires a thorough, transparent assessment of options and ongoing monitoring to ensure an infrastructure project remains cost-effective throughout its lifecycle.

Improved value for money encompasses performance management, the balancing of time, cost, and quality factors, beneficiary satisfaction, and contract management. It also includes:

- **Improved efficiency**: timeliness of procurement; appropriate balance between prior and post-procurement reviews; and the streamlining of systems.
- **Improved economy**: consideration of price and non-price factors (e.g., inclusion of small and medium-sized enterprises (SMEs), sustainability criteria, and life-cycle cost analysis).

Value for money is closely linked to competition, administrative efficiency, and corruption risks. The *competition* captures the extent to which public procurement tenders result in many high-quality bids. *Corruption risks* refer to situations in which public procurement contracts are awarded to a closed network of firms and government officials, while intentionally denying access to others (North, Wallis, & Weingast, 2009). Finally, the concept of *administrative efficiency* captures the administrative costs incurred by the government for achieving the predetermined outcome of public procurement, i.e., the successful completion of the contract.

CoST INTERVENTIONS, CAUSAL MECHANISMS, AND OUTCOMES

The CoST approach to increasing infrastructure transparency, accountability and participation includes:[1] (i) publication of data (disclosure); (ii) multi-stakeholder working, comprising representatives of government, the private sector and civil society, that oversee strategic implementation of the CoST approach; iii) independent review (assurance); and (iv) strengthening social accountability, e.g., by training citizen monitoring groups at the local level.

Across CoST Members and Partners TAP interventions vary considerable in depth and scope due to the flexibility of the CoST approach. For example, in Colombia, interventions remain limited to proactive publication of data through dashboards, while in Costa Rica this publication is sporadic and dependent on institutional discretion. In contrast, Jalisco and Ecuador present more mature models that integrate proactive data publication with structured multi-stakeholder groups and, in Jalisco, with Citizen Oversight Committees that conduct field audits. West Lombok offers an intermediate picture: proactive data publication is underway and complemented by multi-stakeholder forums and an ongoing independent review. Indonesia, more broadly, demonstrates efforts to expand accountability mechanisms through independent review reports and community monitoring, though these are constrained by decentralised politics and limited resources. Overall, transparency interventions are most effective when paired with institutionalised social audits, independent review mechanisms, and multi-stakeholder governance structures.

CoST Members and Partners interventions are expected to improve several factors in public infrastructure procurement that are necessary to achieve the desired impact. By promoting competition, reducing corruption risks, and improving accountability, TAP interventions can help mitigate cost overruns, bid rigging, and other corrupt practices, leading to more competitive pricing and greater cost-effectiveness. At the same time, through improved access to information, enhanced oversight, and stakeholder engagement, CoST Members and Partners can help identify and rectify design flaws, construction defects, and other quality-related issues, ensuring better project outcomes, timeliness and long-term durability. Ultimately, TAP interventions aim to improve systems, procedures, and behaviours to prevent such problems from arising in the first place.

Stakeholder interviews revealed that while data publication and, in some contexts, independent review and social audits are in place, the systematic quantification of cost savings remains nascent. Stakeholders recognise the importance of developing methodologies but face capacity constraints, including limited technical expertise, insufficient institutional memory, and weak interoperability of data systems. These challenges suggest that any replicable methodology must balance ambition with feasibility—focusing on a core set of indicators (e.g., cost overruns, competitive bidding, timelines) that can be adapted to different data environments and progressively scaled up.

However, the impact of CoST Members and Partners interventions unfolds differently depending on the type of intervention and the specific context. We categorise these interventions as: (i) transparency and/or (ii) monitoring (professional and/or civil society monitoring). These two types of interventions are interconnected: transparency equips civil society to monitor projects, while civil society can, in turn, demand transparency and disclosure of information to the public. However, for analytical purposes, we separate them because in some countries where CoST Members and Partners operate, civil society involvement is lower. We elaborate on these two concepts and different impact channels in the sections below.

[1] For more information about CoST approach, see: https://infrastructuretransparency.org/our-approach/

TRANSPARENCY

There is no universally accepted definition of transparency in the literature. Among the frequently cited definitions are Florini (2007)[2] and Meijer (2013)[3]. In this context, transparency in public procurement refers to the extent to which government infrastructure procurement data are made available, the processes that inform bidding decisions, the mechanisms that facilitate civil society oversight, and the ways in which government management is improved.

In general, transparency is widely recognised for promoting good governance. Effects of transparency are often derived from the principal agent theory (e.g., Kolstad & Wiig, 2009). Namely, transparency reduces information asymmetries between principals (the public) and agents (the government), leading to more efficient monitoring of the government and, ultimately, better performance. Numerous studies show that increased transparency has positive effects on public demand for accountability and on government performance. (e.g. Alt, Lassen, & Skilling, 2002; Brunetti & Weder, 2003; Reinikka & Svensson, 2005; Winters & Weitz-Shapiro, 2013). In the context of infrastructure projects, transparency is expected to reduce information asymmetry among stakeholders. Hence, CoST Members and Partners interventions are expected to bridge the gap between project owners, contractors, investors, and the public. This can lead to better decision-making, reduced risks, and improved coordination among stakeholders

There is growing evidence on the impact of transparency initiatives on achieving value for money in public procurement. For example, Saelawong et al. (2024) found that the CoST implementation in Thailand yielded average project-level savings of THB 9.6 million. Overall, enhanced transparency is expected to improve value for money by influencing bidder behaviour and strengthening accountability mechanisms (see **Figure 1**).

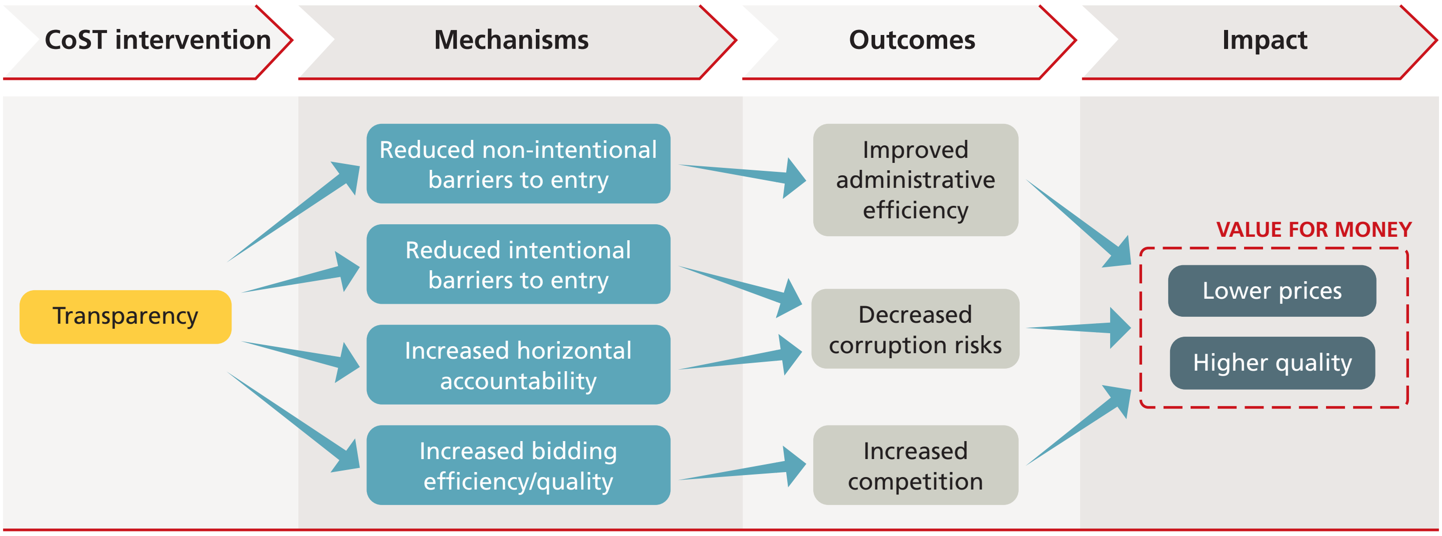

Figure 1: Impact of transparency interventions on value for money in public procurement

[2] Transparency is "the degree to which information is available to external stakeholders, enabling them to participate in decision-making and/or evaluate decisions made internally,"

[3] Transparency is "the availability of information about an actor that allows others to monitor its operations or performance."

a) Barriers to entry: intentional and non-intentional

Increased transparency is expected to reduce overall barriers to entry in public procurement competition (both intentional and unintentional) and to increase the number of bidders. For example, Knack et al. (2017) found that, in countries with more transparent procurement systems, firms are significantly more likely to participate in public procurement markets. Similarly, Huter-Chaturian (2014) reported that procurement transparency initiatives increase bidder participation, while Duguay et al. (2023) observed that, following the TED Open Data Initiative in 2015, procurement officials were 11% more likely to award contracts through open bidding procedures.

Increased transparency reduces government costs associated with the collection, preparation, and analysis of tender information, thereby further reducing unintentional barriers to entry erected by buyers. The costs of preparing a tender and checking bids decline when tender documentation becomes publicly available online in a standardised format; buyers then have free and timely access to information on market conditions (e.g., main suppliers and typical product specifications), regardless of their location. For example, buyers realising the range of companies and prices achieved by comparable entities may choose to harness competition more effectively (e.g., by using open procedures rather than direct contracting).

In addition to reducing unintentional barriers to entry, transparency makes it more difficult for public officials to erect intentional barriers against undesired competitors. Transparency increases the costs of buyers' abusing their discretion and reduces information asymmetries between corrupt insiders and potential market entrants (i.e., excluded outsiders; Knack et al., 2017). Therefore, transparency can mitigate the risk of corruption.

b) Horizontal accountability

Transparency strengthens horizontal accountability by enabling bidders to monitor one another. For example, Bauhr et al. (2019) argue that the anticorruption effects of transparency in public procurement depend on its facilitation of horizontal accountability. Specifically, they analysed 3.5 million government contracts from 2006 to 2015 and found that ex ante transparency lowers corruption risk by facilitating insider oversight during the bidding process. Unlike the standard principal-agent perspective, which emphasises vertical information flows to outsiders, ex-ante data publication empowers insiders by providing access to bid-relevant data before contract awards.

c) Bidding quality and efficiency

Transparency not only increases bidder numbers and diversity but also elevates bid quality by providing all competitors with access to scoring rules and market data. Soudry (2004) shows that better information leads to lower prices and more precise technical proposals. Globally, Knack, Biletska, and Kacker (2017) find that transparent systems across 34,000 firms in 88 countries boost participation and reduce kickbacks. Regional studies confirm this: publicity requirements in Italy (Coviello & Mariniello, 2014) and Japan (Ohashi, 2009) increase both the number of bidders and the technical precision of their submissions. A quasi-experimental evaluation of e-procurement for road projects in India and Indonesia (Lewis-Faupel et al., 2014) reveals that, although bid counts remained constant, transparency-enhancing platforms shifted market share toward non-local firms. Together, these findings demonstrate that transparency deepens competition by improving who bids and how well they bid.

Transparency also enhances bidder efficiency by reducing the time and resources devoted to collection of information and analysis. When standardised tender documents are available electronically, firms incur lower information costs and can more quickly identify and pursue opportunities. Access to market data and business-intelligence tools (which aggregate historical tender outcomes, competitor pricing, and upcoming contract forecasts) further streamlines bid preparation. Quiroga et al. (2020) show that practices such as revealing scoring rules before bidding significantly improve operational efficiency by reducing redundant inquiries and decision-making delays. These efficiency gains complement quality improvements, thereby fostering more competitive procurement outcomes.

Despite its potential, the effectiveness of transparency initiatives in public procurement depends on both data design and stakeholder capacity to use available information. Users must be able to locate relevant, well-structured information quickly for monitoring to be meaningful (Huter-Chaturian, 2014). Moreover, transparency alone is insufficient: civil society needs the motivation and technical capacity to act on published data (Center for Global Development, 2014; Kenny, 2010). Empirical studies underscore these caveats. Adam et al. (2024) show that open-contracting reforms in low- and middle-income countries succeed only where civil society is actively engaged (e.g. Kenya and Uganda) but make weaker progress where political will or capacity is lacking (e.g., Tanzania, Nepal, Nigeria, South Africa, and Zambia). Still, Šípoš et al. (2015) document that after increased transparency in Slovakia, the share of adults checking at least one contract online rose from **0%** to **11%**, while media coverage of procurement scandals grew from **877** articles in 2003–2006 to **1,765** in 2011–2014 - illustrating how greater data accessibility can enhance stakeholder engagement in monitoring public procurement.

MONITORING

For the purposes of this study, monitoring is defined as the oversight of the procurement process by professional actors, civil society organisations, and community stakeholders. Increased monitoring in public procurement can significantly impact the efficiency, integrity, and effectiveness of the procurement process and ultimately improve value for money (VfM) through three main impact channels (see **Figure 2**), as discussed below. We distinguish between two types of monitoring supported by CoST pillars: (i) professional monitoring and (ii) civil society monitoring.

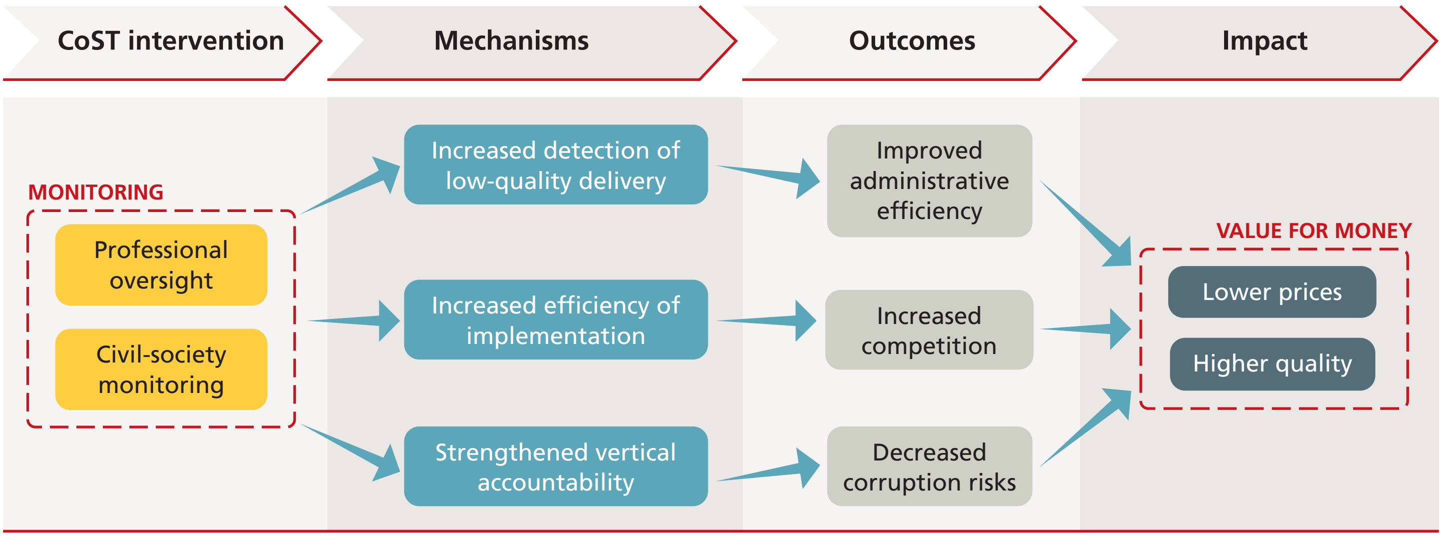

Figure 2: Impact of monitoring interventions on value for money in public procurement

Professional monitoring encompasses monitoring and evaluation processes and auditing procedures, whereas civil society monitoring comprises mechanisms led by civil society organisations and community groups to oversee public procurement. Both forms of monitoring can enhance vertical accountability by deterring and detecting corrupt practices and fraudulent activities in the procurement process (Olken, 2007). Particularly, when professional mechanisms are coupled with civil society monitoring and citizens' activities, this synergy generates feedback loops that further hold procurement actors accountable to the public.

1) Professional monitoring

a) Vertical accountability

Oversight bodies and professionals can identify irregularities and take corrective action promptly, thereby sending a message to officials and suppliers and deterring potentially corrupt conduct. Substantial empirical evidence supports this deterrent effect. Di Tella and Schargrodsky (2003) examined how variations in monitoring regimes affected hospital input prices (used as a proxy for corruption) in Argentina during 1996–1997, finding that intensified monitoring reduced input prices by 14.6%, whereas relaxed controls lowered savings to 11%, thus demonstrating that audits can substantially reduce procurement costs and corruption risks. In a European Union (EU) context, Fazekas and Tóth (2017) analysed changes in procuring bodies' use of exceptional procedures and bidding outcomes following the enforcement of EU court monitoring, reporting declines in corruption-related anticompetitive practices of between 5% and 30%, depending on the country group. As in the Argentine findings, the EU evidence indicates that the benefits of monitoring wane as oversight diminishes.

A randomised controlled field experiment examining village road construction projects in Indonesia during 2003–2004 found that raising the audit probability from 4% to 100% reduced missing infrastructure spending by 8 percentage points, from a baseline of 24% (materials and labour combined) (Olken, 2007). The principal mechanism was not the infrequent criminal prosecutions but the public disclosure of audit findings at open village meetings. Moreover, the prospect of monitoring yielded measurable benefits. For example, Keefer and Roseth (2021) studied corruption in the School Meals program and observed that operators improved their behaviour in response to the threat of external enforcement. Similarly, recent evidence shows that audit threats curtail political favouritism in procurement: favouritism declined from 60% at baseline to 20% at midline and remained at 19% by endline, with this effect evident even before audit results were publicly disclosed (Denny et al., 2023).

b) Efficiency of implementation

Professionals such as engineers can identify procurement risks early (e.g. cost overruns, project delays, or substandard goods and services), enabling timely risk mitigation and reducing defects and costly rework. When oversight is coupled with training and guidance for procurement staff, authorities achieve sustained administrative efficiency through enhanced skills and knowledge. Professional oversight also safeguards economic efficiency by ensuring a fair process and equal access for all eligible suppliers, fostering competition and better value for money. In a natural experiment within a large Russian public sector organisation, Tkachenko, Yakovlev, and Rodionova (2017) found that extending procurement oversight from supplier selection to the full cycle (2008–2013) closed performance gaps between income-earning units (IEUs) under hard budget constraints and non-commercial units (NCUs) reliant on government support: initially, IEUs led in bidder participation and contract execution speed, but after comprehensive monitoring, NCUs improved while IEUs' effectiveness modestly declined. Similarly, Engel et al. (2023) report that agencies facing audit threats reduced year-end procurement spending by 33%, particularly on non-essential items.

Finally, professional oversight ensures that the procurement process complies with applicable laws, regulations, and policies. This minimises the risk of legal challenges and costly disputes. At the same time, it can help standardise procurement processes, making it easier for government agencies to follow best practices and ensure consistent compliance with rules and procedures. A recent study by Bergman (2023) found no statistically significant effect of audits on compliance, suggesting that audits do not strongly influence procurement practices or reduce the incidence of legal challenges. However, the interviews suggest that audits may have modest yet long-lasting effects, particularly by increasing respect for procurement rules and staff competence.

2) Civil society monitoring

There has been substantial interest in how participation affects the development process, as reflected in development actors' efforts to prioritise community involvement in development projects, including infrastructure (Mansuri & Rao, 2013). This growing interest has also manifested in community supervision of procurement execution, whereby local communities or civil society organisations monitor contract performance alongside professional oversight. Despite this interest, robust evidence on the effectiveness of such initiatives remains scarce, with only a few high-quality field experiments.

Building on social accountability theory, which holds that civil society monitoring enhances citizens' power vis-à-vis the state (Fox, 2007), civil society monitoring of infrastructure projects is expected to (i) detect low-quality delivery and (ii) strengthen accountability channels between citizens and government (vertical accountability). In Indonesia (2003–2004), increased community oversight of village road projects, through public review meetings and anonymous feedback forms, showed small effects on road quality and highlighted key dynamics: local labour force participation reduced missing labour expenditure, while bypassing local officials in distributing forms reduced corruption tied to elite capture (Olken, 2007). A Peruvian study (Lagunes, 2017) evaluated district governments implementing infrastructure projects, half receiving an intervention where a civil society organisation partnered with the anti-corruption agency. Although execution rates were similar, costs were 51% lower in the treatment group, resulting in $75,000 in savings per project. This highlights the cost-efficiency of combining citizen and centralised oversight.

However, it is important to note that civil society engagement does not have the same effects under all circumstances. Positive outcomes depend on the community's incentive structure and collective capacity (Kenny, 2010), as free-rider problems and elite capture can quickly undermine even well-intentioned oversight efforts (Bardhan & Mookherjee, 2006). Moreover, the technical complexity of certain projects may exceed community expertise - non-experts, for example, often cannot detect substandard materials in road construction (Olken, 2007). Civil society monitoring alone is therefore often insufficient unless coupled with institutional support; both professional and civil society monitoring require enforcement mechanisms to ensure compliance, as voluntary reporting has only limited deterrent effects (Fox, 2015).

IMPACT: PRICES AND QUALITY

Improved value for money remains the ultimate objective of public procurement, and, as introduced previously, it is captured through both price and quality dimensions. Prices capture the ultimate outcome or impact of transparency interventions, which, in an ideal scenario, capture the full life-cycle cost of goods and services procured, but are typically simply approximated by unit prices of goods, works, or services procured at the same quality at the time of contract award (Saussier & Yukins, 2018). These prices are shaped by the earlier drivers we have discussed: competition, corruption risk, and administrative efficiency. (Fazekas & Kocsis, 2017; Yakovlev, Bashina, & Demidova, 2014). When bidding efficiency is high, i.e., the number of bidders is high, and bidders are informed about all prices, bidders have the best chance to lower their prices for winning the contract (Soudry, 2004). Moreover, reducing both non-intentional and intentional barriers to entry for buyers, as discussed earlier, could lower corruption and increase administrative efficiency, which, by nature, are expected to drive prices down (Lewis-Faupel et al., 2014). Lower corruption typically means lower gains from corruption and, hence, lower prices. In addition, higher administrative efficiency often implies better-prepared and better-formulated tenders, thereby fostering healthier competition and lower prices.

Empirically, a non-experimental study assessing the impact of e-procurement, which improves transparency of tender notifications in Chile, suggests that an increase in the number of bidders and the corresponding decrease in bid prices is the key driver in cost savings to the Chilean central procurement agency (ChileCompra) amounting to 2.65% of total spending (Singer, Konstantinidis, Roubik, & Beffermann, 2009). Several government reports report much larger price savings of 20% in Brazil, Mexico, and Romania (Auriol, 2006). While the above studies cannot be directly compared, they partially support the claim that fair and open access, achieved through transparency and lower transaction costs, improves value for money.

In infrastructure procurement, in addition to price, the quality of the infrastructure is important. For example, in the impact evaluation of infrastructure e-procurement in India and Indonesia, Lewis-Faupel et al. (2014) find no evidence of lower prices, but only higher quality.

However, evidence from Paraguay raises a fundamental barrier to the positive outcome of increased competition driving down prices, namely, there have to be companies that can potentially enter the market once access is widened; if there are none or very few such companies, short-term to mid-term positive effects are null (Straub, 2014). In addition, desirable impacts may not materialise, or may even turn negative, depending on users' computer literacy and SMEs' ability to access online services, as discussed previously. Moreover, high-intensity competition at the bidding stage may bring prices down but could lead to the so-called winner's curse, whereby the lowest-price bidder is compelled to renegotiate the contract after the award (Soudry, 2004). Lastly, the use of transparent procurement has been criticised for being costly, whereas the use of informal, non-open mechanisms, such as reputation and long-term relationships, may, in some cases, save public money (see, e.g., Bandiera, Prat, & Valletti, 2009; Coviello, Guglielmo, & Spagnolo, 2018).

3. Methodology: Step by step

This section outlines the step-by-step methodology for measuring the impacts of TAP interventions through the implementation of CoST pillars. It begins by mapping the availability and structure of infrastructure and public procurement data. It then proceeds to data preparation, cleaning, and dataset linking. Building on this foundation, it sets out the approaches used for quantitative analysis and provides guidance on interpretation, reporting and limitations.

ESTABLISHING THE BASICS: DATA MAPPING

As interviews with stakeholders associated with CoST indicate, data availability and quality remain central constraints across contexts, albeit with notable variation. Ecuador stands out for its comprehensive digitisation of procurement (100% digital, except in emergencies), adoption of open contracting data standards (OCDS/OC4IDS), and consistent publication of data, although backlogs and data-entry errors persist in smaller municipalities. Jalisco similarly benefits from a strong legal framework mandating data publication, though gaps remain in download functions and interoperability, and crucial supporting documents, such as contracts and logs, are absent. By contrast, Bogotá and Costa Rica rely heavily on non-standardised, fragmented, and, in some cases, manual data processes, with proactive data publication being either weak or absent. West Lombok illustrates the challenges of subnational contexts, where data remain largely on paper, only a fraction of projects are linked to tenders, and the capacity for accurate data entry is limited. Common to all cases is the lack of standardisation across institutions, difficulties with harmonisation, and limited system interoperability. This results in datasets that may be publicly visible but lack the reliability and completeness required for robust quantitative analysis.

Mapping available data and defining variables of interest

The impact assessment relies on two sources of data: (i) data published as a result of CoST Members and Partners interventions at national or sub-national levels (ii) public procurement data. Under the data publication process, procuring entities publish data on publicly financed infrastructure projects at key stages of the project life cycle. The publication follows either the CoST Infrastructure Data Standard (CoST IDS)[4] or the Open Contracting for Infrastructure Data Standard (OC4IDS)[5]. Under the general, typically non-CoST publication process, public procurement data is collected through national or subnational e-procurement platforms and disclosed in accordance with national publication formats or an international standard, such as the Open Contracting Data Standard (OCDS).

[4] CoST International, Disclosure Guidance Note, available at: https://infrastructuretransparency.org/resource/disclosure-guidance-note/

[5] Open Contracting for Infrastructure Data Standards Toolkit, available at: https://standard.open-contracting.org/infrastructure/latest/en/about/#

Regardless of the public data source, the impact evaluation requires identifying CoST-treated and non-CoST-treated contracts. When the data are from 2 different sources, it is straightforward to identify CoST-treated and control contracts. However, in some cases, government infrastructure data overlaps with information already available on national procurement platforms. Hence, the infrastructure datasets are used to define the treatment group - i.e., contracting processes subject to CoST transparency requirements.

At the time of preparing this report, infrastructure related data were available from 13 publishers in 12 countries: 11 using OC4IDS and 2 using the CoST IDS. Among these, only seven publishers also make comprehensive procurement data available, which is essential for the impact assessment (see **Table 1**), as it requires a control group for comparison with the treatment group (data published with CoST Members and Partners involvement). Detailed data mapping was therefore carried out only for these seven publishers.

CoST MEMBER	OC4IDS/IDS DATA PUBLICATION	PUBLIC PROCUREMENT DATA	COMPREHENSIVE MAPPING
Indonesia (West Lombok)	**Yes**	**Yes**	**Yes**
Indonesia (Nusa Tenggara Barat)	**Yes**	**Yes**	**Yes**
Thailand	**Yes**	**Yes**	**Yes**
Costa Rica	**Yes**	**Yes**	**Yes**
Ecuador	**Yes**	**Yes**	**Yes**
Panama	**Yes**	**Yes**	**Yes**
Guatemala	**Yes**	**Yes**	**Yes**
Mexico (Jalisco State)	Yes	No	No
Uganda	Yes	Yes[6]	No
Malawi	Yes	No	No
Ghana (Sekondi Takoradi)	Yes	No	No
Mozambique	Yes	No	No
Nigeria (Kaduna State)	Yes	No	No
Colombia	No	Yes	No
Dominican Republic	No	Yes	No
Ukraine	No	Yes	No

Table 1: Data availability in jurisdictions where CoST operates

1) CoST data publication

Data published with support from CoST Members and Partners, following the CoST IDS or OC4IDS standards, are either hosted on analytical platforms or made available through public procurement portals. In some cases (e.g. Indonesia), data is accessible via an API, with accompanying documentation that explains its structure. In others, data can be downloaded directly in formats such as JSON, CSV, or Excel.

Both CoST IDS and OC4IDS structure data at two main levels: project-level and contract-level. In OC4IDS, a project is defined as “the development, maintenance, rehabilitation, expansion, replacement and/or decommissioning of a set of infrastructure assets in a specified location, generally the responsibility of a single procuring entity and budget authority (e.g. a highway overpass or university campus)”[7]. Within the data schema, the project is the highest-level object.

[6] In this case, the quality and coverage of the data is weak.

[7] Open Contracting for Infrastructure Data Standards Toolkit, available at: https://standard.open-contracting.org/infrastructure/latest/en/about/#

For the purposes of the impact assessment, the most relevant information comes from the contractingProcesses element, as this is how the treatment status will be assigned in the final dataset. A single project may involve multiple related contracting processes (e.g., design, construction, and monitoring). The contracting process sub-schema contains various procurement details. To map the necessary data, the key requirement is that these contracting processes are identifiable and can be linked to procurement data. Hence, in the mapping stage, it needs to be determined whether unique IDs (or, where absent, proxies such as titles or dates) are available. Accessing this data typically requires decompressing the second layer.

As the total contract population is unknown, comparing the number of projects and tenders provides a simple check of data availability. In some cases, this reveals significant missing data (e.g. Indonesia).

2) Public procurement data

To ensure comparison on comparable terms, infrastructure data (the treatment group) must be compared with procurement data that has not been exposed to CoST Members and Partners interventions. Therefore, we examine general procurement data to identify a suitable control group - either over time or across similar contracts within the same period.

For some CoST Members, public procurement data had already been collected by GTI[8]. In these cases, mapping focuses on assessing the presence or absence of the variables of interest. Where no GTI dataset exists but procurement platforms are available (e.g. Costa Rica, Panama, Guatemala), data can be collected following the preliminary mapping of the sources provided in **Annex 1**. In such cases, the assessment is useful for understanding the data structure.

Procurement data mapping considers four groups of indicators aligned with the theory of change: prices and quality, competition, corruption risk, and administrative efficiency. **Table 2** lists these indicators alongside their definitions, while calculations for each indicator are presented in the Annex. The framework is comprehensive, yet in practice, analysis depends on data availability. In some cases, for example, effects can be assessed for one outcome but not for others.

VARIABLE GROUP	VARIABLE NAME	DEFINITION
Level of competition	Number of bids	Number of bidders for a single contract, capped at 50
	Share of market entrants	Supplier won a contract on the market in the last year
	Share of non-local firms	The indicator is 1 if the buyer-supplier region is the same, otherwise 0
Corruption risks	CRI (Composite Risk Score)	Government Transparency Institute (GTI) Composite Risk score - Average of the risk scores in Single bidding, non-open procedure, Risk in submission period, Call-for-tenders publication, Risk in decision period
	Single bidding	The indicator is 0 if the lot received more than one bid during the tendering process, 1 otherwise. Low risk: more than one bid received. High risk: one bid received.
Administrative efficiency	Length of submission period	Number of days between the first call for tenders' publication date and the bidding deadline
	Length of decision period	Number of days between the bidding deadline and award decision date
Prices	Relative Price	Relative prices are price ratios between the final contracted price and the estimated contract value (i.e., reference contract price)
Quality	Delivery delay	% increase in project implementation period (final delivery time period / originally planned delivery time period)

Table 2: Key indicators selected for cross-country data mapping

[8] https://www.procurementintegrity.org/countries

DATA PREPARATION

Once the infrastructure data and comparative public procurement data have been mapped, the next step is to clean and prepare them for analysis. This involves restructuring and standardising the datasets, as well as assessing their quality, to ensure they can be linked and used for impact assessment.

Cleaning infrastructure data

The primary cleaning step for infrastructure data is restructuring it from the project level to the contracting process level. In most cases, this requires unnesting the *contractingProcesses* sub-schema (in case of OC4IDS structure), or contract-level data (CoST IDS). Project identifiers and titles should be distinguished from those used in the contracting process, as the latter are used to link to procurement data.

An important step is to calculate the number of missing values for contracting process IDs and titles. These variables determine the number of processes that can be matched to procurement records and the number that will remain unmatched at later stages. Understanding how IDs are generated and stored within each system is also necessary, as formatting differences (e.g., prefixes) can complicate linking to procurement datasets.

Cleaning public procurement data

For public procurement data, once the presence of variables has been mapped, missing-value rates should be calculated (see Annex for preliminary results in countries where comprehensive mapping was conducted). The dataset should then be restructured at the contract level, the unit of analysis for the impact assessment. To do so, for each contract-bidder pair, the total contract value is calculated, and in the final dataset, each row represents an awarded contract to a supplier within a single tender.

Descriptive statistics and preliminary visualisations[9] should be produced for all key variables. This step helps identify unusual distributions, or outliers that require further investigation. Outliers are identified and addressed using standard approaches, including removal, imputation, capping, or data transformation.[10] Finally, this stage involves deriving outcome variables that require calculation, such as relative price or the Corruption Risk Index (CRI), ensuring they are based on cleaned and standardised input fields.

Data linking

After cleaning, the next step is to assess whether and how infrastructure data can be linked to procurement data. This step tests the technical feasibility of merging two distinct systems and often requires both methodological care and additional cleaning.

Two main approaches can be used for merging datasets:

- **ID**: Where tender or contract IDs are consistent across infrastructure and procurement datasets, records can be linked directly. The caveat is that IDs may be inconsistently formatted, so additional checks are required before relying on them as unique identifiers. For example, in the case of Ecuador, the tender ID can be exactly matched between the dataset, after removing the OC4IDS identifier. (see **Annex 1** for more details)

- **Tender title**: In cases where IDs are missing or inconsistent (e.g. Indonesia), tender titles can be used for matching. The first step is to check for exact matches in titles. For example, in Indonesia, this still produces many matches. An additional approach is fuzzy matching (see Navarro, 2001), which involves calculating a similarity score between two strings. This allows matches to be found in cases where there are abbreviations, typos or different spellings. However, this should be examined closely, as it can yield false positives. (see **Annex 1** for more details)

Once the datasets are merged, a treatment/control variable should be created: each contract/tender appearing in the infrastructure data is coded as treatment, whereas all others are assigned to the control group. This distinction is important for comparing contracts. It is also necessary to assess the time coverage of the merged dataset, since the availability of observations before and after CoST Members and Partners interventions partly determines which evaluation methods can be applied.

[9] Useful source on good visualization practices: (Tufte, 1983)

[10] Useful resource for common approaches in data mining in R: (Torgo, 2011)

Readiness assessment

To assess the feasibility of an impact evaluation, a readiness assessment was conducted for each CoST Member where full data mapping was possible. The assessment considers time coverage, the number of contracting processes disclosed following the CoST data standards, the number of procurement contracts available in public procurement records, the availability of 28 core variables, and the possibility of linking datasets. It also provides an overall readiness rating.

Table 3 summarises these results. Some members, such as Ecuador, already have the conditions necessary for a feasible analysis. These could be further improved by collecting data on public procurement from 2022 onward. Others show mixed results: for example, in Indonesia, the West Lombok data have limited availability of infrastructure contracts related data, whereas in Nusa Tenggara Barat the quality is much higher and linking of datasets is possible. By contrast, there is no comprehensive data available in Costa Rica, Panama or Guatemala that would allow the feasibility to be reliably assessed. However, these countries have the necessary conditions for data collection. A more detailed table with variable-level missing values and a description of each country's context is provided in **Annex 1**.

COUNTRY	TIME COVERAGE	INFRASTRUCTURE (number of contracting processes)	PROCUREMENT (number of contracts)	AVAILABLE VARIABLES	DATA LINKING	READINESS ASSESSMENT
Indonesia (Nusa Tenggara Barat)	CoST 2009-2024; Procurement: 2010-2024	593	13016	24 out of 28	Possible	High
Ecuador	CoST: 2022-2025; Procurement: 2015-2022	20674	2,550,309	24 out of 28	Possible	High
Thailand	CoST: 2018-2022; Procurement: 2018-2022	1545	96,863	25 out of 28	Possible	High
Guatemala	CoST: Unknown; Procurement: 2020-2025	Unknown	Unknown	22 out of 28	Unknown	Medium[11]
Panama	CoST: 2011-2025; Procurement: 2008-2025[12]	4375	2,141,047	24 out of 28	Possible	Medium
Indonesia (West Lombok)	CoST: 2018-2024; Procurement: 2012-2023	61	1412	24 out of 28	Not possible	Low
Costa Rica	CoST: Unknown; Procurement: 2014-2025	Unknown	Unknown	11 out of 28	Unknown	Unknown

Table 3: Data readiness assessment

ANALYSIS: RUNNING QUANTITATIVE ESTIMATIONS

Once the data has been prepared, the next step is to estimate the effects of CoST Members and Partners interventions on different procurement outcomes and to trace the underlying mechanisms using quantitative methods. The purpose of this stage is to test whether exposure to CoST pillars is associated with measurable improvements in procurement practices. These

[11] An estimate cannot be provided at this time, as the website is currently not accessible, but both datasets are available.

[12] Most observations in the CoST dataset date from after 2020. The quality of public procurement data improves significantly in later years, particularly following the 2020 reforms to the Public Procurement Law, which requires bidding entities to publish data and information of public interest for all procurement procedures. Accordingly, the data mapping focuses on records from 2020 onwards.

methods enable comparison of outcomes for contracts and buyers exposed to CoST pillars with those not exposed. Overall, two types of effects can be measured: direct effects and indirect. Direct effects fall on the treated, that is, contracts published under CoST data standards (infrastructure contracts), due to the immediate or direct exposure to TAP interventions guided by CoST pillars. Indirect effects fall on the non-treated, that is, non-infrastructure contracts, due to spillover effects, such as learning better procurement methods from a buyer and applying them across the board.

The choice of method depends on the scope and quality of the available data. As a general principle, analysis should begin with a simple analysis to establish baseline patterns, and then progress to more rigorous methods that allow stronger causal claims. Combining several approaches strengthens the robustness of findings and increases confidence in the results.

Analysing direct effects of CoST interventions

Direct effects can be measured by comparing outcomes of contracts subject to data publication following the CoST data standards with those of similar contracts that are not.

1) Bivariate analysis

Bivariate analysis allows simple comparisons between treatment (CoST data standards) and control (non-CoST data standards) groups of contracts. This involves calculating average values of key indicators, such as the number of bids, contract award duration, or relative price, and applying statistical tests (e.g. t-tests) to check whether differences are statistically significant. For instance, if contracts published using CoST data standards are found to have a lower average corruption risk index than non-CoST contracts, a t-test can assess whether this difference is meaningful or merely due to chance. While useful for establishing whether CoST Members and Partners may be making a difference, bivariate analysis does not control for other factors and should be treated as descriptive evidence rather than causal.

2) Matching methods

Matching is used to reduce bias and to create conditions that approximate a randomised experiment.[13] Treatment and control groups are balanced with respect to observable characteristics, ensuring that comparisons are made between contracts that are similar in all key characteristics. In practice, this would mean matching contracts published using CoST data standards and non-CoST contracts on characteristics such as contract size, sector, and project location before estimating differences in outcomes.

Various techniques can be applied, including nearest-neighbour matching, optimal matching, coarsened exact matching (CEM), and propensity score matching (PSM). For example, in a dataset where infrastructure contracts are disproportionately concentrated in one infrastructure sub-sector such as rural road surfacing, matching ensures that non CoST data standards contracts from the same sub-sector are used to a comparable proportion, reducing the risk of biased comparisons.

3) Regression analysis with control variables

Regression models enable comparison of contracts published using CoST data standards and non-CoST contracts while holding other factors that influence procurement outcomes constant. In practice, they test whether contracts published following the CoST data standards differ systematically from those not published, after adjusting for characteristics such as contract value, region or province, buyer type, or buyer size. For example, regression analyses can be used to assess whether contracts published using CoST data standards attract more bidders or have shorter decision periods, even after controlling for differences in contract size or sector.

The two approaches can be combined. On the full (unmatched) dataset, regression offers a broader comparison by using all available observations and adjusting statistically for observable differences between contracts published using CoST data standards and non-CoST data standards contracts. This provides an overview of general patterns but may still reflect bias if the groups differ with respect to unobserved factors. On the matched dataset, regression is applied only after aligning contracts published using CoST data standards and non-CoST data standards contracts on key characteristics. This approach, also called double-robust regression, produces a more careful comparison by ensuring that outcomes are estimated between contracts that are more directly comparable.

[13] For guidance on matching techniques, see Cunningham (2021, chapter 5) and Huntington-Klein (2021, chapter 14).

Analysing indirect effects of CoST interventions

Indirect effects of CoST Members and Partners can be assessed by examining whether buyers alter their overall procurement practices following engagement with CoST tools and standards. This approach moves beyond individual contracts to capture institutional learning and potential spillover effects. A common way to test this is to compare contracts awarded by the same buyer before and after the buyer first engaged with CoST. If a ministry or municipality initially publishes a project under CoST data standards and subsequently attracts more bidders or reduces delays across all its tenders, this would suggest an indirect effect of CoST Members and Partners interventions.

The standard method for this type of analysis is **Difference-in-Differences (DiD)**[14]. DiD compares changes in outcomes between treatment and control groups before and after an intervention. In this context, this method tests whether procurement outcomes improved more for buyers who engaged with CoST tools and standards than for those who did not. For instance, if contracts issued by buyers engaged with CoST Members and Partners showed a noticeable improvement in competition after publication, whereas contracts from non-CoST engaged buyers exhibited only limited change over the same period, this divergence would be attributed to CoST Members and Partners intervention.

The strength of DiD is that it controls for time-invariant differences between groups (e.g., if a ministry is generally better at running competitive tenders than a municipality), focusing instead on how trajectories diverge after the intervention. However, it rests on the parallel trends assumption: that in the absence of CoST Members and Partners interventions, treatment and control groups would have followed similar trajectories. Therefore, testing and justifying this assumption is a key part of applying DiD.

INTERPRETATION, REPORTING AND CAVEATS

The results of the analysis must be interpreted carefully. Different methods have distinct assumptions and limitations that must be taken into account. For example, simple bivariate comparisons are useful for descriptive purposes but cannot establish causal relationships. Regression analysis adds value by controlling for observable characteristics; however, omitted variable bias can also preclude the identification of causal relationships. If implemented carefully, matching methods are closer to causal inference, whereas DiD provides stronger evidence but requires consideration of the parallel trends assumption. Where possible, causal insights should be combined with qualitative evidence (e.g. interviews, desk research) to capture mechanisms and better understand the practical implications of CoST Members and Partners interventions in a given context.

The results should be reported transparently and systematically. The analysis should begin with descriptive statistics presenting the distributions of variables, missingness rates, and the balance between the control and treatment groups. The results should then be presented method by method, based on the strength of the evidence (from the simplest to the most sophisticated). Full results should be reported for each model, including effect sizes and their confidence intervals. Visualisations (e.g. coefficient plots, time-series figures and histograms) are strongly recommended, as they highlight key patterns in the data. Finally, the data cleaning and preparation steps must be documented.

[14] For guidance on the DiD method, see Angrist and Pischke (2014, ch. 5) and Fredriksson and Oliveira (2019)

Some caveats should be acknowledged in the report. From a methodological perspective, regression and matching techniques cannot fully eliminate the possibility of unobserved confounding factors, meaning these methods cannot provide evidence as robust as that from a randomised experiment. Some contextual factors may influence outcomes, regardless of the transparency standards introduced by CoST Members and Partners. For example, if reporting actors perceive that they receive more attention from policymakers and non-governmental actors, they are likely to alter their behaviour, even though the publication of additional data has no impact in itself.

Finally, it is important to acknowledge data limitations and their influence on conclusions. For example, missing values are common and can therefore lead to the exclusion of important variables. Additionally, the small number of treated contracts sometimes limits the statistical power of the results.

4. Conclusion

All interviewees emphasised the gap between existing transparency mechanisms and the capacity to translate them into quantifiable assessments of cost savings. Technical expertise for impact evaluation is generally low, with most cases dependent on temporary consultants (as in Bogotá) or small teams of motivated specialists (as in Costa Rica and West Lombok). Even in Jalisco and Ecuador, where data systems are relatively advanced, oversight committees and civil society actors largely lack the methodological and financial skills to conduct cost–benefit analysis or assess counterfactual savings. Stakeholders across contexts consistently highlighted the need for training in data analysis, procurement evaluation, and quantitative methodologies, as well as practical tools such as standardised variable lists, code scripts, and templates. This report aims to begin to fill that gap. At the institutional level, sustainability requires embedding technical capacity within permanent staff rather than temporary contractors, and ensuring political buy-in to maintain continuity. The methodologies should therefore be adapted to national contexts, beginning with a small set of core indicators and gradually increasing sophistication as capacity and data quality improve.

References

Adam, I., Dávid-Barrett, E., & Fazekas, M. (2025). The political economy of open contracting reforms in low- and middle-income countries. Governance, 38(2), e12897. https://doi.org/10.1111/gove.12897

Alt, J. E., Lassen, D. D., & Skilling, D. (2002). Fiscal Transparency, Gubernatorial Approval, and the Scale of Government: Evidence from the States. State Politics & Policy Quarterly, 2(3), 230–250.

Angrist, J. D., & Pischke, J. S. (2014). Mastering'metrics: The path from cause to effect. Princeton university press.

Auriol, E. (2006). Corruption in procurement and public purchase. Retrieved June 12, 2025, from https://ideas.repec.org//a/eee/indorg/v24y2006i5p867-885.html

Bandiera, O., Prat, A., & Valletti, T. (2009). Active and Passive Waste in Government Spending: Evidence from a Policy Experiment. American Economic Association. Retrieved June 12, 2025, from https://www.aeaweb.org/articles?id=10.1257/aer.99.4.1278

Bardhan, P., & Mookherjee, D. (2006). Decentralisation and Accountability in Infrastructure Delivery in Developing Countries. The Economic Journal, 116(508), 101–127. https://doi.org/10.1111/j.1468-0297.2006.01049.x

Bauhr, M., Czibik, Á., de Fine Licht, J., & Fazekas, M. (2020). Lights on the shadows of public procurement: Transparency as an antidote to corruption. Governance, 33(3), 495–523. https://doi.org/10.1111/gove.12432

Bergman, M. A. (2023). Auditing and compliance in public procurement – an empirical assessment. https://doi.org/10.1108/JOPP-09-2022-0046

Brunetti, A., & Weder, B. (2003). A free press is bad news for corruption. Journal of Public Economics, 87(7), 1801–1824. https://doi.org/10.1016/S0047-2727(01)00186-4

Coviello, D., & Mariniello, M. (2014). Publicity requirements in public procurement: Evidence from a regression discontinuity design. Journal of Public Economics, 109, 76–100. https://doi.org/10.1016/j.jpubeco.2013.10.008

Coviello, D., Guglielmo, A., & Spagnolo, G. (2018). The Effect of Discretion on Procurement Performance. Retrieved June 12, 2025, from https://ideas.repec.org//a/inm/ormnsc/v64y2018i2p715-738.html

Cunningham, S. (2021). Causal inference: The mixtape. Yale university press.

Davoodi, V. T., & Hamid, R. (1998). Corruption, Public Investment, and Growth. IMF. Retrieved June 12, 2025, from https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Corruption-Public-Investment-and-Growth-2353

Denny, E. K., Phan, N., Romero, D., & Wibbels, E. (2024). Incentives, audits and procurement: Evidence from a district-level field experiment in Ghana. Governance, 37(3), 729–750. https://doi.org/10.1111/gove.12798

Di Tella, R., & Schargrodsky, E. (2003). The Role of Wages and Auditing during a Crackdown on Corruption in the City of Buenos Aires. The Journal of Law & Economics, 46(1), 269–292. https://doi.org/10.1086/345578

Dimitri, N. (2013). "Best value for money" in procurement. https://doi.org/10.1108/JOPP-13-02-2013-B001

Di Tella, R., & Schargrodsky, E. (2003). The Role of Wages and Auditing during a Crackdown on Corruption in the City of Buenos Aires. Journal of Law & Economics, 46(1), 269–292. https://doi.org/10.1086/34557

Duguay, R., Rauter, T., & Samuels, D. (2023). The Impact of Open Data on Public Procurement. Journal of Accounting Research, 61(4), 1159–1224. https://doi.org/10.1111/1475-679X.12479

Engel, E., Jordán, F., Rau, T., & Repetto, A. (2023). Audit threats and year-end spending by government agencies: Experimental evidence from Chile. https://doi.org/10.1108/JOPP-07-2022-0032

Fazekas, M., & Tóth, B. (2017). The Effectiveness of the European Union in Safeguarding Competition in Public Procurement Markets. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3101885

Fazekas, M., & Tóth, B. (2018). The extent and cost of corruption in transport infrastructure. New evidence from Europe. Transportation Research Part A: Policy and Practice, 113, 35–54. https://doi.org/10.1016/j.tra.2018.03.021

Fighting Corruption to Improve Schooling: Evidence from a Newspaper Campaign in Uganda. Retrieved June 12, 2025, from https://www.jstor.org/stable/40004969?seq=1

Florini, A. (Ed.). (2007). The Right to Know: Transparency for an Open World. Columbia University Press. https://doi.org/10.7312/flor14158

Fox, J. A. (2015). Social Accountability: What Does the Evidence Really Say? World Development, 72, 346–361. https://doi.org/10.1016/j.worlddev.2015.03.011

Fredriksson, A., & Oliveira, G. M. D. (2019). Impact evaluation using Difference-in-Differences. RAUSP Management Journal, 54(4), 519-532.

Huntington-Klein, N. (2021). The effect: An introduction to research design and causality. Chapman and Hall/CRC.

Keefer, P., & Roseth, B. (2021). Curbing Grand Corruption in the Contracting Out of Public Services: Lessons from a Pilot Study of the School Meals Program in Colombia. IDB Publications. https://doi.org/10.18235/0003335

Kenny, C. (2007). Construction, Corruption, and Developing Countries. SSRN Scholarly Paper No. 996954. Retrieved June 4, 2025, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=996954

Kenny, C. (2010). Publishing Construction Contracts and Outcome Details. SSRN Scholarly Paper No. 1578115. Retrieved June 4, 2025, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1578115

Knack, S., Biletska, N., & Kacker, K. (2017). Deterring Kickbacks and Encouraging Entry in Public Procurement Markets: Evidence from Firm Surveys in 88 Developing Countries. SSRN Scholarly Paper No. 2985503. Retrieved June 11, 2025, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2985503

Kolstad, I., & Wiig, A. (2009). Is transparency the key to reducing corruption in resource-rich countries? World Development, 37(3), 521–532. https://doi.org/10.1016/j.worlddev.2008.07.002

Lagunes, P. F. (2017). Guardians of accountability: A field experiment on corruption and inefficiency in local public works [Working paper]. International Growth Centre & Columbia University.

Lagunes, P. F. (2021). The eye and the whip: Corruption control in the Americas. Oxford University Press. https://doi.org/10.1093/oso/9780197577622.001.0001https://books.google.at/books?hl=en&lr=&id=Ghc6EAAAQBAJ&oi=fnd&pg=PP1&dq=Lagunes(2021)%20civil%20society&ots=TJ7HJ0e9Pj&sig=uJDJQuzW6G5RxGd8fm5JPvtwvRs&redir_esc=y#v=onepage&q=Lagunes(2021)%20civil%20society&f=false

Lewis-Faupel, S., Neggers, Y., Olken, B. A., & Pande, R. (2016). Can Electronic Procurement Improve Infrastructure Provision? Evidence from Public Works in India and Indonesia. https://www.aeaweb.org/articles?id=10.1257/pol.20140258

Mansuri, G., & Rao, V. (2013). Can participation be induced? Some evidence from developing countries. Critical Review of International Social and Political Philosophy, 16(2), 284–304. https://doi.org/10.1080/13698230.2012.757918

Mansuri, G., & Vijayendra, R. (2014). Localizing development. Does participation work? Journal of Economics, 112, 201–205. https://doi.org/10.1007/s00712-014-0394-4

Meijer, A. J. (2013). Understanding the complex dynamics of transparency. Public Administration Review, 73(3), 429–439. https://doi.org/10.1111/puar.12032

Navarro, G. (2001). A guided tour to approximate string matching. ACM computing surveys (CSUR), 33(1), 31-88.

North, D. C., Wallis, J. J., & Weingast, B. R. (2009). Violence and social orders: A conceptual framework for interpreting recorded human history. Cambridge University Press. https://doi.org/10.1017/CBO9780511575839

Olken, B. A. (2007). Monitoring corruption: Evidence from a field experiment in Indonesia. Journal of Political Economy, 115(2), 200–249. https://doi.org/10.1086/517935

Pyman, M. (2021). Curbing corruption in Construction, Public Works, and Infrastructure

Quiroga, B. F., Moritz, B. B., & Guide, V. D. R., Jr. (2020). The role of transparency in procurement: Revealed versus concealed scoring rules in sealed bid A + B auctions. Journal of Operations Management, 67(1), 71–81. https://doi.org/10.1002/joom.1104

Saelawong, T., Yomnak, T., Chaiwat, T., & Sutuktis, C. (2023). Transparency and budget savings in public procurement: Evidence from Thailand's Infrastructure Transparency Initiative (CoST). Journal of Financial Crime, 31(3). https://doi.org/10.1108/JFC-10-2023-0282

Saelawong, T., Yomnak, T., Chaiwat, T., Poopunpanich, S., & Sutuktis, C. (2023). Transparency and budget savings in public procurement: Evidence from Thailand's Infrastructure Transparency Initiative (CoST). Journal of Financial Crime, 31(6), 1407–1419. https://doi.org/10.1108/JFC-10-2023-0282

Saussier, S. S. (2020). Life-Cycle Costing in Public Procurement. In C. A, P. G, S. S, & T. T (Eds.), The Challenges of Public Procurement Reforms. Routledge. https://hal.science/hal-03285964

Singer, M., Konstantinidis, G., Roubik, E., & Beffermann, E. (2009). Does e-procurement save the state money? https://doi.org/10.1108/JOPP-09-01-2009-B002

Soudry, O. (2004). Promoting economy: Electronic reverse auctions under the EC directives on public procurement. https://doi.org/10.1108/JOPP-04-03-2004-B002

Torgo, L. (2011). *Data mining with R: learning with case studies*. Chapman and Hall/CRC.

Tufte, E. R., & Graves-Morris, P. R. (1983). *The visual display of quantitative information* (Vol. 2, No. 9). Cheshire, CT: Graphics press.

Winters, M. S., & Weitz-Shapiro, R. (2013). Lacking Information or Condoning Corruption: When Do Voters Support Corrupt Politicians? Comparative Politics, 45(4), 418–436.

Yakovlev, A., Bashina, A., & Demidova, O. (2014). The effectiveness of simple homogeneous commodity procurement. Retrieved June 12, 2025, from https://ideas.repec.org//p/hig/wpaper/13-pa-2014.html

Annex 1: Indicators overview

This section outlines the steps for calculation of indicators in each category.

LEVEL OF COMPETITION

1) Share of market entrants: Number of bidders appearing for the first time in a given year divided by total active bidders that year, calculated using the following formula:

$$\textit{Share of market entrants} = \frac{\textit{First-time bidders in year y}}{\textit{Total active bidders in year y}}$$

2) Share of non-local firms: Share of awarded contracts where the bidder's location (city/province) differs from the buyer's location, calculated using the following formula:

$$\textit{Share of non-local firms} = \frac{\textit{Number of contracts where bidder location} \neq \textit{buyer location}}{\textit{Total number of awarded contracts}}$$

CORRUPTION RISK

CRI (Composite Risk Score) is calculated as the average of individual binary corruption risk indicators (Single bidding, Type of procedure, Submission period, Call for tender publication, and Decision period). It ranges from 0 to 1, where higher values indicate higher overall corruption risk for a given contract. Formula for calculation is the following:

$$\textit{CRI} = \frac{\textit{Single bidding} + \textit{Type of procedure} + \textit{Submission period} + \textit{Call for tender publication} + \textit{Decision period}}{5}$$

Individual binary corruption indicators either take 0 (Low risk), or 1 (High risk). They are calculated in the following way:

1) Single bidding: Coded based on number of bids, using the following formula:

$$\textit{Single bidding} = \{1 \textit{ if Number of bids}=1, 0 \textit{ if Number of bids} > 1\}$$

2) Type of procedure (non open procedure): Coded based on type of procedure, which can be open/competitive procedure, or non-open/restricted (e.g. negotiated, direct award).

$$\textit{Non open procedure} = \{1 \textit{ if Type of procedure} = \textit{Restricted}, 0 \textit{ if Type of procedure} = \textit{Open}\}$$

3) Submission period: Coded based on Length of submission period (described in the following section):

$$\textit{Submission period} = \{1 \textit{ if Length of submission period} \leq 14 \textit{ days, or missing}, 0 \textit{ if} = \textit{normal}\}$$

4) Call for tender publication: Coded based on whether call for tender published in official journal, in the following way:

$$\textit{Call for tender publication} = \{1 \textit{ if Call for tender} = \textit{Not published}, 0 \textit{ if Call for tender} = \textit{Published}\}$$

5) Decision period: Coded based on Length of decision period (described in the following section):

Decision period = {1 if Length of decision period = Too short or too long, 0 if = normal}

ADMINISTRATIVE EFFICIENCY

1) Length of submission period: Number of days between publication of call for tenders and submission deadline. It is calculated using the following formula:

Length of submission period = Submission deadline - Publication date

2) Length of decision period: Number of days between submission deadline and announcing of contract award. It is calculated using the following formula:

Length of decision period = Contract award date - Submission deadline

PRICES

Relative Price: Calculated price ratio between the final contracted price and the estimated contract value, using the following formula:

Relative Price = Final contracted price ÷ Estimated contract value

QUALITY

Delivery Delay: Calculated difference between planned and final delivery period, using the following formula:

Delivery Delay = Actual delivery date - Planned delivery date

Annex 2: Data mapping

This table below provides an overview of the availability of key variables in public procurement and CoST related datasets. Where possible, the table also reports the rate of missing data.

CATEGORY	VARIABLE	INDONESIA (NUSA TENGGARA BARAT)	ECUADOR1	THAILAND	GUATEMALA	PANAMA	INDONESIA (WEST LOMBOK)	COSTA RICA
Background information	Title (Procurement)	0%	0%	0%	0%	Yes	0%	0%
	Title (CoST)	0%	0%	0%	Unknown	Yes	0%	Unknown
	Tender ID (Procurement)	0%	0%	0%	0%	Yes	0%	0%
	Tender ID (CoST)	0%	0%	0%	Unknown	Yes	0%	Unknown
	Year	1.51%	0%	0%		Not available	0.14%	0%
	Buyer ID	100%	0%	0%	0%	Not available	100%	82.87%
	Buyer name	0%	0%	0%	0%	Yes	0%	Not available
	Buyer address	17.93%	0%	0%	0.02%	Yes	0%	Not available
	Bidder ID	7.35%	0%	0%	0%	Yes	2.20%	0%
	Bidder name	7.35%	0%	0%	0%	Yes	2.20%	0%
	Bidder address	2.58%	0%	1.24%	0.02%	Yes	8.00%	0%
Level of competition	Number of bids	0.61%	70.74%	0%	0%	Yes	0.42%	Calculation
	Share of market entrants	Calculation	Calculation	Calculation	0.02%	Calculation	Calculation	Calculation
	Share of non-local firms	Calculation	Calculation	Calculation	0%	Calculation	Calculation	Calculation
Corruption risk	Single bidding	0.61%	70.74%	0%	0%	Yes	0.42 %	Calculation
	Type of procedure (non open procedure)	2.24%	0%	0%	0%	No	2.83%	Not available
	Submission period	0.15%	78%	0%	0%	Yes	0%	Calculation
	Call for tender publication	100%	Not available	0%	0%	Yes	100%	Not available
	Decision period	0.00%	70.69%	0%	0%	Yes	0.00%	Calculation
	CRI (Composite Risk Score)	Calculation		0%	0%	Calculation	Calculation	Calculation
Administrative efficiency	Length of submission period	0.15%	78%	34.29%	0%	Yes	0%	Calculation
	Length of decision period	0.00%	70.69%	0.03%	0%	Yes	0.00%	Calculation

[1] Missing rates are calculated across the full public procurement dataset (2015–2022). Data quality improves substantially from 2022 onward, which also marks the start of CoST-related reporting, as confirmed in interviews.

Prices	Estimated contract value	0.05%	0%	13.80%	Not available	Yes	0.00%	82.87%
	Final contracted price	42.63%	0.82%	0%	0%	Yes	8.07%	17.12%
	Relative Price	Calculation	Calculation	13.80%	Not available	Calculation	Calculation	Calculation
Quality	Planned delivery period	100%	Not available	Not available	0.08%	Yes	100%	Not available
	Final delivery period	100%	Not available	Not available	Not available	No	100%	Not available
	Delivery Delay	100%	Not available	Not available	Not available	No	100%	Not available

Table 5: Detailed mapping of variables

INDONESIA

West Lombok Regency launched the INTRAS portal in 2021, publishing infrastructure data across the regency, while Nusa Tenggara Barat began publishing data through the same platform in 2024. Both provide API access with documentation[2] and a GitHub repository[3] and data is structured in OC4IDS JSON with nested information. For analysis, contracting processes must be unpacked from each project[4]. At the time of preparing the report, for West Lombok data was available for 2,594 projects and 61 contracting processes. This is a limited sample, though local stakeholders confirmed that additional data is being processed in order to get published. For Nusa Tenggara Barat, at the time of preparing the report, there was data available for 961 infrastructure projects and 596 contracting processes.

The GTI public procurement dataset for Indonesia contains 5,453,113 contracts across the country. To focus on the two subnational units of interest: West Lombok Regency and Nusa Tenggara Barat Province, relevant subsets can be created using URL variables, which identify the local publisher of each contract. As these variables have no missing values, the filtering process is straightforward: entries containing "lombokutarakab" reveal 1,412 observations for West Lombok, while those with "ntbprov" produce 13,016 for Nusa Tenggara Barat.

Direct ID-based matching between infrastructure and procurement data is not possible. In West Lombok, local stakeholders confirmed that entries are added manually from paper records, making titles a feasible alternative. Based on preliminary check, title-based matching works in Nusa Tenggara Barat, where 484 exact overlaps were found (out of 593 CoST records). Applying fuzzy matching at a 93% similarity threshold identified 54 additional potential links. On the other hand, West Lombok produced no exact matches, likely due to its small dataset of 61 contracting processes. While fuzzy matching suggested some similarities, these require manual verification, leaving the dataset insufficient for analysis.

MEXICO (JALISCO STATE)

Jalisco runs the portal through which infrastructure project data is published according to OC4IDS.[5] Data is available from download in .csv, excel, or .json format. Contracting processes are nested within each project, with id available for each. Overall, there are 723 projects and 723 contracting processes during the period 2019-2025.

The GTI procurement dataset for Mexico covers national procurement and cannot be linked to Jalisco. There is a procurement platform specifically for the state of Jalisco[6]. Local stakeholders reported that its coverage is expanding but remains partial, with quality and periodicity of data varying across institutions, highlighting the need for stronger harmonisation and enforcement of publication standards. Furthermore, there is no option to download the Jalisco procurement data in bulk, and the information available on the source is not in an interoperable format.

[2] West Lombok: https://intras.lombokbaratkab.go.id/documentation, Nusa Tenggara Barat: https://intras.ntbprov.go.id/documentation

[3] Available here: https://github.com/costwestlombok/costwestlombok?tab=readme-ov-file

[4] Enpoint: /oc4ids/project/{project_id}/contractingProcesses

[5] Available here: https://costmexico.com/list-projects

[6] Available here: https://compras.jalisco.gob.mx/historico-de-compras

COSTA RICA

In July 2025, Costa Rica released a platform for publishing data on infrastructure projects in line with the OC4IDS standard.[7] The data release is ongoing; therefore, the data was not fully available at the time the report was prepared. In an interview with local stakeholders it was confirmed that the data would be available in the upcoming period. As the data release should follow OC4IDS structure, the steps should be the same as for other datasets: unpacking the nested structure, particularly the list of contracting processes.

General public procurement data is available for Costa Rica on the SICOP (national procurement platform)[8]. However, interviews with local stakeholders revealed that public procurement data is not legally required to be published proactively, which renders data coverage to be patchy. As part of preparing this report, we mapped the availability of the procurement data. Specifically, data can be accessed via the 'Datos Abiertos' section of the website. Overall, the data is available to download in .xlsx, .json or .csv format. It is not possible to download all the available data at once, but rather for a six-month period. To access the full time series data, downloads should be conducted for each six-month period and merged afterwards. Additionally, data cleaning and processing need to be conducted.

ECUADOR

CoST Ecuador launched a new platform[9] in July 2025, where infrastructure data is disclosed according to the Open Contracting for Infrastructure Data Standard. Data is available for download in .csv, .xls, or json format. However, datasets are available on yearly basis and hence need to be downloaded separately instead of one time series dataset. At the moment of preparation of the report, the data was available for the period 2022-2025 (20,674 projects overall). Projects (and their nested data) are available for download on a yearly basis. Hence, the main task is to unpack the contracting processes lists and create a combined, consolidated dataset.

Public procurement data is available on the GTI platform. Data is available for the period 2015–2022 (the dataset can be extended). At the time of preparing the report, therefore, there was a one-year overlap between the infrastructure and public procurement datasets (2022). Nevertheless, the presence of earlier data enables difference-in-differences analysis.

The datasets can be matched using the tender ID. In the infrastructure dataset, the contracting processes list should be unpacked to get the table of contracting processes, and the variable ID should be used. However, to match the public procurement dataset, the OCDS identifier (part ocds-5wno2w) shall be removed. At the same time, the tender ID variable should be used from the public procurement dataset. Preliminary matching reveals 75,953 contracts with an exact match between datasets. When checking for unique IDs (the number of tenders), the number is 7,142. Checking only for matches in 2022 confirms that all matching IDs are from this year. With 8,674 processes available in 2022, the exact match rate is very high.

PANAMA

Data on infrastructure projects in line with the CoST IDS standard is published on the Panamá en Obras platform[10], which aggregates information from the national procurement system. Following the 2020 procurement law reforms, publishing entities are required to disclose data on all public works, and at the time of preparing the report, information was available for 4,375 projects from 26 entities across 13 municipalities. The full dataset cannot be downloaded in bulk, but the project list[11] is accessible and can be exported in CSV, Excel, PDF, or JSON format. Detailed information[12] is available in project level pages and can be scraped from the platform.

[7] Available here: https://costcostarica.org/proyectos/

[8] Available here: https://www.sicop.go.cr/

[9] Available here: https://costecuador.org/list-projects

[10] Available here: https://www.dgcp.gob.pa/portal/Panama%20en%20Obras.html

[11] Available here: https://www.panamaenobras.gob.pa/#/proyectos

[12] For example: https://www.panamaenobras.gob.pa/#/detalle-proyecto/0/2022-5-02-0-01-CM-006865

Data on public procurement in Panama is not available in the GTI dataset. However, it is available on PanamaCompra portal[13], which operates two systems: V2 (covering best-value procedures, framework agreements, the virtual store, public auctions and emergency procedures) and V3 (covering online quotations, minor purchases, public tendering and exceptional contracting). Data can be filtered by procedure type, but it cannot be downloaded in bulk. Detailed records can only be accessed individually in PDF format. An additional platform, PanamaCompra en Cifras[14], provides aggregate procurement statistics, but does not offer project-level datasets that are suitable for analysis.

It is possible to connect the websites using the tender ID. However, it is not possible to determine the scope of potential matches before all public procurement data has been collected.

GUATEMALA

Guatemala is publishing infrastructure project data on the national procurement platform GuateCompras, using the CoST IDS standard.[15]

The same platform offers the option to download general public procurement data in .csv, .xlsx or .json format. These downloads are available on a monthly basis (e.g. January 2023, February 2023, and so on). To obtain time series data, all the files for the selected period must be downloaded and merged. Additionally, the data would need to be processed, as data for Guatemala is not available among the GTI datasets. The initial mapping of the variables was conducted using the January 2023 data (for illustrative purposes only); therefore, the missing rates do not reflect the full range of data available for this country, but only for this month.

[13] Available here: https://www.panamacompra.gob.pa/Inicio/#/

[14] Available here: https://www.panamacompraencifras.gob.pa/#/

[15] Available here: https://www.guatecompras.gt/

Annex 3: Interview guide

INTERVIEW QUESTIONNAIRE

Note: The precise mix and emphasis of questions was tailored to each interviewee's domain of expertise. For example, when we interview a data owner / technical specialist, we delve more deeply into issues of data structures, quality controls and analytical methodologies, whereas for data users with a socio-political or civil-society background we place greater emphasis on governance contexts and stakeholder engagement. This adaptive approach ensures that we surface the most relevant insights for designing an effective, context-sensitive cost-savings measurement framework.

Introduction & Consent

- Explain the purpose of the interview and how we will collect and use the information shared
- Any questions before we proceed
- Confirm consent to participate

A. Respondent Background

1. Could you describe your current role and your main responsibilities related to public procurement data or oversight?

2. How long have you been engaged with CoST's tools and approaches, and in what capacity?

B. Data Availability & Quality

3. What types of **public procurement data** are routinely collected and published in your context (for example: tender notices, bids received, contract awards)? In what form?

4. What types of **CoST data** are routinely collected and published in your context? How do you link/differentiate CoST data from standard procurement/project data?

5. To what extent are these CoST datasets accessible, complete and standardised across the country / region?

6. What are the principal obstacles you encounter when attempting to access, harmonise or verify CoST/procurement data on infrastructure procurement?

7. Are you aware of any existing studies or analyses aimed at estimating cost savings or value-for-money in CoST/infrastructure procurement?

C. Types of CoST Interventions and Data Users

8. In your context, which types of CoST interventions exist (proactive data publication, independent review, or multi-stakeholder working groups)?

9. Who are the primary users of procurement data in your context (e.g. procurement officials, auditors, civil-society organisations, media)?

10. How do these stakeholders use procurement data to inform decisions, and what analytical tools or skillsets do they typically possess or lack?

11. To what degree do stakeholders have the technical capacity (skills, tools, institutional support) to undertake quantitative impact evaluations on cost-savings measurements?

12. What additional training, resources or partnerships would most strengthen their ability to measure financial savings effectively?

Wrap-up & Additional Insights

- Any further comments, challenges or opportunities related to measuring cost savings that we have not yet covered?
- What recommendations would you offer for designing a practical, replicable methodology to assess financial savings from CoST interventions going forward?

www.infrastructuretransparency.org
cost@infrastructuretransparency.org
CoST International
@CoSTransparency
CoST - the Infrastructure Transparency Initiative
CoST - the Infrastructure Transparency Initiative