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Quality Control of Works in Public Procurement: Institutional Practices, Performance Outcomes and Implementation Challenges in Bangladesh

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Abstract

Public procurement is one of the largest channels through which public resources are converted into infrastructure and services in most countries where Bangladesh is no exception. Quality Control (QC) measurements in such construction projects generally are essential to ensuring the delivery of structures that meet safety, functionality, and durability standards. Accordingly, this study begins with examining how the QC of civil works is planned, implemented, and enforced in public procurement system of Bangladesh. It then identifies key challenges that weaken quality outcomes. Using secondary evidence and quantitative signals from e-Government Procurement (e-GP) analytics and procurement system assessments, this study analyses competition patterns. Particularly, the competition patterns are: i) average bids per tender ii) single-bid prevalence iii) market concentration and contract performance risks such as time overruns, price enhancements and variation-order governance. Findings of this study indicate that (i) competition in Open Tender Method (OTM) remains thin (≈ 3.54 bids/tender) while Limited Tender Method (LTM) tends to be crowded (≈47.75 bids/tender); (ii) single-bid awards can be substantial in specific procuring entities, reaching to 60 – 89% in some Public Works Department (PWD) divisions and (iii) contract management weaknesses where a large share of contracts miss planned schedules create pressure points that can compromise workmanship quality. Thus, this study concludes that QC failures are not only technical (supervision, testing, defect rectification), but also institutional (incentives, collusion risks, weak performance feedback loops). Recommendations emphasize risk-based QC planning, digital contract management expansion, stronger accountability for variations and supervision, and structured citizen engagement in implementation monitoring.

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Introduction

Public procurement is one of the largest channels through which public resources are converted into infrastructure and services in most countries where Bangladesh is no exception. In Bangladesh, civil works procurements such as roads, drainages, government buildings including schools, hospitals etc. shape service delivery and long-term asset quality. However, the "quality of works" is persistently raising in public debate on issues such as

- Premature pavement distress,
- Low durability of drainage structures, cracks
- Leakages in public buildings and
- Recurring rehabilitation costs [1].

In practice, quality in public works is not a single event. It is an outcome of decisions made across the procurement lifecycle such as planning / specification, tendering / selection, contract management, and post-completion defect rectification. If incentives prioritize "lowest price" without robust technical evaluation and enforcement be the outcome. On the other hand, if supervision and testing are weak, the built asset can fail early creating a "false economy" [2].

That raises a query what has the economy of Bangladesh been going through on this issue? Briefly answering to the query, this study advances with two subsections in this Introduction Section.

Quality control of works in Bangladesh's public procurement, governed by the Public Procurement Act (PPA) 2006 and Rules (PPR) 2008, has improved via e-GP adoption, yet faces challenges from weak contract management, political interference, and technical staff shortages. While institutions like LGED and RHD show progress, overall performance remains poor-to-average, with issues in monitoring and enforcement.

Way of Procurement in Bangladesh Economy

Quality control of works in Bangladesh's public procurement, governed by the Public Procurement Act (PPA) 2006 and Rules (PPR) 2008. Bangladesh has modernized procurement through legal reforms and introduction of e-GP. A major World Bank supported procurement system assessment notes institutional strengthening, i.e., a nodal agency, standardized documents, training programs and e-GP coverage etc., while also identifying contract management and performance risks that affect delivery [3]. Overall, it faces challenges from weak contract management, political interference, and technical staff shortages. While institutions like LGED and RHD show progress, overall performance remains poor-to-average, with issues in monitoring and enforcement.

The Specific Statement of the Problem

Despite formal Quality Control (QC) clauses in standard works contracts and oversight arrangements, quality outcomes remain inconsistent, especially, for decentralized procurement. The key problem is a gap between (a) "QC requirements on paper" and (b) "QC enforcement in practice," influenced by competition patterns, market power, supervision capacity, time pressure, variation governance, and integrity risks Overall [3].

Accordingly, this study begins with elaborating on how the QC of civil works is planned, implemented, and enforced in public procurement system of Bangladesh. It then identifies key challenges that weaken quality outcomes.

In today's practices, the competition patterns in Bangladesh are i) average bids per tender ii) single-bid prevalence iii) market concentration and contract performance risks such as time overruns, price enhancements and variation-order governance.

Using secondary data statistics from e-Government Procurement (e-GP) analytics, this study analyses competition patterns in multi-faucets for better understanding in aim to marginalize the problem.

Literature Review

Quality Control (QC) failures are strongly linked to weak supervision, inadequate testing, and misaligned incentives, especially, when contract awards are dominated by non-competitive practices or when contract management systems do not produce actionable performance data [4,5].

That raises questions: what does quality control (QC) mean in public works? What are the tools of QC in general?

The QC in construction procurement commonly includes the following [4]:

- Quality planning: specifications, design quality, bill of quantities (BoQ), method statements, QC plans.
- Quality assurance (QA) systems: contractor QA/QC organization, documentation, test plans.
- Supervision & inspection: site engineers, third-party checks, measurement books, checklists.
- Materials testing: lab tests for cement, aggregates, bitumen, compaction, concrete strength, etc.
- Acceptance criteria & payment linkage: withholding/retention, milestone-based payments.
- Defect liability/rectification: post-completion correction of defects and performance monitoring.

Procurement integrity and competition as determinants of quality

Competition affects quality in multiple ways:

- Healthy competition can reduce price inflation and incentivize performance.
- Excessively low pricing can create under-provision of quality (cutting corners) unless quality is strictly enforced.
- Collusion or market capture reduces pressure to deliver quality and can normalize poor workmanship if contractors expect limited accountability.

A Bangladesh e-GP trend analysis highlights increasing competition in some respects but also rising single-bid contracting and market concentration signals: overall, 5% of bidders controlling ~30% of contracts.

Bangladesh Evidence on Procurement Performance and Quality Risks

Two major sources provide relevant empirical signals:

e-GP competitiveness analytics (2012–Feb 2023): The study finds OTM averages around 3.54 bids per tender, while LTM averages 47.75 bids per tender; and single-bid awards in OTM can be around 26% vs 11% in LTM (reported in charts/summary).

Procurement system assessment and contract management indicators: A World Bank procurement system assessment notes that 70% of contracts were not completed on time, and in 34% of cases contracts required price enhancement due to delay; payments were made in 77% of cases within 30 days of bill submission. It also reports that quality of construction—especially at decentralized level—is a major concern, and flags variation orders sometimes not handled diligently.

Research Gap

Existing analyses often focus on transparency/competition or corruption risks. Less integrated work connects competition patterns + contract management performance + QC mechanisms to explain "why quality fails" and "where to intervene" in the Bangladesh context. This study contributes by linking these elements into a practical QC strengthening framework.

Objectives of the Study

This study aims to

- Chart the QC system for works in public procurement (planning → supervision/testing → defect rectification)
- Use quantitative procurement signals (competition, single-bid prevalence, concentration, time overrun indicators) to infer QC risk hotspots.
- Identify key operational and governance challenges that undermine QC in Bangladesh.
- Propose practical, Bangladesh-relevant recommendations to strengthen QC and value for money.

Answer the research questions

- What QC mechanisms exist in Bangladesh's works procurement practices, and where do they fail in implementation?
- How do competition and market structure signals relate to QC risks?
- Which reforms and managerial practices are most feasible to improve QC outcomes in the Bangladesh context?

Materials and Methods

Study Design

A mixed-methods, evidence-synthesis design was used:

- Secondary quantitative analysis of published procurement analytics and system assessment indicators.
- Institutional mapping of QC responsibilities and control points in works procurement.
- Risk-based interpretation connecting procurement signals (single-bid prevalence, concentration, delays, variations) with QC vulnerabilities.

Data Sources

- e-GP competitiveness analysis (2012–Feb 2023) providing data points on bids per tender, single-bid patterns, concentration signals, and ministry/entity patterns.
- World Bank procurement system assessment (MAPS-related) providing contract management indicators and reform recommendations (e-CMS, citizen monitoring).
- Bangladesh procurement authority site evidence indicating existence of updated procurement rules and governance arrangements (contextual).
- Bangla legal portal statement of principles (shows procurement aims include quality/sustainability among core principles in Bangladesh legal framing).

Variables and Analytical Approach

Key indicators were analysed:

- Competition intensity: average bids per tender (OTM vs LTM).
- Single-bid prevalence: shares by method and by procuring entities (PWD examples).
- Market concentration: top 5% contractor share of contracts (risk signal).
- Contract performance risk: share of contracts delayed; price enhancements due to delay; variation governance notes.
- Governance innovation: citizen engagement pilot monitoring.
- Analyses included descriptive statistics and visualizations (bar charts) using extracted reported values.

Limitations

- This study relies on secondary sources; it does not include fresh primary field measurements (core sampling, compressive strength tests, etc.).
- Some indicators are proxies (e.g., single-bid prevalence as a competition/integrity risk proxy, not direct proof of poor quality).
- A full 9,000-word version would ideally add: structured interviews with PE engineers, contractor QA staff, and lab technicians; plus project-level QC test record audits.

Data Analysis and Results

Competition intensity: OTM vs LTM (national-level signal)

The e-GP competitiveness analysis reports:

- Average bids per tender (OTM): ~3.54
- Average bids per tender (LTM): ~47.75

It also reports single-bid incidence differences by method:

- Single-bid share (OTM): ~26%
- Single-bid share (LTM): ~11%

Interpretation will be discussed later, but at results level these numbers signal that (a) OTM competition may remain thin and (b) method choice shapes the competitive environment.

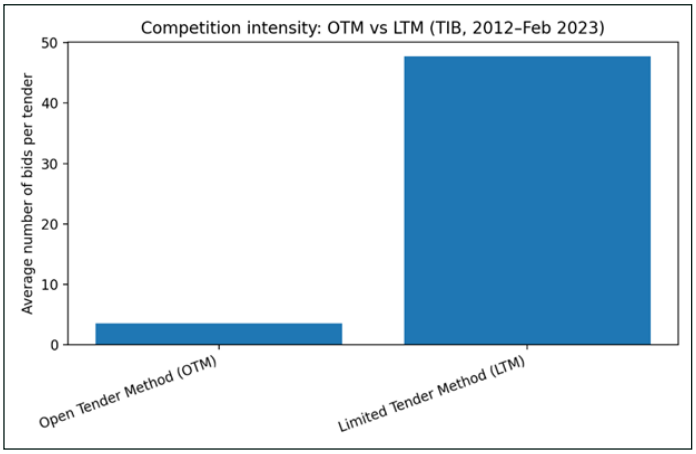

Figure 1: Average bids per tender (OTM as LTM)

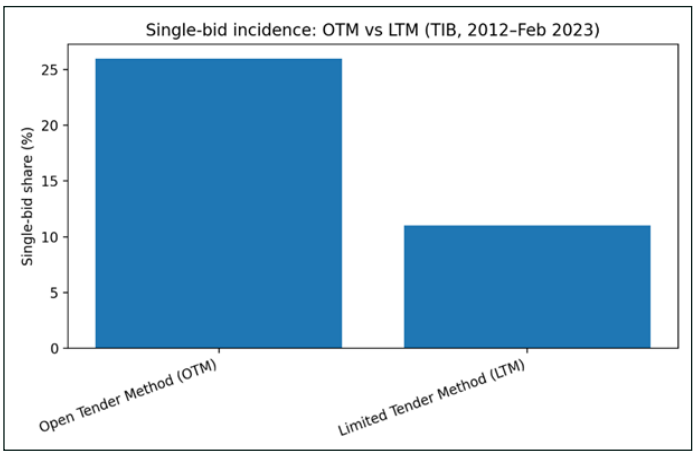

Figure 2: Single-bid share (OTM vs LTM)

Market Concentration (Structural Risk Signal)

The competitiveness report indicates that overall, 5% of bidders controlled ~30% of contracts, suggesting increasing market capture risks.

This is important as a result because concentrated markets can weaken performance pressure and increase collusion risk.

Single-bid prevalence in selected PWD procuring entities (micro-level signal)

The report provides entity-level evidence that single-bid prevalence can be extremely high in certain procuring entities. For example, among "Top 10 single-bid prone PWD entities," single-bid percentages include:

- Narayangonj PWD Division: 89.49% (666 works)
- Chandpur PWD Division: 83.97% (574 works)
- PWD Resource Division, Dhaka: 80.81% (469 works)
- PWD EM Division-8, Dhaka: 75.68% (1,731 works)
- Comilla PWD Division: 65.67% (1,075 works)

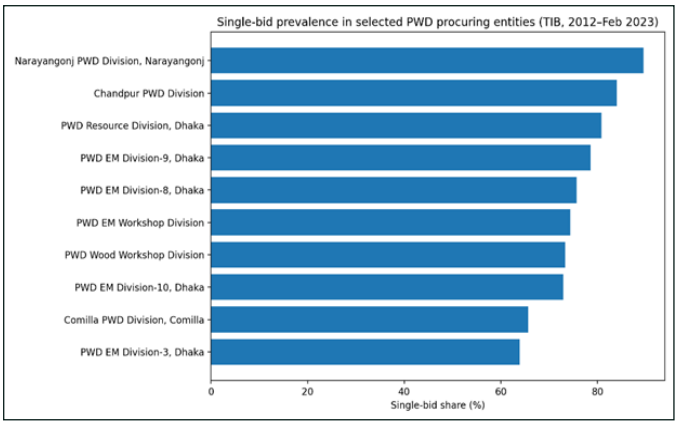

Figure 3: Single-bid prevalence in selected PWD procuring entities

e-GP coverage and contract size distribution (scope signal)

Concluding observations in the competitiveness report state:

- e-tendering covers ~20–35% of government procurement and "nearly all high value contracts are excluded" (as reported in that study's conclusion).
- Most e-procurement contracts (reported) fall within BDT 1–25 crore range.

These results matter because QC risk in "excluded high-value contracts" cannot be assessed via e-GP open data alone, creating monitoring gaps.

Contract performance and management risks (time, price, variations)

The procurement system assessment reports several performance indicators and risk notes:

- 70% of contracts not completed on time (identified as a high-risk "red flag").
- 34% of cases required price enhancement due to delay; and payments were made in 77% of cases within 30 days after bill submission.
- Focus group discussions indicated quality of construction, especially at decentralized level, is a major concern.
- Auditors pointed out variation orders often not carried out diligently or in compliance with legal requirements.

Emerging Mitigation Practices: e-CMS and citizen monitoring

The assessment notes system-side and social accountability responses:

- CPTU developed an electronic contract management and payment module (e-CMS) with features to monitor milestones, flag slippages, and raise red flags when payment progress exceeds physical progress.
- A pilot on citizen engagement in contract implementation monitoring was introduced in 48 sub-districts, with "promising" initial results suggesting improved construction quality; however, citizen engagement was not yet included in procurement laws at that time.

Discussion

Why competition patterns matter for quality control

The results show a striking divergence: OTM ≈3.54 bids/tender versus LTM ≈47.75 bids/tender.

A likely mechanism in Bangladesh works procurement is that thin competition can increase:

- risk of price padding and reduced incentive to excel technically, and/or
- risk of collusive outcomes disguised as formal competition.

Conversely, very high bids per tender (as reported for LTM) can reflect a highly crowded contractor market in certain segments—but does not automatically ensure quality: if many bidders compete only on price while supervision is weak, the winning contractor may still cut corners.

Therefore, competition must be paired with credible QC enforcement (testing, supervision, defect rectification, performance records). The system assessment's emphasis on contract management tools (e-CMS)

aligns with this need.

Single-bid concentration as a QC red flag (not proof, but strong risk)
Single-bid shares around 60–89% in some PWD entities indicate a near absence of contestability.

When contractors expect low challenge, QC can degrade through:
- weak discipline on method statements,
- compromised site supervision,
- substitution of materials,
- reduced accountability for defects.

This does not mean every single-bid contract is low quality, but it is a strong signal to prioritize audits, third-party checks, and citizen monitoring.

Time overruns, variations, and quality "trade-offs"

The assessment's finding that 70% of contracts are not completed on time suggests pervasive schedule risk.
In practice, time pressure can drive quality failures:
- rushed concreting without curing time,
- inadequate compaction,
- reduced testing frequency to "save time,"
- acceptance of incomplete snag/defect lists.

Variation orders and price enhancements (reported 34%) can indicate unstable designs/estimates or weak site readiness, which again can produce "patchwork delivery" rather than quality-first delivery.

Institutional and capacity constraints at decentralized levels

Bangladesh's decentralized procurement is often where supervision resources are stretched. The assessment's focus group note about decentralized quality concerns supports this.
Common practical bottlenecks include:
- insufficient number of trained site supervisors relative to project volume,
- lab capacity constraints (distance, turnaround time),
- weak documentation culture (test records not tied to payment milestones),
- political/economic pressure to "complete quickly" before fiscal year close.

Why citizen monitoring can complement technical QC

The pilot in 48 sub-districts suggests that citizen committees with simple checklists can identify visible defects early (poor finishing, inadequate safety, substandard visible materials), raise social accountability, and reduce complacency.

However, citizen monitoring must be integrated carefully:
- it complements but cannot replace technical tests,
- it needs grievance handling pathways and protection against intimidation,
- findings should be linked to corrective actions and contractor performance history.

Recommendations

Risk-based QC planning and budgeting (before tender)
- QC Plan as mandatory tender attachment for works above a threshold: frequency of tests, lab arrangements, staffing, inspection checklists, hold points.
- Design/specification readiness gate: do not tender until drawings/BoQ/specs are internally peer-reviewed to reduce variation-driven quality trade-offs.

Strengthen supervision, testing, and acceptance controls (during execution)
- Payment linked to QC evidence: milestone payments require uploaded test certificates, geo-tagged site photos, and supervisor checklists (can be integrated into e-CMS).
- Third-party/rotational checks for high-risk entities: where single-bid prevalence is unusually high (e.g., ~80–89%), adopt targeted independent verification (IV).
- Standardized quality checklists by work type (roads, buildings, drainage) with simple pass/fail criteria.

Improve competition integrity to protect quality incentives

- Single-bid risk protocol: if single-bid share in an entity crosses a threshold, require (a) market sounding, (b) enhanced bid evaluation review, (c) stronger site QA audits.
- Market concentration monitoring: track top contractors' shares and patterns; where top 5% control

a large share, trigger scrutiny for collusion and performance outcomes.

Expand Digital Contract Management and Performance Feedback

- Scale up e-CMS and ensure it captures physical progress vs payment progress, milestones, LD triggers, and variation approvals—because this directly addresses the assessment's performance risks.
- Contractor performance registry: link QC failures, defect rectification delays, and repeated nonconformance to future eligibility scoring.

Institutionalize Citizen Engagement (with Safe-Guards)

- Legal and procedural integration of citizen monitoring into procurement implementation rules (building on the 48 sub-district pilot experience).
- Provide structured response timelines: PE must respond to citizen-reported defects within X days and document corrective action.

Conclusion

Quality control of works in Bangladesh public procurement is shaped as much by governance and incentives as by engineering practice. Secondary evidence indicates that thin competition in OTM (≈3.54 bids/tender), significant single-bid prevalence in specific entities (sometimes >80%), market concentration (top 5% controlling ~30% of contracts), and widespread schedule slippage (70% not completed on time) create a risk environment where QC can be compromised unless enforcement is systematic.

The way forward is not a single reform but a package: risk-based QC planning, stronger supervision/testing tied to payments, disciplined management of variations, expanded digital contract management (e-CMS), and institutionalized citizen engagement. Taken together, these can improve durability, reduce lifecycle costs, and strengthen value for money—advancing the legal principle that procurement should ensure not only transparency and efficiency but also quality and sustainability [5-9]

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