



MONOGRAPH OF RESEARCH

PROCUREMENT RESEARCH CENTRE

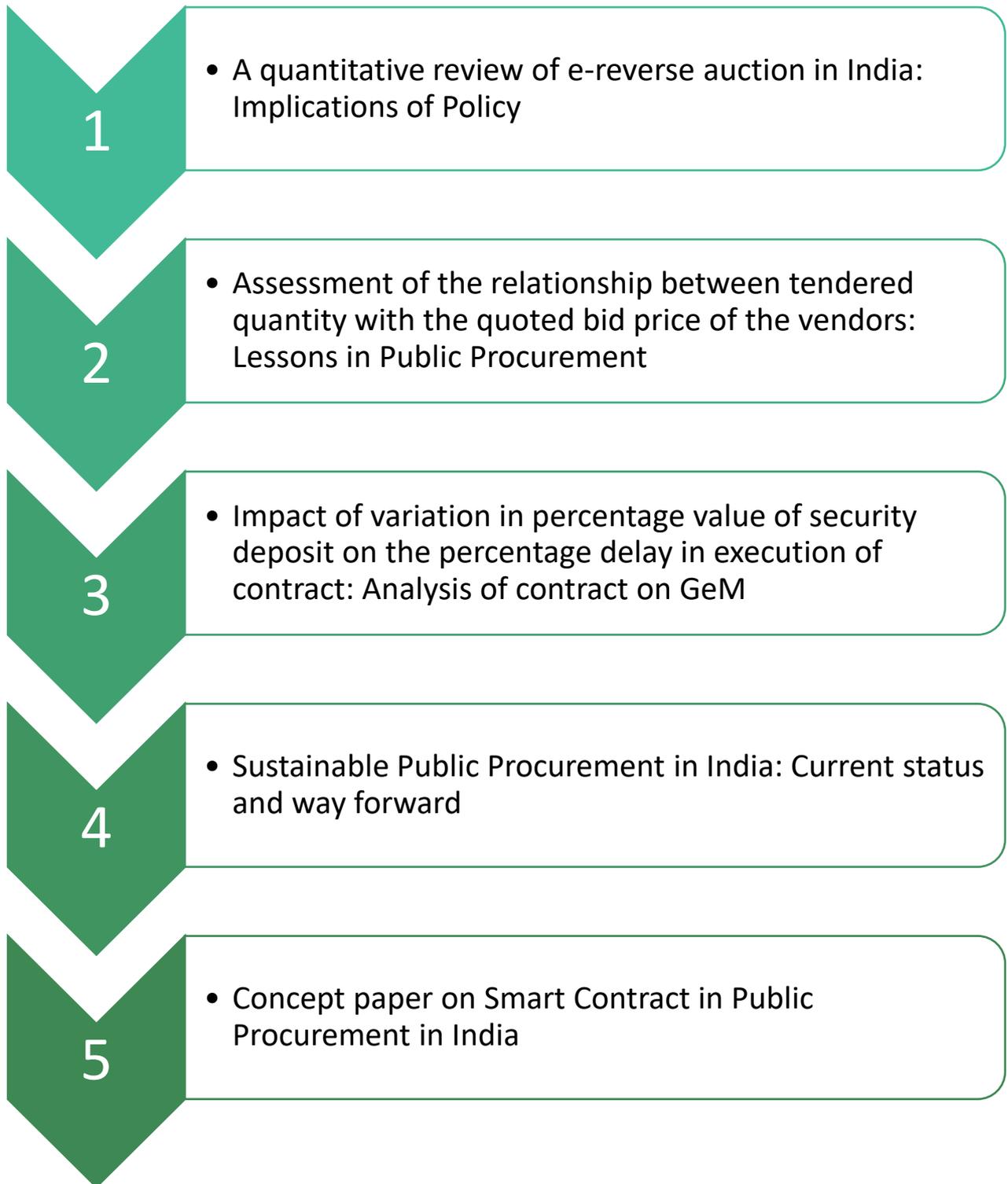
(2022-2024)



मनुष्यवती भूमिरर्थः

ARUN JAITLEY NATIONAL INSTITUTE OF FINANCIAL MANAGEMENT
(An Institute under Ministry of Finance, Government of India)

REPORTS SUBMITTED (2022-2023)



A QUANTITATIVE REVIEW OF E-REVERSE AUCTION IN INDIA

Implications for Policy



Report by Procurement Research Centre (PRC)



Arun Jaitley National Institute of Financial Management

Ministry of Finance, Government of India

The extant literature on e-RA brings out that the calling of two bid e-RA process and allowing the final decision only on price basis as stipulated in GFR is the theoretically correct approach to conduct e-RA. In terms of absolute price reduction, for a representative RA purchase of Rs 2700 cr, average reduction in price was about 1.99% from the initial minimum RA bid Price to final RA bid price from technically qualified vendors. Further, as a more refined approach to assess the relative efficacy of e-RA as a preferred choice of procurement over non-RA advertised tender (NRA hereinafter) bidding process, analysis of the bid price of the same item purchased through RA and also through NRA by the same Railway in the same calendar year was done. It brought out that if we take weighted average of the price reduction, the RA final bid rate was lower by 2.64% for regular order than the NRA min bid rate for the same item purchased by the same Railway in the same year. However, subsequent RA in subsequent years need not give the same reduction in price. Also, if a procuring entity is able to get six qualified vendors for participating in the RA price bidding, this is sufficient to bring about maximum reduction in RA final bid price. Any further increase in number of qualified vendors may not necessarily bring about further reduction in RA final bid price.

Assessment of the relationship between tendered quantity with the quoted bid price of the vendors

Lessons in Public Procurement



Report by Procurement Research Centre (PRC)



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The research shows that JIT purchasing is always a balance between inventory carrying cost and stockout cost. Also, JIT is highly sensitive to demand fluctuation. With the caveat as given above, given the severe repercussions of stockout within the safety driven organizations like Indian Railways (IR), since any stockout cannot be tolerated this research then studied whether there is any decrease in bid rate with increase in tender quantity. If found true, this will create a justification for increasing the ordered quantity i.e., using the annual procurement system. Through data analytics over the purchase data of 2019-21, for tender mode = advertised tender, we could zero on 25 rolling stock items (identified pan India by their part numbers) which have been purchased more than 30 times during 2019-21 by different procuring entity within IR. The scatter plot of minimum bid price vs tender quantity brought out that even if the tendered quantity increases by five times, the minimum bid price from regular vendor remains range bound, resulting in a very marginal decline. This means that increase in tendered quantity does not bring decrease in bid price. Hence any economy of scale approach is not valid here. Therefore, the logic of reduction in price by going for annual procurement is not valid here. However, centrality of 'JIT information' through supplier- buyer wide integrated digital system is an insight which is worth implementing in quality focussed government units like PSUs and Railways.

Impact of variation in percentage value of
Security Deposit on the percentage delay
in execution of contract:
Analysis of contracts placed on GeM



Report by Procurement Research Centre (PRC)

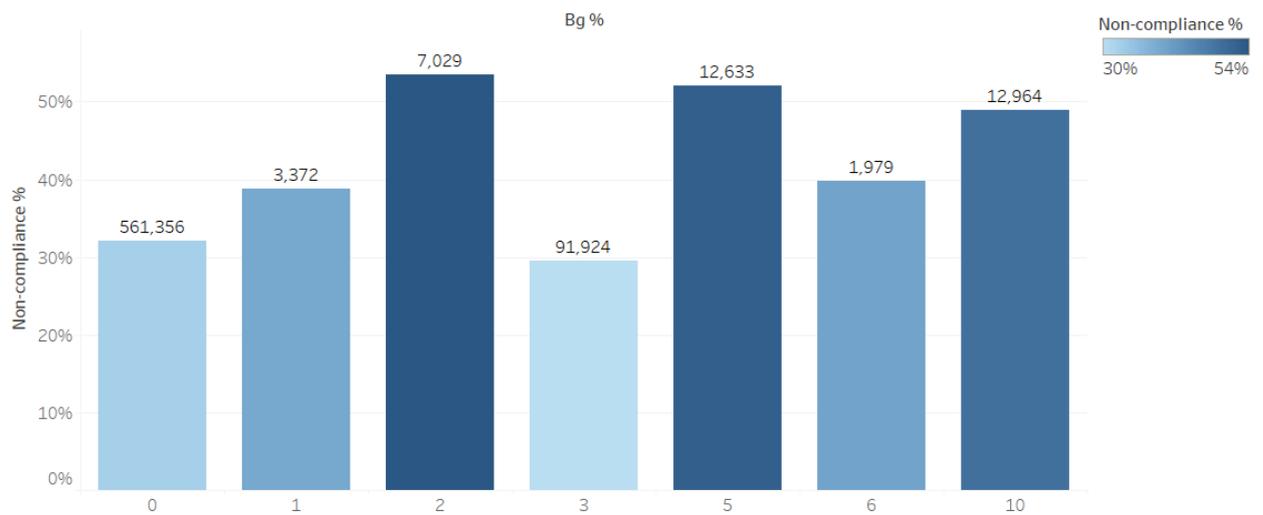


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Using GeM data, and after excluding outliers, an analysis of more than six lakh single item Purchase Orders (POs) (post year 2021 – to avoid Corona related distortions) brings out that increasing the % value of SD does not affect the % of delay in contract execution whether the SD% is 0% or upto 10%. A snapshot below makes it clear:

Non-Compliance% vs BG% with more than 1000 cases



Non-compliance % for each Bg %. Color shows Non-compliance %. The marks are labeled by # of Order IDs . The data is filtered on Order ID with single Subcat ID, Action (Category Level 1) and Action (Sub Category ID). The Order ID with single Subcat ID filter keeps True. The Action (Category Level 1) filter keeps 68 members. The Action (Sub Category ID) filter keeps 6,845 members. The view is filtered on Bg %, which keeps 7 of 45 members.

Thus, the hypothesis that “*with increase in the percentage of SD, the percentage of delay in supply decreases*” is not proved.

Sustainable Public Procurement in India: Current status and way forward



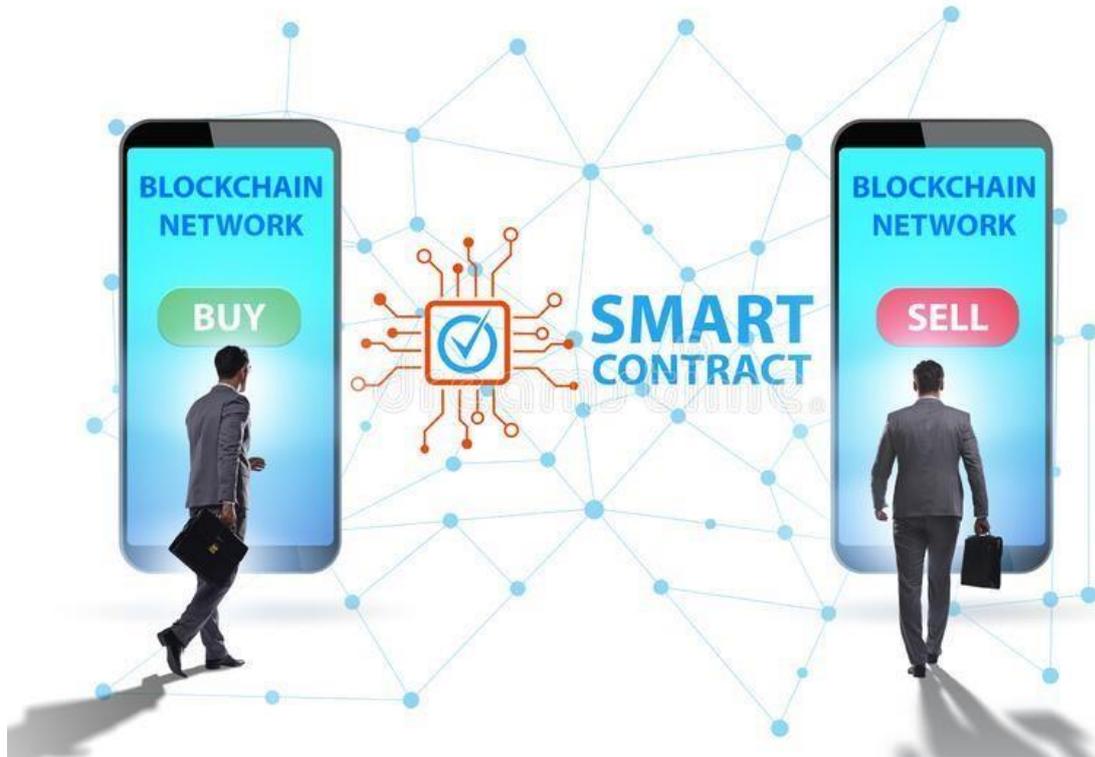
Report by Procurement Research Centre (PRC)



Arun Jaitley National Institute of Financial Management
Ministry of Finance, Government of India

This research brings out that in India, notwithstanding the policy directives for adoption of Value for Money, Life Cycle Cost and Quality Cost Based System (QCBS) criteria in place, the public tendering is often not done (nor monitored) with respect to environmental characteristics. Notwithstanding this, the analysis done in this research places India at 59/100 on the SPP index (as developed by UNEP in 2021) which is just two points below the category of ‘medium to high compliant’ country (61/100 is the threshold) and puts India in the category of ‘medium to low compliant’ countries (score range of 41 to 60). To put it in a comparative perspective, only 9 countries of the 40 countries which participated in the survey could score between 61 to 80 and were rated as ‘medium to high compliant’ on SPP. Analysis of the score obtained by India revealed that on the implementation aspect of SPP, it was only on the social dimension of SPP that India could score well. The process level adoption of SPP norms by Indian industries is among the top six countries globally. That is, there are sufficient number of products and services in India with sustainable specification. Hence, the necessary ground conditions for implementation of economic and environmental dimensions of SPP are already existing in India. In light of the fact that ‘policy commitment plans’ and ‘mandatory sustainable procurement rules/legislation’ emerged as the two top drivers of SPP during the UNEP 2021 survey, in order to nudge public procurement personnels in India towards greater adoption of sustainable procurement, a directive for minimum percentage of sustainable procurement (similar to those for MSEs in 2012) should be issued. This will promote green default behaviour among public procurement professionals. Purchase preference also needs to be given to vendors who are Bronze/Silver/Gold certified under ZED and for EcoMark/ISI mark products.

Concept paper on Smart Contract in Public Procurement in India



Report by Procurement Research Centre (PRC)

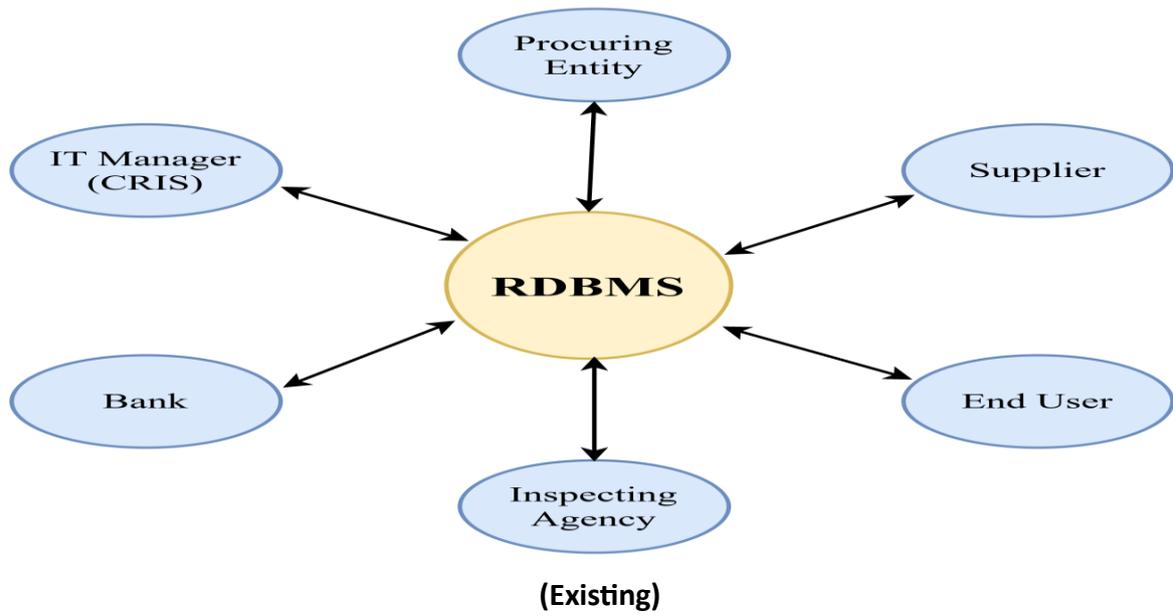


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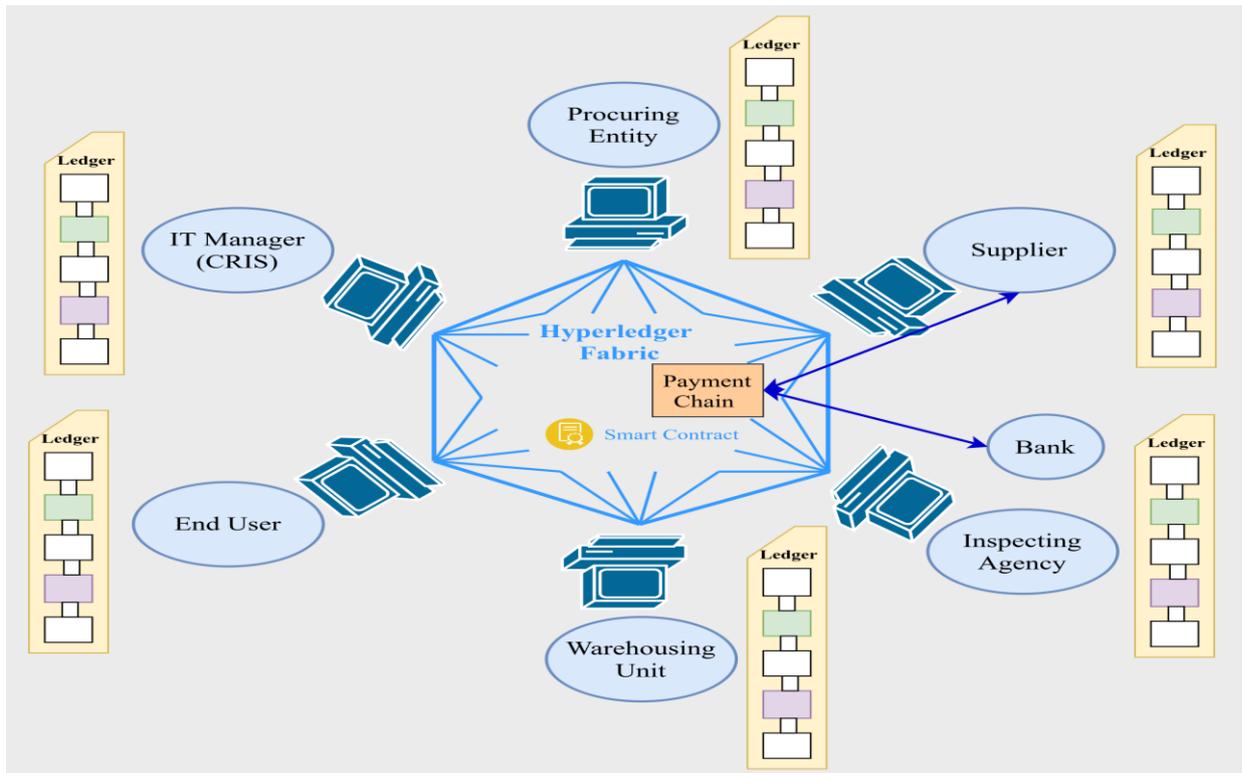
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“Smart Contract” is a computer code which set parameters that parties must agree upon before executing a transaction but is only initiated if all pre-agreed stipulations are met. Without relying on entities like arbitration, smart contracts can verify the facts from the time stamped predetermined events which thus makes each stage of contract execution ab-initio verifiable and also irrefutable. Procurement milestones such as contract, delivery, payment, warranty can be thought of as a series of events (called blocks) which gets added to a chain of event (hence the name blockchain) which once created cannot be undone unilaterally by any party. The irrefutability of not being able to undo an event is done by using simple “if/when...then...” commands. Thus blockchain-based contract is based on three pillars of decentralization, traceability, and immutability. By decentralization, we mean each participant in the procurement system - the procuring entity, the bidders, the inspecting entity, the warehousing personnel, the transporter, the end users, and the bank - can work on their respective digital systems, which can be traditional RDBMS based or which can be futuristic blockchain-based. To the extent a block of an event has been created, it becomes immutable, and it also gets time-stamped. Since this block is immutable, it is always going to figure as an event in any traceability exercise. During the research, one prototype smart contract was created using CRIS contract data. However, at present the blockchain technology has got issues of interoperability and inability to handle large transaction volume. But they will be overcome in next five to six years. For a perspective, Indian Railways did its first EP in 2008 and the rest of GOI adopted EP in 2012 based on Dhall Commission recommendation. Similarly, a beginning should be done for smart contract (SC) before we end up catching up with rest of the world. A schematic diagram of smart contract based digital system is shown below:



(Proposed)



REPORTS SUBMITTED

(2023-2024)

1

- Feasibility of Adoption of Documents-Only Arbitration as a mode of dispute resolution.

2

- Study of knowledge gaps in public procurement professionals and suggestions on how to overcome the knowledge gaps.

3

- Experience of some of the States in implementing special procurement procedures (e.g., State of Gujarat, Andhra Pradesh, Rajasthan etc., with the Swiss Challenge Scheme)

4

- Performance based Contract (Outright purchase of goods vs purchase through service or lease).

5

- Study on the Experience about working of GPA for Developing Countries of WTO GPA.

6

- Understanding the determinants of success in execution of high value contracts in India; arriving at understanding the internal design of these contracts and also external factors that influence their success.

FEASIBILITY OF ADOPTION OF DOCUMENTS-ONLY ARBITRATION AS A MODE OF DISPUTE RESOLUTION

Research Report

Procurement Research Centre (PRC)



**Arun Jaitley National Institute of Financial Management
Ministry of Finance, Government of India**

An analysis of 158 arbitration cases which were challenged upto the Hon'ble Supreme Court brings out that the challenge to arbitration is often on a point of law which becomes important in light of the arbitral decision and not often on the provisions of Arbitration and Conciliation Act 1996 (as amended from time to time). Therefore, the approach adopted in arbitration becomes irrelevant. Globally and in India, DOA has been considered worth trying only if the dispute is decidable based on clear and undisputed facts and involve straightforward legal issues. In DOA, the reliability, adequacy and quality of documents are important. Perhaps, these very pre-conditions of DOA are the impediments to adoption of DOA as even low value cases can involve technical and legal complexity and in India, the quality of documents cannot be vouched for. Another point to note is that arbitrator's own technical competence and ability/willingness to sheave through documents are important factors for success of DOA. Though one of best advantages touted in favour of DOA is quick dispute settlement, a survey among 59 practitioners from eight countries (including India) brings out that the likely time (6.4 months) in settling DOA based dispute settlement will not be much different from the likely time (6 months) in 'hearing based' arbitration settlement. This questions the very foundation of DOA. The majority of respondents from eight countries also mentioned a low percentage or negligible number of document-based arbitration except in the domain of maritime dispute in London. As an add-on, a UNCITRAL survey of 2019 brings out that in China and S. Korea, expedited arbitration (which may not be the same as DOA) is more popular than in the rest of world.

Organizational Preferences and Perceptions of Public Procurement Professionals in India: A Survey-based Study



Research Report

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1. The public procurement professionals in India prefer that a person working in this field should be trained in the following domains (and sub domains):

- (a) Leadership and Interpersonal Skills: (i) Emotional intelligence
(ii) Delegation
(iii) Collaborative contracting
- (b) Supply Chain Management: (i) Purchase order/ requisition processing
(ii) Spend analysis
- (c) Market and Commerce: (i) Market research
(ii) Supply market analysis/ Industry knowledge
- (d) Business Performance and Operations: (i) Project Management
(ii) Legal clarity

2. As a procurement professional, they do understand their role within the organisation but they do not relate their work to the outcomes because they feel that

(a) The focus in e-procurement is more on curbing corruption rather than quality-control. However, they acknowledge that GeM has increased transparency.

(b) The procurement is process driven and not result driven.

(c) They feel that their knowledge of vendor selection methods (e.g. QCBS), arbitration procedures, are not up to the mark.

(d) They understand the importance of timely payment to vendors, but feel that provisioning of finance is an issue not in their control. They suggest more intensive utilisation of existing training institutes and roping in of universities for training.

3. Their ownership for the procurement outcome is affected by the existing system which – as per them - unfairly places the burden solely on them, while the industry's role in adhering to unethical practices is overlooked. This is a demotivating factor while recognition of a good work motivates

**Experience of some of the States in
implementing special procurement
procedures (e.g., State of Gujarat, Andhra
Pradesh, Rajasthan etc., with the Swiss
Challenge Scheme)**



Research Report

Procurement Research Centre (PRC)



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The experience of adoption of Swiss challenge method (SCM) of bidding in India has not been encouraging. The failure of the Amravati project in Andhra Pradesh and failure of even award of contract for the construction of state highways in Rajasthan for 2350 km are some prominent examples, even though both states have Acts/Rules for public procurement. For station redevelopment, Indian Railways, after issuing tenders through SCM and failing to award any contract, reverted back to traditional construction bidding process. Further, the two projects where SCM based contract have been awarded - greenfield LNG terminal with floating storage and regasification unit (FSRU) facility in Gujarat (initiated in 2013, 79% work completed by March 2023) and the SJVN Green Energy in Punjab - the element of competition was missing as the award went to original proponent because no other offer came. In this context, it is worth noting that the Supreme Court of India has laid down healthy competition, no loss of revenue and absence of arbitrariness as some of the key yardsticks to be followed if SCM is to pass the legal muster. Therefore, when the terms and conditions that drive the SCM model are compromised, it results in an unending legal battle. At the review level, the Kelkar committee in 2015 and the Central Vigilance Commission (CVC) in 2021 did not speak favourably about SCM. Keeping in view all the issues associated with the use of SCM, CVC has recommended that a strong legal and regulatory framework to award projects under SCM needs to be in place before this method of procurement is more widely adopted.

**Performance Based Procurement
(Outright purchase of goods vs purchase through
service or lease):
Literature review, case study, suggestions**

by
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and
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Research Report
Procurement Research Centre (PRC)



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Research brings out that while PBPs are particularly suitable for service/leasing agreements in spare parts or after-sales services in private sector, the evidence is unclear in government procurement. Further, in case of service contracts, the full benefits of PBPs can be realised if the suppliers own the physical assets. However, asset ownership of not all public services can be transferred to a private party (example: water supply). PBP scores over traditional procurement if it is only about cost but when quality is also of concern, it is not always true. Most government transactions are indeed quality sensitive (sanitation, higher education, public infrastructure). Also, if performance is dependent on a range of exogenous variables not in the hands of the contractor, PBPs may not be very successful. Further, for successful PBPs,

(a) The presence of a mature and advanced contracting industry with the capability to undertake long-term quality assurance mechanisms is important.

(b) In the specific context of India, for multi-year contracts, it is to be noted that the average life of a corporation has reduced significantly, from average of 61 years in 1958 to merely 18 years in 2014.

(c) Research points out that the teamwork within the procurement bureaucracy is the most important determinant of successful public procurement.

The Indian case studies on PBP bring out that for effective design of PBP, (i) Clear delineation of responsibilities, and adaptability of contract to local contexts are pivotal, (ii) Adequate information on bottlenecks, aligning suppliers' incentives to market-based impulses and defining measures specifically from the buyers' side is crucial for PBPs to work.

Study on the experience (about working of GPA) of Developing Countries of WTO GPA

Research Report
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The developing countries studied (Armenia, Moldova, Ukraine and Montenegro) have only recently acceded to the WTO GPA. Armenia, Moldova, Ukraine and Montenegro have benefitted from improved technical knowledge, transparency and internal reforms, but the international participation has not increased significantly in some of these markets (due to the small size of the market). As compared to India, these countries are small in terms of size of the economy and do not have a wide industrial base. Therefore, it is not possible to make a comparison with India since the scope and scale of the economies of the recently joined developing countries differ widely. Past procurement patterns of GPA member countries indicate that joining the GPA does not guarantee firms from the participating countries in winning the tenders in other member countries who are part of GPA. However, it grants them the rights and privileges that allow them to bid for these tenders. Ultimately, it is the global competitive advantage of a nation which decides its ability to win a contract. So, we need to differentiate between increased 'market access' (which GPA promises) and increased 'market capture' which remains a function of a firm's competency and cost-effectiveness. Literature (Mulabdic & Rotunno, 2022) also indicates that the 'for public procurement of Goods, the influence of the WTO GPA is instead null or even negative when we control for all the relevant types of trade agreements. However, membership to the WTO/ GPA significantly increases cross-border public procurement of services'. 'Market access' notwithstanding, GPA members have a strong home bias and most procurement is awarded to domestically based suppliers. Thus what actually tilts the procurement in favour of a country is the competitive advantage that the country enjoys in different sectors. It explains why notwithstanding being a non GPA country, from 2013 to 2019, the proportion of US federal GP contract secured by Indian firms in the category of 'Professional, Scientific, and Technical (PST) Services' increased from 25.31% in 2013 (the last pre- GPA 2014 year) to 74.02% in the year 2019 (the last pre- Corona year), thanks to India's growing international competitiveness in PST sector. This is in line with the experience of Armenia that 'only those sectors in manufacturing which were already doing well, benefitted from GPA'. Incidentally among the four countries (Armenia, Moldova, Ukraine and Montenegro) studied, Armenia is the earliest signatory to GPA (2011). Assuming India becomes a member of the GPA, and in due course so does China, given the geographical proximity and existing supplier and production networks, there is a reason to believe that India would be facing a potential influx of Chinese equipment, goods and services which can further lead to expanding trade imbalance with China. India has chosen a bilateral mechanism with some of its major trading partners like the EU and the UK which provides greater flexibility in formulating commitments as compared to GPA's plurilateral mechanism. This way India also retains autonomy in its policy space.

Understanding the determinants of success in execution of high value contracts in India; arriving at understanding the internal design of these contracts and also external factors that influence their success

PRC/AJNIFM acknowledges the contributions of Shri Anil Kumar IRSE (Rtd) and Shri Dhirty Prasad Sen ex Executive Director/GAIL in preparing the draft of this report. PRC/AJNIFM also acknowledges the permission given by Sahay (2018) in drawing learning material from his doctoral thesis. This final report owes substantially to the untiring efforts of research associates of PRC/AJNIFM Ms Anshika Tripathi, Ms Renuka Gusain, Ms Vaishnavi Tandon and the office manager Ms Komal Sharma. They weaved a thread of continuity across the different sections of this report.

Research Report
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The four mutually independent factors which influence the success of high value contracts in India are pictorially shown in the Figure 1 below:

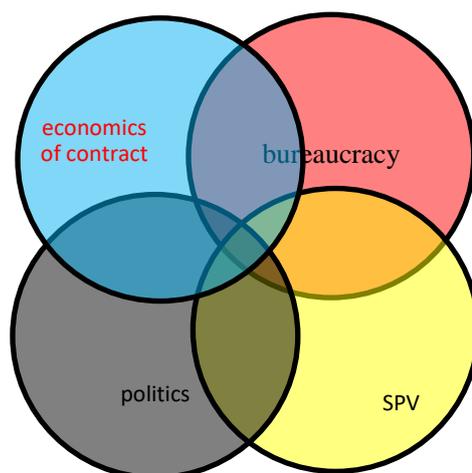


Figure 1

Figure 1 above shows that each of the four determinants has to be correctly aligned for success of infrastructural contract. Only when the four determinants are correctly aligned that a large contract can be successful. Thus, in practice there is a very small subset of favourable circumstances common to the four determinants which lead to successful project execution. The Figure brings into focus the role and importance of politics in infrastructural projects. This was a hitherto unknown determinant not reported in research earlier.

Further, to get an alternative focus on the determinants of delay, the other three factors can be repositioned within operational and governance categories as shown in Table 1 below:

Pre-contract stage	Post-contract stage		
Incomplete contract		Related to SPV	Related to bureaucracy
Bundling of contract, Strength of externality between construction phase and maintenance phase	Operational	Change of ownership during construction phase (displaced agency problem)	contractor selection method
	Governance	SPV ownership structure	Renegotiation, Relationship contracting

Table 1

The research brought out that all high value complex contracts are incomplete contract in the sense that it is not possible to specify all eventualities in a bid document/contract. This led to the development of bundled contract in which a single contractor is responsible for both construction/ supply and also service. In contrast,

an unbundled contract, the agencies for construction/ supply and service are different. However, bundling is not an unbridled panacea. With respect to bundling decision, this research developed and then validated through case studies the conclusions which is pictorially depicted in the Table 2 below:

Contract design	Strong service specification, less construction specification	Less service specification, strong construction specification
Bundled contract	The compulsion to fulfill detailed service specification compels the contractor that the construction is of good quality. Further, the contractor can take steps to do innovative things in construction which reduces service cost and thus overall cost of contract. (Less is better) Supported by case: DIAL [@]	Incentive for firm to reduce the cost of service. It may reduce the social benefit of service. (Less is not desirable) Supported by case: Gurgaon Express way (DGSCA) [@]
Bundled contract	Service quality is dependent on construction quality. Service quality will not be met as the construction was done by another contractor who would take advantage of weak construction specification and thus could afford to do a shoddy work as servicing the shoddy construction is not his responsibility. (Less is disaster) Supported by case: DAMEPL [@]	Service quality is dependent on construction quality. However since construction specification was strong, the service specification (whether strong or weak) should anyway be met. (Less is immaterial) Supported by case: Railways and GM [@]

Framework for contract design from the point of view of incomplete contract –the economics of bundling/ unbundling of contract

[@] DIAL: Delhi International Airport Limited, DGSCA: Delhi Gurgaon Super Connectivity Limited, GM: General Motors, DAMEPL: Delhi Airport Metro Express Pvt Limited

Table 2

To get a deeper understanding of the determinants, this research then performed an empirical analysis of 79 delayed projects selected at random from airport, roadways, railways, port and metro sectors. The reasons for delay in their execution were identified. For these 79 projects, this research analysed the reasons that are most likely to come up either concurrently or in isolation. A machine learning method called ‘frequent pattern-growth algorithm’ (FP-growth algorithm) was used. The result is shown in Table 3 below:

Sr no	Support level¹	Item set (i.e. factors)
1	0.4109	Environmental clearance
2	0.4520	Funding issues
3	0.8219	Land issues
4	0.4520	Regulatory clearance
5	0.4109	Regulatory clearance, land issues

¹Support level is the minimum support for an itemset to be identified as 'frequent'. For example, if an item appears 3 out of 5 transactions, it has a support of $3/5=0.6$

Table 3

At a cut-off point of 0.4 or above, the items (i.e. factors) which contributed to project delay are as indicated above. This indicates that often, it is the government wings whose (in)actions delay the project execution. It also shows that regulatory clearance and land issues tend to occur together.