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Analyses and evaluation of irregularities in public procurement in India

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Public procurement is prone to corruption, which in the global construction market alone accounts for an estimated US$340 billion per year. There is a growing need for procurement systems to be able to fight corruption and improve the effectiveness, efficiency, fairness and transparency of public procurement. A comprehensive list of irregularities in public procurement is derived from irregularities observed during technical vigilance inspections by experts and reported cases. The research involved a questionnaire survey, Delphi method and an empirical investigation of the dynamics of irregular practices in public procurement. The survey revealed the top 15 most frequent irregularities. The irregularities have been classified under five categories: transparency, professional standards, fairness, contract monitoring and regulation and procedural irregularities. The ranking of these categories reveals that transparency is the key factor requiring prime attention. The other categories are of nearly equal importance. A framework for good procurement is developed and actions proposed under five categories to curb corruption in public procurement. The framework and the irregularities can be related systematically to various aspects of combating corruption, and hence should fulfil the urgent need of policy-makers, professional staff, regulators and consumers.

Keywords: Corruption, India, irregularities, public sector procurement.

Introduction

Public procurement comprises all the outsourcing activities of the government, i.e. execution of works, a range of purchases and hiring of various services, etc. The definition has been adopted from the Central Vigilance Commission of India (www.cvc.nic.in) which is similar to the United Nations' view of public procurement, i.e. 'overall process of acquiring goods, civil works and services which includes all functions from the identification of needs, selection and solicitation of sources, preparation and award of contract and all phases of contract administration through the end of services contract or the useful life of an asset' (Thai, 2008, p.3).

Public procurement is most prone to corruption (Søreide, 2002). The most widely used definition of corruption currently is 'the use of public office for personal gain' (Gray and Kaufmann, 1998, p.7). The definition could be debated as there have been major corruption cases in the private sector as well. However, there is near unanimity in defining corruption by the leading banking institutions such as the African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank, International Monetary Fund, American Development Bank and World Bank (Asian Development Bank, 2006).

Several studies have concluded that corruption slows down development (e.g. Gould and Amaro-Reyes, 1983; Askin and Collins, 1993; World Bank, 1997). In addition, corruption can siphon off a nation's resources towards illicit personal gain at the expense of productive investments in fields such as health, education and infrastructure (Shleifer and Vishny, 1993), and destroys citizens' trust in leadership and the legitimacy of the system (Farazmand, 1999). Corruption is a key element in the inability of poor societies to take advantage of development opportunities (Bardhan, 1997; Abed and Gupta, 2002). Transparency International (TI) adds that 'Bribe money often stems from multinationals based in the world's richest countries' (Transparency

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International, 2007). Bribery and corruption hurt the poor. As a UK legislator has put it, the 'cost of bribes falls primarily on the poor. When a corrupt contractor from this or some other rich country pays a 15% bribe, he adds that to the price of his contract. His power station or irrigation scheme will cost more, and the little people—those who buy the electricity or the water to irrigate their crops—will pay the price of that bribe. Bribery is a direct transfer of money from the poor to the rich' (Hansard, 1998).

The World Bank has identified corruption as among the greatest obstacles to economic and social development. It undermines development by distorting the rule of law and weakening the institutional foundation on which economic growth depends. Corruption sabotages policies and programmes that aim to reduce poverty (World Bank, 1997). Transparency International (2005) has shown how corruption can add up to 25% to the cost of public contracting, generating waste of public resources, missed development opportunities, an unstable environment for businesses, and therefore increasing poverty.

Some efforts have been made in the past by different institutions to reduce corruption and bring fair practices into public projects at various levels. The American Society of Civil Engineers has come up with a 'zero tolerance' policy for corruption in construction project management (PM World Today, 2007). Similarly, Transparency International has developed an integrated and comprehensive system known as the 'Project Anti-Corruption System' (PACS) to assist in the prevention of corruption in construction projects (Transparency International, n.d.). This includes measures like appointment of an independent assessor, commitment by all participants, public display of project information, signing of anti-corruption agreements and compliance with anti-corruption rules by all participants. The multilateral development banks and international financial institutions have included fraud and corruption clauses in their generic master procurement documents. Attempts have also been made to prevent corrupt practices in the planning, design, and construction phases of a project.

Despite the efforts made to hinder corruption, it has reached epidemic proportions and is becoming one of the major challenges for management thought and practice in the 21st century (Pearce *et al.*, 2008). Sohail and Cavill (2008) report that corruption in the global construction market (estimated to be around US$3200 billion per year) accounts for an estimated US$340 billion. Annual government procurement in India is estimated to be Rs.500 000 crore (US$125 billion; 1 crore = 10 million) and may go up by at least 25–30% in the next two years (The Financial Express, 2008).

Arrowsmith and Hartley (2000) state that despite the scale and complexity of government purchases, the field of public procurement has remained a relatively under-researched area among economists, lawyers and other social scientists. The reasons are not difficult to comprehend. Corruption is difficult to identify since it is carried out, in most cases, clandestinely and away from the public eye and records. Corrupt practices are normally concealed. It is very difficult to prevent or uncover these practices for anyone who does not have the appropriate skills, access to the relevant documents and people, and an in-depth involvement in the project.

Sohail and Cavill (2008) observed that corruption in the construction industry often results from a combination of: deregulating the infrastructure sector; substantial flow of public money; the highly competitive nature of the tendering process; lack of transparent selection criteria for projects; political interference and caution in investment decisions; the cost of sector assets; the monopolistic nature of service delivery; tight margins; close relationships between contractors, subcontractors and project owners and the complexity of institutional roles and functions; the asymmetry of information between user and provider, or cronyism in the industry. There is no consensus to determine what activities qualify as corruption. But key corruption vulnerabilities in public procurement are the irregularities (Sohail and Cavill, 2008). So an understanding of irregularities can be of great help in thinking about measures to address the problem of corruption.

It is desirable that public procurement is as transparent and free of irregularities as is possible. Thus, the objectives set for the study are:

(1) To identify and analyse irregularities in public procurement.
(2) To identify key actions to curb corruption and provide government/management with an analytical framework to design rules, procedures, and policies to bolster transparency and integrity in public procurement.

In order to understand the various issues involved with irregularities in public projects, a thorough literature search was conducted through academic research journals, proceedings, dissertations, policy papers, occasional papers, publications, textbooks, newspapers and online databases.

Literature review

Cavill and Sohail (2007) emphasized the importance of accountability to reduce corruption in service delivery. They identified various forms and functions of accountability for infrastructure services, i.e. professional, financial, political, moral, administrative and legal. In a subsequent study, Sohail and Cavill (2008)

stressed the importance of accountability in preventing corruption in construction projects. They argued that with improved accountability, attention to ethics and cultural considerations, and reduced corruption, it is possible to construct, operate and maintain adequate quality and quantity of infrastructure on a more sustainable basis and thereby improve construction practices.

Sohail and Cavill (2008) developed a relational model based on the concepts of corruption, cultural norms, ethics and accountability. These concepts are linked to a system of functions and behaviours such as raising awareness, strengthening professional institutions, prevention of corruption, and enforcement and monitoring measures. Using the conceptual framework, they reviewed the links between accountability, norms, ethics, corruption and construction in practice and demonstrate the effectiveness of accountability initiatives in combating corruption in construction projects. Sohail and Cavill (2008) strongly emphasized accountability. They did not consider the views of experts dealing with the analysis of public procurement and they did not focus on what constitutes irregularities in public procurement. Considine (2002) opined that too much accountability can clog up the works.

Davis (2004) identified two elements common to all the successful anticorruption strategies encountered: changes that increase accountability and changes that increase the moral cost of misconduct (or the benefit of good conduct). Simplified procedures also reduce the opportunity for corruption (Pope, 2000). Thus, accountability, good conduct and simplified procedures help in combating corruption.

According to the Project Anti-Corruption System of Transparency International, corruption can take place during any phase of a public procurement, including project identification, planning, financing, design, tender, execution, operation and maintenance. Sohail and Cavill (2008) identified some examples of corruption that might be found at the project selection stage, planning stages, inspection stages, design stages, bid and contract signing stages, construction stages, service delivery stages, and maintenance and management stages of a project. The key stakeholders involved at each of these stages were also identified. The arrangements to combat corruption such as: raising awareness, strengthening of professional institutions, prevention of corruption enforcement and monitoring measures were derived from the identified lists of corruption.

Jourdain and Balgobin (2003) mentioned that transparency, economy, efficiency and fairness are the prerequisites of good procurement. Transparency is key to better public service provision. In the case of education, Reinikka (2001) observed that greater transparency can make a significant contribution to reducing corruption and embezzlement. According to Transparency International Argentina (Poder Ciudadano) most problems in public procurement come from the significant partiality in designing and awarding public contracts and lack of public access to information (Steets, 2001). Transparency International stress the importance of adhering to transparency to prevent irregularities in public procurement.

Some studies put heavy emphasis on prevention of corruption without dealing with the root causes of corruption. For example, Narasimhan (1997) suggested (1) preventive measures such as administrative reforms; (2) punitive measures such as mechanisms for effective investigation, court proceedings, departmental disciplinary action, etc.; and (3) promotional measures such as inculcation of moral and ethical principles, etc. to tackle corruption. In a move to combat global corruption within the construction industry, 19 international engineering and construction (E&C) companies have signed and adopted a set of business principles. The emphasis is on a 'zero tolerance' policy *vis-à-vis* bribery and development of a practical and effective programme of internal systems and controls (Filtration Industry Analyst, 2004). The measures to combat corruption have been suggested by the institutions and individuals based on their gut feelings and the limited cases in which the institutions or the individuals were involved.

Some studies report only on the ill effects of corruption and how it affects the development of poor people. For example, according to a study by Jain (2001), corruption influences bureaucratic efficiency. A corrupt bureaucracy will not necessarily award service and purchase contracts to the most efficient producer. In addition, the inefficient producer so selected could prevent the entry of new producers by exploiting his existing (corrupt) relationship with the bureaucracy. Kaufmann *et al.* (2004) consider the performance of infrastructure services (water, sewerage, electricity and telephones) in 412 cities in 134 countries and find that corruption has significant and substantial effects both on access to services and on the quantity and quality of service delivery. Most of these studies have been carried by institutions engaged in the financing of public projects.

A clear and comprehensive regulatory framework for the conduct of public procurement is a fundamental prerequisite for curbing corruption in public procurement (Asian Development Bank/OECD, 2006). According to Thai (2008), a legal framework based on publicity, transparency and a supervisory mechanism for award of public contracts will contribute to preventing corrupt practices in public procurement. It is evident from the preceding sections that very few systematic studies of unfair practices and irregularities have been conducted in a holistic manner especially in the context of public procurement. Hence an attempt to identify and

evaluate the various irregularities in public procurement has been made in this study. Also an attempt has been made to cluster these irregularities into few groups so that an exploratory framework for public procurement can be established. Finally, the managerial implications, if any, in the form of measures to be adopted to check the irregularities are also explored. The research method adopted to achieve the inherent objectives of the study is described in the following section.

Research method

As a first step, various irregularities observed during technical vigilance inspections by experts and case studies have been identified. The details of identified irregularities, their sources and other steps of the research method are given below.

Identification of irregularities

The following major sources were consulted for identification of irregularities in public procurement. These are (1) the Chief Technical Examiner's Organization; (2) Augilar *et al.* (2000); (3) Stansbury (2005); (4) the Public Procurement Directorate (2003).

The Chief Technical Examiner's Organization (CTEO) has a role to examine the public procurement and works under the Central Vigilance Commission (CVC) of India. The CVC, in India was set up by the Government of India to advise and guide central government agencies in the field of vigilance in order to overcome the evils of corruption in the Indian administrative system. It is also entrusted to investigate any transactions or complaints in which a civil servant was alleged to have acted improperly, and to monitor activities in government departments.

The CTEO publishes the generally observed irregularities on its website besides publishing the cases in which various irregularities are highlighted. It classifies irregularities in public procurement under three stages/phases of a public project: (1) pre-tender stage consisting of project formulation, appointment of consultants, preparation of detailed project report/detailed estimate; (2) tender stage consisting of prequalification, preparation of tender documents, inviting and opening of tenders, tender evaluation and award of work; and (3) execution stage consisting of compliance of agreement conditions, making payments, ensuring quality and timely completion. Augilar *et al.* (2000) have mentioned various irregularities in World Bank projects in their guide for preventing fraud and corruption in the World Bank projects. The World Bank (WB) also publishes cases involving fraud/corruption pertaining to public procurement.

Stansbury (2005) while developing the Project Anti-Corruption System (PACS) for Transparency International (TI) pointed out various irregularities in construction projects. Some of the irregularities are mentioned in the Public Procurement Directorate (PPD) while elaborating on strategies for public procurement reforms in the context of Kenya (Public Procurement Directorate, 2003)

Based on the literature presented in literature review section, the case studies reported by the CTEO, WB, PPD and TI, observations of technical vigilance inspection reports, and personal interviews with key officials involved in technical vigilance inspection, a list of 61 irregularities observed in the public procurement were identified and are shown in Table 1.

Preparation of questionnaires

A questionnaire based on the above-mentioned 61 irregularities was prepared. The questions requested the respondents to indicate the rate of occurrence on average for each of the mentioned irregularities. A sample question is shown in Table 2. The respondents were also given a choice to add any other irregularity not mentioned in the questionnaire. As can be seen, a six-point scale commonly found to have reliable properties was used to collect the responses.

Selection of respondents and collection of response

As mentioned earlier, the CVC has a Chief Technical Examiner's Organization (CTEO) to examine public procurement. The CTEO has two chief engineers called chief technical examiners, who are supported by eight technical examiners (TEs) and their supporting staff whose duty is to technically inspect public procurement from a vigilance angle. Clearly, there are very few personnel engaged in technical vigilance inspection in the Indian context. Thus, it was decided to contact all of them. From these eight technical examiners (respondents for the study), six responses were collected in person and one through electronic mail. One respondent did not oblige.

Analysis of data

As the group of experts was small and considerable variation in opinion was observed, it was found appropriate to apply the Delphi method to obtain the most reliable consensus of opinion from these experts.

The Delphi method is one of the widely used group techniques. It was developed about 60 years ago as a means to collect and synthesize expert judgments. The technique facilitates the obtaining of highly reliable data

Table 1 List of 61 irregularities observed in public procurement

S. no.	Type of irregularity	Source
1.	Administrative approval and financial sanction not taken to execute the work	Chief Technical Examiner's Report
2.	The provisions are not as per laid down yardstick	Chief Technical Examiner's Report; Stansbury (2005)
3.	Work is not executed for the same purpose for which the sanction was accorded	Chief Technical Examiner's Report
4.	Realistic technically sound estimates are not prepared	Augilar *et al.* (2000); Chief Technical Examiner's Report
5.	Some components are repeated in more than one item	Chief Technical Examiner's Report
6.	The consultant is not appointed after proper publicity and open competition	Augilar *et al.* (2000); Chief Technical Examiner's Report
7.	The credentials of all consultants have not been verified	Augilar *et al.* (2000); Chief Technical Examiner's Report
8.	The criteria adopted in prequalification of consultant are restrictive and benefit only few consultants	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
9.	The offer of lowest consultant is ignored on flimsy grounds	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005); Public Procurement Directorate (2003)
10.	The selection of consultant not done by appropriate authority	Chief Technical Examiner's Report; Public Procurement Directorate (2003)
11.	The role of consultant is not clearly defined	Chief Technical Examiner's Report; Public Procurement Directorate (2003)
12.	The provisions are not made for payment to consultant for part performance or repetitive work	Chief Technical Examiner's Report; Public Procurement Directorate (2003)
13.	The upper ceiling limit for payments to consultant is not fixed	Chief Technical Examiner's Report
14.	The detailed project report (DPR) is not prepared as per actual site requirement	Augilar *et al.* (2000); Chief Technical Examiner's Report
15.	Consultant does not submit performance guarantee in time	Chief Technical Examiner's Report
16.	Performance guarantee submitted by consultant is not renewed from time to time	Chief Technical Examiner's Report
17.	The reimbursement of service tax, excise duty, etc. is not done after obtaining the actual proof of depositing the same	Chief Technical Examiner's Report
18.	The updated standard bidding document is not used for tendering process	Augilar *et al.* (2000); Chief Technical Examiner's Report; Public Procurement Directorate (2003)
19.	The tender documents are not approved by competent authority	Chief Technical Examiner's Report; Public Procurement Directorate (2003)
20.	Stipulated conditions in the contract are not feasible to be operated	Chief Technical Examiner's Report
21.	The performance guarantee clause is not stipulated	Chief Technical Examiner's Report
22.	The condition regarding splitting of quantities, if required, is not stipulated in the tender document	Chief Technical Examiner's Report; Public Procurement Directorate (2003)
23.	The nomenclature of the items, drawings and specifications do not conform to each other	Chief Technical Examiner's Report
24.	Adequate & wide publicity is not given to tender	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
25.	Adequate time for submission of tender/offer not given	Augilar *et al.* (2000); Chief Technical Examiner's Report
26.	Complete address of place of tender submission not notified	Chief Technical Examiner's Report
27.	Documents for sale and opening of tender are not properly maintained in transparent manner	Chief Technical Examiner's Report
28.	Unduly restrictive criteria stipulated, creating entry barrier for potential bidders	Augilar *et al.* (2000); Chief Technical Examiner's Report

(*Continued*)

Table 1 (*Continued*)

S. no.	Type of irregularity	Source
29	The objective evaluation criteria for contractor not clearly notified in the tender document	Chief Technical Examiner's Report; Public Procurement Directorate (2003)
30.	Stipulated prequalification (PQ) criteria for selection of contractor are stringent	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
31.	The PQ criteria are not kept same during evaluation of potential bidders as notified	Augilar *et al.* (2000); Chief Technical Examiner's Report
32.	The evaluation criteria are not notified to the bidders	Chief Technical Examiner's Report; Stansbury (2005)
33.	The prequalification is not carried out as per notified criteria	Augilar *et al.* (2000); Chief Technical Examiner's Report
34.	The credentials of the bidders are not matched and verified with the notified criteria	Augilar *et al.* (2000); Chief Technical Examiner's Report
35.	The evaluation of tenders is not done exactly as per the notified criteria	Augilar *et al.* (2000); Chief Technical Examiner's Report; Public Procurement Directorate (2003)
36.	The bids/tenders are not opened in presence of bidders	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
37.	All corrections, omissions, insertions, overwriting are not attested and accounted for	Chief Technical Examiner's Report
38.	'On the spot summary' is not prepared in tender opening register and signed by the person present	Chief Technical Examiner's Report
39.	The decision on tender is not given by appropriate authority within validity period	Chief Technical Examiner's Report
40.	Some items are deleted after opening of tender	Augilar *et al.* (2000); Chief Technical Examiner's Report
41.	The negotiation on tender not done as per laid down guidelines	Chief Technical Examiner's Report
42.	The conditions/specifications are relaxed in favour of contractor to whom the work is being awarded	Augilar *et al.* (2000); Chief Technical Examiner's Report
43.	The offer of lowest bidder is ignored on flimsy grounds	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005); Public Procurement Directorate (2003)
44.	The work order/supply order is not placed within justified rates	Chief Technical Examiner's Report; Stansbury (2005)
45.	Work is executed without the availability of funds for the said purpose	Augilar *et al.* (2000); Chief Technical Examiner's Report
46.	The work is not executed as per original sanction accorded	Chief Technical Examiner's Report
47.	The bank guarantees submitted by bidder not verified	Chief Technical Examiner's Report
48.	Compliance with conditions regarding obtaining licences, insurance policies and deployment of technical staff not being followed by contractor	Chief Technical Examiner's Report
49.	The compliance with agreement conditions not fulfilled	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
50.	All the mandatory tests not being carried out	Chief Technical Examiner's Report; Stansbury (2005)
51.	The proper record of hindrances is not being maintained from the beginning	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
52.	The technical staff as per tender stipulation is not provided at site	Chief Technical Examiner's Report; Stansbury (2005)
53.	The contractors are paid for that part of the work which was not done by them	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
54.	The contractors are not paid for that part of the work which was done by them	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
55.	All the recoveries as per contract are not effected	Augilar *et al.* (2000); Chief Technical Examiner's Report

Table 1 (*Continued*)

S. no.	Type of irregularity	Source
56.	The deviations, especially in abnormally high rated and high value items are not properly monitored and verified	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
57.	Duplicate payment for the same activity under two different items is released	Augilar *et al.* (2000); Chief Technical Examiner's Report; Stansbury (2005)
58.	Recoveries for the land rent or equipment given to contractor not effected	Chief Technical Examiner's Report
59.	The recoveries for statutory taxes/duties not made before releasing the payment	Chief Technical Examiner's Report
60.	Escalation clause is not applied correctly for admissible payment	Chief Technical Examiner's Report; Augilar *et al.* (2000); Stansbury (2005)
61.	The required guarantees for watertightness of roof/ basements, etc. and termite proofing are not obtained	Chief Technical Examiner's Report

Table 2 Sample question of questionnaire

Q 1: As per your experience of vigilance inspection please rate occurrence of following irregularities on average, on a scale of 1 to 6 as below

Sl. no.	Statement	Level of endorsement					
1.	Administrative approval and financial sanction not been taken to execute the work from competent authority	1	2	3	4	5	6
2.	Work is executed without the availability of funds for the said purpose	1	2	3	4	5	6
3.	The consultant is not appointed after proper publicity and open competition	1	2	3	4	5	6
4.	The compliance with agreement conditions not fulfilled	1	2	3	4	5	6

Note: Legend: 1: True always; 2: Mostly; 3: Frequently; 4: Sometimes; 5: Seldom; 6: Never.

from certified experts through the use of strategically designed surveys (Hallowell and Gambatese, 2009). Landeta (2006) has highlighted some of the weaknesses of the Delphi method. The method is liable to manipulation in the selection of experts and the biases of each expert. The researcher conducting the study can also influence the outcome. It is difficult to check the method's reliability. In spite of these weaknesses, the method has been found to compare well with techniques such as statistical groups and classic direct interaction groups (Van de Ven, 1974 cited in Landeta, 2006).

In general, in this technique the feedback or information from the experts is collected in a number of rounds. The responses for each round are analysed and the median of responses, inter-quartile ranges, and some extreme views of a respondent on a specific point are communicated to the respondents in the next round. The process is repeated up to the pre-decided number of rounds. It may be pointed out that reaching consensus is not necessarily the central objective or a measure of success of such studies. The questionnaires were administered in three rounds, as explained below.

Round 1

The responses collected from administration of Round 1 of the questionnaire were used to find out summary statistics of responses such as mean, median, inter-quartile range and standard deviations. Ranking of the 61 irregularities mentioned earlier was also done. There were wide variations in the respondents' consensus range (defined as relative inter-quartile range) and hence it was decided to reaffirm the responses by conducting Round 2 of the same questionnaire to the participating respondents.

Round 2

In the second round, values representing the medians and inter-quartile ranges were provided to the experts, as well as pertinent comments submitted by the respondents on the previous round. Experts were asked to reconsider their responses, and if any of the new responses were outside the designated consensus range for the previous round they were asked to briefly support their position. There was a marked improvement in the

respondents' consensus range evaluated using the responses of Round 2.

Round 3

As in the second round the respondents were provided with the responses of the previous round and a summary of the group's responses mentioning median and inter-quartile ranges. If a respondent's latest response was outside the consensus range even now they were asked to briefly support this 'extreme' position. Analysis of Round 3 responses brought no change in the responses of Round 2.

Ranking and categorization of irregularities

Frequently occurring irregularities have been identified based on mean and standard deviations. Further, the 61 irregularities have been grouped into five categories based on the interviews of the experts and available literature. Subsequently the ranking of the categories has also been established using statistics.

Validation of results

A summary of results of the questionnaire survey was presented to the experts (one from the eight respondents and the superior officer of the eight respondents). Personal interviews with the experts led to the validation of the results as the experts could relate most of the outcomes of the survey to their day-to-day technical vigilance inspection findings.

Analyses and findings

The data were analysed. The reliability of the six-point scale used in the survey was determined using Cronbach's coefficient alpha, which measures the internal consistency. The value of the test was 0.962 (F statistic = 3.544; p = 0.000), which was greater than 0.5, indicating that the six-point scale measurement was reliable at the 5% significance level.

Consensus

Consensus is the measure of the amount of agreement achieved in the last round and the first round. The consensus in this study was measured by computing the RIR (relative index rating) for all the 61 irregularities in all the rounds. The RIR is the change in the spread between the lower and upper quartile values per unit mean value for a given irregularity. In other words,

$$\text{RIR} = ((\text{Q3} - \text{Q1})/\text{Mean}) \times 100$$

The RIR values for the first and final rounds for the first 15 irregularities are shown in Table 3.

Table 3 Ranking of frequently occurring irregularities ($3.5 < \text{mean} \leq 4.5$)

Sl. No.	Nomenclature of irregularities	After first round			After final round		
		Rank	Mean	RIR	Rank	Mean	RIR
1.	Realistic technically sound estimates are not prepared	2	4.00	75.00	1	4.29	46.62
2.	The consultant is not appointed after proper publicity and open competition	1	4.00	0.00	2	4.14	0.00
3.	The provisions are not made for payment to consultant for part performance or repetitive work	3	3.86	25.90	3	4.00	0.00
4.	Compliance with conditions regarding obtaining licences, insurance policies and deployment of technical staff not being followed by contractor	10	3.57	56.02	4	4.00	0.00
5.	The upper ceiling for payments to consultant is not fixed	13	3.57	84.03	5	4.00	50.00
6.	The compliance with agreement conditions not fulfilled	8	3.86	51.81	6	4.00	50.00
7.	The role of consultant is not clearly defined	12	3.57	84.03	7	3.86	51.81
8.	All the mandatory tests not being carried out	9	3.71	80.86	8	3.86	51.81
9.	The proper record of hindrances is not being maintained from the beginning	5	3.86	51.81	9	3.86	51.81
10.	The detailed project report (DPR) is not prepared as per actual site requirement	4	3.86	51.81	10	3.86	51.81
11.	The credentials of all consultants have not been verified	6	3.86	51.81	11	3.71	53.91
12.	'On the spot summary' is not prepared in tender opening register	7	3.71	53.91	12	3.71	53.91
13.	Adequate & wide publicity not given to tender	24	3.00	66.67	13	3.57	28.01
14.	The prequalification is not carried out as per notified criteria	19	3.14	63.69	14	3.57	36.90
15.	The technical staff as per tender stipulation not deployed at site	11	3.57	56.02	15	3.57	56.02

In the second round of this study, the RIR values generally showed considerable reduction. However, in the third round, no expert changed his ranking and thus RIR values remain unchanged. However, as indicated in Table 3, the convergence varied considerably from question to question. This could be the result of the involvement of mixed types of experts: four were involved with the technical vigilance inspection of civil works, two were involved with electrical works, and remaining two were involved with store (stock) related works.

Ranking of 61 irregularities

Based on the mean values of the responses obtained from the final round, the 61 irregularities mentioned in the questionnaire were ranked. For obtaining the mean values of the responses corresponding to a given irregularity, the scale was reversed. In the revised scale '1' was assigned a weight of '6', '2' was assigned a weight of '5', '3' a weight of '4', and so on. The irregularity with the highest mean value was assigned rank 1, the next highest was assigned rank 2 and so on for all the 61 irregularities. Wherever two or more irregularities had the same mean value, the one with the lowest standard deviation was assigned the highest ranking.

Frequently occurring irregularities

Table 3 shows the mean values and RIR values of the top 15 frequently occurring irregularities in public procurements. These irregularities have mean values between 3.5 and 4.5 (inclusive of 4.5) on revised scale. We find that the top 15 irregularities are of a frequently occurring nature. The frequently occurring irregularities identified are also largely in line with the findings of the technical vigilance inspections reported in the inspection reports available at the CVC website. This was also validated by TEs and CTEs during personal interviews.

Categorization of identified irregularities

For reducing corruption, Sohail and Cavill (2008) argued for accountability whereas Jourdain and Balgobin (2003) mentioned transparency, economy, efficiency and fairness. Since procedural accountability, contractual monitoring and regulation help in achieving economy and efficiency, it can hence be argued that, for good procurement, the presence of credible restraints, a monitoring mechanism and accountability is necessary, which come through transparency, professional standards, fairness, contractual monitoring and regulation and procedural accountability. This is also in line with Thai (2008) who argued for a legal framework.

Based on this concept and on the outcome of personal interviews with the experts in the CTEO, 61 irregularities were classified under five categories: (1) transparency irregularities; (2) professional standards irregularities; (3) fairness irregularities; (4) contract monitoring and regulation irregularities; (5) procedural irregularities. These categories with irregularities are shown in Figure 1 and are discussed below.

Transparency

According to Jourdain and Balgobin (2003) 'transparency' is defined as an objective (neutral) and public (visible) mastering of the whole process from call for tender to contract award and management. An important indicator of transparency is the 'public advertisement', which must be adequate and prompt and provide identical responses to all the requests for clarification.

In other words 'transparency' means that laws, regulations, institutions, processes, plans and decisions are made accessible to the public at large or at least to 'representatives' of the public so that the processes and decisions can be monitored and influenced by the stakeholders, and decision makers can be held accountable for them. It is observed that in this category, there are six irregularities out of 61 which pertain either to inadequate publicity or to a failure to define clearly the criteria for selection at the time of publicity.

Professional standards

Professionals must be committed to uphold high standards of integrity and liability, act according to the core values and guiding principles of their organization and promote these standards, values and principles. Surveys conducted by researchers in Australia (Vee and Skitmore, 2003) and South Africa (Pearl *et al.*, 2005) identified several unethical conducts and ethical dilemmas in the construction industry such as corruption, negligence, bribery, conflict of interest, bid cutting, under-bidding, collusive tendering, cover pricing, frontloading, bid shopping, withdrawal of tender, and payment game. It is evident that there exist significant areas of concern pertaining to the ethical conduct practised by construction professionals. Jordan (2005) stated that unethical behaviour is taking an increasing toll on the reputation of the industry. A Standard of Professional Conduct to govern the ethical practices in the American civil engineering profession was published by the American Society of Civil Engineers (ASCE, 2000). On the other hand, Australia has its own codes of tendering to enhance fairness and transparency (Ray *et al.*, 1999).

The irregularities due to lack of professional standards occupy this domain—a total of 16 irregularities

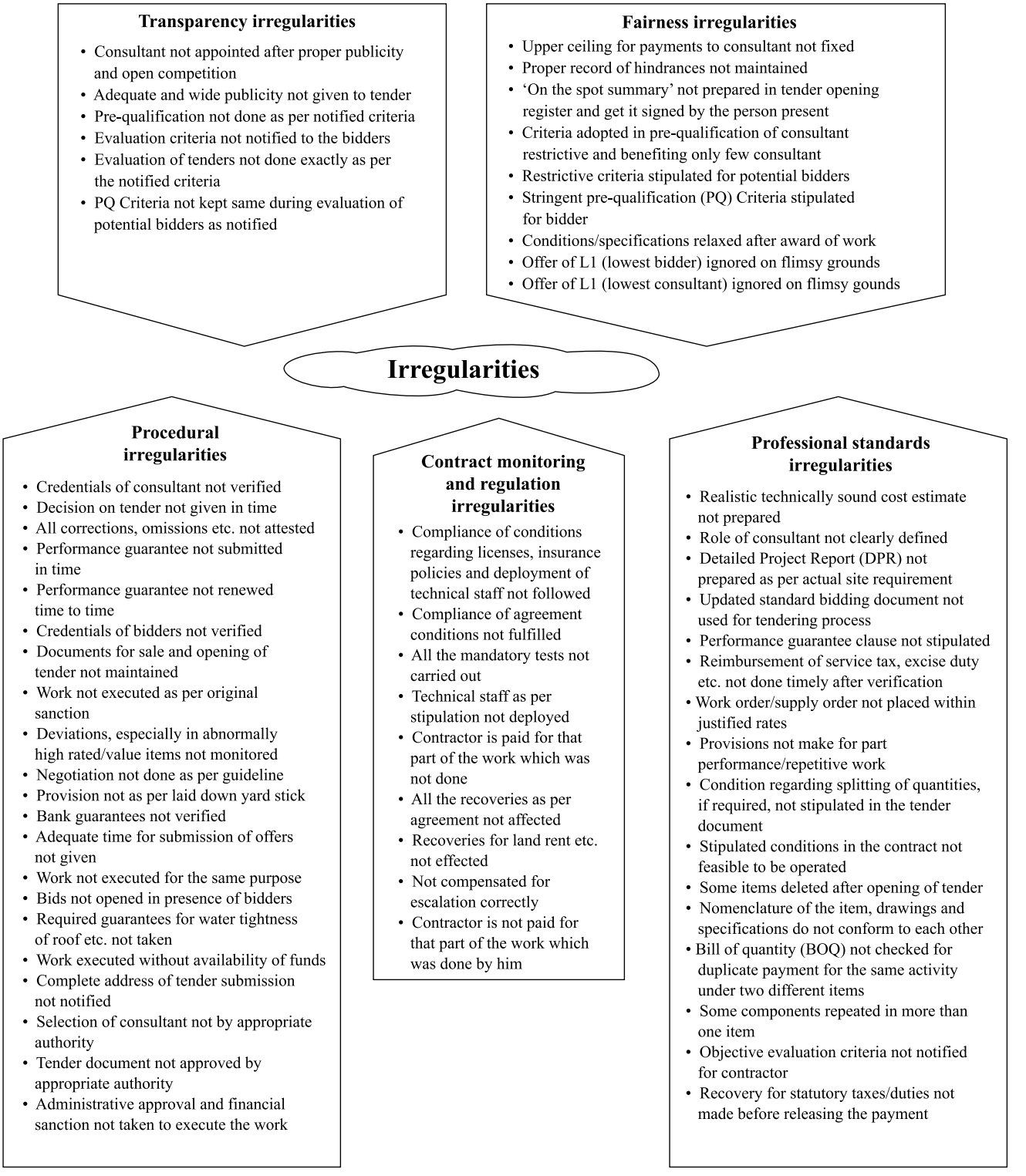

Figure 1 Categorization of irregularities in public procurement

out of 61. One possible example of such irregularity is to prepare a faulty DPR (detailed project report) or estimate which is not based on actual site requirements and prevailing costs, thereby favouring some stakeholders.

Fairness

According to Jourdain and Balgobin (2003) 'fairness and equity' in the procurement process are indicated by a low number of complaints received. Tender

rejections for marginal reasons and patterns of contracts awarded by the same institution are important criteria for verifying compliance with this exigency. Failure to comply with these principles indicates corrupt or fraudulent practice, which is defined as the misuse of an individual's position for improper/unlawful enrichment.

In other words, 'fairness' means providing fair and equitable treatment to all prospective bidders/suppliers. The concept of fairness is closely related to justice also. It centres on how people are treated by others, especially the requirement that they be treated alike, in the absence of significant differences between them. The distinctive focus of fairness is in the decision-making processes of institutions that apply rules.

It is observed that the criteria adopted in prequalification of consultant/bidder are often restrictive and entry barriers are created with the aim to benefit only a few consultants/bidders. There are a total of nine irregularities pertaining to this domain within this category.

Contract monitoring and regulation

Contract monitoring and regulation pertain to compliance with agreement conditions/contractual obligations. Once an agreement is signed, the public officer has to ensure compliance with the stipulated conditions of the agreement.

Irregularities pertaining to non-compliance with agreement conditions/contractual obligations fall within this category. Many irregularities such as not taking licences and insurance policies, not insisting on deployment of technical staff, etc. are committed by not complying with the stipulated conditions of an agreement. A total of nine irregularities have been placed within this category.

Procedural

The irregularities occurring due to non-compliance with procurement principles and procedures come within this category. The centrepiece of procurement principles and procedures is contained in the works manual of the department concerned. A total of 21 irregularities have been placed within this category.

Ranking

After categorization, the mean values for each of the categories were calculated. The categories were ranked based on the mean values. The category with the highest mean value was given first rank; the category with the next highest mean value was given second rank and so on. The rank of categories along with their mean values is shown in Figure 2.

- The irregularities pertaining to transparency issues occupy first rank. Corruption thrives in the dark and manipulation for personal benefit is facilitated by opacity. It also suggests that opaque processes are quickly abused by criminal elements. Hence it is essential that transparency be created from the very beginning to avoid any scope for manipulation.
- The irregularities pertaining to professional standards occupy second rank. The best and most suitable technical expertise should be employed in a non-discriminatory manner through fair and open competition to avoid irregularities of this category.
- Occurrence of irregularities pertaining to fairness issues occupies third rank. This calls for a fair and impartial selection of bidder besides a fair and impartial bid award decision. Public funds should not be used to provide favours to specific individuals or companies.
- Contractual monitoring occupies fourth rank. The contractual obligations must be complied with and whenever violation of contractual obligation occurs the perpetrator must be taken to task and accountability be fixed. The records pertaining to explanation and justification of all decisions and actions should be maintained.
- Procedural irregularities are ranked fifth. Systematic procedures must be formulated for in-built accountability of decision makers to avoid such irregularities.

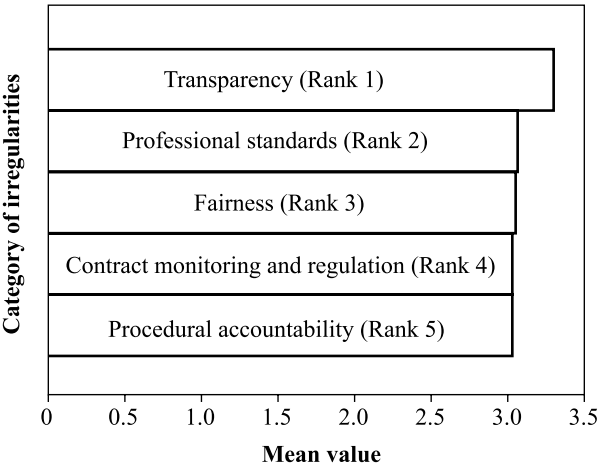

Figure 2 Ranking of different categories of irregularities

Although the ranks have been determined based on the mean values, it may be observed from Figure 2 that except for 'transparency irregularities' the mean values of the remaining four categories of irregularity do not show any significant difference.

Discussion

The opinions of the experts have been gathered on the occurrence of various irregularities observed during technical vigilance inspections. The experts agreed with the ranking of the different categories of irregularity. It is difficult to draw a clear line between these categories because of the overlapping nature of a few irregularities but a general framework for effective action to curb corruption in public procurement can be drawn.

Transparency

Transparency is the most prominent area (rank one) requiring management attention as suggested by this study. Some of the measures to bring in transparency could be: clearly defined procurement parameters, clarity in criteria employed for the evaluation of offers, clear contract terms, and so on. An opaque dimension for such parameters would create opportunities for corruption-induced manipulation.

The information on procurement procedures and the regulatory framework must be available to all potential suppliers in understandable terms. Lack of information may reduce the number of possible bidders, which may affect the competition and thereby the prices. Lack of competition may result in risk of collusion, formation of cartels, and fewer responsive bids. It would also increase opportunities for favouritism and nepotism.

Professional standards

Such irregularities are committed when professionals do not uphold high standards of integrity and liability, and do not follow organizational values and guiding principles. The issues pertaining to part payment, repeat work, doubling of items for payments, and not preparing drawings and specifications as per actual requirements, etc. come under profession-related irregularities.

Fairness

The criteria adopted in prequalification of consultants/bidders are often restrictive and create an entry barrier. The restrictions so imposed may be framed to help select bidders domestic or international, small or large, and so on. Restrictive prequalification norms may limit competition and can abet the corruption as explained in case of 'transparency categories'.

Clear and predetermined criteria for tender evaluation help ensure fair, impartial, and transparent selection and eliminate the risk of abuse.

Transparency of the criteria and transparency in the process of bid evaluation is crucial in bolstering the bidders' trust in the fairness of the procedures. To avoid leakage of information on the lowest bid to a preferred supplier and to exclude late bids, the bid opening ideally takes place immediately after the tender period. Unnecessary delay in the opening of bids causes doubts and should be avoided. Opening the offers in public or at least in the presence of all bidders or their proxies helps ensure that documents have not been altered or destroyed. This also allows manipulations if any to be detected at an early stage. Just as bidders should be allowed to be present at the opening of the bids, bidders should also be informed of the outcome of the selection, allowing them to review the evaluation result.

In some organizations, the summary of bid opening is prepared on loose sheets which means that there is the possibility of getting them replaced in order to favour some bidder. Properly sealed registers with proper authentication should be used instead of loose sheets mentioned earlier.

Contract monitoring and regulation

Contractual laxities are committed by not complying with the stipulated conditions of agreement/contractual obligations. These laxities can be a cause of corruption and thus an in-built mechanism for the compliance with contractual conditions should be explored and formulated. Standardized, clear and concise tender documents contribute to reducing such laxities.

Procedures

The procedural irregularities are ranked last. This could be due to the fact that the procedures and accountability are well defined in the works manual for public procurement. The works manual deals with various issues such as threshold values, technical requirements, procedural details, and so on. There could be some cases requiring adaptation in non-routine circumstances which may give scope for manipulation. Some regulatory mechanism for such non-routine circumstances should also be incorporated in the works manual. In the absence of such a mechanism, routine circumstances may be projected as a non-routine circumstances giving rise to manipulations.

Sound verification procedures also have an important preventive role. The possibility that decisions can be overturned by higher authorities renders corrupt practices more difficult and, therefore, constitutes, together with credible sanctions, a strong incentive to respect the procedures.

Arresting irregularities pertaining to transparency, professional standards, fairness, contract implementation, and procurement procedures can reduce corruption in public procurement. In fact, skilful monitoring and implementation of these categories will help

in ensuring that the public procurement is as transparent and free of irregularities as is feasible.

The real value of the knowledge of the top 15 most frequently occurring irregularities to practitioners is to determine potential pitfalls. This would help them take corrective actions before major problems result. The knowledge of these irregularities and categories will assist professionals in reviewing grey areas as part of the transparency and fairness, etc. This provides a starting point from which an assessment of anti-corruption performance can be made.

Conclusions

Preventing irregularities in public procurement is of utmost importance because of its widespread impact on development. In order to check these irregularities, previous studies laid emphasis on corrective measures in isolation, for example, transparency, accountability, and so on. However, corruption is not easy to tackle by adopting these measures in isolation. There are different kinds of irregularity in public procurement. Specifying the same recommendation (either reliance on transparency alone, or reliance on accountability alone) to tackle different irregularities is like specifying the same medicine for different types of ailment. For example, a faulty DPR prepared to favour one of the stakeholders, and an ambiguous contract document drafted to favour some stakeholder cannot be addressed by adopting transparency measures alone. Such irregularities need to be addressed differently.

From the published cases and literature, 61 irregularities were identified in public procurement. From among these irregularities, the top 15 most frequently occurring irregularities were identified, which, if addressed properly, could have significant influence. The 61 irregularities are further categorized into: (1) transparency; (2) professional standards; (3) fairness; (4) contract monitoring and regulation; and (5) procedural irregularities. The categorization of irregularities would help determine the kind of strategy to be adopted by policy-makers and planners. For example, while some of the irregularities may require bringing in transparency in the system, some may require holding someone accountable, and so on.

Transparency definitely needs more attention as indicated by the ranking of five categories of irregularity; however the other four categories of irregularity cannot be overlooked. This is because substantial irregularities are committed in public procurement on account of: lack of fairness, accountability, contractual monitoring and procedural issues.

For the immediate attention of policy-makers, preventive mechanisms must be in place to check the most frequently occurring irregularities, while in the long term a sound system addressing all five categories of irregularity must be put in place. The framework is expected to be acceptable to policy-makers since the recommendations emanate from the different types of irregularity reported from real cases on public procurement and are not merely opinions of some researchers or some organizations. Further studies are needed to comprehend and formulate strategies to curb irregularities in public procurement in other parts of the world undertaken in a different procurement environment and under different procedural frameworks.

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