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The impact of anti-corruption strategies on corruption free performance in public construction projects

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Despite extensive efforts, corruption in public procurement has reached epidemic proportions and has become one of the major challenges for management. Because corrupt practices mostly occur under wraps, the task of combating corruption becomes even more difficult. In the course of a review of the extant literature on the theme a number of independent constructs with the potential to develop anti-corruption strategies have been identified. A research model was developed on the basis of the hypothesis that anti-corruption strategies lead to corruption free performance in public construction projects. A questionnaire survey was administered and 105 responses were collected. 'Anti-corruption strategies' was defined as a second order construct composed of four latent constructs: leadership, rules and regulations, training and fear of punishment. The structural equation modelling (SEM) technique was used to test the hypothesized positive inter-relations between anti-corruption strategies and corruption free performance. The significance of the role of management leadership, rules and regulations, training, as well as fear of punishment is highlighted to help policy makers and construction institutions in understanding the role of various anti-corruption strategies in public construction projects so that they may contribute to this important endeavour in achieving the goal of promoting economy, efficiency, quality, fairness and transparency.

Keywords: Anti-corruption, corruption, India, public construction projects.

Background

The most widely used definition of corruption is 'the use of public office for personal gain' (Gray and Kaufmann, 1998, p. 7). The involvement of top executive leadership in scandals in recent years has significantly contributed to corruption. Those who were supposed to be the custodians of public money were found to be involved in financial irregularities and all kinds of unethical practices (Pearce *et al.*, 2008). Moreover, fighting corruption is very difficult because it is a multifaceted social phenomenon that penetrates horizontally and vertically through many areas of society. There have been extensive efforts by government, and by non-governmental and international organizations to combat corruption and establish specific guidelines to prevent bribery and unethical practices in international business (Getz and Volkema, 2001).

Furthermore, dealing with corruption has become an important issue in building the states' institutional capacity (World Bank, 1997). Corruption is difficult to identify since it occurs, in most cases, clandestinely and away from the public eye and records. 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. Svensson (2005) indicates that corruption can be a response to either beneficial or harmful rules. Corruption appears in response to benevolent rules when individuals pay bribes to avoid penalties for harmful conduct or when the monitoring of rules is inadequate. Ashforth and Anand (2003) state that there are other routes to corruption besides amoral and immoral behaviour, including principled disagreement with public policy and laws, managerial incompetence and the unin-

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tended consequences of myriad actors and actions ricocheting within complex systems and contexts.

According to Transparency International, corruption in construction projects is a complex problem. It may occur in the form of bribery, extortion, fraud or collusion, and during any phase of a project, viz., project identification, planning, financing, design, tender, execution, operation and maintenance (Transparency International, n.d.). More corrupt countries spend relatively less on operations and maintenance and have lower quality infrastructure (Tanzi and Davoodi, 1997). 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 foundations on which economic growth depends.

In order to mitigate and eliminate the debilitating effects of corruption, nations, organizations and individuals have proposed and implemented several anti-corruption strategies. The anti-corruption strategy in Hong Kong involves investigation, prevention, education and the enlistment of support. A key element of the strategy is the Independent Commission Against Corruption (ICAC), which operates in both the public and the private sectors and seeks to coordinate the separate components of the strategy (Cavill and Sohail, 2007). Like Hong Kong's anti-corruption strategy, Botswana's Directorate of Corruption and Economic Crime (DCEC) has developed a three-pronged attack, with a focus upon investigation and prosecution, public education and prevention (Doig and Riley, 1998). Anti-corruption strategies need to be tailored to the social environment in which the corruption occurs to make them effective. Further to make these strategies more effective, Spector (2005) recommends a sectoral approach, as the incidence of, or vulnerability to, corruption varies by sector in many countries. It makes sense to devote limited anti-corruption resources and efforts to sectors that are more vulnerable to corruption. This pragmatic strategy not only enhances the likelihood of success but also has positive spillover effects on combating corruption in other sectors as it demonstrates that corruption can be defeated.

Despite the efforts made to curb 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 (with a value estimated to be around US\$3200 billion per year) accounts for an estimated US\$340 billion per year. Annual government procurement in India is estimated to be worth Rs.500 000 crore (US\$125 billion; assuming \$1 = Rs. 40) and may go up by at least 25–30% in the next

two years (The Financial Express, 2008). There can be no doubt about the need to address the menace of pervasive corruption in public construction projects. The state of research on corruption is such that there is little inductive theory or statistical evidence about the kinds of policies that work under particular conditions. Neither is there much analysis of how corruption has been or might be reduced or how to identify it. Unfortunately, the construction industry continues to rely heavily on traditional preventive and punitive measures. This implies that the mechanism of measuring the anti-corruption performance or arresting corruption in construction projects is in its infancy and needs to be developed. The sooner this mechanism is known, the sooner a cure may be found. To address this need, a research model is developed linking anti-corruption strategies with corruption free performance in public construction projects. Understanding the intricacies of anti-corruption strategies in a holistic manner will help public procurement reformers contribute to this important endeavour in achieving the goals of promoting economy, efficiency, quality, fairness and transparency. As scholars have pointed out, the ways in which both corruption and its prevention are to be measured have been the subject of debate. For the purposes of this research, qualitative determinants were used to measure a range of variables. This model is then used:

- to test the hypothesized positive inter-relations between anti-corruption strategies and corruption free performance in public construction projects; and
- to examine the impact of various constructs.

Anti-corruption initiatives in the public sector in India

The Central Vigilance Commission (CVC) in India follows a three-pronged strategy to tackle bureaucratic corruption. First is the simplification of rules and procedures, so as to reduce the scope of corruption. The second element is to bring greater transparency to the entire political system. The third element is effective punishment (Vittal, 2001). Most societies have some institutions and procedures that have prevention, detection or punishment of corruption as part of their mission. These include criminal laws, court systems and prosecutors, general inspectorates, supreme audit agencies, civil service codes and hierarchies, frameworks of administrative law and freedom of information and ombudsman institutions (Meagher, 2004).

Public sector projects are not meant to earn profits as private sector projects are, but aim to deliver an

efficient product/service for the public by following certain prescribed rules and procedures. The projects are subjected to financial audit and scrutiny by external agencies. Financial audit and anti-corruption agencies, which are independent and vested with the authority to enforce laws, can be a potent force in combating financial irregularities and corruption. Measures for tackling the problem of corruption may be broadly classified under three heads: (1) preventive; (2) punitive; and (3) promotional. Preventive measures include administrative reforms, which render the transaction of all government business more transparent and accountable to the people. Punitive measures may be prescribed and enforced by laws, rules and the mechanism for effective investigation, court trial, departmental disciplinary action and other means to deter corrupt functionaries. Promotional measures encourage value-based politics, inculcation of moral and ethical principles in the younger generation in schools and colleges, and social ostracization of dishonest people (Narasimhan, 1997).

Theoretical framework

Corruption was rarely treated as a management problem in the past because of obvious reasons such as scarcity of data, restricted and tentative studies with few theoretical frameworks. Rules and regulations, values and ethics, and punishment are used as tools in fighting corruption and improving anti-corruption strategies. The theoretical framework for anti-corruption strategies and corruption free performance is discussed below.

Anti-corruption strategies

For corruption to continue to thrive, three elements must co-exist. First, someone must have discretionary power. Defined broadly, this power would include authority to design and administer regulations in a discretionary manner. Second, there must be economic rents associated with this power. Moreover, the rents must be such that identifiable groups could acquire those rents. Third, the legal/judicial system must be such that there is a sufficiently low probability of detection and/or penalty for any wrongdoing (Jain, 2001).

A clear and comprehensive regulatory framework for conducting public procurement is a fundamental prerequisite for curbing corruption in public contracting (Asian Development Bank/OECD, 2006). As per Thai (2008), a legal framework that contemplates objective procedures for awarding contracts, based on

the principles of publicity and transparency, and provides a mechanism for subsequent supervision of the projects through the incorporation of effective review procedures will contribute to restricting the opportunities for corrupt practices, as it creates a barrier against corruption and other illicit uses of public resources. As a result, procedures to ensure fair competition between and equal treatment of bidders, implemented through rules and regulations and establishing accountability, are important in the fight against corruption as measures of a general nature. Although the regulatory aspects imply great progress in this battle, we cannot ignore the fact that, on occasions, the rules are broken by procurement officials and policy makers. Thus, corruption in public procurement is often caused by those officials who disregard existing procurement rules (Søreide, 2002), and whenever this happens, the personal interest of whoever is taking the decisions in the contractual process overrides the desired objectivity. Punitive measures are used to counteract this partiality. There are more specific measures intended to curb corruption by promoting the probity of the actors involved in public procurement procedures. These include codes of conduct, conflict of interest regulations, incompatibility laws and rules on abstention designed for public officials. Training is used as a tool to foster awareness of rules and ethical issues among the public officials.

The range of variables and constructs leading to anti-corruption strategies are shown in Figure 1. The research model, shown in Figure 2, follows the broad hypothesis that anti-corruption strategies lead to corruption free performance. The anti-corruption strategies are determined by the four independent constructs identified in the literature, i.e. leadership, rules and regulations, training and fear of punishment. Although no studies have investigated the relationship of the above constructs to corruption free performance, a few studies have reported the impact/relationship of one or two of the above factors directly or indirectly (Jain, 2001; Meagher, 2004; Zoghbi-Manrique-de-Lara, 2006). It should be noted that an examination of the inter-relations among these constructs, in an integrative or sequential fashion, is beyond the scope of this study.

As such, we need to define constructs of anti-corruption before we proceed further. These constructs are discussed below.

Leadership

Leaders can develop and facilitate the achievement of a mission and vision of fair performance, develop values required for long-term success and implement them via appropriate actions and behaviours. They

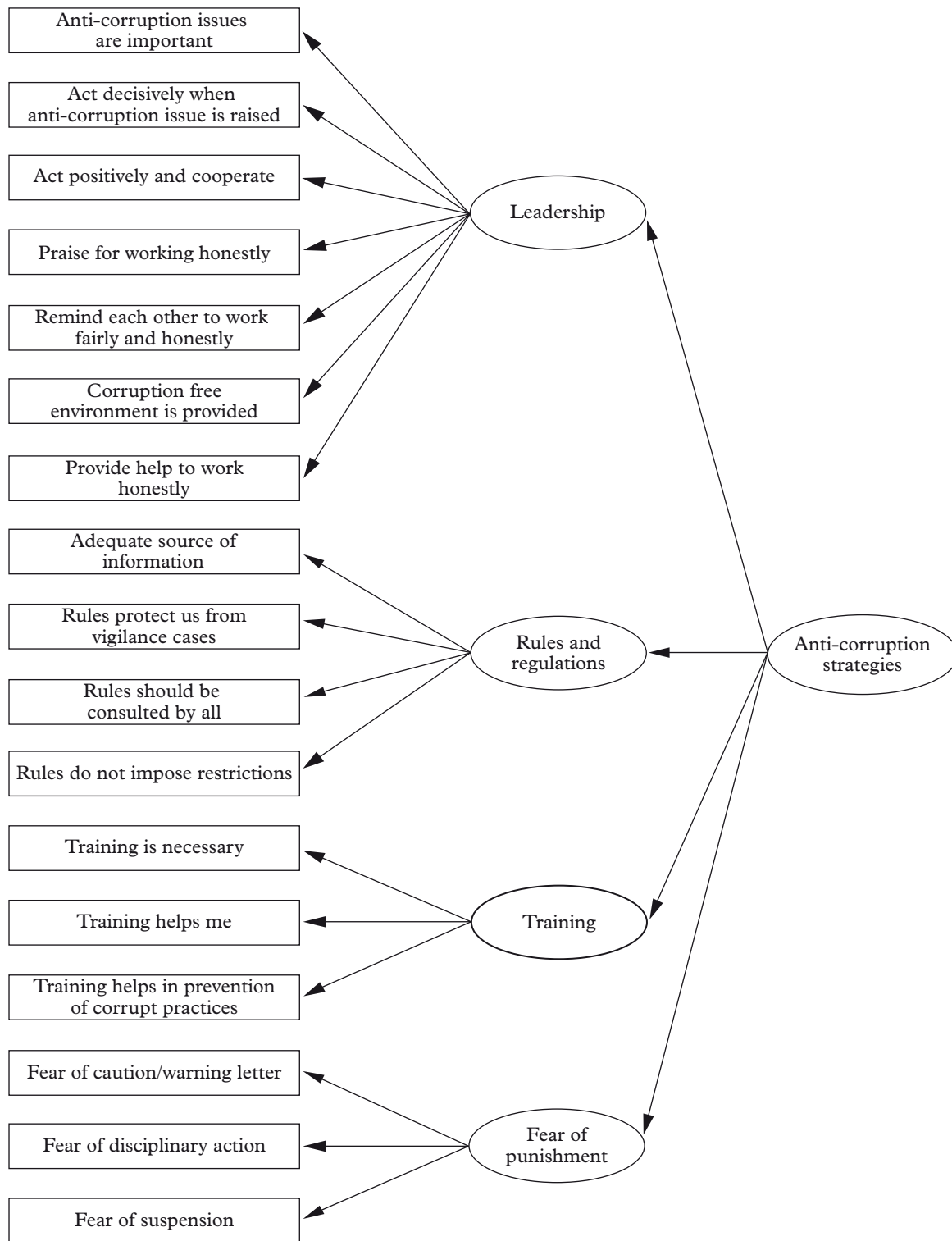


Figure 1 Hypothetical model of anti-corruption strategies

need to be personally involved in implementing an anti-corruption strategy. Ashforth and Anand (2003) point out that leaders play a potentially major role in the institutionalization of corruption because they

may ignore, condone or even reward corrupt behaviours. Hence, the selection of first-rate leaders is paramount when it comes to inoculating an organization against the potential for corrupt business practices

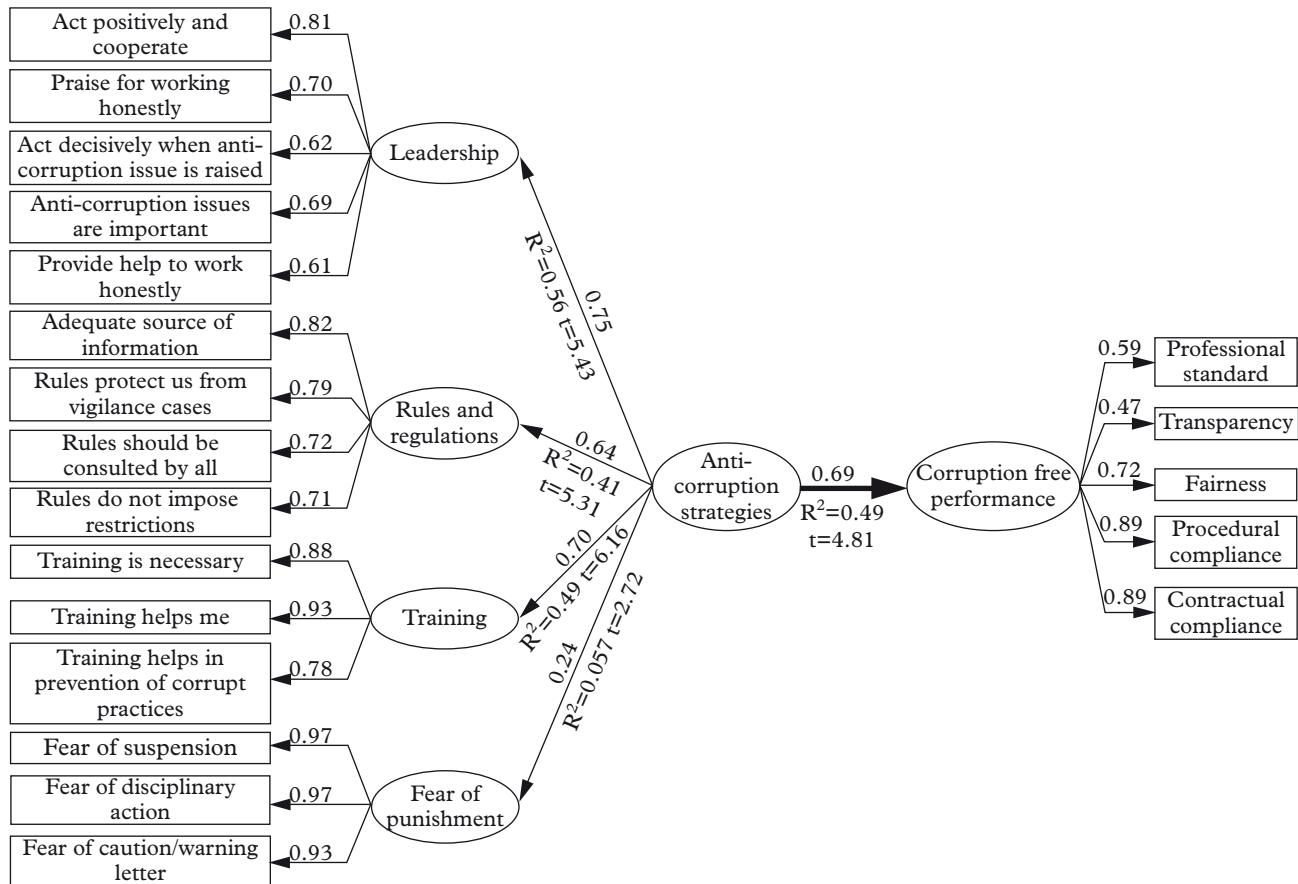


Figure 2 Structural equation model

(Mumford *et al.*, 2003). The role a good leader plays in promoting anti-corruption measures of fairness and transparency cannot be overemphasized. Management's role has to go beyond organizing and providing anti-corrupt fair and transparent policies and instructions for working methods. It can be said that a committed leader develops and facilitates the achievement of a mission and vision of anti-corruption cleanups, develops values required for long-term success, and implements them via appropriate actions and behaviours.

The politics of corruption also shows that self-preservation could be a strong motivating force for leaders to promote anti-corruption cleanups (Gillespie and Okrunhlik, 1991). Mumford *et al.* (2003) found that individuals whose values stressed contributions to others, as opposed to personal gain, exhibited greater integrity when confronted with ethical decision-making dilemmas. Institutionally, fighting corruption would require a commitment from the leadership (Ruzindana, 1997; Tanzi, 1998). Theoretical analysis by Sosa (2000) shows that individual values act as self-imposed corruption deterrents. In summary, it is the workers' confidence and values

that have acted as self-imposed corruption deterrents.

The critical element to our model here is the notion that committed leadership is responsible for an organization's anti-corruption strategies and for a fair and transparent environment on site. Leadership involves developing and communicating mission, vision and values to the members of an organization. A good leader is expected to create an environment for empowerment, innovation, learning and support (Shirazi *et al.*, 1996). Successful leadership can basically be described as comprising four attributes, namely top management commitment, effective two-way communication, management accountability and management leading by example (Chinda and Mohammad, 2008).

Rules and regulations

As per Thai (2008), a sound public procurement system needs to have good procurement laws and regulations. In practice and theory, public procurement laws and regulations have been considered as one of the most important pillars of a sound procurement system.

An organization needs to implement its mission and vision of anti-corruption policies via clear stakeholder-focused strategies, supported by relevant rules and regulations. Rules and regulations are the core component of anti-corruption policies. Studies have shown that the main factors affecting the scope and breadth of corruption are the rule of law, particularly anti-corruption legislation (Leite and Weidmann, 1999). Top managers and directors need to establish clear and well-enforced corporate guidelines and policies against corruption, rather than relying on the personal morality of employees (Rose-Ackerman, 2002).

Training

Training represents another important area to consider for guarding against potential corruption (Charan, 2005). Unfortunately, research suggests that insufficient attention is given to this need in organizations (Pearce, 2004). Ashforth and Anand (2003) strongly believe that, because of the intransigence of normalized corruption, corruption is best handled through prevention—through proactive means of forestalling corruption rather than reactive means of rooting it out. Ethical values and awareness must be inculcated and institutionalized at all levels of analysis (individual, sub-unit, organization and industry) and incorporated into everyday decision making and action. Ethical training, based on a code of ethics that is grounded in specific role-based situations and dilemmas, can foster awareness of ethical issues and thereby forestall amoral behaviour and will act as deterrent. Individuals at all levels of analysis must know that they will be held accountable for means as well as ends, and real sanctions should be promulgated to encourage ethical behaviour and discourage corruption (Ashforth and Anand, 2003).

Fear of punishment

A society's views about the fairness with which penalties are applied may influence the fight against corruption (van Rijckeghem and Weder, 1997). French and Raven (1959) define a coercive power base as being dependent on fear. In effect, coercion in organizations refers to the practice of compelling workers to act by employing the threat of several forms of harm (Bass, 1990). In this sense, punishment is widely argued to be the most important coercion tool for social control in organizations (Zoghbi-Manrique-de-Lara, 2006). Its proponents defend its potential efficacy by indicating, for example, that there is a widespread belief that the ultimate cause of misconduct is developed in the rationality of workers' minds. In our study, we focus on the fear construct as an intimidation construct that aims to measure the level

of fear of formal punishment among an organization's employees.

We developed three items to assess this construct. Based on the levels of severity of disciplinary action established in a study by Trahan and Steiner (1994), Zoghbi-Manrique-de-Lara (2006) opted for four of the levels studied by those authors, namely, those that he considered to provoke a real fear, not of the severity of punishment but of the real possibility of suffering punishment in the case of theoretical deviant behaviour in the workplace. We took into account the characteristics of the specific disciplinary procedure in the public organization researched. In line with the CVC policy, all these types of punishment on the scale are stipulated.

Corruption free performance

Performance measurement is an important process that quantifies the efficiency and effectiveness of all actions in every business (Amaratunga et al., 2000). Therefore, it is also important to measure corruption free performance. However, that fact that corrupt practices are normally concealed makes measurement difficult. Such practices are carried out, in most cases, clandestinely and away from the public eye and records. The increased popularity of performance measurement has also led to the investigation of qualitative measures in contrast to the traditional measures, which were expressed in financial terms (Kaplan and Norton, 1992). As a result, a new field of study emerged in which researchers started to search for different measurement parameters and assess their impact on performance. It was proposed to measure all dimensions qualitatively, i.e. by seeking participants' subjective opinions on a number of variables rather than simply comparing the numbers of penalties imposed or officers prosecuted, ratio of successful convictions to acquittals, overall perceived levels of corruption, etc.

Initially, attempts were made to ask respondents to report the level of corruption at a construction site; but since it might directly affects them, nobody was prepared to share their views. There was no direct way available to measure it. So, an indirect approach was developed. A broad framework was developed by Tabish and Jha (2011), based on the irregularities identified in public construction projects, and respondents were asked to report compliance to specified parameters. In fact most of the parameters, like standardization of contract documents, publishing of evaluation criteria and compliance with performance criteria were in line with ISO 10845 for fair and transparent construction procurement. Tabish and

Jha (2011) identified 61 irregularities and categorized them under five major categories: (1) transparency; (2) professional standards; (3) fairness; (4) contractual compliance; and (5) procedural compliance.

Transparency

'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.

Professional standards

Professionals must be committed to uphold high standards of integrity and liability, act according to the core values and guiding principles of the organization and promote these standards, values and principles.

Fairness

'Fairness' means providing fair and equitable treatment to all prospective bidders/suppliers. The concept of fairness is closely related to that of justice. 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 way that rules are applied by the decision-making processes of institutions.

Contractual compliance

'Contractual compliance' means 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.

Procedural compliance

'Procedural compliance' means compliance with procurement principles and procedures. The core procurement principles and procedures are contained in the works manual of the department concerned.

Respondents' subjective opinions on each of the above categories were obtained to assess the corruption free performance at a particular construction site.

Research method

Measurement of constructs

Given the model described in the preceding section, five constructs were developed to measure leadership, rules and regulations, training, fear of punishment

and corruption free performance. A qualitative research method was chosen to examine the proposed hypothesis. A questionnaire survey was used in order to facilitate the collection of information from construction sites. The identified constructs and their items were scrutinized and verified through a series of face-to-face interviews with a number of selected public project practitioners possessing sufficient experience in public construction projects, including senior management representatives in India. A total of 10 key target project participants were interviewed to solicit their perceptions on these constructs and the items measuring these constructs. The interviews were conducted in the respondents' offices, and lasted for one to two hours, depending on the time allocated by the respondents and the level of detail of their answers. A pilot study questionnaire was drafted to test the measuring items and constructs of a public construction project. A draft of the main empirical research questionnaire was reviewed by the participants during the face-to-face interviews. Because no major adverse comments were received from the respondents, the pilot study questionnaire after slight modifications was taken as the final empirical questionnaire for the investigation. Items in the form of statements, relating to each of the variables, were used to measure individual constructs under investigation. To the extent possible, the different statements used in developing the questionnaire were based upon statements that had been previously used by researchers (Lee and Harrison, 2000; Mohamed, 2002; Zoghbi-Manrique-de-Lara, 2006). A limited number of statements, however, were slightly modified to reflect the nature of the construction industry. An example statement would read 'I act decisively when an anti-corruption issue is raised'. The respondent would rate the statement on a scale of 1 to 9, where 1 represents 'strongly disagree' and 9 'strongly agree'.

Selection of respondents

A list of completed or ongoing public construction projects was developed based on information obtained from the site of Ministry of Statistics and Programme Implementation (Infrastructure and Project Monitoring Division) Government of India (www.mospi.gov.in), which monitors all the public projects worth more than Rs.20 crore (Rs.1 crore = Rs.10 million). Projects costing between Rs.100 crore and Rs.1000 crore are called major projects and projects costing between Rs.20 crore and Rs.100 crore are called medium projects. All major and medium projects were considered and representatives of all 813 major and medium projects were contacted. Questionnaires were

delivered through e-mail, postal services and in person. The respondents included public sector engineers and managers. In our study, the owner is the government agency, local authority, a utility or any organization on behalf of which the engineer/project manager (PM) of the public sector is executing the project. The uniformity of characteristics of respondents (public sector employees) was maintained by selecting only professionals involved in public construction.

One hundred and five responses from PMs/engineers were received. The average response rate was 12.92%. The proportions of the respondents in terms of number of years of construction experience were: minimum seven years and maximum 36 years, with the mean average value of 22 years.

Data analysis

The data obtained from the questionnaires are analysed using a statistical software package. The structural equation modelling (SEM) approach is adopted to understand the causal relations among the various constructs. Kline (2011, p. 9) notes that the ability to analyse both observed and latent variables distinguishes SEM from some more standard statistical techniques such as analysis of variance (ANOVA) and multivariate regression which analyse observed variables only. The first step in SEM is the validation of the measurement model through confirmatory factor analysis (CFA). The steps involved comprise reliability assessment, exploratory factor analysis, confirmatory factor analysis and validity tests. These are discussed in the following sections.

A hypothesized model covering the 17 observed variables for anti-corruption strategies is drawn up to operationally define the constructs of leadership, rules and regulations, training and fear of punishment and is shown in Figure 1.

The responses are analysed to compute their mean scores, standard deviation, skewness and kurtosis, thus ensuring a better understanding of the distribution of each item used in the construct operationalization. There are neither outliers nor severely skewed cases, thus increasing the confidence in the contribution of the questionnaire items to the measurement of their respective constructs.

The overall reliability score is found to be 0.854, which is more than 0.7 hence acceptable (Nunnally, 1978). The appropriateness of data for exploratory factor analysis is assessed through the Kaiser-Meyer-Olkin (KMO) value. The KMO test is a measure of sampling adequacy that compares the magnitudes of the partial correlation coefficients.

The KMO value is found to be 0.763, which is greater than 0.6; thus the responses are felt appropriate for factor analysis (Kim and Mueller, 1978). Exploratory factor analysis (EFA) is conducted to check the appropriateness of the proposed grouping of attributes. The central concept is representation or summarization. Based on a scree plot, the EFA of the 17 variables extracted four factors accounting for 70.398% of the total variance. Factor 1 is predominant, accounting for seven variables, measuring leadership construct, factor 2 is the rules and regulation construct (four variables), factor 3 is the training construct (three variables) and factor 4 is the fear of punishment construct (three variables).

Further, the items in the respective constructs are individually subjected to principal component analysis, followed by Varimax rotation with Kaiser normalization (for better interpretation). First, the communalities values are reviewed. The communalities indicate the percentage of variance in the variable accounted for by extracted factors. The details of the factor loading and communalities are given in Table 1. These values are compared with the values recommended by Hair *et al.* (2006) and Malhotra (1999) and found to be appropriate except for the variables 'corruption free environment is provided' and 'remind each other to work honestly'. Since the value was found to be less than 0.5, these variables are dropped from the leadership construct. A suggested minimum acceptable value for reliability is 0.6 (Nunnally, 1978; Malhotra, 1999). Hence all four factors meet the requirement of reliability. This procedure yielded a model comprising four factors and 15 variables for assessing anti-corruption strategies. The coefficient of alpha for this model (four factors, 15 variables) is shown in Table 2. Similarly the coefficient of alpha for corruption free performance was found to be 0.822. All values are within acceptable limits. Accordingly, the hypothesized model of anti-corruption strategies leading to corruption free performance is developed as shown in Figure 2.

The four constructs extracted through EFA for the measurement of anti-corruption strategies is validated using CFA. Table 2 contains the LISREL estimates for the measurement model and the construct correlations. For each observed variable, the *t* values associated with each of the loadings exceed the critical value 1.96 (0.05 significance level). Thus, all observed variables are significantly related to their specified construct, thereby verifying the posited relationship among variables and constructs.

Content validity

While conducting CFA, construct validity should be satisfied by using content validity and empirical validity tests. Once the measurement model is validated, the structural relationships between constructs are estimated (Anderson and Gerbing, 1988). Content validity tests the extent to which a constituent variable belongs to its corresponding construct. Since content validity cannot be tested by using statistical tools, an in-depth literature survey is necessary to keep the researcher's judgment on the right track (Dunn *et al.*, 1994).

Accordingly, an extensive literature survey was conducted to specify the variables that define constructs. The model has been tested in a pilot study administered to industry professionals and academicians, and content validity is thus achieved.

Construct validity

Construct validity comprises unidimensionality, reliability, convergent and discriminant validity assessments. Unidimensionality refers to the degree to which constituent variables represent one underlying construct. For testing unidimensionality, a measurement model has been specified for each construct, and CFA is run for all the constructs. According to Byrne (1998), a comparative fit index (CFI) of 0.90

or above for the model implies that there is strong evidence of unidimensionality. The CFI value obtained for all four constructs in the model has been found to exceed 0.90. This has indicated strong evidence of unidimensionality for the scale for each construct.

Reliability assessment has been carried out by calculating alpha coefficients separately for each construct. The values obtained were between 97.1% and 76.5% for all constructs, respectively (see Table 1). There is internal consistency among the variables for each of the constructs.

Convergent validity is the extent to which the construct correlates to corresponding variables designed to measure the same construct. If the factor loadings are statistically significant, then convergent validity exists. The factor loadings corresponding to all four constructs of the model shown in Table 2 indicate that all the factor loadings are significant.

Discriminant validity has been assessed through chi-square comparison models. The comparison of chi-square statistics for different models provides support for discriminant validity (Widaman, 1985). The chi-square differences are statistically significant, thereby demonstrating discriminant validity.

Another way of assessing construct validity is the goodness-of-fit of the model. A number of fit indices are available, but Marsh *et al.* (1988) propose that

Table 1 Factor structure and loadings of anti-corruption observed variables

SI No.	Observed variables	Communalities	Factor loading	Coefficient alpha (%)	KMO
A.	<i>Factor 1: Leadership</i>				
1.	Act positively and cooperate	0.682	0.784	76.5	0.728
2.	Praise for working honestly	0.642	0.758		
3.	Act decisively when anti-corruption issue is raised	0.566	0.730		
4.	Anti-corruption issues are important	0.606	0.703		
5.	Provide help to work honestly	0.563	0.646		
6.	Corruption free environment is provided	0.587	0.461		
7.	Remind each other to work fairly and honestly	0.469	0.451		
B.	<i>Factor 2: Rules and regulations</i>				
8.	Adequate source of information	0.800	0.822	84.3	0.769
9.	Rules protect us from vigilance cases	0.729	0.813		
10.	Rules should be consulted by all	0.672	0.779		
11.	Rules do not impose restrictions	0.583	0.662		
C.	<i>Factor 3: Training</i>				
12.	Training is necessary	0.793	0.844	89.4	0.723
13.	Training helps me	0.811	0.827		
14.	Training helps in prevention of corrupt practices	0.750	0.810		
	<i>Factor 4: Fear of punishment</i>				
15.	Fear of suspension	0.920	0.941	97.1	0.774
16.	Fear of disciplinary action	0.916	0.936		
17.	Fear of caution/warning letter	0.878	0.924		

Table 2 Factor loadings

Observed variables & constructs	Variable loading for each factor				
	Factor loading	<i>t</i> values	R ²	Coefficient alpha (%)	KMO
Leadership					
Act positively and cooperate	0.81	6.89	0.65	82.2	0.791
Praise for working honestly	0.70	6.21	0.50		
Act decisively when anti-corruption issue is raised	0.62	5.54	0.38		
Anti-corruption issues are important	0.69	7.51	0.47		
Provide help to work honestly	0.61	5.46	0.37		
Rules and regulation					
Adequate source of information	0.82	9.56	0.68	84.3	0.769
Rules protect us from vigilance cases	0.79	9.12	0.62		
Rules should be consulted by all	0.72	8.08	0.53		
Rules do not impose restrictions	0.71	7.41	0.51		
Training					
Training is necessary	0.88	10.81	0.77	89.4	0.723
Training helps me	0.93	12.35	0.87		
Training helps in prevention of corrupt practices	0.78	9.81	0.60		
Fear of punishment					
Fear of suspension	0.97	21.05	0.94	97.1	0.774
Fear of disciplinary action	0.97	21.68	0.95		
Fear of caution/warning letter	0.93	11.62	0.87		

ideal fit indices should have: (1) relative independence of sample size; (2) accuracy and consistency to assess different models; and (3) ease of interpretation aided by a well-defined continuum or pre-set range. Many fit indices do not meet these criteria because they are adversely affected by sample size (Bentler and Yuan, 1999). In CFA, overall model fit portrays the degree to which the specified attributes represent the hypothesized constructs. The values show that the chi-square (χ^2) statistic has a statistical significance ($\chi^2/\text{degree of freedom} = 1.82$) and other indices show acceptable fit measures. The non-normed fit index (NNFI) considers a correlation for model complexity (Kline, 2011). The CFI is interpreted in the same way as the NNFI, and it represents the relative improvement in fit of the hypothesized model over the null model. CFI and NNFI are 0.95 and 0.93, respectively, more than the recommended level of 0.9. The root mean square error of approximation (RMSEA) assesses the extent to which the given model approximates to the true model. It is an estimate of the discrepancy between the observed and estimated covariance matrices in the population (Hair *et al.*, 2006). The RMSEA is 0.088, which is well within the limits, further supporting acceptance of the proposed model.

Conceptual model and hypothesis

The results of the analysis described in the preceding sections clearly indicate a four-dimensional structure to assess anti-corruption strategies. Using these results, a conceptual model is hypothesized as shown in Figure 2, to test the relationship between anti-corruption strategies and corruption free performance in a public construction project. In the proposed model, 'anti-corruption strategies' is considered to be a four-dimensional and second order construct composed of 'leadership construct', 'rules and regulation construct', 'training construct' and 'fear of punishment construct', and their effect on construction 'corruption free performance' is tested. The second order approach is recommended by Hair *et al.* (2006), as it maximizes the interpretability of both the measurement and the structural models. The dark arrow in Figure 2 defines the direction of the influence

between two constructs, while light arrows define the dimensions of constructs. Based on the proposed model, the hypothesis that 'anti-corruption strategies' have a significant positive impact on 'corruption free performance' in public construction project, is tested.

Based on the stated criteria and the suggestions made by various researchers (Bentler and Yuan, 1999; Jackson, 2003) four parameters are selected for validating the hypothesized relationship as shown in Table 3. The first step involved in validation is to examine the chi-square statistic. The chi-square statistic compares the observed covariance matrix to the one estimated on the assumption that the model being tested is true. But, when the sample size is small, the ratio of χ^2 to degree of freedom (df) is to be examined. The chi-square statistic of the model obtained is 297.44, and the ratio between chi-square and its degree of freedom (χ^2/df) is 1.802; and thus the model fit is acceptable according to Kline (2011), who specifies a ratio smaller than 3 to be a candidate for an acceptable fit.

In the present case, values obtained for NNFI and CFI exceed the minimum prescribed value of 0.9; the value of RMSEA obtained is 0.088, which indicates close fit (Widaman, 1985).

The SEM results for the hypothesized model are shown in Figure 2. The relationship between the constructs hypothesized is represented with a heavy arrow and can be interpreted similar to a regression coefficient that describes the linear relationship between four constructs (Matt and Dean, 1993). The coefficients pointing from anti-corruption strategies to the observed variables represent the standardized path coefficients. The greater the coefficient value, the more important the variable as an indicator of anti-corruption strategies. The results of standardized path estimates, *t* values and the coefficient of determination (R^2) for the proposed structural model are also shown in Figure 2.

From Figure 2, the relationship between anti-corruption strategies and the four constructs can be expressed as:

$$\text{Anti-corruption strategies} = 0.75 (\text{leadership construct}) + 0.64 (\text{rules and regulation construct}) + 0.70$$

Table 3 Goodness of fit measures for the structural equation model

SI No.	Goodness of fit indices	Recommended value	Overall model
1.	$\chi^2/\text{degree of freedom}$	<3	297.44/165 = 1.802
2.	Non-normed fit index (NNFI)	>0.90	0.93
3.	Comparative fit index (CFI)	>0.90	0.94
4.	Root mean square error of approximation (RMSEA)	<0.1	0.088

(training construct) + 0.24 (fear of punishment construct)

The path coefficients in the above equation represent the standardized estimates. The standard errors for 'leadership', 'rules', 'training' and 'fear' are 0.14, 0.12, 0.11 and 0.11, respectively, and the corresponding *t* values associated with the path are 5.46, 5.32, 6.12 and 2.05. The *t* test examines the significance of path coefficients and indicates whether or not the hypothesized relationship holds. The coefficient of determination R^2 (see Figure 2) values obtained also confirms a strong linear relationship among constructs.

All the standardized path coefficients are positive and statistically significant in the desired direction, indicating linkages. The path coefficients being standardized can be taken to be indicative of the relative importance of each construct. The 'leadership construct' emerges as the most important anti-corruption strategy. The hypothesis, which assumes that anti-corruption strategies have significant positive impact on the corruption free performance in public construction projects is found to be supported as the path coefficient (0.69) is significant and positively related as shown by the heavy arrow. The path coefficient marked on this heavy arrow is calculated for a 95% confidence level and can be interpreted in a manner similar to a regression coefficient that describes the linear relationship between two constructs.

Discussion

All the criteria used to measure the reliability and fit of the model, including Cronbach's alpha values, factor loading, path coefficients and goodness of fit indices, were found to be highly satisfactory as shown in Table 3 and Figure 2. The SEM results suggest that the 'leadership construct', 'rules and regulation construct', 'training construct' and 'fear of punishment construct' have significant correlations with the second order construct 'anti-corruption strategies'. The analysis results are found to be acceptable on all the statistical parameters suggested by the statisticians for such study and validate the hypothesis.

The indices suggested by various researchers, such as Bentler and Yuan (1999), Jackson (2003) and Tabachnick and Fidell (2007), have been used, and it is confirmed that there is a considerable influence of 'leadership', 'rules and regulation', 'training' and 'fear of punishment' on corruption free performance.

The 'leadership construct' emerges as the most important anti-corruption strategy construct with a

loading of 0.75. This also validates earlier studies, wherein the importance of leadership has been stressed in the fight against corruption (Ruzindana, 1997; Tanzi, 1998; Ashforth and Anand, 2003). Top management can play a major part in the enforcement of anti-corruption measures. Leaders' drive for self-preservation could be a strong motivating force behind anti-corruption cleanups (Gillespie and Okrunhlik, 1991). Engineers, architects, PMs and contractors may also be driven by professional conscience. Conscientious refusal may be effected by either simply not participating in the activity that one sees as immoral, or with the hope of making a public protest, which will draw attention to the situation that one believes is wrong. Corruption is harmful for the success of a public project and can introduce inefficiencies and inequities. We argue that individual commitment is the most important factor in the fight against corruption, but we also accept the reality that collective action may be the only way to produce widespread changes. Obviously, efforts to control corruption will be easier if the owners and top managers of public construction projects believe that it is in the interest of the project to control corruption. Dininio *et al.* (1998) also note that fighting corruption is not a one-off proposition as it requires constant vigilance and sustained commitment. Along with integrity, the cooperation of all team members is also important. Once a low level of corruption is achieved, construction firms will also realize the benefit and will stop paying bribes.

The 'training construct' emerges as the second most important anti-corruption strategy construct, with a loading of 0.69. Every organization should provide training and development opportunities to help public officials to maintain the highest professional standards. The Construction Industry Development Board (CIDB) of Malaysia also hosts integrity courses for contractors to promote the importance of integrity and plans to make the course a prerequisite for contractors when renewing their registration (The Star, 2006). Model documentation is being developed and procurement staff in many countries are being trained in the rules of professional conduct to give the reforms full effect.

As per Vee and Skitmore's (2003) study on the construction industry, most professionals (90%) subscribed to a need for professional codes of ethics. Owing to ever-increasing instances of scandals and corruption, ethics has become a frequently addressed topic for research and spirited debate (Evans *et al.*, 2006). As Heineman and Heinemen (2006) noted, corruption is best handled through *prevention*—through proactive means of forestalling corruption rather than reactive means of rooting it out. Of

course, codes alone are insufficient to ensure ethical conduct and they need to be complemented with accountability and employer training (Calhoun and Wolitzer, 2001). Although most organizations provide some training, the reality is that very little training is provided to employees in the general workplace and even that which is provided is of a very general nature. To achieve this training objective, to inculcate ethical values, create awareness about rules and accountability, clarify doubts regarding emergent ethical dilemmas and ambiguities (e.g. conflicts of interest, gift giving and receiving) and promote awareness about punishment and its severity for wrongdoing, may bring desired results.

The 'rules and regulations construct' emerges as the third most important anti-corruption strategy construct, with a loading of 0.64. Rules and regulations can be designed with the aim to rectify and remove practices that allow corruption to pervade the bidding for, awarding and implementation of contracts. Rules and regulations must further ensure appropriate competition and should develop greater transparency and accountability. The e-tendering could bring transparency and competition. Someone at organizational level must evaluate the regulatory framework, monitor compliance with laws and regulations, measure performance and advise the appropriate authorities regarding successes and deficiencies in the procurement laws.

The 'fear of punishment construct' emerges as the least important anti-corruption strategy construct with a loading of 0.24. As noted above, for corruption to continue to thrive, three elements must co-exist. First, someone must have discretionary power; second, there must be economic rents associated with this power; third the legal/judicial system must be such as to allow little likelihood of detection and/or penalty for any wrongdoing (Jain, 2001). Sanctions should be imposed for breaches of codes of conduct, including termination of employment, reduction in grade, reassignment of duties, reduction in salary, deductions from salary (by way of fine) and reprimands. However, such sanctions are very rarely enforced, and hence fear of punishment is diminishing. Punishment can be imposed if the wrongdoer is caught, but there is little likelihood of a person being caught and, once caught, being punished. Disciplinary authorities and the judiciary are, most of the time, unable to provide punishment in cases of corruption. The low loading of 0.24 in Figure 2 for 'fear of punishment' is evidence of this fact. There is a need to make such punishment effective and severe to have desirable effects.

Conclusions

Corruption has been one of the major international concerns of the past decade. It is an issue that affects all countries, rich and poor, in different ways and to different degrees. The field of corruption in public sector construction has remained a relatively under-researched area. Those measures to combat corruption that have been suggested by institutions and individuals have been based on their gut feelings and the application of such measures is restricted to the specific cases in which the institutions or the individuals were involved. Very limited research has been carried out to examine the relationship between anti-corruption strategies and corruption free performance. Public sector projects require economy, efficiency, quality, fairness and transparency. Methodologically, we establish the feasibility of capturing an untouched area in construction management with a range of variables and modelling the resultant constructs as a second order construct, which is then amenable to a structural analysis of their causal relationship. A SEM approach is used to measure the five constructs—'leadership', 'rules and regulation', 'training', 'fear of punishment' and 'corruption free performance'—through their constituent variables and to see if the hypothesized relationship holds good. The path analysis indicates that anti-corruption strategies are strongly positively related to corruption free performance. The investments made to improve anti-corruption strategies would positively enhance corruption free performance in public construction projects. The positive linkage of anti-corruption strategies with corruption free performance provides a useful indication to public procurement reformers as to how to achieve the goal of promoting efficiency, economy, quality, fairness and transparency.

The proposed model will help managers identify the variables that may lead to successful corruption free performance of public construction projects. We find that leadership can play a decisive role in anti-corruption performance, having a path coefficient of 0.75. Curbing corruption in public construction projects is not an impossible dream, but it does require committed leadership. Leadership is the key for anti-corruption performance. Training is also important to emphasize the preventive nature of anti-corruption efforts rather than the enforcement aspect. It requires raising awareness and the introduction of education programmes to ensure its effective implementation and proper understanding by the personnel concerned. The inculcation of values, attitudes and behaviour based on principles of integrity and justice is arguably the most important element in the fight against corruption. Education systems can play a vital

role in instilling good values. While the integrity of public service is a priority in most countries in the world, the effectiveness of their respective rules will depend on the rigidity with which they are implemented and enforced. Prosecuting offenders is necessary to demonstrate that it is not possible to evade punishment for violating the rules of the game. There is a need for swift and exemplary action for offenders.

Another purpose of the study was to investigate the causal relationship between anti-corruption strategies and corruption free performance. For this the hypothesized model was empirically tested.

The proposed model was validated by data collected from a large number of construction senior executives, but these were based in India only. Also, the self-reported method of data collection was used, and hence there may be a possibility of bias playing a role in the final outcome. There are several avenues for future work in improving and refining our constructs. First, a larger sample of respondents representing various organizations from different geographical locations can be used to improve the external validity of the proposed constructs. Second, it is likely that there may be other items for the individual perceptions of these constructs. These items may be identified and added to the existing constructs to improve domain coverage of the constructs.

References

- Amaratunga, D., Baldry, D. and Sarshar, M. (2000) Performance evaluation in facilities management: using the balanced scorecard approach, in *Proceedings from COBRA 2000 RICS (Construction and Building Research Conference)*, Royal Navy College, University of Greenwich, UK, pp. 1–16.
- Anderson, J.C. and Gerbing, D.W. (1988) Structural equation modeling in practice. a review and recommended two-step approach. *Psychological Bulletin*, **103**(3), 411–23.
- Ashforth, B.E. and Anand, V. (2003) The normalization of corruption in organizations. *Research in Organizational Behavior*, **25**, 1–52.
- Asian Development Bank/OECD (2006) Curbing corruption in public procurement in Asia and the Pacific Manila: Asian Development Bank, available at <http://www.adb.org/Documents/Books/Public-Procurement-Asia-Pacific/public-procurement.pdf> (accessed 24 May 2008).
- Bass, B. (1990) *Bass & Stogdill's Handbook of Leadership: Theory, Research, and Managerial Applications*, Free Press, New York.
- Bentler, P.M. and Yuan, K.H. (1999) Structural equation modeling with small samples: test statistics. *Multivariate Behavioral Research*, **34**(2), 181–97.
- Byrne, B.M. (1998) *Structural Equation Modelling with LISREL, PRELIS and SIMPLIS: Basic Concepts, Applications and programming*, Lawrence Erlbaum, Mahwah, NJ.
- Calhoun, C.H. and Wolitzer, P. (2001) Ethics as a value added service. *The CPA Journal*, **71**(1), 71–3.
- Cavill, S. and Sohail, M. (2007) *Accountability Arrangement to Combat Corruption: Literature Review*, WEDC, Loughborough, UK.
- Charan, R. (2005) Ending the CEO succession crisis. *Harvard Business Review*, **83**(2), 4–13.
- Chinda, T. and Mohammad, S. (2008) Structural equation model of construction safety culture. *Engineering Construction and Architectural Management*, **15**(2), 114–31.
- Dininio, P., Kpundeh, S.J. and Leiken, R. (1998) *USAID Handbook for Fighting Corruption*, Center for Democracy and Governance, US Agency for International Development, Washington, DC.
- Doig, A. and Riley, S. (1998) Corruption and anti-corruption strategies: issues and case studies from developing countries, in UNDP (ed.) *Corruption and Integrity Improvement Initiatives in Developing Countries*, New York: United Nation Development Program, pp. 45–62.
- Dunn, S.C., Seaker, R.F. and Waller, M.A. (1994) Latent variables in business logistics research: scale development and validation. *Journal of Business Logistics*, **15**(2), 145–72.
- Evans, J.M., Treviño, L.K. and Weaver, G.R. (2006) Who's in the ethics driver's seat? Factors influencing ethics in the MBA curriculum. *Academy of Management Learning & Education*, **5**(3), 294–305.
- Evans, J.M., Treviño, L.K. and Weaver, G.R. (2008) PSUs to focus on procurement, to spend Rs 650 K crore in two years. *The Financial Express*, 21 November.
- French, J.R.P., Jr and Raven, B.H. (1959) The bases of social power, in Cartwright, D. and Zander, A.F. (eds) *Studies in Social Power*, Institute for Social Research, Ann Arbor, MI, pp. 150–67.
- Getz, K. and Volkema, J. (2001) Culture, perceived corruption, and economics. *Business & Society*, **40**(1), 7–30.
- Gillespie, K. and Okrunhlik, G. (1991) The political dimensions of corruption cleanups: a framework for analysis. *Comparative Politics*, **24**(1), 77–95.
- Gray, C.W. and Kaufmann, D. (1998) Corruption and development. *Finance and Development*, **35**(1), 7–10.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006) *Multivariate Data Analysis*, Pearson Prentice Hall, Upper Saddle River, NJ.
- Heineman, B.W. and Heinemen, F. (2006) The long war against corruption. *Foreign Affairs*, **85**(3), 75–86.
- Jackson, D.L. (2003) Sample size and number of parameter estimates in maximum likelihood confirmatory factor analysis: a Monte Carlo investigation. *Structural Equation Modeling*, **8**(2), 205–23.
- Jain, A.K. (2001) Corruption: a review. *Journal of Economic Surveys*, **15**(1), 71–121.
- Kaplan, R.S. and Norton, D.P. (1992) The balanced scorecard—measures that drive performance. *Harvard Business Review*, **70**(1), 71–9.
- Kim, J. and Mueller, C. (1978) *Factor Analysis*, Sage Publications, London.
- Kline, R.B. (2011) *Principles and Practice of Structural Equation Modeling*, Guilford Press, New York.

- Lee, T. and Harrison, K. (2000) Assessing safety culture in nuclear power stations. *Safety Science*, **34**, 61–97.
- Leite, C. and Weidmann, J. (1999) Does mother nature corrupt? Natural resources, corruption, and economic growth. IMF Working Paper 99/85, International Monetary Fund, Washington, DC.
- Malhotra, N.K. (1999) *Marketing Research: An Applied Orientation*, Prentice Hall, Upper Saddle River, NJ.
- Marsh, H.W., Balla, J.R. and McDonald, R.P. (1988) Goodness of fit indexes in confirmatory factor analysis: the effect of sample size. *Psychological Bulletin*, **103**(3), 391–410.
- Matt, G. and Dean, A. (1993) Social support from friends and psychological distress among elderly persons: moderator effects of age. *Journal of Health and Social Behavior*, **34**(3), 187–200.
- Meagher, P. (2004) Anti-corruption agencies: a review of experience. Paper No. 04/02, The IRIS Discussion Papers on Institutions and Development, Center for Institutional Reform and the Informal Sector at the University of Maryland.
- Mohamed, S. (2002) Safety climate in construction site environments. *Journal of Construction Engineering and Management*, **128**(5), 375–84.
- Mumford, M.D., Helton, W.B., Decker, B.P., Connelly, M.S. and van Doorn, J.R. (2003) Values and beliefs related to ethical decisions. *Teaching Business Ethics*, **7**, 139–70.
- Narasimhan, C.V. (1997) Prevention of corruption: towards effective enforcement, in Guhan, S. and Paul, S. (eds) *Corruption in India: Agenda for Action*, Chapter 10, Vision Books, New Delhi, pp. 251–65.
- Nunnally, J. (1978) *Psychometric Theory*, 2nd edn, McGraw-Hill, New York.
- Pearce, C.L. (2004) The future of leadership: combining vertical and shared leadership to transform knowledge work. *Academy of Management Executive*, **18**(1), 47–57.
- Pearce, C.L., Sims, H.P. Jr and Manz, C.C. (2008) The roles of vertical and shared leadership in the enactment of executive corruption: implications for research and practice. *The Leadership Quarterly*, **19**, 353–9.
- Rose-Ackerman, S. (2002) Grand corruption and the ethics of global business. *Journal of Banking & Finance*, **26**, 1889–918.
- Ruzindana, A. (1997) The importance of leadership in fighting corruption in Uganda, in Elliot, K.A. (ed.) *Corruption and the Global Economy*, Institute for International Economics, Washington, DC, pp. 133–45.
- Shirazi, B., Langford, D.A. and Rowlinson, S.M. (1996) Organizational structures in the construction industry. *Construction Management and Economics*, **14**(3), 199–212.
- Sohail, M. and Cavill, S. (2008) Accountability to prevent corruption in construction projects. *Journal of Construction Engineering and Management*, **134**(9), 729–38.
- Søreide, T. (2002) *Corruption in Public Procurement: Causes, Consequences and Cures*, CMI Report 2002:1, Chr. Michelsen Institute, Bergen, available at <http://www.cmi.no/publications/publication/?843=corruption-in-public-procurement-causes/> (accessed 24 May 2008).
- Sosa, L. (2000) Macroeconomic effects of corruption, unpublished PhD thesis, Department of Economics, University of North Carolina.
- Spector, B.I. (2005) *Fighting Corruption in Developing Countries: Strategies and Analysis*, Kumarian Press, Bloomfield, CT.
- Svensson, J. (2005) Eight questions about corruption. *Journal of Economic Perspectives*, **19**, 19–42.
- Tabachnick, B.G. and Fidell, L.S. (2007) *Using Multivariate Statistics*, Pearson Education, Upper Saddle River, NJ.
- Tabish, S.Z.S. and Jha, K.N. (2011) Analysis of irregularities in public procurement in India. *Construction Management and Economics*, **29**(3), 261–74.
- Tanzi, V. (1998) Corruption and the budget: problems and solutions, in A.K. Jain (ed.) *Economics of Corruption*, Boston, Massachusetts: Kluwer Academic Publishers, pp. 111–28.
- Tanzi, V. and Davoodi, H. (1997) Corruption, public investment, and growth. IMF Working Paper WP/97/139, International Monetary Fund, Washington, DC, October.
- Thai, K.V. (2008) *International Handbook of Public Procurement*, CRC Press, New York.
- The Financial Express (2008) PSUs to focus on procurement, to spend Rs. 650 K crore in two years, *The Financial Express*, 21 November, available at www.financialexpress.com/news/psus-to-focus-on-procurement-to-spend-rs-650-k-cr-in-two-years/388414/.
- The Star (2006) New exam for engineers. 12 December, available at <http://thestar.com.my/news/story.asp?file=/2006/12/12/nation/16287587&sec=nation> (accessed 10 December 2007).
- Trahan, W.A. and Steiner, D.D. (1994) Factors affecting supervisors' use of disciplinary actions following poor performance. *Journal of Organizational Behavior*, **15**, 129–39.
- Transparency International (n.d.) *Project Anti-Corruption System*, available at www.transparency.org/tools/contracting/construction_projects (accessed 15 May 2008).
- van Rijckeghem, C. and Weder, B. (1997) Corruption and the rate of temptation: do low wages in the civil service cause corruption? IMF Working Paper 97/73, International Monetary Fund, Washington, DC.
- Ve, C. and Skitmore, M. (2003) Professional ethics in the construction industry. *Engineering, Construction and Architectural Management*, **10**(2), 117–27.
- Vittal, N. (2001) Corruption and the state: India, technology, and transparency. *Disease*, **23**(3), available at www.hir.harvard.edu/issue/disease (accessed 16 May 2008).
- Widaman, K.F. (1985) Hierarchically nested covariance structure models for multitrait-multimethod data. *Applied Psychological Measurements*, **9**(1), 1–26.
- World Bank (1997) *Helping Countries Combat Corruption: The Role of the World Bank*, World Bank, Washington, DC, available at <http://www1.worldbank.org/publicsector/anti-corrupt/corruptn/coridx.htm> (accessed 20 April 2008).
- Zoghbi-Manrique-de-Lara (2006) Fear in organizations: does intimidation by formal punishment mediate the relationship between interactional justice and workplace internet deviance? *Journal of Managerial Psychology*, **21**(6), 580–92.