

ANALYSIS OF THE ANTI-CORRUPTION STRATEGIES IN THE CONSTRUCTION SECTOR OF CHINA

Ming Shan*

Research Institute of Complex Engineering and Management, School of Economics and Management, Tongji University, Shanghai, China; Department of Building and Real Estate, The Hong Kong Polytechnic University, Hong Kong, China

Albert P.C. Chan

Department of Building and Real Estate, The Hong Kong Polytechnic University, Hong Kong, China

Yun Le

Research Institute of Complex Engineering and Management, School of Economics and Management, Tongji University, Shanghai, China

Yi Hu

Department of Building and Real Estate, The Hong Kong Polytechnic University, Hong Kong, China

ABSTRACT

While various anti-corruption strategies (ACSs) have been developed to curb the widespread corruption in the construction sector, effectiveness of these ACSs has seldom been investigated. This study, therefore, aims to identify and evaluate the ACSs being implemented in China. To achieve these objectives, a comprehensive literature review and a two-round Delphi survey of 14 experienced industry experts and academics were conducted. Survey results reveal that the most effective ACS is legal framework, followed by penal sanction, regulations, positive leadership, adequate institutions, transparency, economic sanction, administrative sanction, and education and training. Also, the results show that the effectiveness of raising the wage level as an anti-corruption strategy did not receive a high evaluation by the Delphi panel. Findings of this study can help enhance a better understanding of anti-corruption strategies and thus improve a corruption-free environment.

Keywords: *Anti-Corruption Strategies; Construction Sector; China; Delphi Survey.*

1. INTRODUCTION

Construction has been consecutively regarded as the most corrupt sector according to the Bribery Payer Index published by the Transparency International (1999, 2002, 2006, 2008 and 2011). This may be because that the construction sector is fragmented in nature as a result of involving clients, designers, contractors, consultants, and suppliers, which imposes difficulties in tracing of payments and information and the diffusion of standards of practice (Kenny, 2009). Similar to other developing countries, China faces a considerable challenge of preventing corruption because of imperfect legislation and administrative systems (Zou, 2006). The National Bureau of Corruption Prevention of China revealed that 15,010 persons were prosecuted for corruption in the construction sector between 2009 and 2011, and the amount of corruption reached USD 490 million (Xinhua Net, 2011). Such a serious situation has forced the government to increase their focus on anti-corruption issues and strengthen relevant supervision in the Chinese construction sector.

Various anti-corruption strategies (ACSs), such as leadership, rules and regulations, training, and sanctions, have been proposed to prevent corruption in the construction sector (Zou, 2006; Sohail and Cavill, 2008; Tabish and Jha, 2012). However, the effectiveness of these strategies has been seldom systematically evaluated before. Therefore, in the context of Chinese construction sector, this study aims to evaluate the

*Corresponding Author: E-mail - ming.shan@connect.polyu.hk

effectiveness of ACSs that is being implemented by a two round Delphi survey. Two specific questions will be addressed in this study:

- What are the ACSs being implemented in the construction sector of China?
- Which of these ACSs have higher effectiveness?

2. LITERATURE REVIEW

Considerable efforts have been made to develop anti-corruption strategies in the construction sector of China. For instance, Hu and Guo (2001) and Tan *et al.* (2011) believed that positive leadership plays an important role in the issue of anti-corruption because an upright leader communicates values of integrity to the rest of the organisation and creates conditions that motivate people to behave in an upright way. Ge (1994) and Long and Tian (2008) reported that a completed legal framework can effectively ensure fairness and transparency in the construction sector and curb corruption. Ge (1994) and Wu and Yao (2008) stated that sound systems, including a scientific decisions making system, a thorough supervision system, and a wholesome credit guarantee system, can help prevent individuals from resorting to corrupt practices. Wang and Ni (2004) and Nan and Meng (2008) reported that rigorous execution of laws and rules is crucial to corruption prevention otherwise any law or rule proposed will be useless. He (2004) believed that transparency mechanism is an effective anti-corruption strategy because it can provide the public with access to information on construction projects so that project processes can be monitored. Wu *et al.* (2008) and Long and Tian (2008) stated that raising the wage level for industry practitioners can effectively decrease their potential attempt of performing corrupt practices. Xia and Zhang (2005) stated that the education and training of industry practitioners on anti-corruption practices could help establish a sound corporate culture for the prevention of corruption. Wu *et al.* (2008) and Xie and Kang (2010 and 2011) reported that, effectiveness of anti-corruption strategy of sanction, including an administrative sanction, economic sanction, and the penal sanction, has also been supported widely. Based on the above review, a list of ten (10) ACSs currently advocated in the construction sector of China was identified from literature as shown in Table 1.

Table 1: Anti-Corruption Strategies Identified from Literature

Anti-Corruption Strategy	Source															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Positive leadership		√							√			√				
A completed legal framework	√		√										√			
Sound systems	√						√								√	
Rigorous execution of laws and rules				√									√		√	
Transparency mechanism											√					
Raising wage level			√			√										
Education and training					√											
Administrative sanctions												√				√
Penal sanctions								√		√						√

Note: A = Ge (1994); B = Hu and Guo (2001) C = Long and Tian (2008); D = Nan and Meng (2008); E = Xia and Zhang (2005); F = Wu *et al.* (2008); G = Wu and Yao (2008); H = Xie and Kang (2010); I = Tan *et al.* (2011); J = Xie and Kang (2011); K = He (2004); L = Zhou and Liu (2004); M = Li and Li (2004); N = Lv and Liu (1999); O = Wang and Ni (2004); P = An *et al.* (1999)

3. RESEARCH METHOD

A two-round Delphi survey was employed to evaluate the effectiveness of these 10 ACSs identified from the literature. The Delphi method is a structured communication and consensus building approach amongst a group of experts on a complex problem (Chan *et al.*, 2001; Hallowell and Gambatese, 2010). This method refers to an iterative process where consensus is often reached through rounds of feedbacks of experts' opinion and judgment on a particular subject (Hon *et al.*, 2012). The selection of experts is crucial to secure the quality of a Delphi survey (Chan *et al.*, 2001; Hallowell and Gambatese, 2010). Therefore, the following criteria were employed to identify eligible panel members for this Delphi survey: (1) at least 10 years of experience in the construction sector, (2) senior positions in their organisations, (3) various professional backgrounds, and (4) different geographic backgrounds across the country. In this study, a Delphi panel constituting 14 experts that satisfy the above criteria was established to facilitate the survey. Table 2 shows the backgrounds of these experts.

Table 2: Backgrounds of Interviewees

No.	Employer	Position	Years of Experience	Working Place*
A	Government	Director	20	Eastern developed areas
B	Government	Deputy Director	16	Central and western developing areas
C	Client	Project Manager	19	Eastern developed areas
D	Client	Project Manager	17	Eastern developed areas
E	Client	Director	13	Central and western developing areas
F	Contractor	General Manager	25	Eastern developed areas
G	Contractor	Project Manager	20	Central and western developing areas
H	Contractor	Director	15	Central and western developing areas
I	Consultant	General Manager	20	Eastern developed areas
J	Consultant	Project Manager	16	Central and western developing areas
K	Consultant	Project Manager	15	Central and western developing areas
L	Academic	Professor	22	Eastern developed areas
M	Academic	Professor	17	Central and western developing areas
N	Academic	Associate Professor	13	Eastern developed areas

Note: *Working places are divided into eastern areas with GDP per capita above USD 8,000, and central and western areas with GDP per capita below USD 5,000, according to the National Bureau of Statistics of China (2012).

In the first round of Delphi survey, the panel members were requested to provide their evaluation on the effectiveness of the 10 ACSs using a five-point rating system (i.e., 1 = very ineffective, 2 = ineffective, 3 = neutral, 4 = effective, and 5 = very effective). Then the mean scores of evaluations of these ACSs were calculated and returned to the Delphi panel in the second round of the survey. In the light of the feedback, the panel members were requested to reconsider their evaluation and reassess these ACSs. To assess the consistency among the Delphi panel, Kendall's Coefficient of Concordance (W) was calculated as recommended by Hon *et al.* (2012). The consistency can be proved if asymptotic significance value is less than 0.05 (Siegel and Castellan, 1988). Additionally, the calculation of the Chi-square value (χ^2) was also conducted to test the significance because the number of ACSs evaluated in this study is larger than 7 (Siegel and Castellan, 1988). Considering that panel members have different professional backgrounds, such as government, client, contractor, consultant, and academic, Kruskal-Wallis test was conducted to examine whether any significant difference exists among the panel members of different professional backgrounds (Breslow, 1970; Hon *et al.*, 2012). The significant difference can be proved if asymptotic significance value is less than 0.05 (Breslow, 1970; Hon *et al.*, 2012).

4. RESULTS

Table 3 shows the prioritisation result of ACSs and the statistical analysis results of the two-round Delphi survey. For each ACS, the asymptotic significance value of Kruskal-Wallis test in each round is larger than 0.05, indicating no significant difference exists among the panel members of different professional

backgrounds (Breslow, 1970; Hon *et al.*, 2012). The asymptotic significance value of Kendall's Coefficient of Concordance test of each round is less than 0.05. The actual calculated Chi-square value (χ^2) is larger than the critical value of Chi-square value in each round. These results suggest that consistency exists across the whole Delphi panel (Siegel and Castellan, 1988; Hon *et al.*, 2012). In addition, the Kendall's Coefficient of Concordance of Round 2 (0.410) is larger than that of Round 1 (0.364), indicating that consistency has been improved via the two-round Delphi survey (Hon *et al.*, 2012). The prioritisation of ACSs by its effectiveness is discussed in the following section.

Table 3: Results of the Two-Round Delphi Survey

Ranking	Anti-Corruption Strategy	Round1		Round2	
		Mean	Asymp. Sig. of KWT*	Mean	Asymp. Sig. of KWT*
1	A completed legal framework	4.29	0.996	4.36	0.996
2	Penal sanction	4.21	0.876	4.29	0.915
3	Rigorous execution of laws and rules	4.21	0.446	4.21	0.446
4	Positive leadership	3.93	0.511	4.00	0.542
4	Sound systems	3.93	0.430	4.00	0.363
6	Transparency mechanism	3.79	0.269	3.79	0.269
7	Economic sanction	3.64	0.710	3.71	0.698
8	Administrative sanction	3.64	0.538	3.64	0.538
9	Education and training	2.71	0.773	2.64	0.790
10	Raising wage level	2.14	0.269	2.07	0.354
	KCC*	0.364		0.410	
	Actual calculated Chi-square value (χ^2)	45.851		51.675	
	Critical value of Chi-square from table	23.68		23.68	
	Asymp. Sig. of KCC* test	0.000		0.000	

Note: KWT* represents for Kruskal-Wallis test, KCC* represents for Kendall's Coefficient of Concordance (W)

5. DISCUSSIONS

A completed legal framework received the first ranking among all the ACSs. A completed legal framework plays an important role in preventing corruption because it provides the sources of provisions curbing corruption. In recent years, a series of laws, such as *The Law of Construction of People's Republic of China*, and *The Law of Bidding of People's Republic of China* have been legislated to curb corruption in the Chinese construction sector. Particularly, some interpretation documents of these laws are also successively issued to enhance its operability in the practical construction practice (State Council of China, 2011).

Penal sanction received the second ranking among all the ACSs. Penal sanction is the severest kind of sanction being implemented in the construction sector of China. The person that gets the penal sanction will be sentenced to prison or even to death. Thus, such kind of sanction can bring the most fear to those who may conduct corrupt practice and thus help prevent corruption.

Rigorous execution of laws and rules ranked third among all the ACSs. Although rules and regulations are crucial to address corruption issues, its rigorous execution is the guarantee of the effectiveness. Nan and Meng (2008) strengthened that even the most thorough rules and regulations will become useless without the rigorous execution. Tabish and Jha (2012) also mentioned that the rigorous execution of laws and rules can be deeply affected by the benefits networks of contracting parties which deserve more attention.

Positive leadership was ranked fourth of all ACSs. Leadership plays a vital role in preventing corruption because leaders have a strong power to establish anti-corruption measures, investigate reported corrupt practices, and decide on the punishment of verified corrupt practices (Tabish and Jha, 2012). In addition, the acts and standards of the professional ethics of leaders or those who confront the attraction of corrupt

benefits can send a strong signal to their subordinates, and have a significant influence on the acts of subordinates.

Sound systems also received the fourth ranking with the same evaluation of positive leadership. A sound system has been deemed as the core component of anti-corruption strategies because it is the platform that an organisation implements its mission and vision of anti-corruption policies (Tabish and Jha, 2012). Particularly, a sound system is crucial to prevent corruption in developing countries undergoing economies transition, and it usually contains all or some of the following components: national anti-corruption program, ministerial commission, specialised agency assigned to corruption prevention, implementation program, and supervising mechanism (Tisne and Smilov, 2004).

Transparency mechanism occupied the sixth position. Sohail and Cavill (2008) observed that transparency mechanisms can provide the public with access to information on construction projects so that project performance can be monitored, and decision makers can be held accountable for their decisions. Goldie-Scot (2008) noted that some developing countries such as Tanzania, Zambia, the Philippines, and Vietnam have already made considerable efforts in introducing transparency initiatives to prevent corruption in construction.

Economic sanction and administrative sanction were ranked seventh and eighth with evaluations of 3.71 points and 3.64 points respectively. Economic sanction mainly refers to the fine imposing on corrupt organisations or individuals. Administrative sanction, such as the demotion of qualification certificates of corrupt organisations, prohibition of tendering of corrupt tenderers, and warning letters or suspension letters to corrupt individuals is also common punishment methods applied in the construction sector of China.

Education and training received the ninth ranking with an evaluation of 2.64 points. This result indicates that the effectiveness of education and training is questioned. In the construction sector of China, particularly in those public construction projects, education and training on anti-corruption issues have been conducted compulsively. But considerable efforts in current training are merely the publicity that corrupt acts should be avoided otherwise strict sanction will be incurred. Limited investment is devoted to clarify doubts on emergent ethical dilemmas, such as conflicts of interest, and gift receiving (Zou, 2006). This may be the reason why education and training got such a low evaluation.

Raising wage level was ranked last among all the ACSs. This result indicates that the Delphi panel did not consider raising the wage level as an effective anti-corruption strategy in the construction sector. National Bureau of Statistics of China (2012) revealed that the wage level in the construction sector of China ranks 6th among all the 19 sectors which also suggests a not too low wage level in the sector. Additionally, Zhou and Liu (2004) stated that the high wage level could not help prevent corruption if the potential corruptor is risk loving. Long and Tian (2008) also opined that the effect of the high wage level in corruption prevention is doubted in developing countries undergoing economic transition where numerous opportunities exist for potential corruptors to grab corrupt money.

6. CONCLUSIONS

This paper has conducted a two-round Delphi survey with 14 industry experts and academics to evaluate the various anti-corruption strategies being implemented in the construction sector of China. Results show that the most important anti-corruption strategy is a completed legal framework, followed by penal sanction, rigorous execution of laws and rules, positive leadership, sound systems, transparency mechanism, economic sanction, and administrative sanction. Education and training, and raising the wage level, on the other hand, were perceived as least effective, according to the Delphi experts. This paper provides a clear picture of ACSs in the construction sector of China and evaluates the effectiveness of these ACSs.

7. ACKNOWLEDGEMENT

This paper is an abridged version of a journal paper which the authors have developed and submitted to Science and Engineering Ethics Journal. This study is funded by Joint PhD scheme between The Hong Kong Polytechnic University and Tongji University, and National Natural Science Foundation of China (No. 71172107 and 71390523).

8. REFERENCES

- An, L., Zhao, W. and Xi, Y. 1999. The gamble analysis on corruption problem, *Systems Engineering-Theory and Practice*, 19(9), 34-40.
- Breslow, N. 1970. A generalised kruskal-wallis test for comparing K samples subject to unequal patterns of censorship. *Biometrika*, 57(3), 579-594.
- Chan, A. P., Yung, E. H., Lam, P. T., Tam, C. M. and Cheung, S. O. 2001. Application of delphi method in selection of procurement systems for construction projects, *Construction Management and Economics*, 19(7), 699-718.
- Hallowell, M. and Gambatese, J. 2010. Qualitative Rresearch: Application of the delphi method to CEM research, *Journal of Construction Engineering and Management*, 136, SPECIAL ISSUE: Research Methodologies in Construction Engineering and Management, 99–107.
- Hon, C.K.H., Chan, A.P.C. and Yam, M. C. 2012. Empirical study to investigate the difficulties of implementing safety practices in the repair and maintenance sector in Hong Kong, *Journal of Construction Engineering and Management*, 138(7), 877-884.
- He, Z. 2004. Prevention and governance on corruption: Innovation on institution systems, *Journal of Public Management*, 1(3), 20-27.
- Hu, A. and Guo, Y. 2001. Anti-corruption strategies and design of institutions for the governance on corruption in transitional period. *Management World*, (6), 44-55.
- Ge, Y., 1994. Consideration of corruption in perspective of social science. *Management World*, (3), 206-210.
- Goldie-Scot, H. 2008. Briefing: Corruption in construction in developing countries, *Proceedings of the ICE-Municipal Engineer*, 161(4), 211-213.
- Kenny, C. 2009. Transport construction, corruption and developing countries, *Transport Reviews*, 29(1), 21-41.
- Li, X. and Li, J. 2004. Corruption research in the science of public administration in China, *Journal of Public Management*, 1(3), 27-34.
- Long, C. and Tian, Y. 2008. Corruption and cures: Research based on the prospect theory, *Journal of Public Management*, 5(4), 46-52.
- Lv, R. and Liu, B. 1999. Determinants of corruption in enterprisers, *China Soft Science Magazine*, (11), 69-72.
- Nan, X. and Meng, W. 2008. Corruption based on entry fees and financial institution, *China Soft Science Magazine*, (1), 56-61.
- National Bureau of Statistics of China. 2012. *China statistical yearbook*, Available from: <http://www.stats.gov.cn/tjsj/ndsj/2012/indexch.htm>. [Accessed 24 March 2014].
- Siegel, S. and Castellan, N. J. 1988. *Nonparametric statistic for the behavioral sciences*, 2nd ed. McGraw-Hill, New York.
- Sohail, M. and Cavill, S. 2008. Accountability to prevent corruption in construction projects, *Journal of Construction Engineering and Management*, 134(9), 729-738
- State Council of China. 2011. *Implementing regulations of the law of bidding of People 's Republic of China* [online]. Available from: http://www.gov.cn/zwgk/2011-12/29/content_2033184.htm. [Accessed 24 March 2014].
- Tabish, S. and Jha, K. N. 2012. The impact of anti-corruption strategies on corruption free performance in public construction projects, *Construction Management and Economics*, 30(1), 21-35
- Tan, Y., Liao, J. and Li, J. 2011. Evolution, mechanism, and intervention of unethical behaviors by leaders: analysis based on the micro social psychological perspective, *Management World*, (12), 68-77.
- Tisné, M. and Smilov, D. 2004. *From the ground up. Assessing the record of anticorruption assistance in southeastern Europe*. Center for Policy Studies, Central European University, Budapest, Hungary.
- Transparency International. 1999. *Bribe payers index 1999* [online]. Berlin, German. Available from: http://www.transparency.org/research/bpi/bpi_1999. [Accessed 24 March 2014].
- Transparency International. 2002. *Bribe payers index 2002* [online]. Berlin, German. Available from: http://www.transparency.org/research/bpi/bpi_2002. [Accessed 24 March 2014].
- Transparency International. 2006. *Bribe payers index 2006* [online]. Berlin, German. Available from: http://www.transparency.org/research/bpi/bpi_2006. [Accessed 24 March 2014].

- Transparency International. 2008. *Bribe payers index 2008* [online]. Berlin, German. Available from: http://www.transparency.org/research/bpi/bpi_2008. [Accessed 24 March 2014].
- Transparency International. 2011. *Bribe payers index 2011* [online]. Berlin, German. Available from: http://www.transparency.org/research/bpi/bpi_2011. [Accessed 24 March 2014].
- Wang, L. and Ni, X. 2004. System change and construction of integrity in leadership of public management in transitional period in China, *Journal of Public Management*, 1(2), 12-20.
- Wu, J. and Yao, L. 2008. Corruption and the departure in the composition of public expenditure, *China Soft Science Magazine*, (5), 8-15.
- Wu, F., Hu, S. and Zeng, X. 2008. Corruptive character analysis based on efficiency wage, *Systems Engineering-Theory and Practice*, 28(6), 65-69.
- Xia, G. and Zhang, S. 2005. Research on mechanism and settlement of corruption in authority market, *China Industrial Economy*, (8), 65-72.
- Xie, B. and Kang, J. 2010. Consideration of the public wishes in the anti-corruption strategies of penal punishment, *Management World*, (1), 173-174.
- Xie, B. and Kang, J. 2011. Construction of anti-corruption strategies of penal punishment in a scientific way, *Management World*, (3), 170-171.
- Xinhua Net. 2011. More efforts will be imposed on investigation of corruption in construction sector in China [online]. Available from: http://news.xinhuanet.com/legal/2011-05/17/c_121426891.htm. [Accessed 24 March 2014].
- Zhou, J. and Liu, M. 2004. Performance of anti-corruption strategy of high wages in uncertainty conditions, *The Journal of Quantitative and Technical Economics*, 21(12), 95-105.
- Zou, P. X. 2006. Strategies for minimising corruption in the construction industry in China, *Journal of Construction in Developing Countries*, 11(2), 15-29.