Evaluation of ethical codes implementation – a fuzzy approach

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Abstract

Purpose – Setting measurable criteria for implementing ethical codes is a pivotal issue in construction organizations. This paper aims to present an approach for evaluating ethical codes implementation within an organization based on 30 indicators for effective implementation of codes of ethics, with the objective of enhancing employees' ethical behaviour within the organization.

Design/methodology/approach – This study builds on a theoretical model that was developed using existing classification in the literature, including six processes of ethical codes implementation (process of: identification and removal of barriers, coding, internalization, enacting values, monitoring and accountability). The model was validated by applying partial least square structural equation modelling (PLS-SEM) estimation approach on questionnaire survey data which were collected from construction practitioners in Hong Kong. Fuzzy synthetic evaluation (FSE) analysis was adopted to assess the level of ethical code implementation.

Findings – The results of the PLS-SEM indicate a good model fit, and the model has a substantial predictive power and satisfactory model representation. Thus, the model is suitable for measuring or evaluating codes of ethics implementation within organization. The process of "enacting value" has the greatest influence on "ethical code implementation". The results of FSE indicate that the overall level of implementation of ethical codes is high, but there are rooms for further improvement.

Research limitations/implications – The response to the self-assessment questionnaire used for measuring the extent of implementation is relatively low, but it was adequate for statistical analyses considering the fact that it represents the second stage of data collection in a longitudinal manner, and only the respondents who participated in the initial questionnaire survey were asked to participate. The essence of doing this is to test the model for the purpose of self-evaluation of construction organizations regarding codes implementation. Thus, the outcomes are not representative enough for the entire construction organizations in Hong Kong. However, the model was tested to demonstrate how to reflect the strengths and weaknesses of construction companies in Hong Kong with respects to ethical code implementation to identify areas requiring improvement.

Practical implications – Facilities managers can benefit from the findings of this study by applying the model to assess ethical codes implementation within the organization to enhance ethical behaviour.

Originality/value – The main contribution of this study is the generation of a framework for measuring the extent of implementation of ethical codes within construction organizations. The contribution from this study can add significant value to facilities management discipline as well, being a business-oriented sector. As ethical behaviour plays an important role in delivering various facilities. The approach used in this study is useful for facilities managers in the process of implementing codes of ethics.

Keywords Evaluation, Implementation, Modelling, Ethics, Construction, Organizations

Paper type Research paper

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1. Introduction

The ever-growing demands for a reputable construction industry require a dynamic approach to creating a formidable professional environment. The expectation of this kind of environment can only be met by strict compliance with corporate codes of ethics (Ohrn, 2002) and by setting a standard for ethical behaviour (Kleiman, 2013). The claim that ethical codes can reshape construction environment is gaining more recognition nowadays. For instance, due to incessant unethical conduct within the construction industry in Hong Kong, codes of ethics soon became a requirement for contractors to tender for government works (Ho *et al.*, 2004). Similarly, in the USA, codes of ethics has become a necessary commodity for all registered organizations which is evidenced from the efforts of some construction institutions such as Construction Management Association of America and American Institute of Constructors (Ohrn, 2002).

Worrisome but not surprising, whenever the construction industry is compared with the concepts of ethics, the result will trigger a reminder of bad reputation (Rapoport, 2013). This is due to alarming rate of reports regarding ethical issues in the industry. Common reports of unethical practices are related to bribery, abuse of client and company resources, favouritism, discrimination and harassment (Kang and Shahary, 2013). According to Adnan *et al.* (2012), most of the blame emanating from unethical conduct are often attributed to the main contractors as key players in the industry. Kleiman (2013) asserts that contractors can play an active role to solve ethical issues in the industry by training managers to become leading examples and characterize the company's ethical expectation which will eventually reflect on the industry's reputation as a whole. Therefore, it is imperative to address ethical issues at company's level.

Research from various countries across the world concerning ethical issues in construction industry reveals the extent of unethical behaviour as manifested in different levels. For example, studies in the USA (Jackson, 2005), South Africa (Pearl *et al.*, 2005), Australia (Vee and Skitmore, 2003), Malaysia (Adnan *et al.*, 2012), Kenya (Mathenge, 2012), Pakistan (Nawaz and Ikram, 2013), the UK (Mason, 2009), China (Zou, 2006) and Nigeria (Ameh and Odusami, 2009), all describe prevalence of ethical issues in the industry. In the present era of growing interest in code of ethics as a tool for managing ethical behaviour, only little empirical research has studied codes of ethics within the context of construction industry (Vee and Skitmore, 2003; Ho *et al.*, 2004; Tow and Loosemore, 2009; Ho, 2013). The issue of implementation of codes of ethics has been the subject of surprisingly little scholarly attention in construction research. The only studies that have done so (Ho *et al.*, 2004; Ho, 2013), only recommend "top management commitment" and "communication of ethical codes" as means of effective implementation and thus do not explore other supporting factors of codes implementation and how to measure the factors.

Although efforts are being made to implement codes of ethics in construction organizations, corporate management of some organizations adopted a *laissez-faire* approach in implementing their corporate codes (Ho *et al.*, 2004). Thus, setting measurable criteria for implementing ethical codes is a pivotal issue in construction organizations. This study offers a much-needed synchronized perspective on this critical issue by presenting an approach for measuring implementation processes by adopting the process assessment approach method for measuring codes of conduct, illustrated by Nijhof *et al.* (2003). The framework includes 30 indicators extracted through a critical review of literature presented in earlier study (Oladinrin and Ho, 2015a). In this study therefore, the processes of implementing codes of ethics and how to measure the extent of ethical code implementation are demonstrated. The framework is useful for construction organizations willing to assess their ethical performance with respect to ethical codes implementation.

Though the framework was generated for assessing codes implementation within contractor's organizations in this paper, the same approach may be adopted in the facilities management (FM) and building maintenance sector. Ethical issues within the conduct of FM practice are unavoidable, and there is an established relationship between FM and business ethics that prompt many businesses to now have codes of ethics to satisfy the increasingly demand of ethical conduct by the public (Grimshaw, 2001). Hence, the contribution from this study can add significant value to FM discipline as well, being a business-oriented sector. As ethical behaviour plays an important role in delivering various facilities, it is therefore imperative for facilities managers to recognize the need to implement codes of ethics within their business domain and subsequently manage the implementation processes to ensure that employees' behaviours continually match with corporate ethical conduct.

2. Review of the relevant literature

2.1 Concepts of codes of ethics

There are numerous ideas of what the meanings of codes of ethics are. Many researchers looked at it from different perspectives starting from Heermance (1924) handbook on the topic "codes of ethics". Nevertheless, confusion still exists on the precise nature of ethical codes (Kaptein and Schwartz, 2008; Pearce and David, 1987; Schwartz, 1999; Stevens, 1994) emanating from different names used to describe the phenomenon such as codes of ethics (Cressey and Moore, 1983; Molander, 1987; Benson, 1989), code of conduct (White and Montgomery, 1980), business principles (Sen, 1997), corporate credo (Murphy, 1995), corporate ethics statement (Murphy, 1995) and code of practice (Schlegelmilch and Houston, 1989). Meanwhile, Schwartz (1999) analyses various ethics documents and opines that a code of ethics could also be a code of conduct, code of practice, corporate credo or even a value statement. However, the most commonly used terms are "codes of ethics" and "codes of conduct", and the two terms are complimentary in nature (Gilman, 2005). The current study uses "codes of ethics" or "ethical codes" throughout this article to describe documents which contain the basic philosophical principles and state the accepted values within an organization (Stevens, 2009). The studies on codes of ethics have been around for some decades, but there is dearth of research in construction management studies on this subject. Therefore, due to limited studies, the literatures search for this study extended beyond the scope of construction research.

2.2 Relevance of ethics codes implementation in construction organizations

In practice, while most large companies around the world have now legalized behaviour through written corporate codes, reported ethical malpractices are unabatedly sustained in most of these organizations. A survey reported by Doran (2004), cited in Mason (2009), reveals the status of ethical practices in construction that only a few companies in the USA feel concerned about ethics. Similarly, contractors in Hong Kong pay less attention to ethics (Ho *et al.*, 2004). Kang and Shahary (2013) identify 18 ethical issues in construction industry; common ethical challenges include substandard construction quality, bid shopping, payment games, lying, unreliable contractors, claims games (e.g.

inflated claims, false claims), threats, conflict of interest, collusion, fraud and professional negligence. This necessitates the need for a viable tool such as codes of ethics to be implemented in the web of construction practices so as to address possible ethical menace. Although efforts have been made to address these ethical issues in construction, for instance, Ho *et al.* (2004) reveal that there are certain missing factors, which must be put in place for codes of ethics to be effective in construction organizations.Ho (2013) notes that, although many attempts have been made to improve ethical codes implementation and administration, a formal approach has not been fully optimized in the construction industry.

2.3 Implementation of codes of ethics

There are two terms to describe the management of ethical codes within an organization according to McCabe *et al.* (1996):

(1) "implementation" of ethical codes, referring to *the extent to which an organization attempts to communicate its code to employees and ensure compliance*; and

(2) "embeddedness" of ethical codes, describing *the degree to which the code is integrated into the organization's culture*.

Both the implementation and embeddedness as described here connote what is expected of an organization in the attempt to ensure that ethical expectation is properly met within a company. According to Kaptein and Schwartz (2008), implementation process of the codes of ethics is one of the determinant of the extent to which the conduct of management and employees is steered by ethical codes. Although codes cannot be effective unless distributed to employees (Weaver *et al.*, 1999), the distribution alone is not sufficient because there is no certainty that the employees will read it (Kaptein and Schwartz, 2008). This implies that mere distribution of codes to members of an organization does not guarantee effective implementation.

A number of studies on the implementation of codes of ethics in Hong Kong have been reported in literature (Snell *et al.*, 1999; Snell and Herndon, 2000, 2004), using several firms across diverse sectors of the economy. The studies conclude that code adoption did not translate into any significant improvement in conduct, even some times after the adoption of codes. In line with this, Ho *et al.* (2004) point out that the failure of the code in influencing ethical conduct is inherent in the way and manner of implementing the code especially within construction organizations in Hong Kong. The study (Ho *et al.*, 2004) reports an in-depth case study of an international construction company that examined the state of corporate ethics management in relation to the implementation of corporate codes in Hong Kong, revealing that corporate management of the subject organization adopted a *laissez-faire* approach in implementing its corporate code. Also, senior management of many construction companies claim that their organizations have produced corporate code of ethics, but they simply do not know how to implement and embed it in their organizations' culture. Ho (2010) reveals that few studies about codes of ethics focus more on creation, adoption and content of codes, while the implementation aspect seems to be neglected. Meanwhile, according to Ho (2011), the existence of a corporate code is no longer sufficient to steer ethical conduct within construction organization.

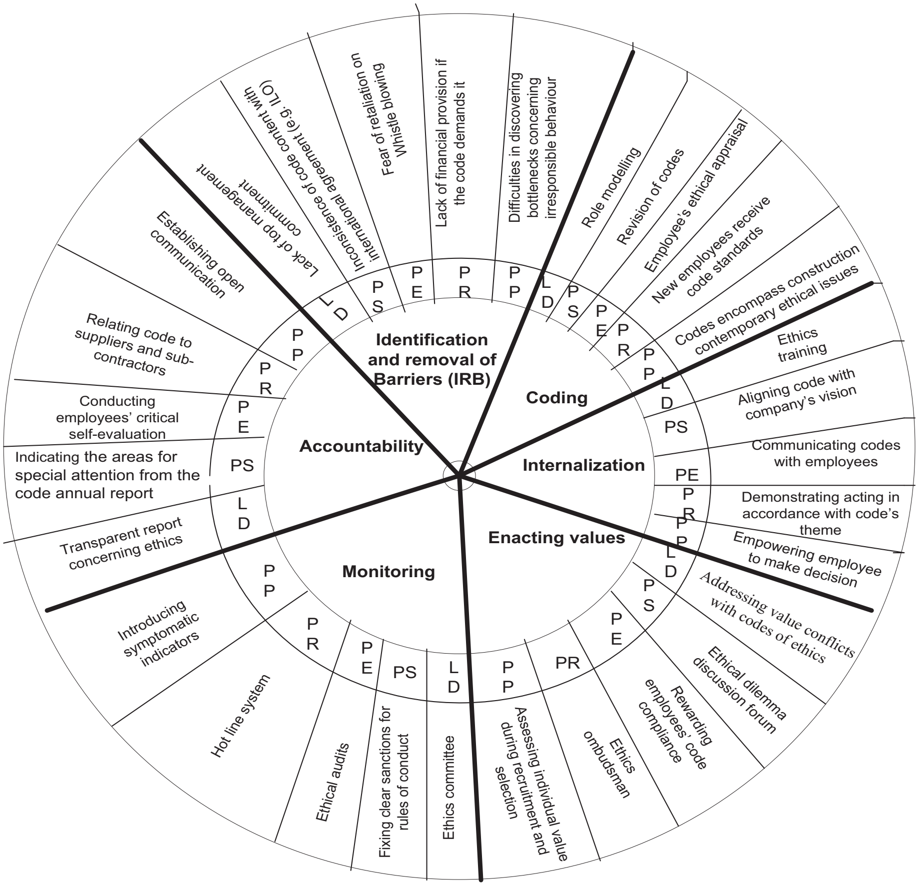
Goodell (1994), based on the account of ethics report centre, notes that implementation of a code will produce a negative effect on members of a company regarding perceptions of ethical behaviour especially, when such implementation is not reinforced by other supporting instruments such as ethics training and ethics office. Supporting instruments do not necessary mean tangible tools; rather, they represent the activities within an organization which enable effective implementation of codes of ethics. Mamic (2003) claims that the process of implementing codes of ethics begins with ensuring that code is consistent with international standard such as International Labour Organization. This is to avoid contradiction of codes with existing standard. Giving copies of ethical codes to new employees at the beginning of their employment contract (Hemingway and Maclagan, 2004) is another instrument of code implementation. Investigation on how a business organization can best implement an ethical code of conduct was conducted by Adam and Rachman-Moore (2004), and two methods of implementation were identified including, formal method (i.e. training and courses on the subject of ethics) and informal method (i.e. manager sets an example). The result shows that informal method was more effective than formal ethics training in the process of implementing an ethical code of conduct.

A case study by Ho (2013) on implementation of ethical codes within construction organization in Hong Kong makes it clear that communication is an important tool to ensure effective implementation of ethical codes, and this is supported by Kleiman (2013). Other instruments include the use of ethics ombudsman (Mathenge, 2012), the use of ethics committee (Adam, 2005), regular ethical audits (Suen *et al.*, 2007), protecting whistleblowers (Lloyd and Mey, 2010), etc. In a nutshell, a recent study by Oladinrin and Ho (2014b) on strategies for improving ethical code implementation summarizes all the activities which steer effective implementation of codes and describes them as "enablers for code implementation" in line with Nijhof *et al.* (2003) instrument. The strategies contain 30 items which must be complied with in the process of implementing codes of ethics within an organization.

Furthermore, a framework was developed by Oladinrin and Ho (2014a) incorporating all the enablers and six processes of code implementation as shown in Figure 1. There are six sectors in the circle representing six processes of implementation. All the activities necessary to achieve each process of implementation are linked with their respective organization enablers (Leadership, Policy and strategy, Employees, Partnership and Resources, Process) based on EFQM classifications. The framework takes into account the basic components that contribute to success of code implementation within an organization as well as the processes for ensuring effective integration of the ethical codes enablers. The division of the processes in a certain respect is artificial because the processes are closely connected to each other. However, the application of each division has a considerable added value. Each of these processes separately contributes considerably to stimulating responsible behaviour.

2.4 Measuring the implementation process of codes of ethics

Helin and Sandström (2007) argue that the process of implementing codes of ethics is highly complex. In as much as this argument is true, it is important to note that the effect of codes of ethics on the conduct of individual and organization depends on "implementation strength" of the code (McCabe *et al.*, 1996). This strength can be determined by measuring the extent of implementing the supporting instruments or



Notes: LD = Leadership; PS = Policy and Strategy; PE = Employees/People; PR = Partnership and Resources; PP = Process

Source: Adapted from: (Oladinrin and Ho, 2015a)

Figure 1.
Framework for code implementation process

indicators that aids code implementation within an organization. Unfortunately, studies focusing on the outcome of ethical codes are far more than those focusing on a process (Montoya and Richard, 1994) such as ethical code implementation process (Oladinrin and Ho, 2015a). Another aspect suffering from paucity of research is the measuring of ethical code implementation process. The only study that attempts the measurement of code implementation is Nijhof *et al.* (2003), but the study did not provide theoretical justification for the measured variables; however, the approach was validated by a case study. A study conducted in the USA, on behalf of the Ethics Resource Centre, reveals that most organizations lack approach for measuring code effectiveness (Kaye, 1992). Although some organizations claim to be implementing codes (McCabe *et al.*, 1996), empirical support for measuring the extent of such implementation is lacking in construction research.

Webley (1988) found that many companies cannot sustain the code shortly after adoption. This is as a result of laxity in complying with code process (Sethi, 2002). Therefore, Nijhof *et al.* (2003) argue that if an organization wishes the codes of ethics to be rooted in its daily routine, it is important to give shape to and manage processes of implementation. Kaptein and Schwartz (2008) argue for the needs to have a model for measuring effectiveness of ethical codes because of several mediating factors involved. In the same way, the current study argues for, and proposes a framework for measuring ethical codes implementation process within construction organizations. The factors depicted in Figure 1 represent the indicators to be measured as expected of any responsible organization willing to have a successful code implementation. For clarity purpose, the enablers associated with each process are numbered accordingly starting from the process of identifying and removing barrier (IRB) with the items named number "1". For instance, the enablers/indicators relating to IRB sector of the circle is numbered LD1, PS1, PE1, PR1 and PP1, in the measurement model. For the coding process, number "2" was assigned to all the enablers attached to it (e.g. LD2, PS2 […], PP2). The same procedure is applied to other processes as hypothesized in Figure 2. The main task is to test whether the indicators for the enablers can substantiate the six processes and to test the influence of the processes (*H1-H6*) on ethical codes implementation. Although the complexity of measuring code implementation process is undeniable, this study proposes a reductionist view of the implementation process of codes of ethics whereby the enablers' indicators could be understood completely in terms of the processes they are composed of.

3. Research methods

3.1 Questionnaire survey and procedures

Research related to codes of ethics implementation has been predominantly carried out with the aid of a questionnaire survey (Beeri *et al.*, 2013; Majluf and Navarrete, 2011; Svensson *et al.*, 2009), being an effective instrument for gathering people's perceptions and the ease of analysing inter-correlations among participants' opinions (Spector, 1997). Thus, the use of questionnaire survey is considered suitable for this study. The questionnaire consisted of 30 variables previously developed on the basis of a review of the related literature contained in the framework (Figure 1). The questionnaire was bilingual (i.e. designed and presented in English and Chinese) for ease of comprehension because of the involvement of frontline employees in the research (Hon *et al.*, 2013). There are two sets of questionnaires. For the first set, the indicators were represented by statements in the questionnaire, and all the statements are in turn rated on a five-point Likert-type scale with points 1 and 5 representing strongly disagree and strongly agree, respectively (Doloi, 2009). This set was launched to solicit opinions of practitioners regarding the 30 items included in the framework. The second set targeted construction companies in Hong Kong, launched to determine the significance of the enablers regarding codes of ethics implementation, using five-point Likert-type scale ranging from 1 to 5, representing highly insignificant and highly significant, respectively.

Due to public policy in Hong Kong, making it a compulsory obligation for all contractors to have a written code of ethics, all the research participants are working for organizations with written codes of ethics. Before embarking on organization-wide survey, a pilot study was conducted in one Construction Company in Hong Kong to validate the content of the questionnaire due to the willingness of the company to fully

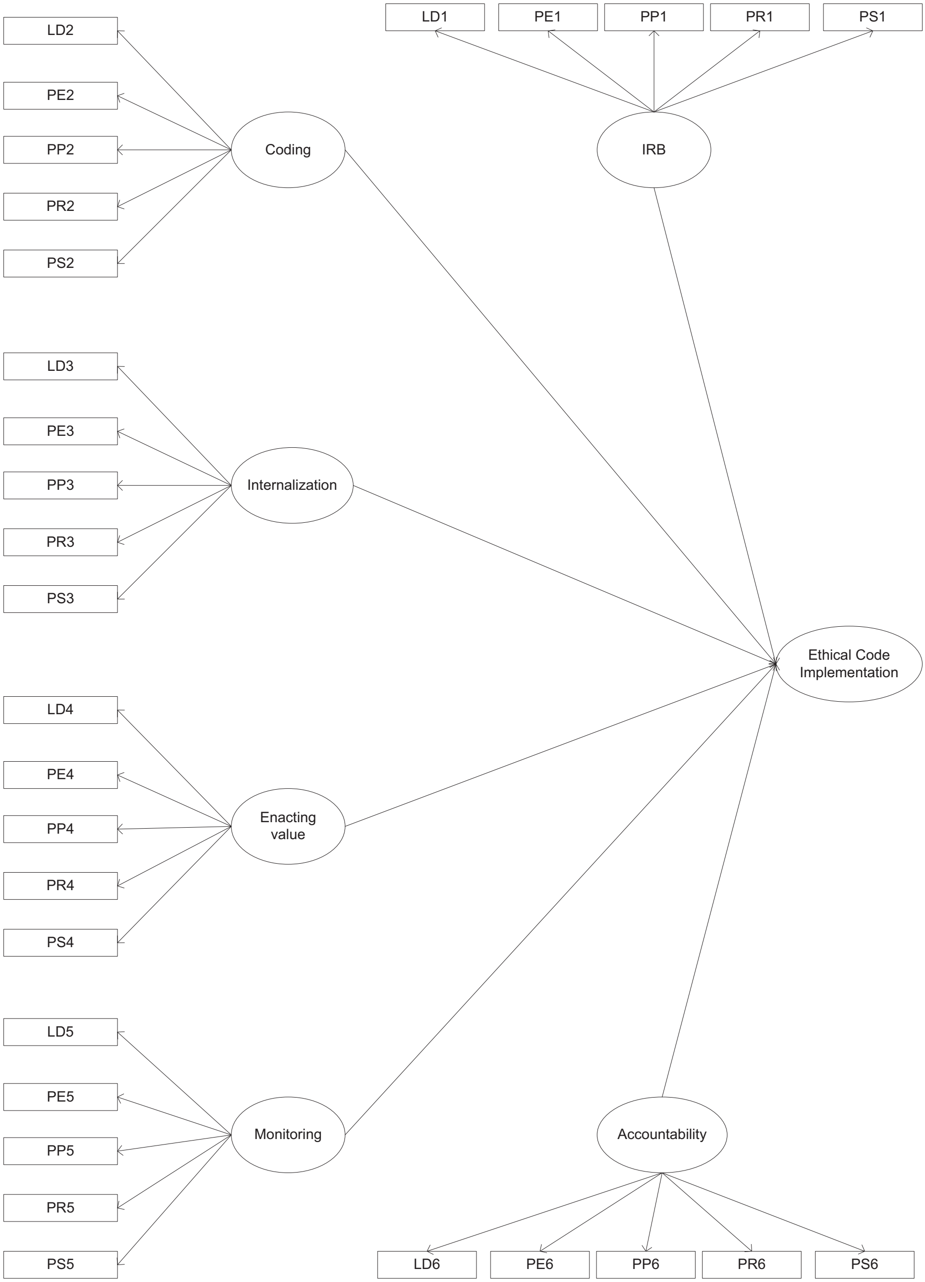


Figure 2.
Hypothetical model for PLS-SEM analysis

participate in the research (Robinson, 1991). The selection of the case organization for the pilot study was guided by the assumptions advocated by Nijhof *et al.* (2003) as follows:

- the organization must have adopted a written code of ethics;
- the code should contain guidelines about both desirable behaviour (value orientation) and prohibited behaviour (compliance orientation);
- the code pertains to the behaviour of employees as individuals and to the corporate behaviour of the organization as a whole;
- the code signifies responsibility distribution forms within the firm;
- the use of the code as an instrument focuses on heightening corporate social responsibility; and
- finally, the organization must have attempted code implementation in a way.

Considering these assumptions, coupled with the sensitivity of ethics-related study and the willingness of the company, the current study used one construction organization for pilot study as reported in Oladinrin and Ho (2015b). This is preceded by academic review of the questionnaire by experienced researchers.

The pilot questionnaires were distributed using snowball sampling within the organization, and 17 filled questionnaires were returned of 50 administered. In exploratory study involving survey research, Hill (1998) suggests that 10 to 30 participants should be used for pilots. However, there were no suggestions for further improvement on the preliminary instrument; thus, the content of the survey instrument was deemed satisfactory to be used for larger coverage. The issue of reliability and validity of the pilot survey is not addressed due to the nature of the research and limited sample, as suggested by Johanson and Brooks (2009). Generally, there are two sets of questionnaires in the larger survey, the first one focused on general assessment of the indicators, while the second focused on organization-based assessment of the processes. To boost the survey response rate, small incentive packages in form of supermarket cash coupons were attached to the questionnaires (Lucko and Rojas, 2010). The questionnaires were distributed and collected personally by the researchers due to the sensitivity of ethics research (Beeri *et al.*, 2013) and the increased response rate identified with personal delivery and collection methods (Ki *et al.*, 2012). However, the participants were assured of the anonymity of the information provided. Thus, to enhance the response rates, participants and organizations that show interest in participating in the research were approached.

For the first round of questionnaire survey, 260 questionnaires were administered to practitioners within construction companies in Hong Kong to determine their level of agreement regarding the influence of the identified indicators on effective implementation of ethical codes. Due to the sensitivity of ethics research, convenient and snowball samplings were used. These approaches are commonly used in construction management research (Abowitz and Toole, 2009), due to difficulties in determining actual sampling frame. Although a list of 282 registered construction companies in Hong Kong was generated from Hong Kong Construction Association and invitation letters were sent to all the companies with several reminder and follow-up emails, only one company gave positive response, while others either declined or did not respond at all. However, in this study, the nature of the sample is considered more important than its size (Johanson and Brooks, 2009). Hence, the need for convenient and snowball samplings. In all, 166 were returned, representing 64 per cent overall response rate which was considered satisfactory because it is more than the recommended minimum response rate of 30 per cent of 107 questionnaires (Fellows and Liu, 2009). After checking for outliers and missing values, all the 166 completed questionnaires were deemed valid for analysis.

Table I shows the professional background of the respondents. Approximately, 46.4 per cent were engineers (*N* = 77), 1.2 per cent were architects (*N* = 2), 8.4 per cent were quantity surveyors (*N* = 14) and 12.7 per cent were builders (*N* = 21). A total of 31.3 per cent represent others in different professional categories such as mechanical engineer, structural engineer, tunnel specialist, plant operator (fork-lift, excavator, etc.).

Years of experience of the respondents are presented in Table II. In this study, 75.3 per cent of the respondents have between 0 and 5 years of working experience, 9 per cent have between 6 and 10 years of working experience and 15.7 per cent have above 11 years of working experience. As can be seen from the analysis, majority of the respondents have low working experiences. This is as result of the difficulties in reaching the senior employees which may be as a result of their busy schedule as claimed by Levitt and Samelson (1993).

Among the respondents, 4.8 per cent were top-level managers, 25.3 per cent were supervisors at various levels and 69.9 per cent were front-line employees (Table III). This reflects hierarchical distribution of employees in construction organizations. In addition, the current research targets to involve members of an organization at different

Professional affiliations	Frequency	Valid (%)	Cumulative (%)
Engineer	77	46.4	46.4
Architect	2	1.2	47.6
Quantity Surveyor	14	8.4	56.0
Builder	21	12.7	68.7
Other	52	31.3	100.0
Total	166	100.0	

Table I. Professional background of the respondents

Years	Frequency	Valid (%)	Cumulative (%)
0-5	125	75.3	75.3
6-10	15	9.0	84.3
11 and above	26	15.7	100.0
Total	166	100.0	

Table II. Years of experience of the respondents

Position	Frequency	Valid (%)	Cumulative (%)
Senior Manager	8	4.8	4.8
Supervisor	42	25.3	30.1
Front-line employees	116	69.9	100.0
Total	166	100.0	

Table III. Position of the respondents in their organizations level in the study to capture necessary information needed to provide answers for the research question. A construction safety climate research in Hong Kong (Hon *et al.*, 2013) reports 19.5 per cent managers, 19.8 per cent supervisors and 60 per cent frontline workers. Thus, the distribution of the respondents for this study is considered appropriate and representative.

For the second set of questionnaire, 100 self-assessment questionnaires were sent to different construction organizations that responded to the invitation to determine the relevance and practice of the indicators within the organizations. This decision was reached after several invitations to gain access into some more organizations were turned down. As mentioned before, five-point Likert scale ranging from 5 to 1, representing highly significant and non-significant, respectively, was adopted for this purpose. Due to sensitivity of ethics, most organizations invited to participate in the research refused to give access into their companies. To facilitate the research process, part-time students of construction management working in different construction companies were invited to be used for snowball sampling. Although these students participated in the first round of questionnaire survey, they were also briefed about the research project and were asked to help in assessing their individual companies based on the established model. In total, 53 questionnaires were returned after a thorough follow-up. Among the respondents that filled each questionnaire on behalf of the company, 8 per cent were senior managers, 51 per cent were project managers, 11 per cent were supervisors, 9 per cent were frontline workers and 21 per cent did not indicate their current position in the company. Based on the years of experience in terms of length of service with the current company, 4 per cent have more than 20 years of experience, 4 per cent have between 16 and 20 years, 13 per cent have between 11 and 15 years, 21 per cent have between 5 and 10, while 58 per cent have between one and five years of working experience in their current company. It was believed that the questionnaire data are a reflection of the practices attainable in the respondents' organizations.

4. Data analysis and results

4.1 Partial least square structural equation modelling

Partial least square structural equation modelling (PLS-SEM) is a non-parametric method (You *et al.*, 2014), closely related to standard least-squares methods (Lu *et al.*, 2012), which is used to estimate causal relationships in path models where latent constructs are indirectly measured by associated indicators (Memon *et al.*, 2013). PLS has been adopted in various construction management-related studies for statistical analysis (Memon *et al.*, 2014; Rahman *et al.*, 2013; Memon *et al.*, 2013; Aibinu and Al-Lawati, 2010; Le *et al.*, 2014; Lim *et al.*, 2010). This due to some of the advantages of PLS path modelling over conventional SEM with covariance analysis which include minimal assumptions regarding population or statistical distributions of data sets is required (Henseler and Sarstedt, 2013); minimum sample size as small as 30 is sufficient (Wixom and Watson, 2001) and more appropriate when dealing with real-world applications and complex models (Wu, 2010). Enegbuma *et al.* (2014) assert that PLS path modelling is prevalent in strategic management research (Lauria and Duchessi, 2007), involving a systematic and sequential procedure in evaluating theoretical model (Rahman *et al.*, 2013). It is more suitable for evaluating a model that is developed with limited theoretical knowledge (Lowry and Gaskin, 2014). As this study describes a strategic approach to implementation of codes of ethics in construction organizations based on theoretical framework that has not been empirically tested before, PLS is adopted using Smart PLS 3.0 software package for the analysis.

In testing the hypotheses, PLS-SEM is used because its primary objective is to establish that the positive relationship is significant, by showing a high R^2 (Gefen *et al.*, 2000; Barclay *et al.*, 1995). Covariance-based SEM cannot be applied in this study due to inherent factor indeterminacy, that is, it generates more than one solution without a definite assumption of a particular solution that corresponds to the hypothesis being tested, making it unreliable in exploratory analysis essential for theory building (Chin and Todd, 1995; Lowry and Gaskin, 2014). The use of covariance-based SEM is recommended when testing an empirically tested theoretical model, but PLS-SEM is suitable for exploratory analysis and developmental theory testing (Lowry and Gaskin, 2014; Fornell and Bookstein, 1982). Given the exploratory nature of the current study and relative newness of the proposed model, PLS-SEM is appropriate. There are two steps in PLS path modelling evaluation: the structural (inner) model and the measurement (outer) model (Henseler and Sarstedt, 2013; Memon *et al.*, 2013). This study is guided by these two steps.

4.2 Results of partial least square structural equation modelling

In PLS-SEM analysis, the measurement (outer) model must be established first. To do this, convergent reliability and validity are conducted to measure the internal consistency to ascertain that the items associated with each latent construct based on the theoretical model actually measure the construct and not measuring another latent construct (Rahman *et al.*, 2013, Hulland, 1999). To ensure a satisfactory level of reliability and validity of a model, three common tests need to be conducted (Mohamed, 2002). First, the individual item reliability which is measured by the loadings or simple correlations of the observed indicators (manifest variables) on their respective latent constructs must be examined. Using 0.50 as a cut-off point (Chin, 1998), all the loadings are above the cut-off value ranging from 0.647 to 0.849 as shown in Table IV. Second measurement property is the composite reliability (CR) which is used to check the extent to which a latent construct is measured by its observed indicators. CR has the same interpretation as Cronbach's alpha, and the value of CR must be greater than 0.7 (Lowry and Gaskin, 2014). The CR values ranging from 0.840 to 0.888 (Table IV) and the coefficient of reliability measured by Cronbachs's alpha values which must also be higher than 0.7 (Rahman *et al.*, 2013) ranging from 0.765 to 0.842, show a satisfactory level of internal consistency.

Furtherance to CR is the average variance extracted (AVE) test, a measure of internal consistency of the construct which shows the amount of variance that a latent construct captures from its observed items, relative to the amount of variance imputed by measurement errors (Fornell and Larcker, 1981). The value for AVE must be higher than 0.50 as stated by Hair *et al.* (2011). The AVE value for each of the constructs is above the threshold as listed in Table IV. This implies that more than half of the measured item's variance is accounted for by the observed items, while less than half of the variance is due to measurement error.

The third test is the discriminant validity which indicates the extent to which a particular construct differs from other constructs in the model (Hulland, 1999). There are two techniques for determining discriminant validity (Lowry and Gaskin, 2014) which

	AVE	CR	Cronbach's alpha	IRB	Coding	Internalization	Enacting value	Monitoring	Accountability
LD1	0.561	0.865	0.804	*0.788*	0.519	0.386	0.331	0.303	0.297
PE1				*0.743*	0.517	0.357	0.258	0.266	0.250
PP1				*0.722*	0.537	0.503	0.365	0.336	0.406
PR1				*0.746*	0.478	0.335	0.356	0.285	0.362
PS1				*0.744*	0.513	0.408	0.301	0.263	0.230
LD2	0.572	0.869	0.811	0.578	*0.723*	0.556	0.406	0.391	0.479
PE2				0.512	*0.833*	0.589	0.297	0.407	0.450
PP2				0.610	*0.804*	0.552	0.427	0.480	0.489
PR2				0.461	*0.758*	0.581	0.380	0.470	0.472
PS2				0.408	*0.649*	0.379	0.282	0.321	0.259
LD3	0.614	0.888	0.842	0.423	0.635	*0.792*	0.463	0.524	0.493
PE3				0.362	0.491	*0.806*	0.511	0.527	0.600
PP3				0.372	0.484	*0.690*	0.599	0.496	0.517
PR3				0.474	0.539	*0.771*	0.461	0.500	0.580
PS3				0.473	0.629	*0.849*	0.497	0.528	0.559
LD4	0.515	0.841	0.765	0.356	0.443	0.553	*0.727*	0.468	0.567
PE4				0.358	0.303	0.420	*0.647*	0.433	0.452
PP4				0.238	0.301	0.431	*0.748*	0.592	0.545
PR4				0.280	0.294	0.447	*0.767*	0.573	0.491
PS4				0.306	0.347	0.414	*0.693*	0.559	0.472
LD5	0.610	0.886	0.839	0.331	0.444	0.561	0.577	*0.747*	0.492
PE5				0.313	0.488	0.489	0.577	*0.811*	0.587
PP5				0.307	0.486	0.631	0.624	*0.840*	0.602
PR5				0.278	0.273	0.399	0.575	*0.718*	0.506
PS5				0.300	0.461	0.467	0.488	*0.782*	0.523
LD6	0.587	0.877	0.824	0.493	0.539	0.607	0.524	0.565	*0.726*
PE6				0.169	0.353	0.460	0.518	0.494	*0.764*
PP6				0.208	0.362	0.479	0.549	0.524	*0.750*
PR6				0.293	0.417	0.511	0.482	0.505	*0.773*
PS6				0.422	0.547	0.620	0.639	0.581	*0.815*

Table IV.
Construct and discriminant validity

are adopted in this study. The first technique is to calculate the square root of AVE for each construct which must be greater compare to correlation between the construct and the other constructs. The results for this technique is presented in Table V in which the square roots of AVE are asterisked and represented in italic diagonal elements, while the off-diagonal elements are the correlation values. This is called the Fornell–Larcker

	IRB	Coding	Internalization	Enacting value	Monitoring	Accountability
IRB	*0.749*[a]					
Coding	0.686	*0.756*[a]				
Internalization	0.536	0.712	*0.783*[a]			
Enacting value	0.432	0.480	0.640	*0.718*[a]		
Monitoring	0.390	0.554	0.656	0.728	*0.781*[a]	
Accountability	0.415	0.580	0.700	0.710	0.697	*0.766*[a]

Note: [a] Square root of AVE on diagonal

Table V.
Discriminant validity

criterion. Looking at the result in Table V, one construct (enacting value) has discriminant validity issue. However, Hon *et al.* (2013) suggest that any construct that fails discriminant validity test in this regard could be retained if it can pass cross-loading test. Therefore, discriminant validity of the indicators in this study was further determined by correlating the latent variable scores against the observed indicators (cross-loading) as discussed in Lowry and Gaskin (2014). The correlations symbolize a confirmatory factor analysis, having the same implications with the actual loadings of the indicators (Table IV). The general rule for this technique is that the loading of an indicator should be greater for the latent construct to which it was theoretically assigned than for any other latent construct in the model. Adequacy of discriminant validity is determined using a threshold of 0.100 for cross-loading differences, meaning that the difference between a given indicator under its assigned construct and its loading with other latent construct must exceed 0.100 (Lowry and Gaskin, 2014). This is demonstrated as shown in Table V in which all the observed variables are correlated against the latent constructs.

The result shows that all the indicators loaded strongly with their parent construct than any other constructs. Having evaluated the measurement model, it can be concluded that the constructs achieved a considerable reliability and validity. The next step is to proceed to the evaluation of structural model.

Following the outer model, structural (inner) model must also be established. Inner model measures the structural relationship between latent or unobserved constructs by testing the research hypotheses so as to assess the model's predictive power. The hypotheses in this study set to determine the influence of each established process on ethical code implementation (*H1-H6*) by examining the coefficient of determination (R^2) and the structural path coefficients. The level of significance was determined by bootstrapping technique using SmartPLS 3.0. This is demonstrated in Figure 3 in which four of the six hypotheses (paths) were supported (significant) in accordance with the predicted/hypothesized directions (+) as presented in Table VI. The paths linking process of "identifying and removing barriers" (*H1*), "internalization" (*H3*), "enacting value" (*H4*) and "accountability" (*H6*) to "ethical code implementation" (dependent variable) are positive and statistically significant ($p < 0.1$). The path between "enacting value" (observed construct) and "ethical code implementation" (dependent construct) has the highest significant value (0.232; $p < 0.1$) which indicates that ethical code implementation within construction organizations is greatly influenced by the process of enacting value. However, the expected influence of process of "coding" (*H2*) and "monitoring" (*H5*) were not supported, as "coding" and "monitoring" constructs were not significantly related to ethical code implementation. Despite the insignificant relationship, the two constructs agreed with the hypothesized direction (+) which implies that higher integration of coding and monitoring processes is associated with less positive ethical code implementation.

The R^2 value of the latent construct for the inner model is 0.605 which indicates that the regression of the six independent latent constructs (processes) is substantially high, explaining about 61 per cent of the variance in ethical code implementation. On the whole, the combination of all the six processes has predictive ability for 61 per cent of ethical code implementation in construction organization. Following Cohen (1988) recommendation, R^2 is considered as being substantial at the value of 0.26, moderate for 0.13 and weak for 0.02; thus, the model in this study has a highly substantial satisfactory

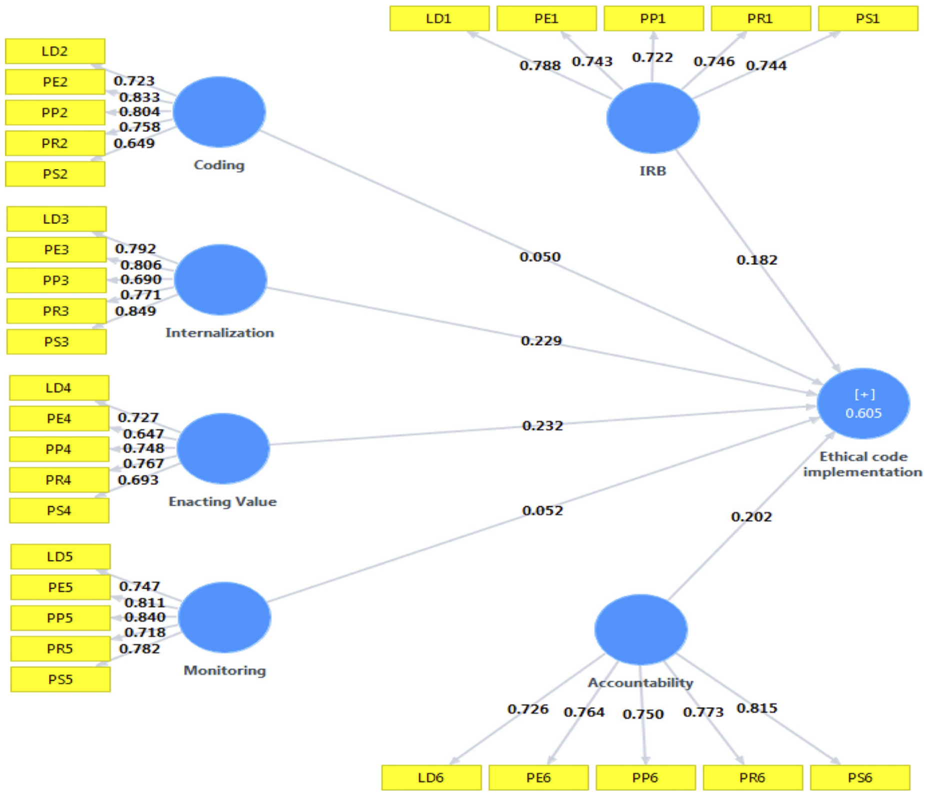


Figure 3.
Validating the results of theoretical model

Table VI.
Summary of path coefficients and significance levels

Paths	Path coefficient	*t*-statistics	*p*-values	Inference
IRB -> ECI (*H1*)	+0.182	2.261*	0.024	Supported
Coding -> ECI (*H2*)	+0.050	0.476	0.634	Not supported
Internalization -> ECI (*H3*)	+0.229	2.207*	0.028	Supported
Enacting value -> ECI (*H4*)	+0.232	2.596*	0.010	Supported
Monitoring -> ECI (*H5*)	+0.052	0.510	0.610	Not supported
Accountability -> ECI (*H6*)	+0.202	1.792*	0.074	Supported

Notes: *Indicates significant paths $p < 0.1$; *ECI = Ethical codes implementation*

level. Also, with the statistical significance of the overall model, it can be concluded that the model signifies excellent predictive power.

4.3 Model representation

Due to the intention to use the model for further assessment in respect to ethical codes implementation within construction organizations, it is imperative to evaluate the representation of the model. This is achieved by conducting global fit measure (GoF), which represents the geometric mean of AVE and average R^2 of dependent construct (ethical code implementation) as defined by Memon *et al.* (2013). GoF accounts for the overall prediction performance of both structural and measurement model. The essence of model representation is to assess the power of developed model for the purpose of generalizability for construction organisations in Hong Kong and elsewhere in predicting overall results of ethical code implementation an organization. The GoF is calculated using the following equation (Akter *et al.*, 2011):

$$GoF = \sqrt{AVE \times R^2}$$

where the AVE and R^2 are the values derived for overall results (dependent construct).

$$GoF = \sqrt{0.463 \times 0.605}$$

$$GoF = 0.529$$

The model representation is *small* if GoF is 0.1, *medium* if GoF is 0.25 and *large* at the value of 0.36 (Wetzels *et al.*, 2009). The GoF value (0.529) exceeds the large threshold (0.36). This implies that the overall model has substantial predicting power to generalize the outcomes of ethical code implementation in construction organization. Having established this, the model is considered suitable for measuring or assessing implementation level of codes of ethics within construction organization. In essence, the first set of questionnaires with 166 respondents were used to establish and empirically validate the model that can be applied for assessing practical implementation of codes of ethics within an organization as discussed in the following section.

5. Fuzzy synthetic evaluation method

Fuzzy concept has its origin in mathematics and is used to analyse problems characterized with uncertainty and imprecise definition (Li *et al.*, 2013), to explain vagueness inherent in human cognitive process (Chan *et al.*, 2009) and to address complex problems arising from imprecise nature of information within the real world system (Baloi and Price, 2003). The application of fuzzy techniques in construction management studies is becoming more prominent (Chan *et al.*, 2014). For instance, fuzzy synthetic evaluation (FSE) was used to evaluate performance measurement (Yeung *et al.*, 2011), model procurement selection for construction projects (Chan, 2007), evaluate risk factors in public–private partnership water supply projects in developing countries (Ameyaw and Chan, 2015), measure stakeholder satisfaction in construction projects (Li *et al.*, 2013) and develop a framework for contractors' selection (Singh and Tiong, 2005). FSE has been used in similar corporate ethics research (Sacconi, 2003).

With regards to the use of FSE in previous studies, it can be realized that the method has inherent advantages in handling complex evaluation with multi-criteria and multi-levels (Xu *et al.*, 2010). As ethical codes implementation processes are multi-layered and fuzzy in nature, involving evaluators' subjective assessment, it is appropriate to adopt FSE method to develop a fuzzy assessment model in this research study. A decision-making problem is termed multi-criteria if multiple decision makers are involved in the assessment of many criteria with the aim of determining the overall importance values of the alternatives on some permissible scale (Singh and Tiong, 2005). In determining ethicality of an organization, the decision-making process is often characterized by uncertainty and imprecise data and involves two or more decision makers for evaluation of a set of factors based on predefined linguistic indicators.

In applying FSE, alternatives are explicitly evaluated in general terms with respect to each of the decision criteria to arrive at a criterion specific priority scores which are then aggregated into overall performance values (Singh and Tiong, 2005). Due to vagueness and sensitivity of ethics in construction industry, the six processes of code implementation were selected for undertaking FSE analysis to determine the level of their implementation within construction organizations in Hong Kong through the instrumentation of enablers' indicators. Thus, FSE is used in this study to calculate the implementation level/index of a particular process and the overall implementation of ethical codes within construction organizations. The data obtained from the second set of questionnaire was used for FSE analysis. There are five steps involved in FSE technique according to Xu *et al.* (2010):

(1) establishing a set of basic criteria (or factors);
(2) determining the membership grade of the factors/processes (Fs) and variables/indicators (Vs);
(3) establishing a set of weightings for each enabler (V) and process (F);
(4) determining a fuzzy evaluation matrix; and
(5) determining the final fuzzy evaluation, by considering the weightings (Step 3) and fuzzy evaluation matrix (Step 4).

5.1 Results of fuzzy synthetic evaluation analysis

Basically, the five steps are summarized into three levels in this study. The analysis starts from Level 3 which represents the MFs of the enablers, and Level 2 shows MFs of the processes. Both Levels 2 and 3 are shown in Table VII. Level 1 presents MF of overall implementation level. From the initial grouping, there are six processes of code implementation with each process including five enablers. Each set of enablers (Level 3) forms the input variables for their associated process to arrive at Level 2. The six processes in turn form the input variables for overall implementation (as a single output variable).

To evaluate the overall implementation level of all the processes, the following equation is used:

$$\bar{D}_{Overall} = \bar{W}_{u_i} \cdot \bar{R}_{u_i}$$

where $\bar{D}$ denotes the fuzzy evaluation matrix for impact of barriers to ethical code implementation in construction organizations, $\bar{W}$ is the weighting functions of the respective barrier factor (F) which is used to normalize $\bar{R}$ to obtain the fuzzy evaluation matrix (Table VIII).

To present the result in a linguistic form, the following interpretation is adopted (Li *et al.*, 2013):

- "very low" ($IL \leq 1.5$);
- "low" ($1.51 \leq IL \leq 2.5$);
- "neutral" ($2.51 \leq IL \leq 3.5$);

Table VII. Weightings and membership functions for all the enablers (Vs) and processes (Fs)

Processes (F) and enablers (V)	Mean	Weightings (w) for enablers	Membership function MF of enablers					Membership function MF of the processes = D_i					*ui*
Process of identifying and removal of barriers (IRB) to ethical codes													
$u_{11(LD)}$	3.96	0.21	0.00	0.06	0.19	0.49	0.26	0.01	0.05	0.28	0.45	0.20	*3.77*
$u_{12(PS)}$	3.94	0.21	0.02	0.00	0.26	0.45	0.26						
$u_{13(PE)}$	3.77	0.20	0.02	0.04	0.32	0.40	0.23						
$u_{14(PR)}$	3.49	0.19	0.02	0.09	0.36	0.43	0.09						
$u_{15(PP)}$	3.62	0.19	0.02	0.08	0.30	0.47	0.13						
Total	18.79	1.00											
Process of coding													
$u_{21(LD)}$	4.08	0.22	0.00	0.06	0.17	0.42	0.36	0.03	0.06	0.26	0.41	0.25	*3.80*
$u_{22(PS)}$	3.57	0.19	0.02	0.09	0.30	0.47	0.11						
$u_{23(PE)}$	3.96	0.21	0.04	0.00	0.23	0.43	0.30						
$u_{24(PR)}$	3.72	0.20	0.06	0.06	0.30	0.28	0.30						
$u_{25(PP)}$	3.60	0.19	0.02	0.09	0.30	0.43	0.15						
Total	18.92	1.00											
Process of internalization													
$u_{31(LD)}$	3.74	0.21	0.04	0.09	0.19	0.45	0.23	0.03	0.07	0.31	0.42	0.17	*3.64*
$u_{32(PS)}$	3.58	0.20	0.02	0.06	0.38	0.42	0.13						
$u_{33(PE)}$	3.74	0.21	0.02	0.06	0.32	0.38	0.23						
$u_{34(PR)}$	3.72	0.20	0.02	0.08	0.25	0.49	0.17						
$u_{35(PP)}$	3.42	0.19	0.04	0.08	0.43	0.34	0.11						
Total	18.19	1.00											
Process of enacting values													
$u_{41(LD)}$	3.81	0.21	0.02	0.04	0.23	0.55	0.17	0.02	0.11	0.27	0.47	0.13	*3.57*
$u_{42(PS)}$	3.42	0.19	0.02	0.15	0.32	0.42	0.09						
$u_{43(PE)}$	3.51	0.20	0.04	0.11	0.26	0.47	0.11						
$u_{44(PR)}$	3.64	0.20	0.02	0.11	0.21	0.53	0.13						
$u_{45(PP)}$	3.45	0.19	0.02	0.13	0.36	0.36	0.13						
Total	17.83	1.00											

(*continued*)

Processes (F) and enablers (V)	Mean	Weightings (*w*) for enablers	Membership function MF of enablers					Membership function MF of the processes = *Di*					*ui*
Process of monitoring													
$u_{51(LD)}$	3.57	0.20	0.06	0.12	0.18	0.49	0.16	0.03	0.10	0.29	0.40	0.17	*3.58*
$u_{52(PS)}$	3.71	0.21	0.02	0.08	0.27	0.43	0.20						
$u_{53(PE)}$	3.45	0.19	0.06	0.08	0.37	0.33	0.16						
$u_{54(PR)}$	3.63	0.20	0.02	0.12	0.24	0.47	0.16						
$u_{55(PP)}$	3.55	0.20	0.02	0.10	0.39	0.29	0.20						
Total	17.90	1.00											
Process of accountability													
$u_{61(LD)}$	3.76	0.20	0.02	0.06	0.25	0.47	0.20	0.02	0.07	0.28	0.42	0.20	*3.72*
$u_{62(PS)}$	3.61	0.19	0.04	0.06	0.33	0.39	0.18						
$u_{63(PE)}$	3.68	0.20	0.00	0.10	0.32	0.38	0.20						
$u_{64(PR)}$	3.78	0.20	0.02	0.08	0.22	0.47	0.22						
$u_{65(PP)}$	3.76	0.20	0.02	0.06	0.29	0.39	0.24						
Total	18.60	1.00											

Table VII.

Table VIII. Weightings and membership functions for the processes code implementation

Processes	Weightings (*w*) for the processes	Membership function MF of the processes = *Di*					Membership function MF of overall implementation					*U*
IRB (u1)	0.17	0.01	0.05	0.28	0.45	0.20	0.02	0.08	0.28	0.43	0.19	*3.68*
Coding (u2)	0.17	0.03	0.06	0.26	0.41	0.25						
Internalization (u3)	0.16	0.03	0.07	0.31	0.42	0.17						
Enacting value (u4)	0.16	0.02	0.11	0.27	0.47	0.13						
Monitoring (u5)	0.16	0.03	0.10	0.29	0.40	0.17						
Accountability (u6)	0.17	0.02	0.07	0.28	0.42	0.20						
Total	1.00											

- "high" ($3.51 \leq IL \leq 4.5$); and
- "very high" ($IL \geq 4.51$), where IL is the implementation level of the processes.

From the results shown in Table IX, it can be seen that the implementation levels of all the six processes as well as the overall level of ethical codes implementation are high.

6. Discussion of results

The theoretical model involving six processes of ethical code implementation with five enablers/indicators associating with each process as hypothesized based on literature review has been validated. The results of the analysis show that the model has an excellent predictive power and a very reliable model representation. Thus, all the six predetermined processes can sufficiently predict and measure ethical codes implementation so as to enhance ethical behaviour within construction organizations. This finding is consistent with past finding of Nijhof *et al.* (2003) which states that the six processes of responsibilization are capable of enhancing positive ethical behaviour in an organization. Subsequently, the model was used to measure the extent of ethical codes implementation within construction organizations in Hong Kong.

6.1 Measuring the implementation processes of codes of ethics

Using the FSE approach, the initial framework was evaluated by measuring the extent of implementation of the six processes with the aim of identifying and acting on the processes requiring additional effort and maintaining the ones that are well implemented. Generally, the results show a *high* level for the overall implementation (3.68) of codes of ethics within construction organizations in Hong Kong as shown in Table IX. The extent of implementation of the six processes determines the overall level of implementation which should in turn be an indication for ethical organization. Overall, the findings reveal that ethical codes implementation within construction organizations in Hong Kong has improved, compared with the findings by Ho *et al.* (2004) which affirm the dwindling state of ethical code implementation of construction companies in Hong Kong.

6.2 Process of coding

For the coding process, this is a reflection of the focus of construction companies on the activities aiming at the common translation of organization's desirable behaviour into specific standards and target. In Hong Kong, as a result of government policy requiring all contractors to have codes of ethics, almost all construction organizations now have written codes which they make available to new employees when they newly join the

Processes	Implementation level	Linguistic	Rank
Coding	3.80	High	1
IRB	3.77	High	2
Accountability	3.72	High	3
Internalization	3.64	High	4
Monitoring	3.58	High	5
Enacting values	3.57	High	6
Overall implementation	3.68	High	–

Table IX. Interpretation and ranking of the processes company. This might have contributed to the process of coding having the highest level of implementation with regards to ethical codes. This is in relation with findings of Snell *et al.* (1999) that most business organizations in Hong Kong are actively involved in activities towards transforming their employees' ethical behaviour via the instrumentation of codes of ethics. Nijhof *et al.* (2003) found this aspect of code implementation process as second most relevant within the reported case study, the result which reveals a significant improvement in employees behaviour as a result of effort in implementing ethical codes. In essence, despite the insignificance influence (Figure 3), the process of coding is prominent in terms of ethical code implementation within construction organizations in Hong Kong.

6.3 Process of identification and removal of barriers

This process aims at identifying the risks and barriers obstructing effective implementation of codes of ethics within an organization so that they can easily be dealt with. The indicators associated with this process as common barriers identified in previous study are demonstrated in the framework. As shown in Table IX, this process ranked second (3.77) in terms of the extent of implementation in construction organizations. The result is similar to Nijhof *et al.* (2003) in which the process ranked third in the case-organization. This means that the process is common and significant to code implementation. For instance, commitment of top management is highly important in achieving desired ethical standard, but lack of leadership commitment will hamper ethical codes implementation. Tow and Loosemore (2009) and Ho *et al.* (2004) argue that the extent to which an organization embraces and practices ethics will be greatly affected by the leadership commitment to ethics. Lack of provision to protect whistleblowers can also hinder effective implementation of codes as affirmed by Suen *et al.* (2007) that employees will be discouraged to report unethical practice due to fear of retaliation when there is no clear provision for their protection.

6.4 Process of accountability

This process involves activities of an organization to ensure mutual expectations about ethical codes are attuned among relevant stakeholders of the company. This process ranked third (3.72) in terms of level of implementation in construction organizations, implying that the process received some significant measure of attention within construction organizations in Hong Kong. Accountability is a major factor that can help to curb corrupt practices and raise ethical standards in construction organizations (Sohail and Cavill, 2008). Contrary to the findings in this study, Nijhof *et al.* (2003) found that process of accountability received the least attention in the case organization in the attempt to implement codes of ethics. The framework illustrates the enablers for accountability in code implementation including establishment of open communication platform to recognize the stakeholders' voices, ensuring that sub-contractors and suppliers subscribe to the code, engaging employees in critical self-evaluation so that they can be held accountable for their ethical misconduct. All the enablers contribute significantly to process of accountability, and the process itself significantly influences ethical code implementation.

6.5 Process of internalization

This is an essential aspect of code implementation process which aims at acquiring clear meaning of ethical codes and encouraging people to behave ethically within the organization. The result in Table IX shows that the process of internalization ranked fourth (3.64) with regards to implementation level in construction organizations. On the contrary, Nijhof *et al.* (2003) found that the process of internalization received the greatest attention in the case organization, as it ranked first among the six processes of code implementation. Despite the adoption of codes of ethics in most of the construction organizations in Hong Kong, Ho *et al.* (2004) and Ho (2013) argue that reports of unethical behaviour seem to be increasing. This implies that codes of ethics have not been effectively internalized within construction organizations in Hong Kong, despite the significance level of adoption among construction companies. One of the reasons for the unabated ethical misconduct could be linked to lack of proper internalization of codes of ethics. For instance, ethics training is a proven enabler for code internalization as affirmed by Beeri *et al.* (2013). Internalization of ethical codes can also be achieved by proper communication of codes with employees which is lacking within Hong Kong construction organizations according to Ho (2013). This is an area requiring more attention to achieve successful implementation of codes of ethics within construction organizations.

6.6 Process of monitoring

This process helps to determine whether behaviour within an organization meshes with the code of ethics. The process is very important to code implementation as confirmed by Suen *et al.* (2007) which identifies "*monitoring*" as one of the structural mechanisms for managing ethics in construction organizations. Unfortunately, this process ranked fifth (3.58) in terms of level of implementation; this result is consistent with previous result reported by Nijhof *et al.* (2003). Nevertheless, it is important for organizations to set up a mechanism for monitoring the process of integration via a responsible approach such as setting up an ethics committee to keep under surveillance and to ensure compliance of the organization with ethical standard. Murphy (1988) describes the process of implementing business ethics in an organization from two perspectives of informal and formal organizations and notes that the use of ethics committee is one the key factors of ensuring code implementation.

6.7 Process of enacting values

This is an integral process of code implementation involving the alignment of behaviour with the ethical code standard for further internalization. The process ranked sixth (3.57) in terms of the extent of implementation in construction organizations contrary to Nijhof *et al.*'s (2003) in which the same process ranked fourth. This implies that, although the process receives less attention, it is very relevant to ethical codes implementation within organizations. Brimmer (2007) emphasizes that the best organizations in the present modern world will embrace the institutionalization of ethical values to shape its future. To ensure value enactment, certain indicators must be considered such as the use of ethics ombudsman (Mathenge, 2012). For efficiency and effectiveness, it must be ensured that anyone that will be selected as ombudsman must have better understanding and appreciates the values of the organization. Another way of making values explicit within the organization is by creating a forum whereby ethical dilemma can be discussed in line with the values embraced by the organization. Brimmer (2007) opines that leaders in organizations must constantly watch the values of their companies. This can be achieved by emphasizing the code requirement and its importance on any new project (Kleiman, 2013).

6.8 Implication of the study for facilities management

While the current study focused on construction organizations, the findings hold useful implications for FM, being a sector that incorporates multiple disciplines involving people, processes and technology for the purpose of effective functionality of the built facilities (Aishah Kamarazaly *et al.*, 2013). The fundamental role of FM remains the maintenance, improvement and adaption of built infrastructure of an organization to enable an environment that sustain the organization's core activities (SFMS, 2006). The framework and the identified processes of ethical codes implementation will enhance this crucial role. Globally, there is a change in business operations which is characterized by a fundamental impact on future corporate real estate requirements and processes; however, FM players are not appreciative of the real value of managing this processes (Grimshaw, 1999). While FM is regarded by many as non-central and unimportant to the business cycle, Green and Price (2000) emphasize the needs to develop FM's business credibility instead of focusing on its professional status so as to reap its inherent full benefits, of which parts of the benefits are connected to ethics.

Indeed, there is a significant development of business-based ethical codes such that FM ethics can no longer be seen in isolation from the development of business ethics (Grimshaw, 2001). Considering the importance of FM in the society, Grimshaw (2001) points out that enhancing ethical awareness is important to its vigorous growth. From the literature, potential for the development of unethical working environments has already been reported, and ethically driven FM can act as a moderating influence on business decision-making processes (Grimshaw, 2001). In essence, the current study is paramount and relevant to FM, considering the potential of the framework in supporting the development and implementation of codes of ethics towards ethical FM organizations. The indicators in the framework are not entirely new, organizations that have knowledge of ethics management should be familiar with terms like, ethics training, ethics audits, role modelling, etc. In essence, ethics is not only a global and managerial perspective (Fritzsche, 2004) but also important for effectiveness of organizations (Singhapakdi *et al.*, 1995), and its implementation is paramount for sustainability of business corporations (Oladinrin *et al.*, 2015). Thus, organizational effectiveness and sustainability of FM can be enhanced by proper implementation of codes of ethics.

7. Conclusions, limitations and recommendations

This study presented a model for assessing codes of ethics in construction organizations which was validated and evaluated. The model will enhance the understanding of construction practitioners on successful implementation and measuring the level of implementation of codes of ethics. Adopting fuzzy set theory, this study has equally demonstrated how to measure the extent of ethical code implementation within construction organizations. Looking at the six processes of ethical codes implementation: identification and removal of barriers IRB, coding, internalization, enacting values, monitoring and accountability, it can be seen that construction companies seem to have understood the process of *coding, identification and removal of barriers* and *accountability* as they ranked at the top of Table IX, but there is a limited attention on the last two processes in respect to ethical code implementation which require more attention.

The overall level of code implementation in construction organizations is considered relatively high leaving enough rooms for further improvement. However, the six processes are believed to concisely represent the key processes of integrating codes of ethics into the web of construction organizations and are believed to be capable of facilitating ethical behaviour if properly implemented. The model is useful for construction organizations willing to assess their ethical performance. It can also be used to promote codes of ethics in FM to foster good ethical behaviour. Although the measurement of the extent of implementation demonstrated in this study incorporates data from different construction companies, the framework can be used to measure code implementation within a single organization by following the same procedure as illustrated in this study.

Because the indicators for each enabler were identified through a literature review, there is a possibility of having different descriptions for the same factors from different authors. Also, some important indicators might possibly be missing out because only indicators that are common in previous studies were included in the model. The response to the self-assessment questionnaire used for measuring the extent of implementation is relatively low, but it was adequate for statistical analyses considering the fact that it represents the second stage of data collection in a longitudinal manner, and only the respondents who participated in the initial questionnaire survey were asked to participate. The essence of doing this is to test the model for the purpose of self-evaluation of construction organizations regarding codes implementation. Thus, the outcomes are not representative enough for the entire construction organizations in Hong Kong. However, the model was tested to demonstrate how to reflect the strengths and weaknesses of construction companies in Hong Kong with respects to ethical code implementation to identify areas requiring improvement.

Considering a relatively small sample size used in this study, further research can be conducted by using a larger sample size comprising large pool of data from various construction organizations. Also, future research should consider different method of data collection such as case study or focus group meeting because these methods were not suitable at the time of collecting data for this study due to time constraint and other difficulties. Although this research study was conducted in Hong Kong, the methods used can be replicated in other countries of similar or different nature, and the findings can as well be extrapolated because of some generic terms which are likely to be applicable elsewhere. The replication will allow international comparison as well as benchmarking by comparing the level of implementation of codes of ethics across different countries.

References

Abowitz, D.A. and Toole, T.M. (2009), "Mixed method research: fundamental issues of design, validity, and reliability in construction research", *Journal of Construction Engineering and Management*, Vol. 136 No. 1, pp. 108-116.

Adam, A.M. (2005), "Effective implementation of ethical programs: theory and practice", paper presented the Twelfth Annual International Conference Promoting Business Ethics, St. John's University, New York, NY, 26-28 October.

Adam, A.M. and Rachman-Moore, D. (2004), "The methods used to implement an ethical code of conduct and employee attitudes", *Journal of Business Ethics*, Vol. 54 No. 3, pp. 225-244.

Adnan, H., Hashim, N., Mohd, N. and Ahmad, N. (2012), "Ethical issues in the construction industry: contractor's perspective", *Procedia-Social and Behavioral Sciences*, Vol. 35, pp. 719-727.

Aibinu, A.A. and Al-Lawati, A.M. (2010), "Using PLS-SEM technique to model construction organizations' willingness to participate in e-bidding", *Automation in Construction*, Vol. 19 No. 6, pp. 714-724.

Aishah Kamarazaly, M., Mbachu, J. and Phipps, R. (2013), "Challenges faced by facilities managers in the Australasian universities", *Journal of Facilities Management*, Vol. 11 No. 2, pp. 136-151.

Akter, S., D'Ambra, J. and Ray, P. (2011), "Trustworthiness in health information services: an assessment of a hierarchical model with mediating and moderating effects using partial least squares (PLS)", *Journal of the American Society for Information Science and Technology*, Vol. 62 No. 1, pp. 100-116.

Ameh, O. and Odusami, K. (2009), "Professionals' ambivalence toward ethics in the Nigerian construction industry", *Journal of Professional Issues in Engineering Education and Practice*, Vol. 136 No. 1, pp. 9-16.

Ameyaw, E.E. and Chan, A.P. (2015), "Evaluation and ranking of risk factors in public-private partnership water supply projects in developing countries using fuzzy synthetic evaluation approach", *Expert Systems with Applications*, Vol. 42 No. 12, pp. 5102-5116.

Baloi, D. and Price, A.D. (2003), "Modelling global risk factors affecting construction cost performance", *International Journal of Project Management*, Vol. 21 No. 4, pp. 261-269.

Barclay, D., Higgins, C. and Thompson, R. (1995), "The partial least squares (PLS) approach to causal modeling: personal computer adoption and use as an illustration", *Technology Studies*, Vol. 2 No. 2, pp. 285-309.

Beeri, I., Dayan, R., Vigoda-Gadot, E. and Werner, S.B. (2013), "Advancing ethics in public organizations: the impact of an ethics program on employees' perceptions and behaviors in a regional council", *Journal of Business Ethics*, Vol. 112 No. 1, pp. 59-78.

Benson, G.C. (1989), "Codes of ethics", *Journal of Business Ethics*, Vol. 8 No. 5, pp. 305-319.

Brimmer, S.E. (2007), "The role of ethics in 21st century organizations", available at: www.regent.edu/acad/global/publications/lao/issue_11/pdf/brimmer.pdf

Chan, A.P., Chan, D.W. and Yeung, J.F. (2009), "Overview of the application of 'fuzzy techniques' in construction management research", *Journal of Construction Engineering and Management*, Vol. 135 No. 11, pp. 1241-1252.

Chan, C.T. (2007), "Fuzzy procurement selection model for construction projects", *Construction Management and Economics*, Vol. 25 No. 6, pp. 611-618.

Chan, W.D., Chan, H.J. and Tony, M. (2014), "Developing a fuzzy risk assessment model for guaranteed maximum price and target cost contracts in South Australia", *Facilities*, Vol. 32 Nos 11/12, pp. 624-646.

Chin, W.W. (1998), "The partial least squares approach to structural equation modeling", *Modern Methods for Business Research*, Vol. 295 No. 2, pp. 295-336.

Chin, W.W. and Todd, P.A. (1995), "On the use, usefulness, and ease of use of structural equation modeling in MIS research: a note of caution", *MIS Quarterly*, Vol. 19 No. 2, pp. 237-246.

Cohen, J. (1988), *Statistical Power for the Social Sciences*, Laurence Erlbaum and Associates, Hillsdale, NJ.

Cressey, D.R. and Moore, C.A. (1983), "Managerial values and corporate codes of ethics", *California Management Review*, Vol. 25 No. 4, p. 53.

Doloi, H. (2009), "Relational partnerships: the importance of communication, trust and confidence and joint risk management in achieving project success", *Construction Management and Economics*, Vol. 27 No. 11, pp. 1099-1109.

Enegbuma, W.I., Aliagha, U.G. and Ali, K.N. (2014), "Measurement of theoretical relationships in building information modelling adoption in Malaysia", paper presented The 31st International Symposium on Automation and Robotics in Construction and Mining (ISARC), Sydney, 9-11 July.

Fellows, R.F. and Liu, A.M. (2009), *Research Methods for Construction*, John Wiley & Sons.

Fornell, C. and Bookstein, F.L. (1982), "Two structural equation models: LISREL and PLS applied to consumer exit-voice theory", *Journal of Marketing Research*, Vol. 19 No. 4, pp. 440-452.

Fornell, C. and Larcker, D.F. (1981), "Structural equation models with unobservable variables and measurement error: algebra and statistics", *Journal of Marketing Research*, Vol. 18 No. 3, pp. 382-388.

Fritzsche, D.J. (2004), *Business Ethics: A Global and Managerial Perspective*, McGraw-Hill, New York, NY.

Gefen, D., Straub, D. and Boudreau, M.-C. (2000), "Structural equation modeling and regression: guidelines for research practice", *Communications of the Association for Information Systems*, Vol. 4 No. 1, p. 7.

Gilman, S.C. (2005), "Ethics codes and codes of conduct as tools for promoting an ethical and professional public service: comparative successes and lessons", prepared for the PREM, World Bank, Washington, DC.

Goodell, R. (1994), *Ethics in American Business: Policies, Programs and Perceptions: Report of a Landmark Survey of US Employees*, Ethics Resource Center, Washington, DC.

Green, A. and Price, I. (2000), "Whither FM? A Delphi study of the profession and the industry", *Facilities*, Vol. 18 Nos 7/8, pp. 281-293.

Grimshaw, B. (1999), "Facilities management: the wider implications of managing change", *Facilities*, Vol. 17 Nos 1/2, pp. 24-30.

Grimshaw, B. (2001), "Ethical issues and agendas", *Facilities*, Vol. 19 Nos 1/2, pp. 43-51.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "PLS-SEM: indeed a silver bullet", *The Journal of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139-152.

Heermance, E.L. (1924), *Codes of Ethics: A Handbook*, Free Press Printing Company, Burlington.

Helin, S. and Sandström, J. (2007), "An inquiry into the study of corporate codes of ethics", *Journal of Business Ethics*, Vol. 75 No. 3, pp. 253-271.

Hemingway, C.A. and Maclagan, P.W. (2004), "Managers' personal values as drivers of corporate social responsibility", *Journal of Business Ethics*, Vol. 50 No. 1, pp. 33-44.

Henseler, J. and Sarstedt, M. (2013), "Goodness-of-fit indices for partial least squares path modeling", *Computational Statistics*, Vol. 28 No. 2, pp. 565-580.

Hill, R. (1998), "What sample size is 'enough' in internet survey research", *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century*, Vol. 6 Nos 3/4, pp. 1-10.

Ho, C.M.F. (2010), "A critique of corporate ethics codes in Hong Kong construction", *Building Research & Information*, Vol. 38 No. 4, pp. 411-427.

Ho, C.M.F. (2011), "Ethics management for the construction industry: a review of ethical decision-making literature", *Engineering, Construction and Architectural Management*, Vol. 18 No. 5, pp. 516-537.

Ho, C.M.F. (2013), "Communication makes a corporate code of ethics effective: lessons from Hong Kong", *Journal of Construction Engineering and Management*, Vol. 139 No. 2, pp. 128-137.

Ho, M.F., Drew, D., Mcgeorge, D. and Loosemore, M. (2004), "Implementing corporate ethics management and its comparison with the safety management system: a case study in Hong Kong", *Construction Management and Economics*, Vol. 22 No. 6, pp. 595-606.

Hon, C.K., Chan, A.P. and Yam, M.C. (2013), "Determining safety climate factors in the repair, maintenance, minor alteration, and addition sector of Hong Kong", *Journal of Construction Engineering and Management*, Vol. 139 No. 5, pp. 519-528.

Hulland, J. (1999), "Use of partial least squares (PLS) in strategic management research: a review of four recent studies", *Strategic Management Journal*, Vol. 20 No. 2, pp. 195-204.

Jackson, B.J. (2005), "The perceptions of experienced construction practitioners regarding ethical transgressions in the construction industry", *Construction Education and Research*, Vol. 1 No. 2, pp. 112-128.

Johanson, G.A. and Brooks, G.P. (2009), "Initial scale development: sample size for pilot studies", *Educational and Psychological Measurement*, Vol. 70 No. 3, pp. 394-400.

Kang, B.G. and Shahary, M.A.B. (2013), "A comparative study on the ethical perceptions of contractors and designers in the Malaysian Construction Industry", *International Conference on Structural Engineering, Construction and Management*, Kandy.

Kaptein, M. and Schwartz, M.S. (2008), "The effectiveness of business codes: a critical examination of existing studies and the development of an integrated research model", *Journal of Business Ethics*, Vol. 77 No. 2, pp. 111-127.

Kaye, B.N. (1992), "Codes of ethics in Australian business corporations", *Journal of Business Ethics*, Vol. 11 No. 11, pp. 857-862.

Ki, E.-J., Choi, H.-L. and Lee, J. (2012), "Does ethics statement of a public relations firm make a difference? Yes it does!!", *Journal of Business Ethics*, Vol. 105 No. 2, pp. 267-276.

Kleiman, J. (2013), "Placing the ethical cornerstone", *Professional Constructor: The Journal of the American Institute of Constructors*, Vol. 37 No. 1, pp. 42-45.

Lauria, E.J. and Duchessi, P.J. (2007), "A methodology for developing Bayesian networks: an application to information technology (IT) implementation", *European Journal of Operational Research*, Vol. 179 No. 1, pp. 234-252.

Le, Y., Shan, M., Chan, A.P. and Hu, Y. (2014), "Investigating the causal relationships between causes of and vulnerabilities to corruption in the Chinese public construction sector", *Journal of Construction Engineering and Management*, Vol. 140 No. 9.

Levitt, R.E. and Samelson, N.M. (1993), *Construction Safety Management*, John Wiley & Sons, New York, NY.

Li, T.H., Ng, S.T. and Skitmore, M. (2013), "Evaluating stakeholder satisfaction during public participation in major infrastructure and construction projects: a fuzzy approach", *Automation in Construction*, Vol. 29, pp. 123-135.

Lim, B.T., Ling, F.Y., Ibbs, C.W., Raphael, B. and Ofori, G. (2010), "Empirical analysis of the determinants of organizational flexibility in the construction business", *Journal of Construction Engineering and Management*, Vol. 137 No. 3, pp. 225-237.

Lloyd, H.R. and Mey, M.R. (2010), "An ethics model to develop an ethical organisation: original research", *SA Journal of Human Resource Management*, Vol. 8 No. 1, pp. 1-12.

Lowry, P.B. and Gaskin, J. (2014), "Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: when to choose it and how to use it", *IEEE Transactions on Professional Communication*, Vol. 57 No. 2, pp. 123-146.

Lu, J., Chen, S., Wang, W. and van Zuylen, H. (2012), "A hybrid model of partial least squares and neural network for traffic incident detection", *Expert Systems with Applications*, Vol. 39 No. 5, pp. 4775-4784.

Lucko, G. and Rojas, E. (2010), "Research validation in the construction domain: challenges and opportunities", *Journal of Construction Engineering and Management*, Vol. 136 No. 1, pp. 127-135.

McCabe, D.L., Trevino, L.K. and Butterfield, K.D. (1996), "The influence of collegiate and corporate codes of conduct on ethics-related behavior in the workplace", *Business Ethics Quarterly*, Vol. 60 No. 4, pp. 461-476.

Majluf, N.S. and Navarrete, C.M. (2011), "A two-component compliance and ethics program model: an empirical application to Chilean Corporations", *Journal of Business Ethics*, Vol. 100 No. 4, pp. 567-579.

Mamic, I. (2003), *Business and Code of Conduct Implementation: How Firms Use Management Systems for Social Performance*, International Labour Organization, Geneva.

Mason, J. (2009), "Ethics in the construction industry: the prospects for a single professional code", *International Journal of Law in the Built Environment*, Vol. 1 No. 3, pp. 194-204.

Mathenge, G.D. (2012), "Ethical issues in the construction industry in Kenya: a critical analysis of the professional conduct in engineering technology management", *Industrial Engineering Letters*, Vol. 2 No. 7, pp. 1-11.

Memon, A.H., Rahman, I.A., Aziz, A. and Abdullah, N.H. (2013), "Using structural equation modelling to assess effects of construction resource related factors on cost overrun", *World Applied Sciences Journal*, Vol. 21 No. 5, pp. 6-15.

Memon, A.H., Rahman, I., Azis, A. and Asmi, A. (2014), "Assessing causal relationships between construction resources and cost overrun using PLS path modelling focusing in southern and central region of Malaysia", *Journal of Engineering and Technology*, Vol. 4 No. 1, pp. 67-77.

Mohamed, S. (2002), "Safety climate in construction site environments", *Journal of Construction Engineering and Management*, Vol. 128 No. 5, pp. 375-384.

Molander, E.A. (1987), "A paradigm for design, promulgation and enforcement of ethical codes", *Journal of Business Ethics*, Vol. 6 No. 8, pp. 619-631.

Montoya, I.D. and Richard, A.J. (1994), "A comparative study of codes of ethics in health care facilities and energy companies", *Journal of Business Ethics*, Vol. 13 No. 9, pp. 713-717.

Murphy, P.E. (1988), "Implementing business ethics", *Journal of Business Ethics*, Vol. 7, pp. 907-915.

Murphy, P.E. (1995), "Corporate ethics statements: current status and future prospects", *Journal of Business Ethics*, Vol. 14 No. 9, pp. 727-740.

Nawaz, T. and Ikram, A.A. (2013), "Unethical practices in Pakistani construction industry", *European Journal of Business and Management*, Vol. 5 No. 4, pp. 188-204.

Nijhof, A., Cludts, S., Fisscher, O. and Laan, A. (2003), "Measuring the implementation of codes of conduct. An assessment method based on a process approach of the responsible organisation", *Journal of Business Ethics*, Vol. 45 Nos 1/2, pp. 65-78.

Ohrn, L.G. (2002), "Foundations of ethical judgment in construction", *ASC Proceedings of the 38th Annual Conference, Virginia Polytechnic Institute and State University*, Blacksburg, VA.

Oladinrin, O.T. and Ho, C.M.-F. (2015a), "Enabling ethical code embeddedness in construction organizations: a review of process assessment approach", *Science and Engineering Ethics*, pp. 1-23, doi: 10.1007/s11948-015-9679-4.

Oladinrin, T.O. and Ho, C.M.F. (2014a), "Implementing codes of ethics in construction organizations: a self-assessment process approach", *CIB W107 International Conference*, Lagos, 28-30 January.

Oladinrin, T.O. and Ho, C.M.F. (2014b), "Strategies for improving codes of ethics implementation in construction organizations", *Project Management Journal*, Vol. 45 No. 5, pp. 15-26.

Oladinrin, T.O. and Ho, C.M.F. (2015b), "Critical enablers for codes of ethics implementation in construction organizations", *Journal of Management in Engineering*, Vol. 32 No. 1, p. 04015023.

Oladinrin, T.O., Ho, M.-F.C. and Chiang, Y.H. (2015), "Evaluating codes of ethics implementation for a sustainable construction organization", *International Conference for Sustainable Development and Management (ICSDM)*, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, 28-30 June.

Pearce, J.A. and David, F. (1987), "Corporate mission statements: the bottom line", *The Academy of Management Executive*, Vol. 1 No. 2, pp. 109-115.

Pearl, R., Bowen, P., Makanjee, N., Akintoye, A. and Evans, K. (2005), "Professional ethics in the South African construction industry – a pilot study", paper presented at The Queensland University of Technology Research Week International Conference, Brisbane, 4-8 July.

Rahman, I.A., Memon, A.H. and Karim, A.T.A. (2013), "Examining factors affecting budget overrun of construction projects undertaken through management procurement method using PLS-sem approach", *Procedia-Social and Behavioral Sciences*, Vol. 107, pp. 120-128.

Rapoport, T. (2013), "Setting the standard for ethical behavior and legal compliance", *Professional Constructor: The Journal of the American Institute of Constructors*, Vol. 37 No. 1, pp. 46-49.

Robinson, J.B. (1991), "Delphi methodology for economic impact assessment", *Journal of Transportation Engineering*, Vol. 117 No. 3, pp. 335-349.

Sacconi, L. (2003), "Incomplete contracts and corporate ethics: a game theoretical model under fuzzy information", in Cafaggi, F.N.A and Pagano, U. (Ed.), *Legal Orderings and Economic Institutions*, Routledge, London.

Schlegelmilch, B.B. and Houston, J.E. (1989), "Corporate codes of ethics in large UK companies: an empirical investigation of use, content and attitudes", *European Journal of Marketing*, Vol. 23 No. 6, pp. 7-24.

Schwartz, M. (1999), "Repetition and ethics in late Foucault", *Telos*, No. 117, pp. 113-132.

Sen, A. (1997), "Economics, business principles and moral sentiments", *Business Ethics Quarterly*, Vol. 7 No. 3, pp. 5-15.

Sethi, S.P. (2002), "Corporate codes of conduct and the success of globalization", *Ethics & International Affairs*, Vol. 16 No. 1, pp. 89-106.

SFMS (2006), "Strategic facilities management", available at: www.massey.ac.nz/massey/depart/admin/sfm/strategic-facilities-management_home.cfm (accessed 25 October 2014).

Singh, D. and Tiong, R.L. (2005), "A fuzzy decision framework for contractor selection", *Journal of Construction Engineering and Management*, Vol. 131 No. 1, pp. 62-70.

Singhapakdi, A., Kraft, K.L., Vitell, S.J. and Rallapalli, K.C. (1995), "The perceived importance of ethics and social responsibility on organizational effectiveness: a survey of marketers", *Journal of the Academy of Marketing Science*, Vol. 23 No. 1, pp. 49-56.

Snell, R.S. and Herndon, N.C. (2000), "An evaluation of Hong Kong's corporate code of ethics initiative", *Asia Pacific Journal of Management*, Vol. 17 No. 3, pp. 493-518.

Snell, R.S. and Herndon, N.C. (2004), "Hong Kong's code of ethics initiative: some differences between theory and practice", *Journal of Business Ethics*, Vol. 51 No. 1, pp. 75-89.

Snell, R.S., Chak, A.M.-K. and Chu, J.W.-H. (1999), "Codes of ethics in Hong Kong: their adoption and impact in the run up to the 1997 transition of sovereignty to China", *Journal of Business Ethics*, Vol. 22 No. 4, pp. 281-309.

Spector, P.E. (1997), *Job Satisfaction: Application, Assessment, Causes, and Consequences*, Sage, Thousand Oaks, CA.

Stevens, B. (1994), "An analysis of corporate ethical code studies: where do we go from here?", *Journal of Business Ethics*, Vol. 13 No. 1, pp. 63-69.

Stevens, B. (2009), "Corporate ethical codes as strategic documents: an analysis of success and failure", *Electronic Journal of Business Ethics and Organization Studies*, Vol. 14 No. 2, pp. 14-20.

Suen, H., Cheung, S.-O. and Mondejar, R. (2007), "Managing ethical behaviour in construction organizations in Asia: how do the teachings of Confucianism, Taoism and Buddhism and Globalization influence ethics management?", *International Journal of Project Management*, Vol. 25 No. 3, pp. 257-265.

Svensson, G., Wood, G., Singh, J. and Callaghan, M. (2009), "A cross-cultural construct of the ethos of the corporate codes of ethics: Australia, Canada and Sweden", *Business Ethics: A European Review*, Vol. 18 No. 3, pp. 253-267.

Tow, D. and Loosemore, M. (2009), "Corporate ethics in the construction and engineering industry", *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, Vol. 1 No. 3, pp. 122-129.

Vee, C. and Skitmore, C. (2003), "Professional ethics in the construction industry", *Engineering, Construction and Architectural Management*, Vol. 10 No. 2, pp. 117-127.

Weaver, G.R., Trevino, L.K. and Cochran, P.L. (1999), "Integrated and decoupled corporate social performance: management commitments, external pressures, and corporate ethics practices", *Academy of Management Journal*, Vol. 42 No. 5, pp. 539-552.

Webley, S. (1988), *Company Philosophies and Codes of Business Ethics: A Guide to Their Drafting and Use*, Institute of Business Ethics, London.

Wetzels, M., Odekerken-Schröder, G. and Van Oppen, C. (2009), "Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration", *MIS Quarterly*, Vol. 33 No. 1, pp. 177-195.

White, B.J. and Montgomery, B.R. (1980), "Corporate codes of conduct", *California Management Review*, Vol. 23 No. 2, pp. 80-87.

Wixom, B.H. and Watson, H.J. (2001), "An empirical investigation of the factors affecting data warehousing success", *MIS Quarterly*, Vol. 25 No. 1, pp. 17-41.

Xu, Y., Yeung, J.F., Chan, A.P., Chan, D.W., Wang, S.Q. and Ke, Y. (2010), "Developing a risk assessment model for PPP projects in China – a fuzzy synthetic evaluation approach", *Automation in Construction*, Vol. 19 No. 7, pp. 929-943.

Yeung, J.F., Chan, A.P. and Chan, D.W. (2011), "Fuzzy set theory approach for measuring the performance of relationship-based construction projects in Australia", *Journal of Management in Engineering*, Vol. 28 No. 2, pp. 181-192.

You, W., Yang, Z. and Ji, G. (2014), "Feature selection for high-dimensional multi-category data using PLS-based local recursive feature elimination", *Expert Systems with Applications*, Vol. 41 No. 4, pp. 1463-1475.

Zou, P.X. (2006), "Strategies for minimizing corruption in the construction industry in China", *Journal of construction in Developing Countries*, Vol. 11 No. 2, pp. 15-29.

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