

Corruption and Internal Fraud in the Turkish Construction Industry

Murat Gunduz · Oytun Önder

Received: 29 September 2011 / Accepted: 13 February 2012 / Published online: 28 February 2012
© Springer Science+Business Media B.V. 2012

Abstract The purpose of this paper is to develop an understanding about the internal fraud and corruption problem in the Turkish construction industry. The reasons behind the internal fraud and corruption problem as well as the types of prevention methods were investigated; and as a result various recommendations were made. To this end, a risk awareness questionnaire was used to understand the behavioral patterns of the construction industry, and to clarify possible proactive and reactive measures against internal fraud and corruption. The type of fraud experienced by Turkish construction companies was also surveyed in the questionnaire. The questionnaire was sent to 89 firms; and depending on the collected data, certain recommendations for construction industry professionals were provided.

Keywords Corruption · Internal fraud · Construction industry

Introduction

The construction industry is one of the most risky industries regarding internal fraud due to its complex and costly nature and dense third-party contracting relationships. This very nature of the construction business creates the right circumstances for things to go wrong. According to the Association of Certified Fraud Examiners (2010), organizations lose 5% of their annual revenues to fraud. In addition to this

M. Gunduz (✉)

Department of Civil Engineering, Middle East Technical University, 06800 Ankara, Turkey
e-mail: gunduzm@metu.edu.tr

O. Önder

Ernst & Young, Istanbul, Turkey
e-mail: oytun.onder@tr.ey.com

financial loss, internal fraud may also cause reputation loss, business disruption and regulatory sanctions.

Construction contractors should develop strong audit mechanisms and control processes to prevent internal fraud. However, such factors as growing complexity of construction businesses, high employee turnover ratios in the sector, low frequency of construction projects, insufficient regulations and understaffing due to cost reduction strategies make it difficult to develop internal audit structures. Moreover, management supervision and control over operations are very low since the operations are performed at a remote site, mostly far away from the company headquarters. Prevention of internal fraud should not be the only reason for contractors to consider adopting audit mechanisms and control processes as efficient control structures streamline operations, reduce waste time and material and support accounting functions.

In this study, the problem of internal fraud and corruption in the construction industry is investigated. The study consists of an explanation of common fraud types experienced in the construction industry and respective prevention methods. In the study, the results of the fraud awareness questionnaire administered to Turkish construction contractors are also shared.

Literature Review

The literature review covers the subject of corruption and internal fraud in the construction industry. The aim of this review is to understand the magnitude of the corruption problem, to present governmental and non-governmental precautions against corruption and internal fraud, and to demonstrate the results of the selected international surveys carried out by independent firms on corruption and internal fraud.

Corruption Issue in the Construction Industry

For a long time the industry did not have a concerted plan to target the corruption problem, but in the late 1990s several events gave rise to the industry's most far-reaching effort to address corruption. Nowadays, efforts are underway by world governments, engineering/construction organizations, and individuals to combat corruption and conduct business in an honest, transparent, and fair manner (De Jong et al. (2009)). This article discusses the magnitude of corruption in engineering, particularly in the construction industry, describes the most common types of corruption, identifies actions currently being taken to eliminate corruption in the industry, and explains what individuals can do to address the problem.

Krishnan (2009) argues that it is not a surprising fact that the construction sector is the most corrupt sector due to its complex nature of doing business with the involvement of so many different parties. There are also some characteristics of the construction sector that also make construction businesses more complicated compared to some other sectors; these characteristics are a large flow of public money, highly competitive nature of the tendering process, a lack of transparent

selection criteria for projects, political interference, monopolistic nature of service delivery, tight margins, and close relationships between contractors (Sohail and Cavill 2008; De Jong et al. 2009; Rodriguez et al. 2005). These specific properties and specific conditions of the construction sector increase the tendency towards corruption.

De Jong et al. (2009) indicate that the actual cost of corruption is unknown; however, the estimated loss is around USD 500 billion per year which is equal to approximately 10% of the construction industry. When the magnitude of loss due to corruption is compared to the volume of state budgets, it is obvious that this issue needs to be analyzed in detail. De Jong et al. (2009) also recommend developing more open and transparent decision making processes from the procurement phase till the completion of a project. These transparent processes should be performed by all of the parties involved in a construction project. Besides, a transparency point of view should be adopted by the owners of the project (governmental or private), regulators, engineers, contractors, subcontractors, material and equipment suppliers, founders and lenders.

Various forms of corruption in the construction industry are discussed in Shakantu (2006) along with a number of possible solutions to reduce corruption. According to Shakantu's paper, practices like the implementation of ethical guidelines and policies, adoption of the World Economic Forum Anti-Corruption Principles, as well as performance specifications can provide a framework for good business practices and risk management strategies for dealing with the corruption problem.

International Surveys Related to Internal Fraud and Corruption

Some surveys have been reviewed in order to draw a statistical picture of the effects of internal fraud and corruption in the construction sector.

The Association of Certified Fraud Examiners (ACFE) publishes Report to Nations on Occupational Fraud and Abuse (RTTN) to analyze eventuated internal fraud cases. ACFE (2010) indicates that the three main types of occupational fraud attempted by fraudsters are asset misappropriation, corruption and financial statement fraud. According to the ACFE (2010), asset misappropriation (stealing or misusing the organization's resources) is the most frequent but least costly type of occupational fraud. According to the ACFE (2010; p. 4), "90% of cases" were asset misappropriation, and the median of the loss amount related to asset misappropriation was USD 135 K.

Ernst and Young's (EY) 11th Global Fraud Survey states that Turkish companies are under the risk of being subject to internal fraud; 18% of the respondents from the Middle East and Africa Region, where Turkey is included, experienced a significant internal fraud case in the past 2 years (Ernst and Young (2010)).

Ernst and Young (2009) reported that around half of the respondents expected an increase in the corporate fraud cases in the coming years; in fact, the expectation percentage of the respondents from Turkey was 67%. This high expectation level showed the importance of the fraud risk in Turkey.

Kroll Company commissioned the Economist Intelligence Unit to carry out the Global Fraud Survey for 2010; and the survey showed the importance of the fraud problem for the construction sector. According to the survey results, almost 84% of the construction companies had been affected by an internal fraud incident (Kroll (2010)).

According to the survey, the most common types of internal fraud in the construction sector were:

- Management conflict of interest
- Theft of physical assets or stock
- Information theft, loss or attack
- Corruption and bribery
- Vendor, supplier or procurement fraud

According to the KPMG (2010) Global Construction Survey, almost half of the constructors stated that they did not have appropriate anti-corruption procedures and policies.

The Corruption Problem in Turkey

Transparency International consolidates different sources of information and publishes the Corruption Perceptions Index (CPI) to exhibit the perceived level of corruption in different countries. According to the current index that was launched on 26 October 2010, Turkey had a score of 4.4 (10 for highly clean and 1 for highly corrupt) and ranked the 56th least corrupt country among 178 countries (Transparency International (2010)). According to this index, Turkey, like other developing countries, maintains a corruption risk. Melgar et al. (2009) emphasize the devastating results of a high level of perceived corruption and state that a high level of perceived corruption may generate a “culture of distrust”. Besides, if the level of perceived corruption increases, people may start to see as normal some corruptive actions such as giving and taking gifts with the purpose of affecting the decisions of others.

OECD’s Anti-Bribery Convention is an important milestone for cross-border business deals of Turkish construction contractors; because following this convention, Turkey established the laws numbered 4782 and 5377 against international bribery. These laws are the first global instruments in the Turkish Penal Code to fight corruption in cross-border business deals. The law numbered 5377 addresses the bribery of foreign public officials and imposes criminal penalties on those who offer or promise bribes to foreign public officials. These potential wrongdoings are followed by the Financial Crimes Investigation Board (MASAK) which was established previously to combat money laundering. However, in the current structure it is also responsible for the fight with international bribery.

Why People Commit Fraud

The reasons that drive people to perpetrate fraud were elaborated on by the Auditing Standards Board of the American Institute of Certified Public Accountants under the

Statement on Auditing Standards (SAS) No: 99: Consideration of Fraud in a Financial Statement Audit¹ and embodied within the fraud triangle theory. According to this theory, the reasons for perpetrating fraud are financial pressure, rationalization and opportunity.

Perceived financial pressure is one of the three elements in the fraud triangle theory. According to this theory, one may commit fraud, if he/she perceives non-shareable financial pressure and believes that the only solution is the violation of the individuals' financial trust. In other words, the potential fraudster has a driving need for additional income for various purposes, and holds the belief that he/she would be unable to compensate these costs with his/her legitimate income.

Another component of the fraud triangle is rationalization. The fraudster tries to find a way to justify his/her improper acts. In this respect, Cendrowski et al. (2007) state that there are three types of perceptions; the first one is not admitting the wrongdoing as a crime, the second perception is the idea that he/she deserves more, and finally the feeling of revenge against the company.

The fraudster sometimes discovers weaknesses in control processes/procedures, and turns these weaknesses into opportunities to commit fraud.

Governmental and Non Governmental Precautions Against Corruption

Transparency and accountability are the two important issues that need to be considered while doing business in the construction sector.

De Jong et al. (2009) recommend developing more open and transparent decision making processes from the procurement phase till the completion of a project. These transparent processes should be performed by all of the parties involved in a construction project. Besides, a transparency point of view should be adopted by the owners of the project (governmental or private), regulators, engineers, contractors, subcontractors, material and equipment suppliers, founders and lenders.

Countries have been trying to develop laws to improve the existing anti-corruption precautions. Besides, multinational organizations are trying to encourage countries to develop anti-corruption programs, laws, etc. There are some important multinational conventions which have been announced by these organizations in order to reinforce the fight against corruption and bribery. The following list shows some of the most important conventions:

- United Nations Convention against Corruption,
- Organization for Economic Cooperation and Development (OECD) Convention on Combating Bribery of Foreign Public Officials in International Business Transactions,
- Inter-American Convention against Corruption,
- Council of Europe Conventions against Corruption,
- European Union Conventions against Bribery and Corruption,
- African Union Convention on Preventing and Combating Corruption,

¹ SAS 99 is an auditing statement issued by the Auditing Standards Board of the American Institute of Certified Public Accountants.

- OECD/Asian Development Bank Anti Corruption Action Plan for the Asia and the Pacific.

The United Nations Convention against Corruption is the most noteworthy one as it covers all of the 140 member countries. The convention requests the following items from the member countries:

- Development of anti corruption policies,
- Establishment of transparent public processes,
- Criminalization (both in public and private sectors) of the acts such as money laundering, bribery, influencing authorities, abuse of power and expanding the notion of liability of legal persons,
- Establishment of an independent anti-corruption agency,
- Development of cooperation on international and national levels.

The OECD (1997) Anti-Bribery Convention was the first international anti-corruption instrument which established compulsory standards for member countries in order to find a solution to bribery among foreign public officials in international business transactions.

Some countries have also developed specific local regulations in order to prevent corruption and bribery. For instance, the Foreign Corruption Practice Act developed by the US government is one of the leading practices. This act prohibits the bribing of foreign government officials by US companies or their subsidiaries.

The International Federation of Consulting Engineers (FIDIC) developed the Business Integrity Management System (BIMS), which is an internal system within a given firm that aims to prevent corrupt behavior and to encourage integrity. According to De Jong et al. (2009), this system helps the construction sector with its fight with corruption, because it tries to constitute uniform, transparent and accountable practices.

The code of ethics developed by FIDIC is also an important preventive measure of corruption. According to the code, the consulting engineer should not offer or accept any kind of remuneration which seeks to influence the selection process or to affect the fairness of the engineer. Moreover, the consulting engineer should be totally open to any legitimately constituted investigative body.

The American Society of Civil Engineers (ASCE) and The United Kingdom Institution of Civil Engineers have published several codes of business conduct and ethical conduct in order to develop anti-corruption procedures and to inform engineers about best ethical practices.

Research Methodology

For this study, a fraud survey was utilized in order to investigate the following issues:

- Fraud awareness of construction companies,
- Proactive measures developed by construction companies to prevent fraud,
- Common fraud types that the construction companies face,
- Reactions of construction companies towards cases of fraud.

The questionnaire consists of twenty-four questions, seven of which aim to gather information about the respondent and the company. These seven questions are very crucial to understand the relationship between the profile of a respondent and survey results.

The questionnaire was distributed online via a web page between August, 2010 and November 2010. The questionnaire can be seen in Table 1. The responses were collected anonymously. However, due to the controversial nature of the survey, some people avoided completing it.

Respondents' Characteristics

The total number of the respondents was 89. In the following parts, main characteristics of the survey attendants ("respondent"), the companies that the attendants are working for ("the company"), and the attendants' ideas about certain subjects are discussed by using descriptive statistics.

The respondents were mainly the members of top management and construction teams (including project managers, technical office chiefs and site chiefs) of the companies. Table 2 illustrates the distribution of the roles of the respondents.

More than half of the companies had at least fifty employees in their headquarters. Besides, when the companies were grouped according to the number of employees as small companies (1–25), medium companies (26–50) and large companies (>50), it was seen that most of them were small and large companies. Table 3 illustrates the number of employees working in the headquarters and their respective percentages.

The average revenue of 42.7% of the respondents was more than USD 60 M, which came from construction projects in the past 3 years. Table 4 illustrates the companies' average annual revenues and their respective percentages.

The majority of the respondents (70.8%) defined themselves as main contractors and 15.7% of them indicated that they worked as subcontractors. More than half of the respondents (65.2%) stated that they performed projects abroad.

Fraud Risk Awareness of the Respondents

The majority of the respondents (62.9%) stated that they thought their companies were under the risk of fraud. 40.4% of the respondents stated that middle management (managers, etc.) and junior management (chiefs, etc.) were more likely to commit fraud. Table 5 shows the demographics of respondents who think their companies are under the risk of fraud.

A list of fraud prevention methods was prepared and the respondents were asked to assign an effectiveness level to each as 'Not at All Likely', 'Likely' and 'Extremely Likely'. The results indicated that internal and external audits were considered as the most effective fraud prevention methods, which were followed by the implementation of segregation of duties principle and management reviews. Table 6 summarizes the effectiveness levels of each fraud prevention method as suggested by the respondents.

Table 1 Fraud Awareness Questionnaire

Questionnaire Question	Type of Data Collected
What is your position in the company?	Owner/Shareholder/Member of Board of Directors General Manager/General Coordinator Project Manager Site Chief Technical Office Chief Administration Manager/Procurement Manager Internal Audit Manager/Internal Auditor Other
How many people are working in central office/s of your company?	1–25 26–50 > 50
What is the average annual revenue of your company from construction projects in the last 3 years? (In USD)	<input type="radio"/> <10,000,000 <input type="radio"/> 10,000,000–60,000,000 <input type="radio"/> >60,000,000
Please indicate the average number of projects simultaneously conducted by your company in the last 3 years	1–3 4–6 >6
Please indicate most frequent type of contracts that were/have been conducted by your company in the last 3 years	Main Contractor Joint Venture Sub Contractor Main Contractor—Joint Venture Main Contractor—Sub Contractor
What types of the projects were/have been conducted by your company in the last 3 years?	i) Superstructure (Residential buildings, hospitals, schools, renovations, etc.) ii) Infrastructure (Roads, water supply, sewers, power grids, telecommunications, etc.) iii) Industrial (Medicine, petroleum, chemical, power generation, manufacturing, etc.) iv) Mechanical Works (Plumbing, HVAC, etc.) v) Electrical Works vi) Airports, Seaports, Railways vii) Dams, Hydro-electric Plants
Has your company carried out a construction project abroad in the last 3 years?	Yes or No
Do you think that your company is under the risk of internal fraud?	Yes or No

Table 1 continued

Questionnaire Question	Type of Data Collected
Which level of the employees is closer to perpetrate internal fraud?	Senior Management (Management Board, General Director, CEO, CFO, etc.) Middle Management (Managers, etc.) Junior Management (Chiefs, In Charges, etc.) Blue Collared (Workers) Do not know Do not want to answer
What types of preventive measures are likely to prevent internal fraud in construction sector? (On a scale of 1–3, where 1 is “not at all likely” and 3 is “extremely likely”)	Implementing segregation of duties principle Internal audit Internal trainings Management reviews—periodic reporting External audit Periodic rotation of employees Encouragement and protection of whistleblowers and whistle-blowing hotlines
What types of internal frauds are likely to occur in construction sector? (On a scale of 1–3, where 1 is “not at all likely” and 3 is “extremely likely”)	Financial statement fraud Cash theft Inventory theft Data theft Misuse of an inventory or an asset of the company Invoices received for fictitious goods or services, inflated invoices Reimbursement of fictitious or inflated business expenses by an employee Bid rigging Kickback/bribe taken by employee Ghost employee Falsified working hours
Does your company permit/ encourage facilitation payments for non-firm processes such as custom processes, license application, etc.?	Yes No Do not know Do not want to answer
Which of the following actions are acceptable in order to maintain the company’s survival during an economic crisis?	Making payments to employers to protect the present work or win new businesses Giving presents to employers to protect the present work or win new businesses Organization of entertainments for employers to protect the present work or win new businesses Misrepresenting financial status of the company to the market

Table 1 continued

Questionnaire Question	Type of Data Collected
When was the soonest fraud risk assessment project applied on your company?	<6 months 6 months–1 year >1 year Never Do not know
Does your company have any of the following anti-fraud measures in place?	Internal audit External audit Code of business conducts Legal counsel Periodical legal due diligence Internal trainings (fraud awareness, ethical rules, etc.) Whistle-blowing hotline Do not know
Are background checks performed for potential vendors?	Yes or No or Do not know
Does the company have different parties for the processes of purchase order and vendor selection?	Yes or No or Do not know
Are the purchase invoices approved by the personnel/department who gave the purchase order?	Yes or No or Do not know
Does your company have any requirement for obtaining bids from multiple vendors?	Yes or No or Do not know
Does your company have a list of qualified/selected vendors?	Yes or No or Do not know
While hiring a new employee, which of the following checks/verifications are applied by your company?	Past employment verification Criminal conviction checks Reference checks Education and certificate verification Do not know
Has your company been a victim of any sort of internal fraud in the last 3 years?	Yes No Do not know Do not want to answer

Table 1 continued

Questionnaire Question	Type of Data Collected
Please indicate which of the following/s has occurred in your organization in the last 3 years?	Financial statement fraud
	Cash theft
	Inventory theft
	Data theft
	Misuse of an inventory or an asset of the company
	Invoices received for fictitious goods or services, inflated invoices
	Reimbursement of fictitious or inflated business expenses by an employee
	Bid rigging
	Kickback/bribe taken by employee
	Ghost employee
	Falsified working hours
	Do not know
	Do not want to answer
	If your company has faced with an internal fraud/s, what actions did you/management take?
Warned the employee	
Dismissed the responsible employee/s	
Prosecuted the responsible employee/s	
Demanded restitution but did not cover the damage	
Demanded restitution and covered the damage	
Do not know	
Do not want to answer	

As in the previous question, a list of fraud types was distributed and the respondents were asked to assign a likeliness of occurrence to each fraud type as 'Not at All Likely', 'Likely' and 'Extremely Likely'. According to the respondents, most critical fraud types were receiving invoices for unreal transactions or receiving inflated invoices. This was followed by kickback/bribery and bid rigging. It is seen that most critical fraud types are all related to procurement and purchase processes. Table 7 shows the likeliness of occurrence of each fraud type according to the respondents' perceptions.

46.1% of the respondents stated that facilitation payments were acceptable; and approximately 25% of them also stated that making payments to third parties or falsifying financial figures of the company were acceptable during an economic crisis.

Fraud Prevention Status of the Companies

51.7% of the respondents stated that their companies had never performed a fraud risk assessment, and 32.6% of them did not know whether or not a fraud risk assessment had ever been applied. As a result, almost 85% of the respondents had

Table 2 Positions of the respondents

Position	Number of respondents	% of total number of respondents
Technical office chief	26	29.2
Owner/shareholder/member of board of directors	17	19.1
Site chief	14	15.7
Project manager	13	14.6
Administration manager/procurement manager	5	5.6
General manager/general coordinator	4	4.5
Internal auditor	4	4.5
Finance manager	3	3.4
Human resources manager	3	3.4
Total	89	100.0

Table 3 Number of employees working in the headquarters of respondent's company

Number of employees	Number of respondents	% of total number of respondents
1–25	27	30.3
26–50	15	16.9
>50	47	52.8
Total	89	100.0

Table 4 Annual average revenues of the companies (Average of last 3 years)

Annual revenue of the company (USD)	Number of respondents	% of total number of respondents
<10 M	32	36.0
10–6 M	19	21.3
>60 M	38	42.7
Total	89	100.0

not experienced a fraud risk assessment, whereas only 15% of the companies had performed a fraud risk assessment.

'Internal audit' was the most popular method used by the companies to prevent fraud. This method was followed by the written code of business conduct and external audits, which were used in almost 35% of the companies. Table 8 illustrates the fraud prevention methods used by the companies.

Most of the companies also applied vendor selection/purchase process controls. The vendor selection control questions were about general controls of the company such as obtaining bids from multiple vendors, having a list of qualified vendors, etc. Table 9 shows the controls over vendor selection/purchase process.

Table 5 Respondents who think their companies are under the risk of fraud

Level of management likely to commit fraud	Number of respondents	% of total number of respondents
Do not know	24	27.0
Middle Management	19	21.3
Junior Management	17	19.1
Senior Management	11	12.4
Blue Collared	9	10.1
Do not want to answer	9	10.1
Total	89	100.0

Table 6 Effectiveness of fraud prevention methods

Fraud prevention method	Likelihood to prevent fraud		
	Extremely likely	Likely	Not at all likely
Internal audit	61	14	14
External audit	57	22	10
Implementing segregation of duties principle	57	18	14
Management reviews—periodic reporting	45	29	15
Periodic rotation of employees	29	23	37
Internal training	28	26	35
Encouragement and protection of whistleblowers and whistleblowing hotlines	25	16	48

Approximately 60% of the respondents stated that they applied past employment verification during employee selection. Table 10 shows the controls and verifications utilized during the employee selection process.

Internal Fraud Cases and Responsive Actions

In the survey, one of the most critical topics was the fraud cases experienced by the companies and their responsive actions. The first question was a direct question asking whether the companies had experienced any sort of internal fraud in the past 3 years. According to the results, almost half of the respondents stated that their companies had experienced at least one internal fraud case in the past 3 years whereas 25.8% of them stated that they had not experienced any internal fraud. The rest of the respondents either had no idea about it, or did not want to answer the question.

Receiving inflated invoices or invoices for fictitious materials/services and reimbursement of fictitious business expenses by employees appeared as the two most common types of internal fraud experienced by the companies. These types of

Table 7 Likelihood of occurrence of fraud types

Fraud type	Likelihood to occur		
	Extremely likely	Likely	Not at all likely
Invoices received for fictitious goods or services, inflated invoices	55	20	14
Kickback/bribe taken by employee	54	21	14
Bid rigging	53	20	16
Reimbursement of fictitious or inflated business expenses by an employee	45	24	20
Misuse of an inventory or an asset of the company	43	30	16
Data theft	39	24	26
Financial statement fraud	36	26	27
Inventory theft	29	23	37
Cash theft	25	18	46
Falsified working hours	21	23	45
Ghost employee	17	18	54

Table 8 Fraud prevention methods used by the companies

Fraud prevention method	Existence in the company		
	Yes	No	Do not know
Internal audit	59	26	4
Code of business conducts	34	51	4
External audit	30	55	4
Legal counsel	20	65	4
Internal trainings (fraud awareness, ethical rules, etc.)	15	70	4
Periodical legal due diligence	12	73	4
Whistle-blowing hotline	7	78	4

frauds were followed by kickbacks/bribes taken by employees and cash theft. Table 11 illustrates the internal fraud type and the number of companies which experienced this particular fraud type.

Most of the companies dismissed the employees who had committed fraud. This action was followed by warning the responsible employee. Table 12 lists the actions taken by the companies' managements in response to the fraud cases.

Statistical Analyses of the Collected Data

In statistical testing, two different testing methods are applied. One of them is the Chi-square test, which is used to understand whether there is any association

Table 9 Controls applied during vendor selection/purchase process

Controls applied during vendor selection	Existence in the company		
	Yes	No	Do not know
Using different parties for purchase order and invoice approval	69	13	7
Requirement to obtain bids from multiple vendors	68	16	5
Having a list of qualified/selected vendors	64	18	7
Using different parties for purchase order and vendor selection	56	29	4
Background checks for potential vendors	55	25	9

Table 10 Controls applied during employee selection

Controls applied during employee selection	Existence in the company		
	Yes	No	Do not know
Past employment verification	53	29	7
Reference verification	49	33	7
Criminal conviction check	39	43	7
Education and certificate verification	22	60	7

Table 11 Types of fraud cases experienced by construction companies

Internal fraud type	Experienced by the company		
	Yes	No	Do not know/ do not want to answer
Invoices received for fictitious goods or services, inflated invoices	15	46	28
Reimbursement of fictitious or inflated business expenses by an employee	15	46	28
Kickback/bribe taken by employee	14	47	28
Cash theft	14	47	28
Misuse of an inventory or an asset of the company	13	48	28
Inventory theft	13	48	28
Data theft	11	50	28
Falsified working hours	11	50	28
Bid rigging	8	53	28
Financial statement fraud	8	53	28
Ghost employee	6	55	28

between two variables. If a relationship is observed between variables, the Kendall-tau Test is used to determine the strength of this relation.

While applying the Chi-square independence test, the following steps are followed: Null hypothesis (H_0) is proposed; a Contingency Table is prepared to record and analyze the relation between two or more categorical variables; the observed values

Table 12 Actions of the companies after experiencing internal fraud cases

Actions of the company after experiencing internal fraud	Performed by the company?		
	Yes	No	Do not know/ Do not want to answer
Dismissed the responsible employee	33	39	17
Warned the employee	12	60	17
Demanded restitution from the responsible employee but did not covered the damage	9	63	17
Nothing	9	63	17
Prosecuted the responsible employee	6	66	17
Demanded restitution from the responsible employee and covered the damage	6	66	17

(OV) and expected values (EV) are recorded in the corresponding rows and columns; and, the significance level (α) is determined as 0.05. The Degree of Freedom (DF) is equal to $(r-1) \times (c-1)$ in which r is the number of rows and c is the number of columns. H_0 rejection area is determined by using the level of significance (α), DF, critical value (χ^2_c) is determined in case of $\chi^2 > \chi^2_c$, H_0 hypothesis will be rejected. χ^2 value is calculated by using the contingency table and the formula below:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(OV_{ij} - EV_{ij})^2}{EV_{ij}}. \quad (1)$$

On the other hand, for 2×2 , the Fisher's exact test is applied by using SPSS software (v.17). This test is used for the analysis of the contingency tables which have small sample sizes, mostly for 2×2 tables. The Fisher's exact test is accepted as an exact test due to its ability to calculate the significance of the deviation from the null hypothesis in an exact way. For larger samples, significance values based on the Pearson's goodness-of-fit test and Fisher's exact test are almost identical.

There are several methods that can be utilized to determine the relationship between two variables. The calculation of Kendall's tau (τ) coefficient is one of the methods in which the coefficient represents the rank correlation between the two measured quantities. In this study, Kendall-tau-b for square tables and Kendall-tau-c for rectangular tables were used while calculating the strength of the association of the cross tabulations when both variables were measured at the ordinal level.

The formula of tau-b and tau-c were shown below.

$$\text{Tau - b} = \frac{P - Q}{\sqrt{(P + Q + Tx)(P + Q + Ty)}} \quad (2)$$

$$\text{Tau - c} = \frac{2m(P - Q)}{n^2(m - 1)} \quad (3)$$

where P: Number of concordant parts, Q: Number of discordant parts, Tx: Number of pairs tied on X but not on Y, Ty: Number of pairs tied on Y but not on X, m:

Number of rows or columns whichever is smallest, n : Total number of cases. In Kendall-tau tests, coefficient values range from -1 to $+1$, where -1 means complete negative association and $+1$ means complete positive association. The values for each pair are presented in Table 13. In this study, most of the data are not ordinal; however, in order to apply Kendall tests, the data were classified with ordinal numbers.

Data Analysis Results

All suggested hypotheses and their statistical results are summarized in Table 13; and the relation between the independent and dependent variable are presented. The hypotheses are also listed. According to the statistical analyses, the following results are achieved:

Construction companies face more challenges in dealing with the problem of internal fraud and corruption compared to the companies operating in other sectors due to the nature of construction works. However, dealing with this problem is not easy as it requires extra time and resources.

In order to understand the fraud awareness level of the Turkish construction companies, a survey was conducted on them. In the survey, the questions were related to three main areas, which were the proactive measures of the construction companies to prevent fraud, the common fraud types that the construction companies face, and the reactions of the construction companies towards fraud cases.

Survey results show that almost half of the construction companies experience internal fraud cases. The most common ways of internal fraud are receiving fictitious invoices for goods or services, inflating invoices, reimbursement of fictitious or inflated business expenses by an employee, kickbacks/bribes taken by employees and cash theft.

Around half of the survey respondents believe that the companies for which they are working are under internal fraud risk. Besides, a correlation analysis indicate that the ones who have already experienced an internal fraud incident or those working for the construction companies which are doing construction projects abroad are more likely to believe that their company is under internal fraud risk.

More than half of the respondents believe in the importance of internal audit, external audit and implementation of segregation of duties principle to prevent fraud. Despite the fact that the reports published by ACFE demonstrate the importance of encouragement and protection of whistleblowers and whistle-blowing hotlines to prevent fraud, most of the respondents have not mentioned the importance of such services.

According to the respondents, fictitious invoices received for goods or services, inflated invoices, kickbacks/bribes taken by employee and bid rigging are the most likely methods to perpetrate internal fraud in the construction business. Inventory theft, cash theft, falsified working hours and ghost employee are considered as less likely types of fraud. However, according to the survey results, construction companies are frequently faced with the fraud types that are less frequent such as cash and inventory theft.

Table 13 The variables and expected associations

Independent variable	Dependent variable	Expected association	Result (on 5% significance level)	Kendall's tau-b	Kendall's tau-c
Performing projects abroad	Thinking the company is under the risk of fraud	The employees, who are working for companies performing projects abroad, are more likely to think that their company is under the risk of fraud due to diversified structure of the company	No relationship identified	N/A	N/A
Annual revenue	Having code of business conduct	The companies which have higher revenues are more likely to have code of business conduct	The higher the company revenue, the more likely is that the company has code of business conduct	N/A	0.336
Number of employees	Having code of business conduct	The companies which have higher number of employees are more likely to have code of business conduct	The higher the number of employees is working at central offices, the more likely it is that a company has code of business conduct	N/A	0.375
Number of employees	Getting external audit services	The companies which have higher number of employees are more likely to get external audit services	The higher the number of employees, the more likely it is for the company to get internal audit services	N/A	0.373
Annual revenue	Having an internal audit function	The companies which have higher revenues are more likely to have internal audit function	The higher the company revenue, the more likely it is for the company to get external audit services	N/A	0.295

Table 13 continued

Independent variable	Dependent variable	Expected association	Result (on 5% significance level)	Kendall's tau-b	Kendall's tau-c
Number of employees	Having a list of qualified/ selected vendors	The companies which have higher number of employees are more likely to have a list of qualified/ selected vendors	The higher the number of employees works at the central office of the company, the more likely it will be for the company to have a qualified/ selected vendor list	N/A	0.242
Annual revenue	Having a list of qualified/ selected vendors	The companies which have higher revenues are more likely to have a list of qualified/ selected vendors	The higher the company revenue, the more likely it will be for the company to have qualified/ selected vendor lists	N/A	0.231
Annual revenue	Having requirement to obtain bids from multiple vendors	The companies which have higher revenues are more likely to have requirement to obtain bids from multiple vendors	The higher the company revenue, the more likely it will be for the company to have requirements to obtain bids from multiple vendors	N/A	0.235
Number of employees	Having segregated purchase order and vendor selection functions	The companies which have higher number of employees are more likely to have segregated purchase order and vendor selection functions	The higher the number of employees, the more likely it will be for the company to segregate purchase order and vendor selection functions	N/A	0.288
Number of employees	Verifying education and certificate information of job applicants	The companies which have higher number of employees are more likely to verify education and certificate information of job applicants	The higher the number of employees, the more likely it will be for the company to verify education/ certificate information of job applicants	N/A	0.205

Table 13 continued

Independent variable	Dependent variable	Expected association	Result (on 5% significance level)	Kendall's tau-b	Kendall's tau-c
Internal Fraud Occurred	Thinking the company is under the risk of fraud	The employees, who witness fraud incidents, are more likely to think that their company is under the risk of fraud	The respondents who experienced fraud case are more likely to believe that the company is under the risk of fraud	0.646	N/A
Annual revenue	Internal Fraud Occurred	The companies which have higher revenues are more likely to experience internal fraud	No relationship identified	N/A	N/A
Number of expertise areas	Internal Fraud Occurred	The companies which have higher number of expertise areas more likely to experience internal fraud	No relationship identified	N/A	N/A
Performing projects abroad	Internal Fraud Occurred	The companies which perform projects abroad are more likely to experience internal fraud	No relationship identified	N/A	N/A
Having an internal audit function	Internal Fraud Occurred	The companies which have internal audit function are less likely to experience internal fraud	No relationship identified	N/A	N/A
Checking the references of job applicants	Internal Fraud Occurred	The companies which check the references of job applicants are less likely to experience internal fraud	The companies that check the references of job applicants are less likely to experience fraud	0.298	N/A
Permitting/encouraging facilitation payments	Internal Fraud Occurred	The companies which permit/encourage facilitation payments are more likely to experience internal fraud	The companies which permit/encourage facilitation payments are more likely to experience fraud	0.364	N/A

Table 13 continued

Independent variable	Dependent variable	Expected association	Result (on 5% significance level)	Kendall's tau-b	Kendall's tau-c
Thinking “organizing entertainments for employers is acceptable for the survival of the company”	Internal Fraud Occurred	The companies which have employees thinking “organizing entertainments for employers are acceptable for the survival of the company” are more likely to experience internal fraud	No relationship identified	N/A	N/A
Thinking “giving presents to employers is acceptable for the survival of the company”	Internal Fraud Occurred	The companies which have employees thinking “giving presents to employers are acceptable for the survival of the company” are more likely to experience internal fraud	The companies which consider giving presents to the employers in order to maintain the existence of a company is acceptable are more likely to experience fraud	0.346	N/A
Thinking “bribing employers is acceptable for the survival of the company”	Internal Fraud Occurred	The companies which have employees thinking “bribing employers is acceptable for the survival of the company” are more likely to experience internal fraud	No relationship identified	N/A	N/A
Permitting/encouraging facilitation payments	Internal Fraud, “misuse of inventory” occurred	The companies which permit/encourage facilitation payments are more likely to experience misuse of inventory	The companies which permit/encourage facilitation payments are more likely to experience “misuse of inventory” fraud	0.316	N/A

Table 13 continued

Independent variable	Dependent variable	Expected association	Result (on 5% significance level)	Kendall's tau-b	Kendall's tau-c
Permitting/encouraging facilitation payments	Internal Fraud, "cash theft" occurred	The companies which permit/encourage facilitation payments are more likely to experience cash theft	The companies which permit/encourage facilitation payments are more likely to experience cash theft	0.412	N/A

The Survey results also indicate that more than half of the companies have not performed a fraud risk assessment. Moreover, only 'internal audit' is used as a fraud prevention method by more than half of the companies. Other preventive measures such as legal counsel, internal trainings, periodical legal due diligence and whistle-blowing hotlines are used by only a small number of companies. The results from the Correlation tests show that the companies having internal audit functions are less likely to experience internal fraud incidents.

A noteworthy number of companies -particularly the ones that have higher revenues and number of employees- have developed structures for vendor selection procedures. It is observed that the methods such as using different parties for purchase order and invoice approval, obtaining bids from multiple vendors, having a list of qualified/selected vendors and using different parties for purchase order and vendor selection are used by most of the companies.

In terms of employee selection procedures, it is observed that the construction companies mostly focus on past employment verifications and reference verifications. However, criminal conviction checks and education and certificate verifications are not common procedures. Depending on the results of the survey, it would not be wrong to claim that the companies checking the references of job applicants are less likely to experience fraud.

A considerable number of respondents stated that they can rationalize the giving of presents to clients, organization of entertainments for clients, misrepresentation of the financial status of the company and payments to clients if they believe the company that they are working for has a survival risk. However, it is monitored that the companies are more likely to experience internal fraud incidences if the culture of the company permits the rationalization of wrong actions for the survival of the company.

Facilitation payments can be given as another example of wrongdoings. Although facilitation payments comprise major corruption risks, nearly half of the construction companies permit them. It is observed that the companies which show tolerance to facilitation payments are more likely to experience internal fraud incidences. According to the Kendal Tau test results, the fraud types, misuse of inventory and cash theft, are more likely to occur in companies which permit and encourage facilitation payments.

Conclusion/Recommendation to Construction Professionals

The survey has revealed that there are some improvement opportunities which should be considered by construction professionals in order to mitigate internal fraud risks. Governance should be established by providing written workflows, job descriptions, clear organizational structure, comprehensive policies and procedures to reduce the risk of internal fraud. Internal controls should be implemented to ensure the effectiveness and efficiencies of operations and their compliance with laws and regulations. Being in compliance with 'segregation of duties' principle, background checks of employees and authorization of employees for accessing important information are crucial to implement effective internal controls. A pre-employment background check is an important control that should be established to reduce the risk of hiring dishonest employees. The pre-employment background check should include the check of criminal history, education, past employment and references of job applicants. An implementation of an independent internal and external audit program would help to identify new vulnerabilities, and to measure the effectiveness of the existing controls. Employees should also be trained about policies and procedures related to fraud, internal controls, code of conduct and ethic policies of the company. The implementation of an anonymous reporting system provides a confidential way of reporting for employees, vendors, and customers related to the violations of policies and procedures. This paper reported on the behavioral patterns of the construction industry and possible proactive and reactive measures against internal fraud and corruption through a questionnaire. Recommendations to the construction industry professionals are provided based on the analysis of data.

References

- Association of Certified Fraud Examiners. (2010). *Report to the nations on occupational fraud and abuse*. Retrieved from <http://www.acfe.com/rtnn/rtnn-2010.pdf> on 11th March, 2011.
- Cendrowski, H., Petro, L. W., & Martin, J. P. (2007). *The handbook of fraud deterrence* (2nd ed.). New York: Wiley.
- De Jong, M., Henry, W. P., & Stansbury, N. (2009). Eliminating corruption in our engineering/construction industry. *Leadership and Management in Engineering*, 9(3), 105–111.
- Ernst and Young. (2009). *European fraud survey*. Retrieved from http://www2.eycom.ch/publications/items/fraud_eu_2009/200904_EY_European_Fraud_Survey.pdf on 11th March, 2011.
- Ernst and Young. (2010). *11th global fraud survey*. Retrieved from [http://www.ey.com/Publication/vwLUAssets/EY_11th_GLOBAL_FRAUD_Survey/\\$FILE/EY_11th_GLOBAL_FRAUD_Survey.pdf](http://www.ey.com/Publication/vwLUAssets/EY_11th_GLOBAL_FRAUD_Survey/$FILE/EY_11th_GLOBAL_FRAUD_Survey.pdf) on 11th March, 2011.
- KPMG. (2010). *Global construction survey 2010*. Retrieved from <http://www.kpmg.com/US/en/IssuesandInsights/ArticlesPublications/Documents/kpmg-global-construction-survey-2010.pdf> on 11th March, 2011.
- Krishnan, C. (2009). Combating corruption in the construction and engineering sector: The role of transparency international. *Leadership and Management in Engineering*, 9(3), 112–114.
- Kroll. (2010). *Global fraud report*. Retrieved from http://www.kroll.com/library/fraud/Fraud_Report_English-US_Oct10.pdf on 11th March, 2011.
- Melgar, N., Rossi, M., & Smith, T. (2009). The perception of corruption. *International Journal of Public Opinion Research*, 22(1), 120–131.

- OECD. (Adopted by the Negotiating Conference on 21 November 1997). *Convention on combating bribery of foreign public officials in international business transactions*. Retrieved from <<http://www.oecd.org/dataoecd/4/18/38028044.pdf>> on 11th March, 2011.
- Rodriguez, D., Waite, G., & Wolfe, T. (Eds.) (2005). *The global corruption report 2005*. Retrieved from http://www.transparency.org/publications/gcr/download_gcr_2005#download on 8th March, 2011.
- Shakantu, W. (2006). Corruption in the construction industry: Forms, susceptibility and possible solutions. *Civil Engineering/Siviele Ingenieurswese*, 14(7), 43–47.
- Sohail, M., & Cavill, S. (2008). Accountability to prevent corruption in construction projects. *Journal of Construction Engineering & Management*, 134(9), 729–738.
- Transparency International. (2010). *Corruption perceptions index 2010*. Retrieved from <http://www.transparency.org/content/download/55725/890310> on 11th March, 2011.