Identifying and Assessing the Root Causes, Impacts and Countermeasures of Corruption in Warzone Countries: A Case of Yemen's Public Construction Projects

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Abstract: The issue of corruption in Yemen's construction industry receives less attention from researchers and reporters due to its sensitivity and complexity. This article aimed to uncover and assess the causes and effects of corruption in the Yemeni construction industry and propose preventive measures. A general explorative literature study was carried out to explore and identify the causes, effects and countermeasures contributing to and resulting from the spread of corruption in the country's construction industry. Accordingly, a questionnaire survey was developed and then distributed to Yemeni construction practitioners. The participants hand to rank each factor using a five-point Likert scale. The study findings showed that the most dominant causes of corruption were political instability, economic instability, a lack of law enforcement, lobbying and a lack of transparency. The major effects of corruption were the cessation of foreign investment, project failures, disruption of social and economic development, the construction of defective and dangerous infrastructure and the offering of tenders to unqualified contractors. The study proposed some preventive measures and the ones with the highest priority, namely support of public disclosure, third-party evaluation of contractors, motivating honesty and high integrity, transparent employee recruitment and supporting freedom of the press. The finding of the current study could best serve the Ministry of Works and other legislative state departments in addressing their anti-corruption agendas and bringing forward the attention of public awareness.

Keywords: Yemen's public construction projects, Corruption in construction, Causes of corruption, Effects of corruption, Construction industry in Yemen

INTRODUCTION

Corruption is a major concern for public strategy and is one of the biggest obstacles to the growth of a nation and its continued improvement of the standard of living, especially in an industrialised nation (Chan and Owusu, 2017). Studies have shown that the increased rate of corruption has a detrimental effect on the

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progress of society, the economy and the environment (Zou, 2006). The effect can be observed when the high levels of poverty among construction workers are dominant, contractors are getting richer and bribery is normalised (Oni et al., 2022). According to the intensive report by Thabit (2019), corruption is a common problem in Yemen and has been exacerbated by the country's ongoing conflict and political instability. The Transparency International Corruption Perceptions Index ranked Yemen as one of the most corrupt countries in the world in 2020, with a score of 14 out of 100 (with 0 being "Highly Corrupt" and 100 being "Very Clean") while in 2021 with a score of 16 out of 100, it ranked 174 (Transparency.org, 2021).

In addition, there have been numerous reports of corruption at all levels of government in Yemen, addressing embezzlement of public funds, nepotism and bribery. The lack of transparency and accountability in the country's political and economic systems has contributed to the widespread corruption (Gamil et al., 2017). The ongoing conflict in Yemen has also made the country more vulnerable to corruption, as it has disrupted the economy and led to a breakdown in the rule of law. Humanitarian organisations have reported that aid intended for civilians has been diverted or misused by corrupt officials and armed groups, leading to further suffering for the people of Yemen (Gamil and Rahman, 2020). Efforts to combat corruption in Yemen have been limited due in part to the ongoing conflict and the lack of a functioning government (Al-Awlaqi and Al-Madhaji, 2018). However, international organisations and civil society groups have worked to raise awareness about corruption and promote transparency and good governance in the country (Sultan, 2005). Nonetheless, academics and experts agree that corruption can be eliminated via improved education and cultural shifts (Chan and Owusu, 2017; Jong, Henry and Stansbury, 2009; Monteiro, Masiero and Souza, 2020). In addition, the built environment professionals, civil servants, politicians and many other interested stakeholders play a major role in combating corruption (Chiocha, 2009).

In the construction industry, the definition of corruption remains the same in different sectors; in the construction sector, it can mean the deviation from normal duties or practices and violation of official ethics of public services due to individual influences (Chan and Owusu, 2017). It is a complex set of personal processes involving many types of crime that implies some form of illicit human behaviour which is difficult to recognise or measure (Chan and Owusu, 2017; Hartley, 2009; Shakantu, 2006). In general, it is difficult to achieve a corruption-free sector due to its fragmentation and complexity in nature (Gamil and Rahman, 2022; Yap et al., 2022). Furthermore, the industry involves many parties in a complicated contractual framework and has many different factors that influence the ethics and morale of individuals who are susceptible to corruption (Thabit, 2019). Every stage of a construction project can include corrupt practices, which have disastrous effects on the built environment's quality, the timeline for completing the project and the industry's ability to be a corruption-free sector (Chan and Owusu, 2017; Monteiro, Masiero and Souza, 2020). According to the report released by PwC's global economic crime and fraud survey, about 49% of economic crimes, including bribery and corruption, happened in the construction industry, the highest compared to other industries (PwC, 2014).

Corruption is caused by different factors which are related to governmental and unimplemented legislative enforcement, then comes to the project stakeholders and then to the individual ethics and morale matters (Ayodele et al., 2011; Cavill, 2006; Ebekozien, 2020; Owusu, Chan and Shan, 2019; van Klinken and Aspinall, 2010). The weak counter-corruption institutions have been the dominating

reason for corruption in different countries (Ayodele et al., 2011; Bowen, Edwards and Cattell, 2012a; Nordin, Takim and Nawawi, 2011; Thabit, 2019; Yap et al., 2022). Corruption should be treated as a technical matter of insufficient legislation and punishment and behavioural issues of individuals in the institutions should not be left behind (Nordin, Takim and Nawawi, 2013).

The effect of corruption can be disastrous and difficult to resolve because it is associated with money for rehabilitation and casualties if unsafe work is constructed (Chih et al., 2022; Thabit, 2019; Urazaliev, 2022). Studies on corruption in economics, social science, and law demonstrate that corruption may affect a variety of activities, including economic collapse and the spread of crimes (Monteiro, Masiero and Souza, 2020). There are several instances in the literature, press and legal cases that demonstrate how corrupt practices are especially common in huge infrastructure projects (Bowen, Edwards and Cattell, 2012b; Cavill, 2006; Shakantu, 2006; Yap et al., 2022). The study of corruption, however, has not received enough attention from academics due to the nature of the issue and its complexity (Thabit, 2019).

The source of corruption in the construction industry can vary across the stages of the project, and most of the corruption starts in the procurement stage (Thabit, 2019). An intensive study on the issues of preventing corruption in procurement in Uzbekistan (Urazaliev, 2022) highlights that crimes involving corruption in the construction business are typically connected to land allocation, holding bids, registering urban planning papers and permits and procedures for connecting to engineering and communication networks.

Yemen faces many challenges, such as political instability, war, lack of modern technologies and poverty (Gamil and Rahman, 2020; Gamil et al., 2017; Gamil et al., 2020; Gamil and Rahman, 2019; Thabit, 2019). The construction industry was subsequently affected negatively (Sultan, 2005). Many projects have been suspended or even failed to achieve the stipulated plans (Gamil and Rahman, 2020; Gamil et al., 2017). There are many reports addressing the issues of the Yemeni construction industry in terms of technologically decelerated application of the legislation and less awareness of the governmental role. However, the issue of corruption in its many forms has not yet been thoroughly discovered, especially in government and aid-funded projects. This study aimed to answer the following questions:

1. What are the factors contributing to the widespread corruption in Yemen's construction industry?

2. What are the effects of corruption on project performance and project completion?

3. What possible strategies/ preventive measures should be proposed to minimise corruption in the Yemen construction industry?

Implications of the Research

The implications of research on corruption in the construction industry are wide-ranging and significant. This research helps to identify the causes and effects, as well as develop effective strategies for preventing and combating corruption. The theoretical implication of this research lies in the study of corruption as a complex

phenomenon in Yemen with different causes and effects, and the impact can be realised on the economy, stability, and equality. The practical implications include proposing effective strategies for preventing corruption. These strategies are useful for the government and relevant agencies. The methodological implications of this topic concern the challenges of measuring and quantifying corruption, but more flexible methods such as questionnaires and opinion sharing would glimpse into the issue indirectly; hence, more research is needed, particularly in underdeveloped countries such as Yemen.

A Review of Corruption Causes, Effects and Preventive Measures

The motives for corruption differ from one industry to another due to the societal and cultural background and the extent of law enforcement (Castro, Phillips and Ansari, 2020). One of the main causes is that the nature of the construction industry and its projects are fragmented and many involved stakeholders and players, which may cause corruption (Yap et al., 2022; Yap, Lee and Skitmore, 2020). The method of payment in some countries deals with cash, where the flow of cash can be a major reason for corruption and seepage of money due to the difficulty of control (Owusu, Chan and Shan, 2019). Another factor that leads to corruption is the low salary scheme (Yap, Lee and Skitmore, 2020). According to an investigation by Nordin, Takim and Nawawi (2011), a negative workplace can also lead to corruption in a way that makes project players irritable and defensive, and that can also lead to poor productivity and lack of motivation.

In countries where civil war exists, political instability creates a vacuum for low breakers and that leads to a lack of law enforcement which leads to the spread of corruption (Bowen, Edwards and Cattell, 2012b; Thabit, 2019). Corruption in construction projects can be in different forms (Chan and Owusu, 2017). One of the forms is intimidation and threats which have been discussed before as the abuse of power against any individual or firm. Influence peddling is also a form of corruption, which is the practice of using or influencing the government to obtain projects in return for unlawful payment (Chan and Owusu, 2017). Another form of corruption is the kickbacks which is a payment made to someone to facilitate transactions or any service particularly illicitly (Hope, 2020). One other form is embezzlement which is the theft of money in one's trust and baselessly and unlawfully (Balleisen, 2023). Other forms include blackmail, coercion, clientelism and dishonesty (Thabit, 2019). The lack of technology is also one of the forms of corruption because technology promotes transparency in the way a project is handled (Owusu, Chan and Shan, 2019).

Corruption behaviour is more likely to occur when there is no enforcement, followed by the nature of the construction sector and weak regulatory frameworks. The best preventive measures include high integrity and honest construction cultures, effective reporting channels and enforcement of laws and fines. The audit system and code of conduct are the most important cause-driven preventive measures, according to a correlational study. Two recent studies by (i.e., Yap et al., 2022; Yap, Lee and Skitmore, 2020) investigated corruption in the Malaysian construction industry and found the most common reasons for corruption occurrence are the relations between the stakeholders in the project, lack of transparency, defective legal system, inadequate sanctions, personal greed, low morale, people perception toward the faulty party, less attention from people and negative leader role.

A comprehensive working paper on anti-corruption in Yemen by Thabit (2019) highlighted some common causes of corruption which include a lack of law enforcement that motivates project stakeholders to break the law despite the terms being harsh against corruption. Another reason addressed is money laundering since money is dealt with mostly in physical cash which leads to concealing the source. The study also stressed the bureaucratic traditions that hinder the lack of law enforcement and lead to a lack of monitoring of the project activities and quality of the work. Moreover, the study also addressed the issue of collusion and bid rigging which is a fraudulent scheme in the procurement process of selecting non-competitive contractors to gain the project tender. Another common problem addressed by the study is the concentration of power which is very widespread across many governmental institutions in Yemen and gives the right to the ministers and executives to decide on baseless grounds because no one can question their decisions due to their ultimate power and that leads to the abuse of power which also leads to lobbying to try and sway top management on getting the projects. This also leads to nepotism, patronage and favouritism by offering the projects to those who are close relative to the decision-makers or even to the unqualified contractor who seems to have a common interest with the decision-makers and that is supported by the findings from (Ebekozien, 2020). The findings also considered economic instability as one of the leading motives for corruption.

In South Africa, Amoah and Steyn (2022) investigated the barriers to unethical and corrupt practices and the results show that contractors face a variety of unethical problems while performing their duties, including inflated tender prices, overpricing of rates, kickbacks based on tenders, bribes for projects, unethical project execution techniques and use of low-quality materials. Some other causes of corruption include problems like avarice, accepting corruption as a standard practice, ignorance of the code of conduct and peer pressure making it difficult for construction professionals to adhere to the code of conduct and prevent corruption practices.

Corruption can have many negative impacts on the public sector and the nation's development at large (Khan and Krishnan, 2019). In the construction industry, corruption can lead to many effects which presumably damage the trust between project stakeholders and the people (Wells, 2015). A comprehensive study (Yap et al., 2022) found the effects of corruption can emerge from the inception of the project to the end, which include compromising quality, safety, project delay, defective work, lack of productivity and deterioration of the construction sector. These tangible effects may even lead to the failure of the entire project or at minimum to the sustainability of the project.

Another effect would be the demotivation of foreign investment which is hugely affected by widespread corruption (Ashyrov and Masso, 2020). A study by Chih et al. (2022) on Chinese construction found that high corruption leads to more local investment than international. In the Thai construction sector, Opoku et al. (2022) found that the negative effects accumulate in the middle-income people causing more suffering and poverty. In Zambia, Kabwe (2022) found that corruption is an influencing factor in the performance of the organisation, especially among local contractors. Above all corruption can lead to the failure of construction projects (Gamil et al., 2017) or leads to disastrous infrastructure that can collapse at any time (Chiocha, 2009). Corruption can also result in increased costs of operation due to excessive maintenance due to faulty construction or low-quality materials (Yap et al., 2022).

Although a corruption-free sector is unachievable, many preventive measures can reduce the problem or perhaps stop it in its tracks. According to Sohail and Cavill (2008), accountability is a key element in reducing corruption while Gunduz and Önder (2013) reported that a clear workflow and job description are required to reduce the risk of fraud and internal control is also proposed in compliance with the regulation, in terms of hiring, a pre-employment background check is essential to be considered for the job. Additional measures suggested by Gunduz and Önder (2013) include training employees about their rights and ethics and proposing an anonymous reporting system to report any fraud or misuse of power.

A comprehensive study on corruption and its effects in Malawi by Chiocha (2009) recommended that more directive actions are required from the authorities to combat corruption giving more attention to law enforcement and motivating transparency. Meanwhile, in Thailand, Opoku et al. (2022) suggested some of the tactics that could be utilised to combat corruption in the Thai construction sector include organisational system improvement, decentralisation, ethical training and encouraging ethical culture. In addition to that, working on ethical and spiritual considerations, especially in more conservative societies would minimise corruption (Zulkifle and Sabli, 2022). In terms of strategies, Tabish and Jha (2012) investigated the effect of anti-corruption strategies in public projects and found that most of the effective ways to combat corruption are the focus on management leadership while promoting quality and transparency to prosper the economy. Despite many studies focused on corruption issues in different regions of the world. In Yemen, few were reported due to the sensitivity of the topic. Hence, this study aims to further identify and assess these causes, effects and countermeasures of corruption focusing on the Yemeni construction industry.

METHODOLOGY

The methodology used in this research consisted of two research methods. First, a literature review was conducted to identify the causes, effects and preventive measures of corruption in different construction industries before finalising these factors to avoid any repetition or similarity. The second method was a quantitative study. A questionnaire survey was developed based on the literature and then distributed to practitioners from different provinces in Yemen. The data was analysed using Statistical Package for the Social Sciences (SPSS) to determine the relative importance of each factor. The methodology is demonstrated in Figure 1.
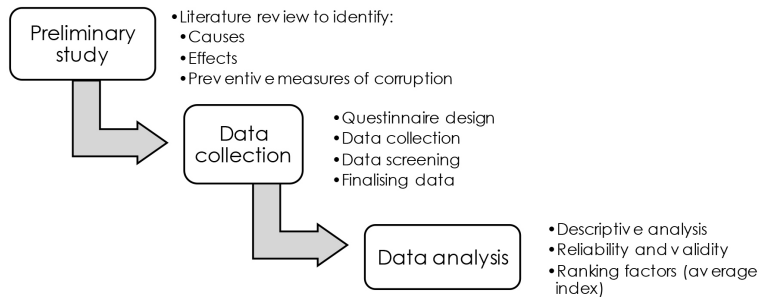
Figure 1. Research methodology

Figure 1 demonstrates the process and methods employed to carry out this research, from the initial study to the final stage of thesis writing. The process followed three key phases. The first was the introduction to the study, which focused on identifying the research problem by studying the literature to understand the issue and identifying any gaps or opportunities for more research. The causes, effects and preventive measures of corruption included in the survey were also identified from the literature. To translate this extensive review into a manageable data collection tool, these factors were framed into multiple-question questionnaire surveys.

The second phase involved conducting a quantitative study by applying these factors to the construction industry with the use of a questionnaire survey. The questionnaire consisted of two main parts. The first part inquired about the demography of participants. The second part addressed the assessment of the causes, effects and measures. Respondents were given a scale from 1 to 5 according to the importance level, where 1 = "Not Important" and 5 = "Extremely Important". The data collection for this study targeted engineers, architects, project managers and government representatives in public project company owners and directors. Their contact details were obtained from the Ministry of Public Works and the Board of Engineers. The questionnaire was prepared and sent to them via an online questionnaire survey and follow-up on their answers was also set. A total of 327 responses were received and verified to analyse the factors. The response rate was 65%, which was acceptable.

The third phase involved data checking and analysis using univariate analysis on SPSS. The mean and standard deviation (SD) were used to rank the importance of causes, the severity of effects and the priorities of preventive measures. The ranking was set from the highest mean in descending order. In the occurrence of the same mean value, then standard deviation was used, thus, the lower SD ranks higher for the same mean.

RESULTS AND ANALYSIS

Demographic Profile of Respondents

To get insights from different construction industry players, the demographics of the targeted participants were varied, including both public and private sectors. The first part of the questionnaire included all the necessary information about the

respondents, which included the type of company, the qualifications, the years of experience and the role in the company. Table 1 demonstrates the demographic of the study respondents. The selection process of the respondents to this survey is based on the databases of the Ministry of Works and Board of Engineers Yemen which made them suitable to participate in public construction projects.

Table 1. Distribution of respondent's profile

Category	Sub-category	Frequency	%
Type of company	Private	189	57.80
	Public (state-owned)	138	42.20
Company projects	Residential buildings	124	37.92
	Commercial buildings	97	29.66
	Infrastructure projects	56	17.13
	Industrial facility	42	12.84
	Maintenance	8	2.45
Role of respondent	Company director	17	5.20
	Company owner	27	8.26
	Government representative	83	25.38
	Project manager	48	14.68
	Architect	33	10.09
	Civil engineer	119	36.39
Years of experience	Less than 10 years	195	59.63
	11 years to 20 years	79	24.16
	More than 20 years	53	16.21
Qualification	Below bachelor's degree	102	31.00
	Bachelor's degree	183	56.00
	Master	39	12.00
	PhD	3	1.00

Table 1 displays the demographic analysis for the study's participants. The questions primarily targeted industry professionals in the construction industry from different agencies, as well as their qualifications, activities and years of experience. Most participants worked in the private sector and their most common projects were residential building projects. The participants were mostly civil engineers. Most of the participants had a bachelor's degree. In addition, most of the participants had about less than 10 years of experience. These diversified characteristics demonstrate that the participants managed different types of projects and their opinions would significantly serve to understand the issue of corruption in Yemen's construction sector.

Data reliability

Before proceeding to the data analysis, it is a prerequisite to check the data and questionnaire reliability and that could be achieved through checking Cronbach's alpha. Cronbach's alpha helps to test the reliability and validity of scores which is the Likert scale used to rank the factors (Ghazali, 2016). The analysis showed that Cronbach's alpha value was more than 0.87, indicating a good internal consistency of the scales and data and the data were reliable for further analysis.

Assessing Causes of Corruption in the Yemeni Construction Industry

The second part of the questions was on the assessment of the importance of the causes where respondents were given to rank the importance from 1 to 5, with 1 = "Not Important" and 5 = "Extremely Important". Then the mean and SD were calculated using SPSS. Table 2 shows the ranking of significant causes of corruption.

Table 2. Ranking of significant causes of corruption

Categories	Causes	Mean	SD	Category Rank	Overall Rank
Nature of the industry	Political instability	4.98	1.013	1	1
	Economic instability	4.95	1.042	2	3
	Lack of transparency	4.93	1.088	3	5
	Concentration of power	4.88	1.098	4	7
	Bureaucratic tradition	4.84	1.101	5	11
	Lack of technology	4.82	1.156	6	14
	Lower salary schemes	4.81	1.123	7	16
	Relationship between parties	4.71	0.987	8	21
	Poor working conditions	3.86	1.281	9	34
	Salary paid by cash	3.57	1.233	10	40
	Complexity of projects	3.51	0.891	11	42
	Competitions on bidding	3.51	0.983	12	43

(*Continued on next page*)

Table 2. *Continued*

Categories	Causes	Mean	SD	Category Rank	Overall Rank
Legislative and flawed monitoring system	Lack of law enforcement	4.96	0.897	1	2
	Abuse of power	4.86	0.923	2	10
	Defective legal system	4.83	1.022	3	13
	Lack of punishment	4.81	1.102	4	15
	Lack of monitoring	4.79	1.181	5	19
	Money laundering	4.78	1.001	6	20
	Intimidations and threats	4.62	1.212	7	23
	Collusion and bid rigging	4.56	1.100	8	24
	Inadequate sanctions	4.21	1.061	9	30
	The double standard in law practices	3.77	0.966	10	37
	Bid rigging	3.73	0.997	11	38
	Lack of policing mechanisms	3.59	1.051	12	39
	Conflicts of laws	3.54	0.942	13	41
Cultural, personal and ethical	Lobbying	4.93	1.072	1	4
	Nepotism and favouritism	4.92	1.177	2	6
	Bribery	4.88	1.138	3	8
	Clientelism	4.87	1.025	4	9
	Personal greed	4.84	1.291	5	12
	Accepting as a standard practice	4.8	1.320	6	17
	Negative leader role	4.79	1.091	7	18
	Blackmail	4.71	1.230	8	22
	Coercion	4.54	1.090	9	26
	Collusion	4.54	0.983	10	25
	Conflict of interest	4.31	1.281	11	27
	Low morale	4.23	1.232	12	28
	Influence peddling	4.23	0.971	13	29
	Kickbacks	4.02	0.991	14	31
	Dishonesty	4.01	1.021	15	32
	People perception	3.86	1.051	16	33
	Embezzlement	3.82	1.231	17	35
	Different culture	3.81	1.028	18	36
	Lack of ethics	3.21	1.172	19	44
	Personal behaviour	2.89	1.452	20	45

The finding showed that the most dominant causative factors of corruption in the Yemeni construction industry were political instability due to the country's civil war since the Arabic Spring in 2011. The second cause was economic instability, which as a result of political instability. The third was a lack of law enforcement. This was common in Yemen because the integrity issues of the country's law enforcement agencies. The fourth was lobbying, which happened in most of the project tenders. As there was limited emphasis on rigorous evaluation, there was also a lack of transparency. These imperatives need attention from the government and social interventions to combat corruption or at least prevent crime at its root.

To evaluate these results with other construction sectors, personal financial avarice, connections between the parties, a lack of moral principles, fierce competition and a significant sum of money were the top three reasons for corruption, according to a study in Malaysia (Yap et al., 2022). In South Africa, lack of expertise and inefficient procedures, public figures serving as role models, a lack of deterrents and consequences and neglected ethical standards are the main causes of corruption (Bowen, Edwards and Cattell, 2012a; 2012b). However, the leading causes in China include companies who lacked Business to Government (B2G) relationships, the tendering procedure having a significant amount of off-site activities, government officials' power being too centralised and investment funds being sufficient and easily obtainable for public investment projects, as well as unsuccessful judicial administration (Zhang et al., 2017). According to Ameyaw et al. (2017), the operating environment of construction projects, the private opening of tenders, excessive and careless sourcing for public procurement contracts, the lack of commitment by construction firms to combating corruption and high political connections are the main causes of corruption crime in Ghana.

Assessing the Effects of Corruptions on the Yemen Construction Industry

The third part of the survey allowed participants to rank the severity of the corruption effects, which is demonstrated in Table 3.

Table 3. Effects of corruption in the Yemen construction sector

Effects	Mean	SD	Overall Rank
Halting foreign investment	4.97	1.01	1
Project failure	4.94	0.95	2
Interrupt social and economic development	4.94	1.21	3
Defective or dangerous infrastructure	4.92	1.13	4
Offering tenders to unqualified contractors	4.91	1.04	5
Damaging morale	4.90	0.89	6
Raises the operating cost	4.88	0.95	7
Deterioration of the construction sector	4.86	0.92	8

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Table 3. *Continued*

Effects	Mean	SD	Overall Rank
Demotivate workers	4.85	1.24	9
Uncompleted projects	4.84	0.98	10
Cost overrun	4.81	0.92	11
Poor provision of services	4.81	1.06	12
Reduced credibility	4.80	1.18	13
Upsurge in poverty among construction workers	4.79	1.01	14
Lack of productivity	4.77	1.21	15
Compromised quality	4.76	1.02	16
Financial loss	4.72	1.10	17
Labour exploitation	4.72	0.91	18
Defective work	4.69	1.03	19
Mismanagement of project	4.67	0.87	20
Tarnishing the company´s reputation	4.62	0.99	21
Boost nepotism	4.62	1.08	22
Project delay	4.61	0.96	23
Poor growth and development	4.59	1.21	24
Growing mistrust	4.59	1.23	25
Shorten the lifespan of the constructed facility	4.51	1.06	26

The finding demonstrated the most severe effect of corruption was halting foreign investment. This happened due to demotivating investors leading to the fear of corruption. The second effect was project failure, as demonstrated in a study by Gamil et al. (2017). The study showed mega projects in Yemen failed due to corruption. The third effect was interrupted social and economic development caused by the misuse of public funds in failed projects. The cost of corruption was very high and in general, the entire economy was significantly harmed by corruption. The infrastructure and service delivery that was needed for development was not up to par. Additionally, there was unmistakable evidence of mistrust, inequality, labour exploitation and a lack of opportunities.

Preventive Measures of Corruption in the Yemen Construction Industry

The third part of the survey was on the preventive measures that are suggested in different industries and applied to the Yemeni construction sector. Table 4 presents the measures, and their rankings based on their importance.

Table 4. Ranking of prioritised preventive measures against corruption in Yemen

Measures	Mean	SD	Rank
Support public disclosure	4.99	0.922	1
Third-party evaluation of contractors	4.98	1.023	2
Motivating honesty and high integrity	4.92	0.872	3
Transparent recruitment process	4.88	0.982	4
Supporting freedom of the press	4.83	0.792	5
No leniency or exceptions in law enforcement	4.81	0.814	6
Negotiating adequate salaries	4.78	1.032	7
Improved accountability	4.73	0.832	8
Attention to ethics	4.69	0.794	9
A pre-employment background	4.69	0.958	10
Independent internal and external audit	4.63	1.102	11
Anonymous reporting systems	4.61	0.985	12
Training employees in rights and obligations	4.6	1.213	13
Focus on leadership	4.36	1.141	14
Private sector anti-corruption initiatives	4.25	1.125	15
Adequate site supervision	4.02	1.172	16
Procurement process reforms	4.02	0.991	17
Strengthen citizen demand for anti-corruption	4.02	1.031	18
Reform the public admin and finance management	3.95	1.028	19
Third-party monitoring	3.92	0.897	20
Raising awareness	3.81	0.986	21
Code of conduct	3.75	0.987	22
Campaigns in media, newspaper and social events	3.56	0.912	23
Audit practices	3.52	1.093	24

The result in Table 4 demonstrates the most important countermeasures needed by the government. They were ranked: support for public disclosure, third-party evaluation of contractors, motivating honesty and high integrity, transparent recruitment process and supporting freedom of the press. These precautionary actions would help to minimise the corruption crime occurrence in the industry and would lead to a more prosperous and fair distribution of wealth among the citizens.

From the study's open-ended question, the emergence of advanced technologies, for example, building information modelling into the construction industry, not only streamlined the construction process but also helped to produce

a proactive collaborative environment that is associated with higher transparency which tentatively minimises or even exposes the sources of corruption as a major threat crime in the Yemeni construction industry. This research area was discussed previously by Gamil and Rahman (2019). They proposed future studies to link the causes with the effects while mediating with the mitigation measures to provide a relationship model that can be used to develop a combating framework for the stakeholders involved in the construction industry.

CONCLUSIONS

Corruption is a serious issue in the construction industry and it is likely to get worse in Yemen, especially in its current situation where instability is at its climax. More work and initiatives need to be introduced by the government, contractors, built environment specialists, civil employees, legislators, consultants, property owners, developers, public works authorities and many other interested stakeholders in the construction business to fight corruption in the industry. This study identified and assessed the causes, effects and preventive measures to combat or minimise corruption. The results showed that all the factors carry more significance in the Yemeni construction industry. The study covered a wide range of demographic profiles of construction practitioners and players.

The findings implied that political instability, economic instability, a lack of law enforcement, lobbying and a lack of openness were the main factors of corruption. When it comes to consequences, the most adverse repercussions of corruption are the suspension of foreign investment, failure of projects, the interruption of social and economic development, faulty or unsafe infrastructure and the awarding of contracts to subpar firms. The study suggested various preventive measures and the most important ones based on the findings, include support for public disclosure, independent contractor review, encouraging sincerity and high integrity, transparent employee recruitment and promoting press freedom. The Ministry of Works and other legislative state ministries should act on the findings in their agendas for fighting corruption. Effective and coordinated anti-corruption strategies that focus on both the supply and demand sides of corruption are needed to halt fraud and prevent corruption. Accountability, transparency and stricter rules against bribery and corruption all contribute to less corruption. However, those with integrity are less likely to engage in corrupt practices, instilling integrity and ethical values among the stakeholders through ethics education and training programs is a continual commitment toward corruption-free construction.

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