Front. Eng. Manag. 2025, 12(4): 809–827
https://doi.org/10.1007/s42524-025-4151-x

RESEARCH ARTICLE

**Dongping FANG, Wenqi LI, Jianhua LI, Yiqin YU, Hong YANG, He LIU**

# Unethical behaviors of contractors in construction project management: Framework development and causal analysis



**Abstract** Unethical behaviors among contractors are prevalent in engineering management activities within the construction industry, significantly affecting project performance, public safety, and the industry's reputation. Despite the urgent need to enhance the ethical performance of contractor managers, current research lacks a theoretical framework to systematically categorize and characterize these unethical behaviors. This study fills this gap by conducting semi-structured interviews with 20 experienced construction project managers in China, followed by a qualitative content analysis. The findings indicate that contractor mangers' unethical behaviors can be organized into a framework comprising three levels, five dimensions, and 18 themes. The most common behaviors identified include "construction disturbance," "qualification rental," and "deception in settlement." Additionally, the study explores the causes of these unethical behaviors, revealing power and responsibility imbalances within the supply chain and the lack of moral competencies among contractor managers in the construction industry. This study offers a theoretical taxonomy framework for contractor managers to identify and assess ethical performance in practice and provides a scientific basis for authorities to establish ethical guidelines and enhance ethical management practices in the construction industry.

**Keywords** unethical behavior, engineering management, contractor manager, construction industry, moral competency

Received Aug. 14, 2024; revised Nov. 21, 2024; accepted Dec. 8, 2024

Dongping FANG, Wenqi LI, Jianhua LI, Yiqin YU
Department of Construction Management, School of Civil Engineering, Tsinghua University, Beijing 100084, China

Hong YANG
China Academy of Space Technology, Beijing 100094, China

He LIU (✉)
Research Institute of Petroleum Exploration and Development (RIPED), Beijing 100083, China
E-mail: liuhe@petrochina.com.cn

This research was supported by the Strategic Research and Consultation Project of the Chinese Academy of Engineering (No. 2022-XY-10).

## 1 Introduction

Contractors play a crucial role in construction project management due to their direct involvement in the execution and delivery of projects. As the main implementer, they manage challenges related to timelines, budgets, resource coordination, and adherence to safety and quality standards, which are vital to the project's success. However, contractors have consistently been criticized for unethical practices. For instance, Amoah and Steyn (2023) reported that contractors in South Africa often engage in unethical practices to win contracts, contributing to a high prevalence rate of corruption in this industry. Lukhele et al. (2023) noted that contractors may prioritize economic opportunities over ethical practice, such as by using cheap and inferior materials that fail to meet acceptable standards, which harms the health and safety of workers. Other validated negative impacts of unethical behaviors of contractors in construction project management include cost overrun, deterioration of the environment, and damage to the industry's reputation (Inuwa et al., 2015). Furthermore, as moral exemplars, contractor managers' ethical failings can trigger unethical behaviors among other project participants (Oladinrin and Ho, 2015; Ho and Oladinrin, 2019; Fang et al., 2022), such as subcontractors, suppliers, engineers, and workers. Consequently, reducing unethical conducts of contractor managers and enhancing ethical management practices are of paramount importance in construction project management.

Although numerous studies have investigated unethical practices in the construction industry worldwide, there seems to be no comprehensive framework to systematically categorize and characterize unethical behaviors of contractors in construction project management. Available studies largely categorize unethical behaviors based on

industry experience and have not provided a rigorous theoretical rationale for these classifications (Amoah and Steyn, 2023; Coffie et al., 2023). Existing research may use diverse descriptive terminologies for the same ethical concerns. For instance, "kickbacks and illegal commissions" can be viewed as forms of corruption or fraud, while some studies categorize them separately or as alternatives to corrupt practices (Fan and Fox, 2009). Some studies investigate "bid shopping," "bid cutting," and "bid rigging" as separate issues (Aigbavboa et al., 2016), while others classify them under the same category (Abdul-Rahman et al., 2014). Additionally, most studies adopt merely questionnaire surveys to assess the "frequency" and "seriousness" of unethical behaviors, except for a few (Abdul-Rahman et al., 2011; Mukumbwa and Muya, 2013; Abdul-Rahman et al., 2014; Gicheru, 2018). The questionnaire responses undergo standardized processing and fail to delve deeply into the underlying causes of these unethical behaviors. The absence of deep understanding of the institutional factors, industry norms, and managerial perceptions limits the development of effective intervention strategies. Overall, relevant literature to date is fragmented and atheoretical, lacking a comprehensive framework to elucidate the boundaries of unethical behaviors and a coherent understanding to characterize their causes.

This paper aims to fill the theoretical gaps by addressing the following research questions:

RQ1: How can a systematic framework for unethical behaviors of contractor managers in construction project management be developed?

RQ2: What are the underlying causes of these different unethical behaviors?

The primary contribution of this paper to the existing knowledge is to develop a theoretical framework for systematically categorizing and characterizing unethical behaviors of contractors in construction project management for the first time, which offers a vocabulary to describe the key features of unethical practices (Foy et al., 2011), forms foundations for understanding and generalization in different cultural contexts, and provides a unified conceptual basis for both theoretical and empirical research. Practical contributions include providing a tool for managers and regulators to understand, identify, and assess contractor unethical practices prevalent in construction projects, and offering recommendations for effective ethical management based on the causes of different unethical behaviors.

The structure of this paper is organized as follows. Section 2 outlines the foundational concepts and theories underpinning the development of the proposed framework. Section 3 introduces the research methodology for data collection and analysis. Section 4 reports the findings related to the research questions. Finally, Section 5 presents a discussion and practical recommendations for enhancing ethical management practices in the construction industry.

## 2 Theoretical underpinnings

### 2.1 Definition and categorization of unethical behaviors

Ethical concerns arise where a person's behaviors may harm or benefit others when freely performed (Jones, 1991). The person performing the ethical behavior is therefore referred to as the ethical agent. In the field of business ethics, the term "ethical behavior" is used broadly to include both ethical and unethical behavior (Treviño et al., 2014). Treviño et al. (2006) proposed three categories of "ethical behavior": unethical behavior that is not morally acceptable in society, routine ethical behavior that reaches the minimal moral standard, and extraordinary ethical behavior that exceeds moral minimums. Therefore, the unethical behaviors examined in this study encompass both "bad behavior" that violates broadly accepted ethical norms in construction project management (e.g., corruption, fraud) and the failures to engage in actions that exceed minimal ethical standards (e.g., failing to proactively adopt environmentally sustainable technologies, failing to engage in whistleblowing against unethical practices). This suggests two pathways for identifying unethical behaviors in this study: summarizing unethical conducts directly noted in empirical literature and using ethical guidelines as a baseline to determine potential unethical practices, as discussed in subsection 2.2.

Stakeholder theory provides a suitable lens for dimensional categorization (Derakhshan et al., 2019). Kaptein (2008) suggests that the relationships with stakeholders and the ethical responsibilities toward them serve as the basis for defining unethical behaviors, as clustering actions by this approach have similar causes, impacts, or control measures. According to Freeman (2023), stakeholder refers to "any group or individual who can affect or is affected by the achievement of an organization's purpose." In construction project management, commonly considered stakeholders for contractors include clients, designers, subcontractors, supervisors, government authorities, and end users. Recently, nonhuman entities have also been incorporated into the scope of stakeholder research, as they may have influences on construction activities (Franklin, 2020; Kortetmäki et al., 2023). Examples of nonhuman stakeholders include the environment, resources, geography, physical structures, etc.

It is necessary to distinguish between the corporate social responsibility (CSR) of contractors and the unethical behavior of contractor managers. Corporate social responsibility emphasizes a company's moral obligations toward society beyond basic legal and economic duties (Lantos, 2001). Also grounded in stakeholder theory,

modern CSR posits that a company's responsibilities encompass not only shareholder interests but also the welfare of all stakeholders, including employees, customers, suppliers, and the broader community (Freeman and Dmytriyev, 2017). Many construction firms have implemented CSR strategies as an opportunity for differentiation and competitiveness, such as promoting occupational health and safety, environmental protection, and community engagement (Avotra et al., 2021; Fotiadis et al., 2023; Zhang et al., 2023). Recently, the concept of megaproject social responsibility (MSR) has expanded traditional CSR to megaprojects (Cottafava et al., 2024), in response to their characteristics of huge investment and profound impacts (Ma et al., 2021). However, the main distinction between contractor CSR and the unethical behaviors of contractor managers focuses on the ethical agent: the former operates at the corporate level, while the latter occurs at the individual level. CSR is viewed as a strategic issue, whose successful implementation requires managers to exercise ethical behaviors in their daily practice (Fatima and Elbanna, 2023).

The three-level perspective of engineering ethics is also adopted. Li (2010, 2012) proposed the micro-meso-macro framework, where professional ethics constitutes a significant part of micro-level engineering ethics, meso-level ethics addresses corporate, project, or industry issues, and macro-level ethics covers national and global concerns. Halder and Batra (2024) again classified ethical discourse in construction into micro (individual), meso (organizational/project), and macro (national/societal) levels. Many studies have adopted this three-level approach as a foundation for understanding and categorizing ethical concerns in engineering management (Johri and Hingle, 2022; Rodriguez-Nikl and Schaff, 2023).

Combining the stakeholder theory and the three-level distinction, this study proposes a theoretical framework to depict unethical behaviors of contractor managers that encompass micro, meso, and macro levels. This framework progressively expands the scale from contractor managers themselves to other stakeholders within the construction industry, and finally to the social environment.

### 2.2 An overview of unethical behaviors in the construction industry

This section establishes the preliminary taxonomy framework for unethical behaviors of contractor managers through two pathways: directly reviewing identified unethical behaviors from empirical studies since 2000, and using codes of ethics as baselines to generate potential unethical behaviors, as suggested by Kaptein (2008). Table 1 presents an overview of potential unethical behaviors from the two sources. The empirical literature selected encompasses a wide range of construction professionals (including architects, quantity surveyors, engineers, managers, consultants, and workers) from different construction organizations (including contractors, designers, clients, subcontractors, and suppliers) worldwide. The codes of ethics are issued by 13 professional associations and standards organizations, including the Project Management Institute (PMI), Construction Management Association of America (CMAA), Association for Project Management (APM), International Project Management Association (IPMA), American Society of Civil Engineers (ASCE), National Society of Professional Engineers (NSPE), Electrical and Electronics Engineers (IEEE), International Federation of Consulting Engineers (FIDIC), American Institute of Architects (AIA), Public Construction Commission of the Executive Yuan, Taiwan, China (PCC), Society of Construction Law (SCL), Chartered Institute of Building (CIOB), and Master Builders Association of New South Wales (MBA NSW). Given the different classification approaches and terminologies used, we conducted a preliminary categorization of the unethical behaviors from the existing literature and codes of ethics, grouping them into 24 themes, as shown in Table 1. The framework was refined through expert consultation and informal discussions with industry practitioners.

The empirical literature investigated unethical behaviors across different cultural backgrounds, covering developed (e.g., Australia, the USA, the UK) and developing (e.g., China, South Africa, Ghana, Nigeria, Zambia, Malaysia, Saudi Arabia, Kenya) countries and regions. However, the findings share some commonalities. The unethical practices such as "bribery and corruption," "conflicts of interest," "confidentiality and propriety information," and "dishonesty and fraud," are key concerns addressed by most countries. In particular, numerous empirical studies report that "bribery and corruption" is one of the most prevalent unethical practices in the construction industry (Aigbavboa et al., 2016; Gicheru, 2018; Zulu and Muleya, 2019; Kuoribo et al., 2023). Also, although codes of ethics vary in cultural contexts, the core ethical values they are built around are consistent to some extent. For instance, the PMI code is founded on four values that were identified as most important to the project management community: responsibility, respect, fairness, and honesty. The SCL code advocates for seven core values: honesty, fairness, fair reward, reliability, integrity, objectivity, and accountability. These values are reflected in various forms across the other codes of ethics.

Therefore, we believe the proposed taxonomy framework has applicability across diverse cultural contexts for three reasons. First, the summarized themes of unethical behaviors share similarities across empirical studies from various countries, although the rankings of specific unethical behaviors may vary by region. For example, the unethical conduct of "kickbacks and illegal commissions" is mentioned only in studies from certain countries, while the overarching theme (i.e., "bribery and corruption") remains highly prevalent. Second, the moral values and

**Table 1** Preliminary taxonomy framework for ethical behaviors of contractor managers

| Themes of unethical behaviors | | Sources from empirical literature | Sources from codes of ethics |
|---|---|---|---|
| 1 | Conflicts of interest | Coffie et al. (2023), Paul et al. (2021), Shah and Alotaibi (2018), Gicheru (2018), Kang et al. (2017), Aigbavboa et al. (2016), Abdul-Rahman et al. (2014), Mukumbwa and Muya (2013), Bowen et al. (2007), Vee and Skitmore (2003), Jackson (2000) | PMI, CMAA, ASCE, IEEE, NSPE, AIA, SCL, APM, FIDIC, IPMA |
| 2 | Confidentiality and propriety information | Coffie et al. (2023), Paul et al. (2021), Lee and Cullen (2018), Kang et al. (2017), Zulu and Muleya (2019), Mukumbwa and Muya (2013), Adnan et al. (2012), Abdul-Rahman et al. (2011), Fan and Fox (2009), Bowen et al. (2007), Jackson (2000), Vee and Skitmore (2003) | PMI, ASCE, IEEE, NSPE, AIA, APM, CIOB, PCC, IPMA |
| 3 | Environmental damage | Coffie et al. (2023), Zulu and Muleya (2019), Kang et al. (2017), Bowen et al. (2007), Vee and Skitmore (2003), Jackson (2000) | PMI, CMAA, ASCE, NSPE, AIA, APM, PCC, FIDIC, IPMA |
| 4 | Bribery and corruption | Kuoribo et al. (2023), Coffie et al. (2023), Amoah and Steyn (2023), Paul et al. (2021), Zulu and Muleya (2019), Shah and Alotaibi (2018), Gicheru (2018), Kang et al. (2017), Aigbavboa et al. (2016), Abdul-Rahman et al. (2014), Mukumbwa and Muya (2013), Githui (2012), Adnan et al. (2012), Abdul-Rahman et al. (2011), Fan and Fox (2009), Vee and Skitmore (2003) | PMI, ASCE, IEEE, NSPE, AIA, APM, PCC, FIDIC, IPMA |
| 5 | Technical incompetence or misrepresentation of competence | Kuoribo et al. (2023), Paul et al. (2021), Zulu and Muleya (2019), Kang et al. (2017), Githui (2012), Jackson (2000) | PMI, CMAA, ASCE, NSPE, AIA, SCL, APM, CIOB, PCC, FIDIC, IPMA |
| 6 | Negligence | Kuoribo et al. (2023), Coffie et al. (2023), Gicheru (2018), Aigbavboa et al. (2016), Abdul-Rahman et al. (2014), Mukumbwa and Muya (2013), Adnan et al. (2012), Abdul-Rahman et al. (2011), Vee and Skitmore (2003) | PMI, ASCE, NSPE, AIA, APM, MBA NSW |
| 7 | Dishonesty and fraud | Kuoribo et al. (2023), Coffie et al. (2023), Amoah and Steyn (2023), Paul et al. (2021), Lee and Cullen (2018), Gicheru (2018), Aigbavboa et al. (2016), Abdul-Rahman et al. (2014), Adnan et al. (2012), Abdul-Rahman et al. (2011), Fan and Fox (2009), Mukumbwa and Muya (2013), Doran (2004), Vee and Skitmore (2003) | PMI, CMAA, ASCE, IEEE, NSPE, AIA, SCL, APM, MBA NSW, PCC, FIDIC, IPMA |
| 8 | Unfairness | Kuoribo et al. (2023), Coffie et al. (2023), Amoah and Steyn (2023), Paul et al. (2021), Gicheru (2018), Aigbavboa et al. (2016), Abdul-Rahman et al. (2014), Mukumbwa and Muya (2013), Githui (2012), Adnan et al. (2012), Abdul-Rahman et al. (2011), Fan and Fox (2009), Doran (2004), Vee and Skitmore (2003) | PMI, CMAA, ASCE, IEEE, NSPE, AIA, SCL, APM, CIOB, MBA NSW, PCC, FIDIC, IPMA |
| 9 | Breach of public obligations | Coffie et al. (2023), Kang et al. (2017), Jackson (2000) | PMI, CMAA, ASCE, IEEE, NSPE, AIA, SCL, APM, MBA NSW, IPMA |
| 10 | Discrimination and favoritism | Kuoribo et al. (2023), Coffie et al. (2023), Amoah and Steyn (2023), Zulu and Muleya (2019), Shah and Alotaibi (2018), Kang et al. (2017), Aigbavboa et al. (2016), Githui (2012), Fan and Fox (2009), Jackson (2000) | IEEE, ASCE, AIA, NSPE, PMI |
| 11 | Fair competition | Coffie et al. (2023), Amoah and Steyn (2023), Paul et al. (2021), Zulu and Muleya (2019), Lee and Cullen (2018), Gicheru (2018), Kang et al. (2017), Aigbavboa et al. (2016), Abdul-Rahman et al. (2014), Mukumbwa and Muya (2013), Adnan et al. (2012), Abdul-Rahman et al. (2011), Doran (2004), Vee and Skitmore (2003), Jackson (2000) | PMI, ASCE, NSPE, MBA NSW, PCC, FIDIC, IPMA |
| 12 | Compliance with laws and regulations | – | PMI, CMAA, ASCE, IEEE, NSPE, AIA, APM, CIOB, MBA NSW, PCC, IPMA |
| 13 | Safety and health | Coffie et al. (2023), Zulu and Muleya (2019), Shah and Alotaibi (2018), Kang et al. (2017), Jackson (2000) | CMAA, ASCE, CIOB, MBA NSW, IPMA |
| 14 | Intelligent property | – | CMAA, ASCE, IEEE, NSPE, AIA, PCC |
| 15 | Care for employee or subcontractor concerns | – | APM, CIOB, MBA NSW, PCC |
| 16 | Information and warning disclosure | – | PMI, ASCE, IEEE, NSPE, AIA, SCL, PCC, IPMA |
| 17 | Respect for science | – | ASCE, PMI, IEEE, NSPE, AIA, APM, IPMA, FIDIC, CIOB |
| 18 | Gray areas | Amoah and Steyn (2023), Githui (2012) | PCC |
| 19 | Whistleblowing against improper demands | Coffie et al. (2023), Paul et al. (2021), Kang et al. (2017) | PMI, ASCE, IEEE, NSPE, AIA, APM, MBA NSW, IPMA |
| 20 | Breach of promises | – | PMI, APM, CIOB, FIDIC, IPMA |
| 21 | Failure to reconcile conflicting objectives | Lukhele et al. (2023), Maslen et al. (2021), Badshah and Haas (2018) | – |
| 22 | Engineering innovation risks | – | ASCE, IEEE |
| 23 | Resource wastage | Coffie et al. (2023), He et al. (2022) | ASCE, NSPE, AIA, IMPA |
| 24 | Cultural relic damage | – | AIA, PCC |

ethical principles advocated in codes of ethics largely possess societal consensus. This is because these codes are public documents typically developed through intensive stakeholder consultation with the help of academic experts and consultants (Kaptein, 2008). Third, the taxonomy framework demonstrates a degree of comprehen-

siveness, as codes of ethics can highlight potential unethical behaviors not yet identified in empirical research. For example, the ASCE code mentions the expectation to consider limitations of emerging technologies, and the NSPE code emphasizes the protection of intellectual property and prohibits implying credit to an author for work performed by others—issues seldom examined in empirical studies.

## 3 Research methodology

### 3.1 Data collection

The study adopted qualitative research approaches, primarily using semi-structured in-depth interviews for data collection. Qualitative research is suitable for exploring new areas where issues are not yet understood or properly identified (Hancock et al., 2009). Interview methods can provide deep insights into the experiences, meanings, and perspectives of participants (Hammarberg et al., 2016), therefore suitable for this study.

Purposeful and snowballing sampling methods were adopted. We contacted seven construction companies and identified 20 interviewees. The backgrounds and demographic profiles of the interviewees are presented in Tables 2 and 3. The interviewees include senior and middle managers mainly from contractors. They have an average of 23 years of experience in the construction field. Therefore, they are believed to possess a deep understanding, offer valuable insights, and make accurate judgments regarding ethical practices in this industry. Interviewees also include four managers from the owner and one from the third-party supervisor, who provide external and objective perspectives on the unethical practices observed in contractor management. Interviews were conducted between August and December 2022. Due to the pandemic, five managers were interviewed via video conference using Tencent Meeting, one manager through email, and the remaining interviews were conducted face-to-face. The interviews took an average of approximately 140 min. This substantial time commitment ensured that researchers had profound conversations with interviewees to investigate their viewpoints and attitudes in greater depth.

The interview was divided into three parts. The first part focused on the interviewees' backgrounds, including their years of experience and management roles in construction projects. The second part comprised 24 questions (as shown in Table 1). For each theme, interviewees were asked, "Have you ever experienced or witnessed this type of unethical behaviors? Please describe in detail how they manifest in construction project management practice using specific examples." After discussing the 24 themes, an open-ended question was posed in the third part, inviting interviewees to add any unethical behaviors beyond those mentioned above. Pilot interviews with contractor managers were conducted before the main interviews to refine the content and assess its feasibility (Alshenqeeti, 2014). To promote the validity and authenticity of the interviews, researchers introduced the research objectives and related concepts to the interviewees and clarified any misunderstandings at the beginning. Interviewees were asked to base their responses on the broader industry experience and various management activities, rather than on individual or company-specific perspectives to avoid bias. The anonymity and confidentiality of interviewees' responses were assured and interviews were audio-recorded with the consent of interviewees.

### 3.2 Data analysis

Qualitative content analysis was used to analyze the interview transcripts. It is a method for the interpretation of text data through the systematic classification process of coding and identifying themes or patterns (Hsieh and Shannon, 2005). Coding is a heuristic and exploratory analysis technique (Saldaña, 2013). It involves assigning descriptive or inferential tags or labels (i.e., codes) to

**Table 2** Backgrounds of interviewees

| Interviewee | Organization | Position | Years of experience | Interviewee | Organization | Position | Years of experience |
|---|---|---|---|---|---|---|---|
| PM1 | Contractor | Project manager | 17 | HS2 | Contractor | Head of safety | 7 |
| PM2 | Contractor | Project manager | 20 | HC1 | Contractor | Head of the commercial | 20 |
| PM3 | Contractor | Project manager | 27 | HC2 | Contractor | Head of the commercial | 15 |
| PM4 | Contractor | Project manager | 18 | HT1 | Contractor | Head of technology | 24 |
| PM5 | Contractor | Project manager | 23 | HT2 | Contractor | Head of technology | 31 |
| PM6 | Contractor | Project manager | 16 | S1 | Third-party supervisor | High-level manager | 30 |
| PM7 | Contractor | Project manager | 21 | O1 | Owner | Mid-level manager | 27 |
| HP1 | Contractor | Head of production | 39 | O2 | Owner | High-level manager | 34 |
| HP2 | Contractor | Head of production | 28 | O3 | Owner | Mid-level manager | 18 |
| HS1 | Contractor | Head of safety | 20 | O4 | Owner | Mid-level manager | 26 |

**Table 3** Demographic profiles of interviewees

| Profile category | Number of interviewees | Percentage |
|---|---|---|
| Years of experience | | |
| under 10 years | 1 | 5% |
| 11-20 years | 8 | 40% |
| 21-30 years | 8 | 40% |
| over 30 years | 3 | 15% |
| Position | | |
| mid-level | 11 | 55% |
| high-level | 9 | 45% |
| Organization | | |
| contractor | 15 | 75% |
| owner | 4 | 20% |
| third-party supervisor | 1 | 5% |

units of meaning in the raw data and forming a codebook (DeCuir-Gunby et al., 2011). This study adopted a hybrid method to develop the codebook, combining the data-driven inductive approach with the deductive a priori framework (Fereday and Muir-Cochrane, 2006; DeCuir-Gunby et al., 2011), which is believed to balance reliability and validity (Namey et al., 2008).

The interviews were transcribed verbatim and the interview transcripts were coded in NVIVO V.11. The coding analysis followed these specific steps: (1) The 24 themes of unethical behaviors from the interview outline serve as the initial coding scheme, which was assigned to corresponding segments from different transcripts, consolidating discrete text pieces for in-depth analysis (Namey et al., 2008). (2) The transcripts were inductively coded line-by-line to extract specific forms of unethical behaviors and capture the interviewees' opinions regarding them. According to Saldaña (2013), "action coding" was employed to pinpoint unethical behaviors. This was an iterative process involving repeated examination of transcripts to complement the initial coding scheme with newly emerged forms of unethical behaviors. (3) Cross-checking was conducted to ensure coding reliability. Two different coders developed codes independently on one randomly chosen transcript at a time and compared the results. Discussions were held in response to inter-coder disagreements, where code definitions and boundaries were clarified, and redundant or overlapping codes were eliminated (Hruschka et al., 2004). The final codebook was established after all transcripts were reviewed and discrepancies were resolved. (4) Frequency analysis and causation coding were conducted (Saldaña, 2013). Researchers adopted various strategies to ensure the authenticity and accuracy of the results, including triangulation, rigorous and well-defined analysis procedures, peer debriefing, and rich and thick descriptions (Creswell, 2014).

Drawing from the experience of similar qualitative studies regarding sample size, the 20 interviews conducted in this study are considered adequate (Guest et al., 2006; Ho and Oladinrin, 2019). Furthermore, no new codes emerged in the last three interview transcripts, suggesting that data saturation has been achieved (see Table 4) (Francis et al., 2010; Hennink and Kaiser, 2022).

## 4 Results

### 4.1 Theoretical framework for unethical behaviors

After the rigorous coding and analysis procedures, a three-level, five-dimensional, and 18-theme framework for unethical behaviors of contractors in construction project management has emerged, as shown in Fig. 1. Referring to the theoretical premises in Section 2, unethical behaviors can be categorized into five dimensions across three levels from the stakeholder theory perspective: the professional dimension at the micro level; the organizational (involving colleagues, employers, clients, peers, etc.) and engineering (involving engineering knowledge, technology, objectives, etc.) dimensions at the meso level; and the societal (involving the public and government) and environmental (involving natural and cultural environments) dimensions at the macro level.

Compared to the 24 themes in the preliminary taxonomy framework in Table 1, the reintegration through the coding process of qualitative content analysis eliminated conceptual overlaps and intersections, categorizing unethical behaviors into 18 themes that are more distinct in their ethical values. Within this refined framework, "discrimination and favoritism" are presented as violations against the value of fairness and thus are categorized under the theme of "fairness and justice." "Whistleblowing against improper demands" is considered part of

**Table 4** The proportion of codes that emerged per semi-structured interview

| Interview round | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Proportion of newly emerged codes | 35.2% | 15.8% | 11.1% | 5.5% | 15.4% | 1.6% | 2.4% | 4.3% | 1.6% | 1.6% |
| Cumulative proportion of identified codes | 35.2% | 51.0% | 62.1% | 67.6% | 83.0% | 84.6% | 87.0% | 91.3% | 92.9% | 94.5% |
| Interview round | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Proportion of newly emerged codes | 0.8% | 2.0% | 1.2% | 0.0% | 0.0% | 0.4% | 1.2% | 0.0% | 0.0% | 0.0% |
| Cumulative proportion of identified codes | 95.3% | 97.2% | 98.4% | 98.4% | 98.4% | 98.8% | 100.0% | 100.0% | 100.0% | 100.0% |

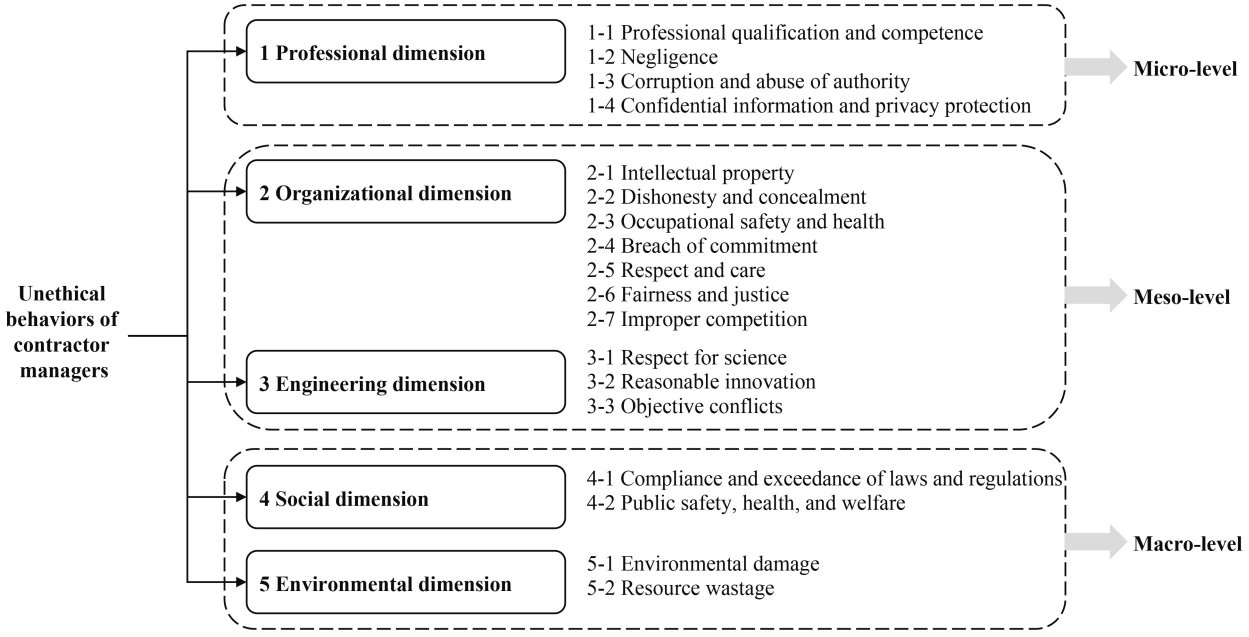


**Fig. 1** The three-level, five-dimensional, and 18-theme framework for unethical behaviors of contractor managers.

managers' ethical responsibility, hence it is classified under the theme of "negligence." The theme of "gray areas" denotes ambiguities surrounding legal thresholds, thus being merged into the theme of "compliance and exceedance of laws and regulations." "Information and warning disclosure" pertains to public risk communication and is allocated to the theme of "public safety, health, and welfare." "Cultural relic damage," relating to the preservation of historical and cultural environments, is categorized under "environmental damage." In the case of "conflicts of interest," the concerns expressed by interviewees encompass problems such as contract negotiations, community disturbances caused by engineering activities, and unfair reward mechanisms, suggesting a multifaceted dimensionality. This indicates that "conflicts of interest" do not belong to fundamental ethical values or standards, hence the associated behaviors are divided into themes of "fairness and justice" and "public safety, health, and welfare."

This section elucidates each dimension and its encompassing ethical themes, delineating the most prevalent three forms of unethical behaviors identified within each theme (Table 5). The complete codebook of unethical behaviors is available upon request from the corresponding author.

#### 4.1.1 Dimension 1: Professional dimension

A profession can be defined as "a group of people organized to serve a body of specialized knowledge in the interests of society" (Vee and Skitmore, 2003). Professionals are distinguished from other ethical agents in terms of knowledge, opportunity, and expectation. Professional ethics sets morally permissible standards of conduct for individual members of a profession, as well as the moral ideals the profession pursues (Davis, 2003; Lukhele et al., 2023). In this study, the professional dimension examines the unethical behaviors of contractor managers related to breaches of their professional commitments and ethical responsibilities. This dimension covers four themes of unethical behaviors.

The first theme is professional qualification and competence. In construction project management, evaluating the competency levels of managers is essential for appointing management personnel, allocating managerial tasks, and undertaking construction projects. Explicit criteria for competency include qualification certificates and evidence of previous project experience (in the form of contract documents, award notifications, and end-user evaluations). Additionally, a posteriori evaluation is based on managerial performance in actual work undertaken. However, managers may not be adequately qualified or competent. The most frequently cited form of this issue is qualification rental, as shown in Table 5. The second salient form is the discrepancy between qualifications or past performance and actual managerial competence.

The second ethical theme is negligence, which means the failure to exercise the degree of care and attention considered reasonably expected for the tasks undertaken (Adnan et al., 2012). This degree of reasonable care involves taking precautions to avoid harm resulting from one's actions and is proportional to the centrality of one's role in producing that harm (Alpern, 1983). Thus, in addition to the basic liability responsibilities imposed by contractual provisions and managerial positions,

**Table 5** Prevalent forms of unethical behaviors and their explanations by ethical theme

| Ethical themes | | Forms of unethical behaviors | Explanations | Mention frequency [a] |
|---|---|---|---|---|
| 1-1 | Professional qualification and competence | Qualification rental | Unqualified or under-qualified managers use the certificates of others to undertake projects | 17 |
| | | High certification but poor competence | Actual managerial capabilities fall short of the represented qualification levels | 10 |
| | | Improper appointments | Improper assignment decisions lead to personnel incompetence in delivering management services | 9 |
| 1-2 | Negligence | Impacts from personal affairs | Managers' private affairs, personal emotions, or bad habits interfere with regular management activities | 9 |
| | | Ineffective correction | Managers fail to identify and correct risks in construction activities timely, especially safety hazards | 8 |
| | | Work evasion or procrastination | Managers delay tasks they are obligated to perform or pushes them onto others | 8 |
| 1-3 | Corruption and abuse of authority | Construction designation | Use of managerial authority to designate or "recommend" construction teams or companies | 13 |
| | | Nepotism | Interference in personnel assessment, appointment, promotion, and replacement due to personal favoritism | 8 |
| | | Regulatory leniency | Abuse of inspection, supervision, and acceptance authority for personal gain | 7 |
| 1-4 | Confidential information and privacy protection | Misdisclosure of tender information | Unauthorized release of construction project tender information | 8 |
| | | Misdisclosure of personal information | Failure to respect and maintain the personal information of project members | 6 |
| | | Misdisclosure of quotation information | Unauthorized release of project bid pricing information | 5 |
| 2-1 | Intellectual property | Scheme plagiarism | Plagiarizing or misappropriating others' original design or construction schemes | 10 |
| | | Patent infringement | Utilizing patented engineering technologies without authorization | 5 |
| | | Nominal authorship | Managers claim credit for work they did not significantly contribute to or participate in | 4 |
| 2-2 | Dishonesty and concealment | Deception in settlement | Dishonest behaviors during engineering settlement (notably failing to provide accurate quantity and pricing information) | 17 |
| | | Quality concealment | Hiding and covering up defects and flaws that do not meet the project's quality standards | 10 |
| | | False documentation | False materials recorded and provided in construction engineering management processes (e.g., signing documents on others' behalf without delegated authority) | 9 |
| 2-3 | Occupational safety and health | Lack personal protective equipment (PPE) | Managers do not provide site personnel with sufficient and high-quality PPE such as construction helmets and safety harnesses | 10 |
| | | Unsafe procedures | Managers organize or allow construction activities without necessary safety measures and procedures (e.g., tunneling operations without sufficient ventilation) | 8 |
| | | Inadequate rest period | Managers unreasonably extend work hours and fail to ensure adequate rest periods for project personnel | 8 |
| 2-4 | Breach of commitment | Payment default | Failure to make timely and full payment for engineering services as agreed | 15 |
| | | Breach of management directives | Managers go back on their given directives (usually beyond contract terms and are not documented promptly) | 11 |
| | | Milestone delays | Failure to complete engineering tasks as per pre-agreed timeline requirements | 9 |
| 2-5 | Respect and care | Disrespecting autonomy | Managers impose their will on other contractual parties instead of voluntary negotiation | 13 |
| | | Disrespecting dignity | Managers fail to provide project members with the inherent respect they deserve as human beings (e.g., verbal abuse or even physical assault) | 8 |
| | | Neglecting work difficulties | Managers focus solely on the completion of objectives, overlooking the difficulties faced by project members during task execution and the support they need | 4 |
| 2-6 | Fairness and justice | Engineering discrimination | Bias based on age, gender, ethnicity, regional affiliation, and occupational roles (especially construction workers) | 16 |
| | | Unfair engineering claims | Inadequate or delayed compensation (financially and/or timely) to stakeholders for losses not of their own making | 13 |
| | | Unfair engineering pricing | Discrepancies between client requirements and the actual charges for engineering services | 13 |
| 2-7 | Improper competition | Collusive tendering | Collusion between bidders, between bidders and employers, as well as between bidders and other parties such as bid evaluation experts | 16 |
| | | Unreasonable underbidding | Employers utilize the lowest bid received to pressure other bidders into submitting lower bids, or bidders intentionally slash their bids to near or below project costs to win and subsequently offset their losses through various means | 10 |
| | | False allegations and defamation | Making baseless allegations and maliciously circulating negative information to tarnish competitors' image | 9 |

(*Continued*)

| Ethical themes | | Forms of unethical behaviors | Explanations | Mention frequency [a] |
|---|---|---|---|---|
| 3-1 | Respect for science | Improper scheduling | Managers set design and construction timelines or milestone requirements that violate fundamental engineering principles | 16 |
| | | Procedural violations | Managers unreasonably compress, omit, or reverse construction procedures (e.g., dismantling concrete molds before the concrete reaches adequate strength) | 7 |
| | | Layperson intervention | Decision-makers either neglect expert advice or inappropriately interfere in professional decisions with non-expert suggestions | 7 |
| 3-2 | Reasonable innovation | Innovation risks | Managers fail to adequately consider the potential risks brought by innovation in decision-making | 8 |
| | | Improper innovation | Innovations fail to address genuine engineering needs, aiming instead for novelty or to meet management performance metrics, thus not yielding positive benefits | 4 |
| | | Inadequate innovation support | Managers offer insufficient support for promoting innovation that benefits project objectives and industry development | 2 |
| 3-3 | Objective conflicts | Imbalance among different objectives | Managers overemphasize one objective at the expense of others | 13 |
| | | Imbalance between individual targets versus overall goals | Managers focus exclusively on their own department's assigned goals, disregarding other departments, which undermines the project's overall objectives | 7 |
| | | Imbalance between short-term versus long-term objectives | Managers prioritize short-term gains at the expense of the project's long-term success and the enterprise's sustainable development | 7 |
| 4-1 | Compliance and exceedance of laws and regulations | Minimal compliance mindset | Managers aim only to avoid violating bottom-line regulations, making no effort to consciously steer clear of actions not explicitly forbidden, nor to embrace commendable practices that are not explicitly mandated | 6 |
| | | Exploiting regulatory loopholes | Managers exploit regulatory and policy loopholes to circumvent restrictions (e.g., dividing large projects into smaller ones to bypass due tendering requirements) | 4 |
| 4-2 | Public safety, health, and welfare | Construction disturbance | Disturbance to the public's normal and comfortable living caused by construction activities, such as noise disturbance and light pollution | 20 |
| | | Traffic inconvenience | Construction activities encroach upon or damage roads, hindering public transportation convenience | 10 |
| | | Environmental deterioration | Construction operations cause deterioration of the surrounding environment, affecting public health | 10 |
| 5-1 | Environmental damage | Air pollution | Air pollution caused by construction processes | 13 |
| | | Wastewater pollution | Environmental pollution from wastewater produced during construction | 11 |
| | | Solid waste pollution | Pollution from solid waste generated during the construction process | 9 |
| 5-2 | Resource wastage | Rework wastage | Rework during the construction process, caused by construction errors, improper preservation of finished products, failure to meet the required standards, etc. | 9 |
| | | Inefficient utilization | Inefficient utilization of building materials and living resources, including water, electricity, and gas (often in the forms of unused surplus or a lack of recycling) | 7 |
| | | Unnecessary cost overruns | Unnecessary expenditures caused by inefficient project management and low operational efficiency | 5 |

Note: [a] The number of mention frequency represents the count of interviewees mentioning that particular form of unethical behavior.

managers should also assume positive and forward-looking ethical responsibilities, which emphasizes what to do to achieve or prevent future outcomes, rather than looking backward at who was responsible for past events (Ladd, 1982). For example, managers are expected to refuse and, where necessary, blow the whistle on unethical managerial directives. Regrettably, only three interviewees mentioned this problem (PM1, PM2, O1), indicating a lack of awareness among current construction industry managers. The three most frequently cited forms of negligence are impacts from personal affairs, ineffective correction, and work evasion or procrastination.

The third theme concerns corruption and abuse of authority. Corruption is defined as the abuse of entrusted power for personal gain (Zhang et al., 2017). The construction industry has been identified as the one of the most corrupt industries worldwide (Zhang et al., 2017). Such assertions align with the perspectives shared by our interviewees. While some interviewees believe that corruption is not exclusive to construction (HP1, HS1, HS2), they acknowledge it is prominent and pervasive in this industry (PM3, HP1, HC2, O3) and permeates throughout all project phases (HC1). Additionally, five managers have observed notable improvements in curbing corruption in China in recent years. The three most frequently cited behaviors are construction designation, nepotism, and regulatory leniency. Notably, due to the sensitivity of this theme, interviewees indicated that direct exchanges of benefits were seldom witnessed or experienced; rather, more subtle forms like "guanxi-based corruption" prevail (Luo, 2008), as proposed by PM1 and PM2.

The fourth theme is confidential information and privacy protection. Respecting and maintaining the

confidentiality of information acquired through professional relationships is essential to the expected conduct of construction practitioners (McCarthy, 2012). For managers, this not only applies to specific confidential projects but also to any other information gathered during their professional engagements that might affect stakeholders' interests, encompassing business details, technical data, organizational management information, and personal privacy. The three most cited breaches of information and privacy are misdisclosure of tender information, personal information, and quotation information. Corrupt behaviors and breaches of confidentiality may occur simultaneously, especially during the tendering or bidding stages. Seven interviewees stated that revealing tender information to help others win projects is a form of corruption.

#### 4.1.2 Dimension 2: Organizational dimension

The organizational dimension pertains to how contractor managers navigate ethical relationships with other industry practitioners with diverse interests, including owners, subcontractors, designers, suppliers, and competitors. Contractor managers may perform unethical practices in seven aspects.

The first ethical theme is intellectual property, regarding the failure of managers to respect and safeguard the intellectual property of others in the construction industry. The most frequently mentioned forms of this issue are scheme plagiarism, patent infringement, and nominal authorship.

The second theme is dishonesty and concealment, pertaining to dishonest behaviors in construction project management. The three most frequently mentioned forms are deception in settlement, quality concealment, and false documentation.

The third ethical theme is occupational safety and health, concerning managers failing to safeguard the safety and health of project members in the workplace. The three most frequently mentioned misconducts are lack of personal protective equipment (PPE), unsafe procedures, and inadequate rest periods for project personnel.

The fourth ethical theme is breach of commitment, which concerns managers failing to honor their commitments, whether formal or informal. Formal commitments usually encompass engineering contracts and other written documents with legal binding, while informal commitments mainly pertain to verbal assurances that are unenforceable. The three most frequently mentioned unethical behaviors are payment default, breach of management directives, and milestone delays. In construction projects, "*The contract serves as the foundational reference for management activities*" (O3). However, many changes that exceed the stipulated scope of contracts frequently arise during the construction engineering management. Such unenforceable agreements inherently carry higher risks of breach. This is because that "*adherence to promises may not always be absolute when profits are at stake. Keeping one's word often depends on individual conscience, which makes it difficult to monitor*" (HS1). Furthermore, these breaches are seldom "*addressed through formal channels*" (O3). This highlights the importance of formalized contract management.

The fifth ethical theme is respect and care. Dillon (1992) proposed the concept of "care respect for persons." "Respect" implies fully recognizing the basic human rights and rational autonomy of others, while "care" entails empathetically understanding others' situations and seeking to enhance their well-being (Dillon, 1992). The three most frequently cited unethical behaviors in the construction industry are disrespecting autonomy, disrespecting dignity, and neglecting work difficulties.

The sixth ethical theme is fairness and justice, which has traditionally been considered one of the four cardinal virtues. The notions of fairness and justice first signify equality and impartiality in guaranteeing each individual's most extensive basic rights and liberties (Rawls, 1971), and embody the principle of "no respecter of persons" (Godwin, 1842). The related unethical behaviors include discrimination and managerial favoritism. From the perspective of distributive justice, "to render to each his due" (Miller, 2022) should be upheld as a guiding principle for the reciprocal exchange of interests and harms in construction project management. Relevant unethical practices of contractor managers include failing to provide remuneration proportionate to stakeholders' contributions, not assuming responsibilities aligned with their powers, and distributing risks and benefits unjustly (Van de Poel and Royakkers, 2011). Justice also serves as a remedial principle, activated when injustice arises from faulty behaviors (Miller, 2022). It seeks to restore a balance of fairness and justice by adjusting the relationships among rights, responsibilities, and interests through reasonable compensation (Fang et al., 2020). Relevant concerns for contractor managers include the punctuality of engineering claims and providing appropriate compensation to individuals who sacrifice for the collective good. Finally, procedural justice is also a critical aspect. Related unethical behaviors include disregarding stakeholders' opinions in decision-making and failing to accurately disclose essential decision-related information (World Health Organization, 2016). Overall, the three most frequently mentioned forms of misconducts are engineering discrimination, unfair engineering claims, and unfair engineering pricing.

The seventh theme is improper competition, which entails unethical practices aimed at gaining competitive advantages in the construction industry. Four interviewees noted the prevalence of such practices, particularly during the tendering or bidding stages (PM3, PM7, HS1, O1).

The three most frequently mentioned forms are collusive tendering, unreasonable underbidding, and false allegations and defamation.

#### 4.1.3 Dimension 3: Engineering dimension

This dimension examines how contractor managers address ethical challenges associated with construction activities. These challenges come from three core aspects. First, construction activities involve the integration of diverse forms of knowledge, including empirical, scientific, and technical knowledge. Second, construction activities are guided by value-oriented objectives to deliver useful products and services to society and generate economic and social benefits; however, these objectives and values sometimes conflict. Third, a construction project operates within certain constraints, such as natural, resource-related, social, economic, and technical conditions (Yin, 2012). Unethical behaviors in this dimension are clasified under three themes.

The first theme is respect for science, which entails honoring the established and systematically recognized knowledge about construction engineering. Moreover, when considering technical aspects, it is vital to adapt them to the unique requirements of specific engineering scenarios, rather than rigidly adhering to predetermined specifications. Thus, "seeking truth from facts" should be inherently woven into the idea of "respect for science." In construction project management practices, the three most frequently cited forms of disregard for scientific principles are improper scheduling, procedural violations, and layperson intervention.

The second ethical theme is reasonable innovation. Engineering innovation is a primary driver of productivity (Yin, 2012). Interviewees agree that such innovation can enhance efficiency and reduce costs (PM6, HP2, O3), improve safety (PM6, O3), promote industrial development (HS2), and align with the construction industry's macro-policy direction (O4). However, these benefits stem from reasonable innovation. The interviewees mentioned three types of problems: innovation risks, improper innovation, and inadequate innovation support. As one manager stated, "*Most innovations during the construction process are reactive and accommodating, rather than being proactive*" (PM2). Another concern raised was "*the reluctance of decision-makers to take responsibility for potential innovation failures*" (PM3), which tends to steer innovation decisions toward conservatism.

The third theme concerns objective conflicts. Contractor managers commonly encounter conflicting objectives, particularly between quality and safety goals versus cost and schedule targets. If not properly addressed, these conflicts may hinder the successful delivery of the project. These conflicts are generally presented in three distinct ways: trade-offs among competing objectives (such as compromising project quality and safety to meet deadlines or budget constraints), individual targets versus overall goals (such as personal career development versus project progress), and short-term versus long-term objectives (such as undertaking high-risk projects solely for short-term revenue boosts).

#### 4.1.4 Dimension 4: Social dimension

This dimension focuses on how contractor managers deal with the external stakeholders of the construction project, specifically the government and the public.

The first theme involves the compliance and exceedance of laws and regulations. Government laws and regulations provide the foundation for construction project management. However, these represent the minimum requirements of the ethical norm system. Contractor managers are expected to conduct their practices not only in compliance with the law but also in pursuit of ethical excellence. Therefore, in addition to legal and regulatory violations, we identified two other forms of unethical behaviors: exploiting regulatory loopholes and the minimal compliance mindset. Examples include selecting construction materials that are not recommended and accepting gifts in gray areas where the lines between acceptable gifts and corruption are blurred (Gordon and Miyake, 2001). The emergence of new ethical concerns and transformations in ethical values can shape the revision of existing laws (Liu, 2002). When these new ethical values are embedded in legal provisions, the overall standard of social norms is raised (Bodenheimer, 1999). This underscores the importance of fostering ethical excellence among contractor managers beyond regulatory compliance.

The second ethical theme is public safety, health, and welfare. Construction activities produce social benefits but also inevitably bring about certain negative impacts. The public, considered as external stakeholders, can be categorized into two groups. One group comprises the end users, whose safety, health, and welfare might be compromised by inferior quality or functional deficiencies in the built environment. The other group includes the surrounding community, who may endure adverse effects caused by the construction activities. The three most mentioned impacts include construction disturbance, traffic inconvenience, and environmental deterioration. Failing to appropriately mitigate these impacts can intensify tensions with the public. Relevant unethical behaviors of contractor managers include inadequate information disclosure (such as construction progress and potential hazards), neglecting public inclusion in decision-making, and insufficient compensation for public disturbances (such as noise disturbances).

#### 4.1.5 Dimension 5: Environmental dimension

This dimension examines contractor managers' ethical responsibilities toward the natural and cultural environments, encompassing two themes of unethical behaviors.

The first theme addresses unethical practices that result in damage to natural environment and cultural heritage. The three most frequently mentioned forms are air pollution, wastewater pollution, and solid waste pollution occurring during the construction process. Twelve interviewees believe that current construction practices adhere to procedures for the exploration and emergency protection of cultural and historical relics, thereby minimizing substantial damage to them. However, two interviewees noted that decisions about cultural heritage preservation typically lie within the purview of government authorities, making it challenging to address such issues at the project level.

The second ethical theme is resource wastage, focusing on unethical behaviors related to resource inefficiency and excessive energy consumption in construction projects. The three most frequently mentioned forms are rework wastage, inefficient resource utilization, and unnecessary cost overruns.

As presented in Table 5, each ethical theme is characterized by prominent forms of unethical behaviors. Upon frequency of mentions, it appears that the most prevalent form of unethical behavior among contractor managers is "construction disturbance," followed by "qualification rental" and "deception in settlement." This indicates the key aspects where ethical improvements are most needed in contractors' involvement in construction project management.

### 4.2 Causal analysis of unethical behaviors

This section explores the causes and consequences of different forms of unethical behaviors based on the interview data. The analysis is approached from two perspectives: the interrelationships between different unethical behaviors and the moral competency perspective based on Rest's Four-Component Model.

#### 4.2.1 From the interrelationships between unethical behaviors

The interrelationships between unethical behaviors are analyzed using causation coding to extract causal inferences from the interview data (Saldaña, 2013). Figure 2 illustrates the most salient causal relationships, where arrows represent causal inferences made by the interviewees and numbers in parentheses indicate the frequency of each mention. The analysis reveals the complexity of the causes and consequences of contractor managers' unethical behaviors, as evidenced by the intricate dynamics of power and responsibility underlying different types of unethical behaviors.

As depicted in Fig. 2, an unethical action may involve a complex causal chain that affects or is affected by other stakeholders. It is "a world of relationships, people, things, time, and space" (Maslen et al., 2020) berween the contractor managers' behaviors and their final consequences. For instance, the contractor's unjust handling of claims with subcontractors can disrupt the subcontractor's schedule, potentially impeding efficient construction workflow and professional coordination,

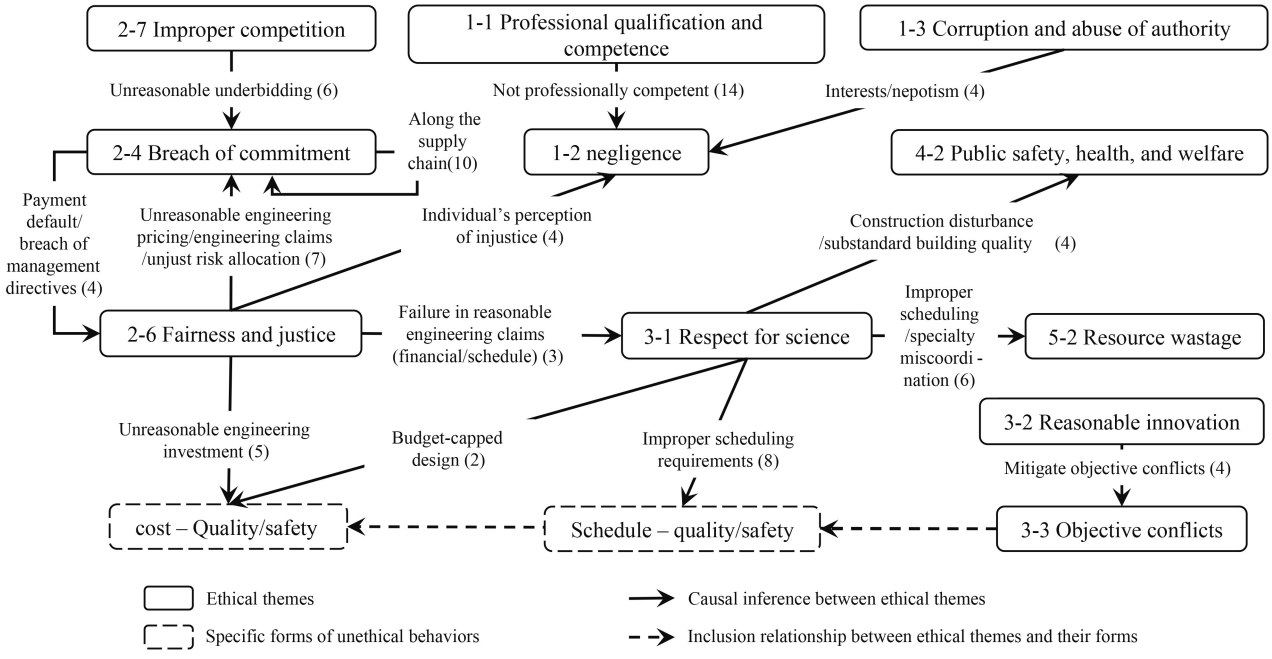


**Fig. 2** Graphic illustration of salient causal inferences between different themes of unethical behaviors.

leading to waste of both human and material resources. Likewise, the owner's breach of payment obligations may intensify the conflicts between safety, quality, and cost management for the contractor managers, discouraging necessary investments in safety. Additionally, the unethical strategy that contractor managers deliberately underbid during the tendering phase heightens the risk of post-commencement defaults. Breaches of contract can also propagate along the supply chain, with five interviewees noting delayed payments trickling down from owners to contractors, subcontractors, and workers. This indicates that each unethical behavior is not merely the result of individual managerial decisions but rather reflects the power structures embedded within the construction supply chain (Nurhayati et al., 2021). The intricate organizational and institutional frameworks within construction projects can limit the capacity of lower-tier participants to resist or rectify unethical practices.

Moreover, the collective and distributed nature of construction activities makes it challenging to assign ethical responsibilities, often leading to blame-shifting among stakeholders (Herkert et al., 2020). For instance, although almost all interviewees recognized the negative impacts of construction on the public (e.g., all 20 interviewees mentioned construction disturbance), they considered this problem to be "*unsolvable*" (PM4, PM7). Four interviewees cited the inevitability of noise production and the difficulty of managing construction techniques as reasons. Six interviewees noted that public obstruction of construction, especially malicious and profit-driven cases, complicates coordination efforts. Furthermore, the division of coordination responsibilities among various managers remains unclear. For example, some managers believe that "*compensation fees should be paid by the owner, but in many cases, it's the general contractor*" (HS1). Correspondingly, contractor managers often respond negatively to these conflicts, displaying indifference and acting only when complaints are received. As they noted, "*If it's just for one night, we proceed forcefully because we will stop the next day, making any complaints from the public irrelevant to us. If this happens every day, we have to initiate negotiations promptly*" (PM3). They believe that obtaining a construction permit from the government signifies compliance and therefore do not proactively show concern or understanding for public disturbances: "*We'll post the permit publicly; even if it affects you, coming here to make trouble means you're breaking the law*" (PM4). The decision to provide compensation, as well as the amount, often hinges on public acceptance and tolerance: "*It's a matter of negotiation... since residents around here are office workers and they don't have time to deal with this issue, we might offer a symbolic compensation*" (PM2). This reveals the inability of contractor managers to recognize their ethical responsibilities and the lack of ethical motivation to take proactive measures to prevent potential conflicts. On the other hand, construction project management is inherently a collective endeavor, so while emphasizing the role of contractor managers, the ethical responsibilities of other participants must also be considered. It's essential to address potential power imbalances and foster ethical accountability across all levels and parties within construction projects.

Overall, the ethical themes of "fairness and justice" and "respect for science" have emerged as the most significant, as failures in these areas can trigger or intensify other unethical behaviors, as shown in Fig. 2. For example, seven interviewees mentioned that unfairness in engineering service fees, engineering claims, and risk allocation could lead to breaches of commitment. Eight interviewees noted that unscientific scheduling demands exacerbate conflicts between schedule and quality or safety objectives, pressuring contractor managers to sacrifice quality and safety to meet milestones. Moreover, three interviewees indicated that unfair economic or scheduling claims can escalate behaviors that disregard scientific principles. The causal inferences between unethical behaviors offer a strategic pathway to their reduction, highlighting the importance of addressing misconducts related to "fairness and justice" and "respect for science" to enhance the ethical performance of contractor management.

### 4.2.2 From the perspective of moral competencies

This section examines the underlying causes of various unethical behaviors through the lens of Rest's Four-Component Model (Bebeau and Thoma, 1999; Bebeau et al., 2016). According to this model, ethical behavior occurs only when all four stages of ethical decision-making are activated (Fig. 3). The components are as follows: ethical sensitivity—recognizing how one's actions may affect others and interpreting the situation as moral; ethical judgment—correctly assessing whether specific actions are morally justifiable; ethical motivation—prioritizing moral values over other competing

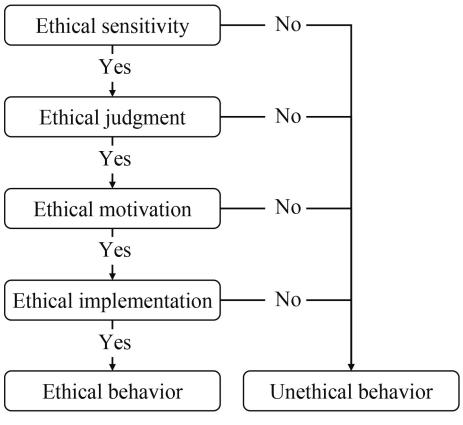


**Fig. 3** Four-component model of ethical behaviors.

concerns; ethical implementation—possessing the necessary skills and courage to act in accordance with moral choices. These four components are often viewed as moral competencies essential for moral intervention planning. Absence of one or more of the competencies can lead to moral failings. Based on the analysis of interview data, we identify and report on the moral competency deficits associated with different unethical behaviors.

The first cause lies in managers' deficiency in ethical sensitivity, which prevents them from recognizing certain unethical practices. For instance, when discussing intellectual property, four interviewees noted that the construction industry, especially during the construction process, rarely encounters with this concern. Five interviewees reasoned that the industry's reliance on mature experiential knowledge and conventional practices leads to a high degree of shareability of intellectual outputs. As one interviewee (HS2) put it, "*There is rarely a type of output that must not be used by others.*" Nonetheless, seven interviewees recognized a prevalent oversight in safeguarding outputs such as drawings and techniques. Some comments underscore this, for example, "*Many don't bother with patents. Some innovative solutions, once digitized, are open for anyone to replicate. It's not something many are particular about*" (PM7), and "*even if your construction method is patented, it might still be widely employed with no one being held to account*" (S1). It becomes clear that the boundary between intellectual property and professional knowledge sharing is ambiguous, revealing a lack of ethical awareness of relevant unethical behaviors in the construction industry. Additionally, regarding dishonest settlement practices, such as inflating project quantities or costs, four interviewees deemed such actions inconsequential or non-problematic, labeling them as "*merely a commercial behavior*" and "*something everyone in the industry does*" (PM3), or "*business operation tricks*" (O1). This illustrates how some unethical behaviors in construction practice can be hidden by vested interests, rendering them less perceptible.

Despite recognizing that some practices are unethical, some managers may still make incorrect ethical judgments. One situation is that managers do not perceive unethical behaviors as leading to negative consequences. For example, three interviewees mentioned that upper-level leaders designating or "recommending" construction teams due to vested interests or personal relations does not necessarily have negative impacts. Instead, it might be easier to establish stable cooperative relationships compared to unfamiliar bidding teams; as a result, they are inclined to accept such arrangements. As they noted, "*Most of the teams introduced through personal relations are trustworthy, which makes us feel more reassured delegating task to them,*" while "*working with a team that strictly adheres to the contract can pose challenges for decision-makers*" (PM2). "*Thus, we prefer teams that come with a recommendation or endorsement from an acquaintance*" (PM5). However, managers overlook the fact that construction teams recommended through personal relations, rather than being selected via open competition, may pose safety and quality risks due to potential incompetency, undermine fairness, and damage the company's reputation.

Another situation is that managers fail to adopt higher ethical standards in their ethical judgments. For instance, 12 interviewees noted significant improvements in occupational safety and health conditions in the Chinese construction industry over the years, especially regarding on-site accommodation. Ten interviewees believed that there's a growing trend among managers to respect and care for workers. However, some managers argued, "*Although the accident rate has decreased in recent years, the construction industry remains accident-prone... and the construction environment is relatively poor*" (HS1); "*Compared to (some developed countries), domestic occupational health and safety measures are basic, with almost no high-standard measures being implemented*" (HS2); "*We emphasize humanistic care now, but I think it's largely superficial... there are areas that need improvement*" (HT2). What factors cause discrepancies in ethical viewpoints? As one manager (PM1) put it, "*The real challenge with these problems (about occupational safety and health) is, what's your benchmark or standard?*" This suggests that if managers focus solely on existing improvements without actively pursuing ethical excellence, their ethical judgment may be somewhat biased.

The third cause of unethical behavior stems from the failure to prioritize ethical considerations, particularly when facing ethical conflicts or even ethical dilemmas. Ethical conflicts arise when two or more positive moral values cannot be fully realized at the same time (Van de Poel and Royakkers, 2011). All interviewees acknowledged the presence of conflicts between different objectives and responsibilities in construction project management. For contractor managers, the conflicts between safety and quality versus schedule and cost are particularly pronounced. While the judgment of prioritizing safety and quality is acknowledged by most managers (PM3, PM4, PM5, PM6, HC1, HC2, HT1, O4), unethical behaviors that compromise safety and quality for the sake of schedule or cost are nonetheless prevalent in practice. Examples include, "*The tower crane must pass inspection before use. But due to tight schedules, it's sometimes put into operation before the inspection is complete*" (HP1); "*Under schedule pressures, (managers) overlook construction principles by adding layers before the concrete reaches adequate strength. This results in cracks in the slab, leading to water leakage, which in turn causes steel corrosion and ultimately reduces structural safety*" (O2); "*Regulations are, of course, followed as long as costs are manageable. But when it's not feasi-*

*ble, some (managers) may choose methods that are riskier but less costly*" (HS2). This reflects that making correct ethical judgments does not necessarily lead to the formation of ethical intent. The disconnect between ethical judgment and intent warrants further exploration.

Finally, although ethical motivation has been formed, contractor managers can face various challenges in the actual implementation. For instance, some managers mentioned, "*Current construction schedule management rarely relies on scientific methods; rushed construction is just how it is and sticking to the scientific schedule is the exception*" (O1). Contractor managers often face pressure from clients' unreasonable timeline demands (O3) and administrative directives (HS2). Three interviewees noted that "*celebratory projects*" frequently come with tight deadlines. These factors make it difficult for contractor managers to prioritize safety in ethical conflicts, ultimately leading to the neglect of scientific practices. Another example pertains to unethical competition among contractor managers in the construction industry. Four interviewees believed that improper competitive practices in bidding and procurement processes are widespread, and that winning contracts purely based on merit is nearly impossible (PM3). This environmental factor further incentivizes managers to engage in unethical competitive behaviors. Under the influence of organizational and industry environmental factors, managers are expected to reject—and, when necessary, report—unethical managerial directives according to certain codes of ethics. Regrettably, only three interviewees mentioned this problem (PM1, PM2, O1), indicating that reliance solely on managers' moral courage may be insufficient to resolve such ethical dilemmas. It's also crucial to cultivate an environment that encourages ethical behavior and provides the necessary support when conducting ethical actions becomes difficult (Alpern, 1983). Only with such supportive measures can ethical practices of contractors in construction project management truly flourish.

## 5 Conclusions and discussion

Unethical practices of contractor managers in construction project management can adversely affect project quality, public safety, and the industry's reputation. However, there seems to be no comprehensive framework to systematically categorize and characterize these unethical behaviors, posing challenges to consistent understanding and effective interventions. To bridge this knowledge gap, this paper develops a comprehensive theoretical framework encompassing three levels, five dimensions, and 18 ethical themes, based on in-depth interviews with 20 experienced construction project managers and qualitative content analysis. The causal analysis of the identified unethical behaviors was conducted from two perspectives: the interrelationships between various unethical behavior, and the moral competency perspective based on Rest's Four-Component Model. The following findings can be drawn.

(1) Unethical behaviors of contractor managers can be categorized into five dimensions: professional, organizational, engineering, social, and environmental dimensions. Based on frequency analysis, the three most prevalent forms of unethical behaviors across all dimensions are "construction disturbance," "qualification rental," and "deception in settlement."

(2) From the causal inference analysis based on the data of contractor managers, unethical behaviors are affected by the power structures embedded within the construction supply chain, while reducing unethical behaviors requires fostering ethical accountability across all levels and parties in construction projects. "Fairness and justice" and "respect for science" emerge as the two most critical ethical themes, with their failings potentially triggering or exacerbating many other unethical practices.

(3) Unethical behaviors of contractor managers can also be attributed to the lack of moral competencies. These include lack of ethical sensitivity (e.g., toward intellectual property protection), incorrect or sub-standard ethical judgments (e.g., in cases of power abuse during construction team appointment, regarding occupational safety and health), failure to form ethical motivation (e.g., toward conflicts between safety and quality versus schedule and cost objectives), and lack of courage in ethical implementation (e.g., unscientific scheduling directives from superiors). This also underscores the industry's inadequacy in providing a supportive ethical environment for contractor managers.

### 5.1 Theoretical implications

This paper yields three contributions to the existing body of knowledge.

First, this work contributes to the current literature by establishing a theoretical taxonomy framework for categorizing and characterizing unethical behaviors of contractor managers. To the best of the authors' knowledge, this is the first instance of such an endeavor in the realm of construction industry. This framework proposes a structured vocabulary for describing unethical behaviors of contractor managers, which enhances clarity in relevant ethical discussions. It offers a unified understanding that can be consistently applied across different cultural contexts. That is because the framework's comprehensive coverage of five dimensions and 18 ethical themes delineates the spectrum of ethical responsibilities expected of contractor managers and aligns with universally acknowledged ethical values and norms within the construction industry. We believe cross-cultural differences mainly influence the prevalence and prominence of specific unethical behaviors, while the framework's dimensions

and themes remain universally applicable. The framework also offers a foundation for developing measurable constructs that can be used in future empirical research to assess, predict, and address unethical practices.

Second, this study extends the understanding of the inherent causal interconnections between different unethical behaviors in construction project management. Individual unethical behaviors have been studied separately in various studies with few discussing how they interact and cascade through the supply chain (Coffie et al., 2023, Kuoribo et al., 2023). The findings provide insights into how power dynamics and responsibility assumptions influence contractor managers' unethical behaviors. This inspires a new theoretical perspective for ethical management research by framing ethical management as a systemic issue within projects rather than isolated aspects. The proposed propositions on causal inferences also lay the foundation for future empirical research on the mechanisms and consequences of specific unethical behaviors.

Third, the study contributes a novel and plausible explanation for the causes of unethical behaviors among contractor managers by integrating them with failures in the ethical decision-making process. Across the existing literature on factors inducing unethical behaviors in the construction industry, the role of moral competencies remains underexamined (Liu et al., 2017; Bimbola et al., 2020; Liu et al., 2023). The introduction of Rest's Four-Component Model provides a structured approach to pinpointing the failing link in the generation of unethical behaviors, thereby suggesting a targeted theoretical pathway for ethical management through the improvement of moral competencies.

### 5.2 Practical recommendations

The following practical suggestions are made for enhancing the ethical performance of contractor management in the construction industry.

For contractor managers, the proposed framework can serve as a tool to help identify and evaluate unethical behaviors within project management processes, enabling targeted interventions. It is recommended to incorporate ethics into the performance management systems. This can be achieved by conducting ethical audits to evaluate contractor managers' ethical performance. Second, ethical training programs should be implemented to enhance contractor managers' moral competencies. Different training strategies should be tailored to the specific characteristics of each unethical behavior. For instance, case studies can help managers recognize that many phenomena involve ethical concerns and correct their ethical judgments on commonly accepted practices such as power abuse in appointments.

For industry authorities, first, it is essential to establish ethical guidelines and codes in construction project management to regulate managerial behaviors. The ethical framework developed in this paper provides a basis for developing such guidelines. In addition to focusing on contractor managers, these guidelines should also address power structures in the construction supply chain to encourage ethical accountability among all stakeholders. Second, industry authorities should provide institutionalized support for contractor managers when they encounter ethical dilemmas, such as establishing helplines for guidance and avenues for anonymous reporting.

### 5.3 Limitations and future work

This study has some limitations. First, while in-depth interviews provide rich insights, the study's reliance on qualitative data limits its ability to quantify the prevalence or severity of specific unethical behaviors. Future studies might employ quantitative surveys to provide a more comprehensive understanding of unethical behaviors of contractor managers. Second, the preliminary causal inferences between unethical behaviors are based merely on the frequency of mentions by the interviewees and shouldn't be seen as definitive causal relationships. Future research could further investigate and verify these propositions.

**Acknowledgments** We acknowledge Liying Wang and Sihan Cao for their assistance in data analysis. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all individual participants included in the study.

**Competing Interests** The authors declare that they have no competing interests.

## References

Abdul-Rahman H, Hanid M, Yap X W (2014). Does professional ethics affect quality of construction—A case in a developing economy? Total Quality Management & Business Excellence, 25(3–4): 235–248

Abdul-Rahman H, Wang C, Saimon M A (2011). Clients' perspectives of professional ethics for civil engineers. Journal of the South African Institution of Civil Engineering, 53(2): 2–6

Adnan H, Hashim N, Mohd N, Ahmad N (2012). Ethical issues in the construction industry: Contractor's perspective. Procedia: Social and Behavioral Sciences, 35: 719–727

Aigbavboa C, Oke A, Tyali S (2016). Unethical practices in the South African construction industry. In: 5th Construction Management Conference, 15–22

Alpern K D (1983). Moral responsibility for engineers. Business & Professional Ethics Journal, 2(2): 39–48

Alshenqeeti H (2014). Interviewing as a data collection method: A critical review. English Linguistics Research, 3(1): 39–45

Amoah C, Steyn D (2023). Barriers to unethical and corrupt practices

avoidance in the construction industry. International Journal of Building Pathology and Adaptation, 41(6): 85–101

Avotra A A R N, Chenyun Y, Yongmin W, Lijuan Z, Nawaz A (2021). Conceptualizing the state of the art of corporate social responsibility (CSR) in green construction and its nexus to sustainable development. Frontiers in Environmental Science, 9: 774822

Badshah D, Haas C T (2018). Age related ethical lapses in construction engineering site management decisions. In: Construction Research Congress 2018, 409–417

Bebeau M J, Thoma S J (1999). "Intermediate" concepts and the connection to moral education. Educational Psychology Review, 11(4): 343–360

Bebeau M J, Thoma S J, Cunningham C D (2016). Educational programs for professional identity formation: The role of social science research. Mercer Law Review, 68: 591–631

Bimbola A E, Babalola A A, Lahanmi A, Oke A, Iyabo B F (2020). Evaluating the factors contributing to unethical practices by quantity surveyors in Nigerian construction industry. In: Proceedings of the 2nd African International Conference on Industrial Engineering and Operations Management. Harare: 3418–3428.

Bodenheimer E (1999). Jurisprudence: The Philosophy and Method of the Law. Translated by Deng Z L. Beijing: China University of Political Science and Law Press (in Chinese).

Bowen P, Pearl R, Akintoye A (2007). Professional ethics in the South African construction industry. Building Research and Information, 35(2): 189–205

Coffie G H, Novieto D T, Yankah J E (2023). Stakeholder views of prevalent unethical practices in the Ghanaian construction industry. Engineering, Construction, and Architectural Management, Vol. ahead-of-print No. ahead-of-print

Cottafava D, Corazza L, Shams Esfandabadi Z, Torchia D (2024). Megaprojects from the lens of business and management studies: A systematic literature review. Journal of Public Affairs, 24(3): e2937

Creswell J W (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th ed. SAGE Publications

Davis M (2003). What can we learn by looking for the first code of professional ethics? Theoretical Medicine and Bioethics, 24(5): 433–454

DeCuir-Gunby J T, Marshall P L, McCulloch A W (2011). Developing and using a codebook for the analysis of interview data: An example from a professional development research project. Field Methods, 23(2): 136–155

Derakhshan R, Turner R, Mancini M (2019). Project governance and stakeholders: A literature review. International Journal of Project Management, 37(1): 98–116

Dillon R S (1992). Respect and care: Toward moral integration. Canadian Journal of Philosophy, 22(1): 105–131

Doran D (2004). FMI/CMAA survey of construction industry ethical practices. FMI Consulting and Construction Management Association of America, Denver, United States

Fan L C, Fox P W (2009). Exploring factors for ethical decision making: Views from construction professionals. Journal of Professional Issues in Engineering Education and Practice, 135(2): 60–69

Fang D, Li W, Zhang H, Liu H (2020). Ethical reflection on the emergency engineering management of COVID-19 epidemic prevention and control. Engineering, 6(10): 1070–1072

Fang D P, Li W Q, Zhang H L, Liu H (2022). Engineering management ethics in the context of engineering practice in China. Strategic Study of Chinese Academy of Engineering, 24(5): 187–196 (in Chinese)

Fatima T, Elbanna S (2023). Corporate social responsibility (CSR) implementation: A review and a research agenda towards an integrative framework. Journal of Business Ethics, 183(1): 105–121

Fereday J, Muir-Cochrane E (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. International Journal of Qualitative Methods, 5(1): 80–92

Fotiadis S, Evangelinos K I, Konstantakopoulou F, Nikolaou I E (2023). Assessing CSR reports of top UK construction companies: The case of occupational health and safety disclosures. Sustainability, 15(8): 6952

Foy R, Ovretveit J, Shekelle P G, Pronovost P J, Taylor S L, Dy S, Hempel S, McDonald K M, Rubenstein L V, Wachter R M (2011). The role of theory in research to develop and evaluate the implementation of patient safety practices. BMJ Quality & Safety, 20(5): 453–459

Francis J J, Johnston M, Robertson C, Glidewell L, Entwistle V, Eccles M P, Grimshaw J M (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. Psychology & Health, 25(10): 1229–1245

Franklin A L (2020). Identifying stakeholders. In: Franklin A L, eds. Stakeholder Engagement. Cham: Springer Nature Switzerland AG, 19–42

Freeman R E (2023). Stakeholder management: Framework and philosophy. In: Dmytriyev S D, Freeman R E, eds. R. Edward Freeman's Selected Works on Stakeholder Theory and Business Ethics, Vol 53. Cham: Springer Nature Switzerland AG, 61–88

Freeman R E, Dmytriyev S (2017). Corporate social responsibility and stakeholder theory: Learning from each other. Symphonya, (1): 7–15

Gicheru E R (2018). Unethical issues and socio-cultural factors affecting construction industry in Kenya. International Journal of Science & Technoledge, 6(7): 1–6

Githui D M (2012). Ethical issues in the construction industry in Kenya: A critical analysis of the professional conduct in engineering technology management. Industrial Engineering Letters, 2(7): 1–11

Godwin W (1842). Enquiry Concerning Political Justice and its Influence on Morals and Happiness (Book II), 4th ed. London: J. Watson

Gordon K, Miyake M (2001). Business approaches to combating bribery: A study of codes of conduct. Journal of Business Ethics, 34(3/4): 161–173

Guest G, Bunce A, Johnson L (2006). How many interviews are enough? An experiment with data saturation and variability. Field Methods, 18(1): 59–82

Halder A, Batra S (2024). Navigating the ethical discourse in construction: A state-of-the-art review of relevant literature. Journal of Construction Engineering and Management, 150(3): 03124001

Hammarberg K, Kirkman M, De Lacey S (2016). Qualitative research methods: When to use them and how to judge them. Human Reproduction, 31(3): 498–501

Hancock B, Ockleford E, Windridge K (2009). An introduction to qualitative research. The NIHR RDS EM / YH

He Q, Wang Z, Wang G, Xie J, Chen Z (2022). The dark side of environmental sustainability in projects: Unraveling greenwashing behaviors. Project Management Journal, 53(4): 349–366

Hennink M, Kaiser B N (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. Social Science & Medicine, 292: 114523

Herkert J, Borenstein J, Miller K (2020). The Boeing 737 MAX: Lessons for engineering ethics. Science and Engineering Ethics, 26(6): 2957–2974

Ho C M F, Oladinrin O T (2019). A paradigm shift in the implementation of ethics codes in construction organizations in Hong Kong: Towards an ethical behaviour. Science and Engineering Ethics, 25(2): 559–581

Hruschka D J, Schwartz D, St.John D C, Picone-Decaro E, Jenkins R A, Carey J W (2004). Reliability in coding open-ended data: Lessons learned from HIV behavioral research. Field Methods, 16(3): 307–331

Hsieh H F, Shannon S E (2005). Three approaches to qualitative content analysis. Qualitative Health Research, 15(9): 1277–1288

Inuwa I I, Napoleon Daniel Usman N D, Dantong J S (2015). The effects of unethical professional practice on construction projects performance in Nigeria. African Journal of Applied Research, 1(1): 72–88

Jackson B J (2000). The perceptions of experienced construction practitioners regarding ethical transgressions in the construction industry. Dissertation for the Doctoral Degree. Colorado: Colorado State University

Johri A, Hingle A (2022). Learning to link micro, meso, and macro ethical concerns through role-play discussions. In: 2022 IEEE Frontiers in Education Conference (FIE), 1–8

Jones T M (1991). Ethical decision making by individuals in organizations: An issue-contingent model. Academy of Management Review, 16(2): 366–395

Kang B G, Long K, Zhang C, Hao J L (2017). Comparative study on the ethical perceptions of contractors and designers in the China construction industry. In: IOP Conference Series Materials Science and Engineering, 291(1): 012024

Kaptein M (2008). Developing a measure of unethical behavior in the workplace: A stakeholder perspective. Journal of Management, 34(5): 978–1008

Kortetmäki T, Heikkinen A, Jokinen A (2023). Particularizing nonhuman nature in stakeholder theory: The recognition approach. Journal of Business Ethics, 185(1): 17–31

Kuoribo E, Owusu-Manu D G, Yomoah R, Debrah C, Acheampong A, Edwards D J (2023). Ethical and unethical behaviour of built environment professionals in the Ghanaian construction industry. Journal of Engineering Design and Technology, 21(3): 840–861

Ladd J (1982). Collective and individual moral responsibility in engineering: Some questions. IEEE Technology and Society Magazine, 1(2): 3–10

Lantos G P (2001). The boundaries of strategic corporate social responsibility. Journal of Consumer Marketing, 18(7): 595–632

Lee C C T, Cullen D (2018). An empirical comparison of ethical perceptions among the consultant's quantity surveyor and contractor's quantity surveyor in the UK construction industry. In: Proceedings of the Construction, Building and Real Estate Research Conference

Li B C (2010). On micro, meso, and macro issues in engineering ethics. Studies in Ethics, (4): 25–30, 141 (in Chinese)

Li B C (2012). From a micro–macro framework to a micro–meso–macro framework. In: Christensen S H, Mitcham C, Li B, An Y, eds. Engineering, Development and Philosophy, Vol 11. Dordrecht: Springer Science+Business Media, 23–36.

Liu H (2002). Re-examining the relationship between law and ethics. Political Science and Law, (3): 2–6 (in Chinese)

Liu J, Wang Y, Wang Z (2023). Multidimensional drivers: Exploring contractor rule violations in the construction industry. Engineering, Construction, and Architectural Management, 30(4): 1496–1518

Liu J, Zhao X, Li Y (2017). Exploring the factors inducing contractors' unethical behavior: Case of China. Journal of Professional Issues in Engineering Education and Practice, 143(3): 04016023

Lukhele T M, Botha B, Mbanga S (2023). Exploring the nexus between professional ethics and occupational health and safety in construction projects: A case study approach. International Journal of Construction Management, 23(12): 2048–2057

Luo Y (2008). The changing Chinese culture and business behavior: The perspective of intertwinement between guanxi and corruption. International Business Review, 17(2): 188–193

Ma H, Sun D, Zeng S, Lin H, Shi J J (2021). The effects of megaproject social responsibility on participating organizations. Project Management Journal, 52(5): 418–433

Maslen S, Hayes J, Holdsworth S, Sandri O (2021). When ethics is a technical matter: Engineers' strategic appeal to ethical considerations in advocating for system integrity. Science and Engineering Ethics, 27(4): 46

Maslen S, Hayes J, Wong J, Scott-Young C (2020). Witch hunts and scapegoats: An investigation into the impact of personal liability concerns on engineers' reporting of risks. Environment Systems & Decisions, 40(3): 413–426

McCarthy S F (2012). Developing an Australian code of construction ethics. Australasian Journal of Construction Economics and Building, 12(2): 87–100

Miller D (2022). "Justice". In: Zalta E N, Nodelman U, eds. The Stanford encyclopedia of philosophy (Fall 2022 Edition). Available at the website of stanford

Mukumbwa B, Muya M (2013). Ethics in the construction industry in Zambia. International Journal of Construction Management, 13(2): 43–65

Namey E, Guest G, Thairu L, Johnson L (2008). Data reduction techniques for large qualitative data sets. In: Guest G, MacQueen K M, eds. Handbook for Team-based Qualitative Research. AltaMira Press, 137–161

Nurhayati K, Rezaei J, Tavasszy L (2021). The interplay between power structure and decision-making in supply chains: A systematic review. Journal of Supply Chain Management Science, 2(3-4): 85–114

Oladinrin O T, Ho C M F (2015). Integrating codes of ethics in Hong Kong construction organizations—Practitioners' perspective. Asian Journal of Business Ethics, 4(1): 15–33

Paul C A, Aghimien D O, Ibrahim A D, Ibrahim Y M (2021). Measures for curbing unethical practices among construction industry professionals: Quantity surveyors' perspective. Construction

Economics and Building, 21(2): 1–17

Rawls J (1971). A Theory of Justice. Cambridge: Belknap Press of Harvard University Press

Rodriguez-Nikl T, Schaff K P (2023). Practical ethical frameworks for civil engineering and environmental systems. Civil Engineering and Environmental Systems, 40(3): 176–194

Saldaña J (2013). The Coding Manual for Qualitative Researchers, 2nd ed. Sage Publications

Shah R K, Alotaibi M (2018). A study of unethical practices in the construction industry and potential preventive measures. Journal of Advanced College of Engineering and Management, 3: 55–77

Treviño L K, Den Nieuwenboer N A, Kish-Gephart J J (2014). (Un)Ethical behavior in organizations. Annual Review of Psychology, 65(1): 635–660

Treviño L K, Weaver G R, Reynolds S J (2006). Behavioral ethics in organizations: A review. Journal of Management, 32(6): 951–990

Van de Poel I, Royakkers L (2011). Ethics, Technology, and Engineering: An Introduction. Oxford: WileyBlackwell

Vee C, Skitmore M (2003). Professional ethics in the construction industry. Engineering, Construction, and Architectural Management, 10(2): 117–127

World Health Organization (2016). Guidance for managing ethical issues in infectious disease outbreaks. Geneva: World Health Organization

Yin R Y (2012). Engineering evolution vs industrial framework optimization. Zhongguo Gongcheng Kexue, 14(03): 8–14 (in Chinese)

Zhang B, Le Y, Xia B, Skitmore M (2017). Causes of business-to-government corruption in the tendering process in China. Journal of Management Engineering, 33(2): 05016022

Zhang Q, Oo B L, Lim B T H (2023). Key practices and impact factors of corporate social responsibility implementation: Evidence from construction firms. Engineering, Construction, and Architectural Management, 30(5): 2124–2154

Zulu S, Muleya F (2019). A student perspective of ethics in the Zambian construction industry. Journal of Engineering Design and Technology, 17(2): 266–282