Implications of competitive tendering on consulting engineering services in South Africa: a thematic analysis

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Abstract

Purpose – Competitive tendering in South Africa is often associated with procurement based on the lowest fee tendered. Previous research on this topic did not provide in-depth examinations of how pricing within consulting engineering companies was affected by competitive tendering nor did it illuminate the extent to which professional services were impacted by competitive tendering. This paper aims to examine the implications of competitive tendering on pricing and delivery of consulting engineering services in South Africa.

Design/methodology/approach – A survey research strategy with a questionnaire as the research instrument elicited qualitative data from 28 experienced consulting engineers in South Africa. Thematic analysis was used to analyse qualitative data from the questionnaires.

Findings – Three key themes were identified, namely: considerations when determining consulting engineering fees on competitively tendered projects; the impact of reduced fees due to competitive tendering on the delivery of consulting engineering services; and interventions to prevent unsustainably "low" professional fees. Many consulting engineers in South Africa still determine fees using fee scales, while other considerations include resources, project complexity, risk, etc. Most participants asserted that design optimisation/value engineering, training, meetings and construction monitoring were adversely impacted by "low" fees.

Originality/value – This paper provides in-depth qualitative feedback from experienced consulting engineers (most having more than 20 years' experience) on a topical issue in the South African construction industry. Thematic analysis was a novel method of analysis that was not used previously in this area of study.

Keywords Competitive tendering, Consulting engineering, Fees

Paper type Research paper

Introduction

Competitive tendering is used in different industries and geographical regions to procure goods and services. The main objective of competitive tendering is to ensure clients obtain value for money (Kavanagh, 2016). Internationally, most large infrastructure projects involving consulting engineering services undergo some form of competition during procurement stages (Laryea *et al.*, 2021).

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Procurement of consulting engineers in developed countries generally includes a quality score for tenderers as part of the final tender evaluation. In the US, procurement of consulting engineers follows a Quality Based Selection (QBS) whereby the most technically competent consultant is identified thereafter; a fee is negotiated based on the scope of service. This is a standardised procurement practice that is documented in the International Organisation for Standardisation (ISO) 10845 and *FIDIC Guidelines for the Selection of Consultants*. Critically, competence plays a major role in selecting a consultant. In the South African context, competitive tendering is generally used to procure consulting engineering services on public sector infrastructure projects (CESA, 2021). During the competitive tendering process, quality is evaluated upfront thereafter, quality points are discarded in the subsequent evaluation stage. A big emphasis is placed on price/fees which contribute between 80% and 90% of tender evaluation points with the lowest fee achieving the highest points. This requires consulting engineers to reduce their fees to improve the likelihood of being appointed on projects.

Reduced fee levels as a result of competitive tendering were observed in the South African consulting engineering industry post 2000 (CESA, 2021). Industry groups and professionals asserted that fees were being "discounted" to unsustainably low levels which adversely impacted quality of professional services (Liebenberg and Wilson, 2011; Okonkwo and Wium, 2018; CESA, 2021). Several studies in the construction literature assessed (to varying degrees) the link between "low" fees and quality professional services. Some studies mentioned that the level of fee was a key factor responsible for quality of documents and designs (Andi and Minato, 2003; Gransberg *et al.*, 2007; Ali and Au-Yong, 2021; Quapp and Holschemacher, 2021) while other studies rejected this notion (Hoxley, 2000; Lam, 2012; Laryea *et al.*, 2021). The ongoing debate around fees suggests it is an important variable in the provision of quality consulting engineering services. However, the literature is silent about how consulting engineers build up their fees on competitively tendered projects. Furthermore, the literature implies that unsustainably low fees may have implications on the delivery of consulting engineering services. However, these implications were not extensively investigated.

This paper investigates how competitive tendering influences pricing and delivery of consulting engineering services in South Africa. The objectives were firstly, to examine how consulting engineers' price their services on competitively tendered projects. Secondly, to explore the impact of competitive tendering on consulting engineering services. Finally, to identify interventions to prevent unsustainably "low" fees in the consulting engineering industry. A questionnaire was used to address the research objectives by eliciting feedback from 28 experienced consulting engineering professionals. A thematic analysis of the feedback is reported in this paper.

Background literature

Procurement of consulting engineering services

Internationally, procurement of consulting engineering services on most public sector projects is conducted using a competitive process. The *ISO 10845 – Part 1*, outlines processes, methods and procedures for construction procurement. The document proposes four methods for evaluating tenders using different combinations of financial, quality and preferences as criteria for evaluation. According to ISO 10845, balancing financials and quality as part of the tender evaluation process depends on the nature and complexity of the work being executed. In other words, where work is relatively straight forward, financials have a high weighting and quality a substantially lower weighting. On the other hand,

where work is complex and difficult, quality is weighted higher than financials to ensure that the appointed tenderer has the capability to undertake the work.

Method 2 in ISO 10845 is widely used in European countries whereby the most economically advantageous tender is selected. Importantly, quality still forms part of the final evaluation. A slightly different approach called QBS is used by the US federal government to evaluate tenders for consulting engineering services. QBS has been used in the USA since promulgation of the Brooks Act in 1972. The Brooks Act mandated the federal government in the USA to procure consultants using QBS (sometimes referred to as qualifications-based selection) which entails evaluating tenderers solely on their technical competence and experience. Financial proposals are not considered as part of the evaluation process. However, a negotiation is held after the most technically competent bidder is identified, to agree upon a fair and equitable fee based on the scope of service of the appointment. Interestingly, the *FIDIC Guidelines for the Selection of Consultants* present QBS as the first method for procuring consulting engineering services.

Procurement of consulting engineering services in South Africa requires a competitive tendering process for most public sector infrastructure projects. The constitution of South Africa states that all procurement shall be fair, equitable, transparent, competitive and cost-effective (NT, 1999). Procurement of consulting engineering services in South Africa generally follows a two-stage evaluation process. Firstly, tenderers are screened against a set of objective quality criteria developed by the client procuring the service. The client sets a minimum threshold or score for tenderers to achieve. Tenderers that do not achieve the minimum score for quality are immediately eliminated. The remaining tenderers then advance to the second stage where they are evaluated based on price and preference (as per ISO 10845 – Method 3). Scores for quality are not considered any further and do not form part of the second evaluation stage. This is contrary to international best practice where quality usually forms part of the final tender evaluation score. During the second stage of the tender evaluation, price and preference are evaluated. The points received for price and preference ultimately determine which tenderer will be awarded the project. Price constitutes 80%–90% of the tenderer's score depending on the value of the project (NT, 2017). The heavy weighting of price highlights the importance of submitting a financially competitive tender.

Historically in the South African consulting engineering industry, professional fees were determined using fee tariffs that were gazetted by the Engineering Council of South Africa (ECSA), i.e. a fixed scale of fees or prescribed rates. The gazetted document entitled *Engineering Council of South Africa: Guideline for Services and Processes for Estimating Fees for Persons registered in terms of the Act*, was not only limited to fee determination but also outlined typical services and deliverables required during different project stages. This offered guidance to clients executing engineering projects. Professional fees provided by the ECSA was linked to a percentage of capital cost of works.

Public sector clients in South Africa under the apartheid government established panels of consultants who had the necessary experience and expertise to provide services. Appointments were based on a fixed fee tariff. This resulted in strong relationships which in many instances endured for long periods. Furthermore, a number of these panels rarely incorporated new panellists and only admitted large companies. Prior to the demise of the apartheid system in 1994, such panels excluded "black" owned companies. The World Bank's *Country Procurement Assessment Report on South Africa* found that "consultants are not selected and appointed in a systematic competitive manner". Supply chain management regulations were issued in 2005 to govern the tendering process and address concerns in the World Bank report.

Since the introduction of competitive tendering, many consultants reverted to "discounting" fees in gazetted fee scales, to improve their competitiveness (Liebenberg and Wilson, 2011; CESA, 2021). In 2016, the Competition Commission of South Africa (CCSA) ruled that publication of fee scales restricted competition and resulted in indirect price fixing (CCSA, 2016). Consultants were then forced to develop mechanisms to price their services from first principles or alternatively, use outdated fee scales to assist with pricing. In response to the provisions in the Competition Act, the ECSA currently presents a range in which a typical fee should fall. Since the competition commission ruling, there has been heightened interest about the level of fees in the South African consulting engineering industry.

The relationship between professional fees and quality of services

The relationship between fees and quality of professional services has been debated since the late 1980s (Parks and McBride, 1987; DeFraites, 1989). Over the years, the debate has continued with some studies supporting the notion that low fees adversely impact quality on projects (Andi and Minato, 2003; Gransberg *et al.*, 2007; Slater and Radford, 2012; Dosumu and Iyagba, 2013; Akampurira and Windapo, 2018; Assaf *et al.*, 2018; Okonkwo and Wium, 2018; Ali and Au-Yong, 2021) while other studies rejected this notion (Hoxley, 2000; Lam, 2012; Laryea *et al.*, 2021). Critically, the relationship between fees and quality of professional services was not directly investigated. Instead, studies either identified fees as a part of a range of factors influencing quality on projects or used proxy indicators to comment on the relationship between fees and quality. Some of the previous studies provided examples where services were curtailed due to reduced fees (refer to Table 1).

Gaps in the literature

Cursory insights around the relationship between fees and quality of professional services have been provided in previous studies, however, the construction literature failed to deeply explore the issue of competitive tendering for consulting engineering services. More specifically, studies have not investigated how competitive tendering influences pricing and delivery of consulting engineering services in South Africa.

Methodology

Consulting engineers are directly involved in pricing and delivering services on competitively tendered projects. Therefore, the most appropriate technique to achieve the research objectives involved directly engaging with consulting engineers to understand their experiences. Since experiences are dependent on social settings, an interpretivist philosophy was adopted to explore and generate rich understandings of the data (Saunders *et al.*, 2019).

This study used a single stage research design which included a survey research strategy (as defined by Saunders *et al.*, 2019) and a questionnaire as the research instrument. Saunders *et al.* (2019) posited that a survey research strategy assists to answer a range of questions. Cohen *et al.* (2007) described a survey as a tool to gather data at a specific point in time to develop an understanding of existing conditions. Surveys are generally used when researchers want to gather a quick understanding of a particular subject in a timely and cost-effective manner (Cohen *et al.*, 2007).

Although surveys in the traditional sense are used to elicit quantitative data (see Saunders *et al.*, 2019), the survey research strategy in this study elicited qualitative data from participants. Elliott *et al.* (1999) opined that in qualitative research, perspectives of those being studied inform the researcher's understanding of the topic. In this study, it was

Aspects of professional services impacted by low/reduced fees	References	Total
Not mentioned in the study	Bubshait *et al.* (1998), Forbes (2002), Andi and Minato (2003), Mbachu and Nkado (2007), Horns and Jenkins (2011), Dosumu and Iyagba (2013), Marisa and Yusof (2020)	7
Low fees do not influence the quality of professional services	Hoxley (2000), Phua (2005), Love *et al.* (2006), Hoxley (2007), Wimalasiri *et al.* (2010), Awolesi and Ayedun (2012), Lam (2012), Philips-Ryder *et al.* (2013), Laryea *et al.* (2021)	9
Restricts resources used on projects	DeFraites (1989), Love *et al.* (1999), Ling (2004), Gransberg *et al.* (2007), Koutsikouri *et al.* (2008), Lopez *et al.* (2010), Slater and Radford (2012), Shrestha and Mani (2014), Assaf *et al.* (2018), Akampurira and Windapo (2018), Okonkwo and Wium (2018), Quapp and Holschemacher (2021)	12
Time boxing practices	Parks and McBride (1987), Love *et al.* (1999), Love *et al.* (2000), Ling (2004), Koutsikouri *et al.* (2008), Lopez *et al.* (2010), Assaf *et al.* (2018), Akampurira and Windapo (2018), Okonkwo and Wium (2018), Ali and Au-Yong (2021)	10

Source: Authors' own work

Table 1. Aspects of professional services impacted by low/reduced fees

important to obtain rich in-depth qualitative feedback to understand experiences of consulting engineers on competitively tendered projects.

A purposive sampling technique was used. This entailed identifying participants who were professionally registered with vast experience in pricing and delivering services on competitively tendered projects. The inclusion of experienced consulting engineers assisted in minimising the risk of participants without requisite knowledge participating in the study.

Questionnaire design

A Web-based questionnaire was designed to elicit data that responded to the research objectives. Construction literature on the topic was synthesised and used to identify key focus areas that underpinned the questionnaire. A total of 11 open-ended questions were used to get an in-depth understanding of the topic. Section 1 provided background information about participants while Sections 2 and 3 elicited data using open-ended questions. Open-ended questions allow participants to provide rich in-depth data which enables the researcher to gain a deep understanding about the topic under investigation. Table 2 illustrates the structure of the questionnaire.

Pilot questionnaire

A pilot questionnaire was sent to two experienced consulting engineering professionals in November 2021. After completing the questionnaires, a discussion was held with both professionals to gather their feedback on the structure and clarity of the questions. Comments from both participants were used to revise a few questions that were unclear. Questions were drafted in a clear and concise manner to facilitate the collection of reliable data. The final questionnaire was prepared and ready for distribution at the beginning of December 2021.

Distribution of questionnaire

The questionnaire was distributed (via an online platform called Qualtrics) in two rounds, first in December 2021 and second in mid-January 2022. The questionnaire was closed to

Section	Questions	Rationale for questions
1	Experience in consulting engineering Please specify your professional registration details	Elicited experience and professional registration of participants. This is a common approach used in previous research to obtain background information of participants (e.g. Dosumu and Iyagba, 2013; Akampurira and Windapo, 2018; Okonkwo and Wium, 2018)
2	What factors do you consider when calculating professional fees for engineering services? Please briefly explain how you determine professional fees on a project? Does your pricing approach for professional services differ according to client? Please explain What effect does competition have on your professional fee and pricing strategy?	Identified factors and pricing strategies considered when submitting proposals for consulting engineering services (including methods used to determine professional fees). This was an area that needed to be explored further as it was only contemplated by Sturts and Griffis (2005) and Laryea *et al.* (2021)
3	How do you balance giving a competitive professional fee and delivering good quality professional services? What service offerings (if any) are minimised/omitted when working on projects with competitively tendered fees? How does competitively tendered fees affect the training of staff on projects? How does competitively tendered fees affect design optimisation/value engineering on projects? Does a "higher" fee (in relation to current market related fees) guarantee a better quality of service? Please substantiate Do you believe that competitive tendering is detrimental to the engineering profession? Please substantiate What interventions can be implemented to ensure that tendered fees are not unsustainably low?	Examined the impact of reduced fees due to competitive tendering on delivery of consulting engineering services. It also sought to identify possible mitigations to unsustainably low fee levels. The questions in this section followed on from themes in international (e.g. Bubshait *et al.*, 1998; Hoxley, 2000; Gransberg *et al.*, 2007; Horns and Jenkins, 2011; Awolesi and Ayedun, 2012) and South African (e.g. Akampurira and Windapo, 2018; Okonkwo and Wium, 2018) construction literature

Source: Authors' own work

Table 2. Structure of questionnaire

participants once theoretical saturation was achieved (i.e. a lack of new relevant information emerging from participants).

Profile of participants

The survey was distributed to 52 experienced consulting engineering practitioners. Participants were identified from voluntary committees within Consulting Engineers South Africa (CESA) and the researchers' professional network. The approach in this study ensured the distribution of the survey to people who were knowledgeable about the topic as opposed to having a larger sample with potentially uninformed participants. Participants in the study had to satisfy the following inclusion criteria:

- Be actively involved in the consulting engineering industry and operate in mid-level management or higher.
- Professionally registered with the ECSA as either a professional engineer or professional technologist.

- Have a minimum of ten years' experience in the South African consulting engineering industry.

A response rate of 54% was achieved with 28 people responding to the survey. Patton (2002) stated the sample and number of interviews conducted are often related to time and resources available on a research project. While Saunders and Townsend (2016) asserted that the purpose of interviews should inform the sample size. A final sample of 28 participants was deemed appropriate. Boddy (2016) stated that sample sizes as small as one may be appropriate in qualitative research if appropriate justification is provided. A smaller sample size is permissible in qualitative studies because these studies focus on depth instead of breadth of inquiry (Boddy, 2016). The following three factors have been used to justify the sample size:

- A homogeneous sample of experienced engineering professionals with deep insight about pricing and delivering consulting engineering services on competitively tendered projects participated in the study. The sample of participants were best placed to provide credible feedback on the topic being investigated.
- The research philosophy was not oriented towards positivism which necessitates a bigger sample size. Instead, an interpretivist philosophy focusing on perceptions of engineering professionals was used.
- Responses from participants were sought until theoretical saturation was achieved.

All participants had more than 10 years' experience in consulting engineering with nearly 80% of participants having more than 20 years' experience. Table 3 provides a summary of participants in the study.

Data and analysis

Qualitative data obtained from the survey was analysed using thematic analysis. Boyatzis (1998) described thematic analysis as a comprehensive approach of coding qualitative data. A paper by Braun and Clarke (2006) that is widely cited by researchers conducting thematic analysis, defined thematic analysis as "a method for identifying, analysing and reporting patterns (themes) within data". Braun and Clarke (2006) posited that thematic analysis is a useful and flexible technique that can be used to analyse qualitative data.

Braun and Clarke (2006) supplied detailed guidelines about conducting thematic analysis. The analysis of data in this study followed on from guidance by Braun and Clarke (2006). An inductive approach was adopted whereby themes were linked to the data (Patton, 2002). The thematic analysis process followed in this study is illustrated in Figure 1.

NVivo (Release 1.6.1) software was used to analyse and code qualitative responses from the survey. Coding was undertaken by examining participants' written responses of each interview question and tagging those with similarities using a code. In NVivo, coded data are referred to as nodes (or themes). Three key themes were identified during the coding process, namely:

(1) *Theme 1:* Considerations when determining consulting engineering fees on competitively tendered projects.

(2) *Theme 2:* Impact of reduced fees due to competitive tendering, on delivery of consulting engineering services.

(3) *Theme 3:* Interventions to prevent unsustainably "low" professional fees.

Participant	Years of experience	Professional registration
P01	11–20 Years	Pr Eng/Pr Tech Eng, Pr CPM
P02	More than 20 Years	Pr Eng/Pr Tech Eng
P03	11–20 Years	Pr Eng/Pr Tech Eng
P04	More than 20 Years	Pr Eng/Pr Tech Eng
P05	More than 20 Years	Pr Eng/Pr Tech Eng
P06	11–20 Years	Pr Eng/Pr Tech Eng
P07	More than 20 Years	Pr Eng/Pr Tech Eng
P08	More than 20 Years	Pr Eng/Pr Tech Eng, Pr CPM
P09	More than 20 Years	Pr Eng/Pr Tech Eng, Pr CPM
P10	More than 20 Years	Pr Eng/Pr Tech Eng
P11	More than 20 Years	Pr Eng/Pr Tech Eng
P12	More than 20 Years	Pr Eng/Pr Tech Eng
P13	More than 20 Years	Pr Eng/Pr Tech Eng
P14	More than 20 Years	Pr Eng/Pr Tech Eng
P15	More than 20 Years	Pr Eng/Pr Tech Eng
P16	More than 20 Years	Pr Eng/Pr Tech Eng
P17	More than 20 Years	Pr Eng/Pr Tech Eng
P18	More than 20 Years	Pr Eng/Pr Tech Eng
P19	More than 20 Years	Pr Eng/Pr Tech Eng
P20	More than 20 Years	Pr Eng/Pr Tech Eng, Pr CPM
P21	More than 20 Years	Pr Eng/Pr Tech Eng
P22	More than 20 Years	Pr Eng/Pr Tech Eng
P23	More than 20 Years	Pr Eng/Pr Tech Eng
P24	More than 20 Years	Pr Eng/Pr Tech Eng
P25	11–20 Years	Pr Eng/Pr Tech Eng
P26	More than 20 Years	Pr Eng/Pr Tech Eng
P27	11–20 Years	Pr Eng/Pr Tech Eng
P28	11–20 Years	Pr Eng/Pr Tech Eng

Table 3.
Summary of participants in the study

Note: Pr denotes professional status; Eng = engineer; Tech Eng = technologist; CPM = construction project manager
Source: Authors' own work

The key themes are discussed further in this paper and have been supported with verbatim data extracts from participants.

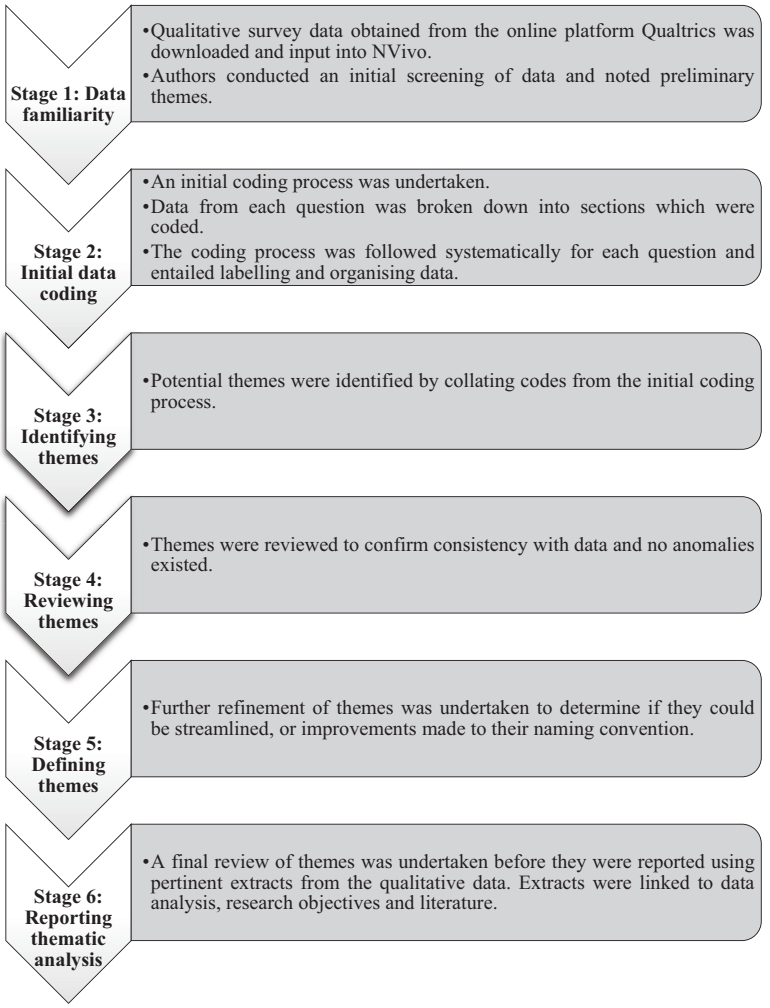
Findings

Themes discussed in this section are supported with extracts from participant responses. Similarly, verbatim extracts from participants' feedback were used to support sub-themes illustrated in Tables 4–6. A total of 686 pieces of coded text were generated from qualitative survey data.

Theme 1: Considerations when determining consulting engineering fees on competitively tendered projects

The first theme was considerations when determining consulting engineering fees on competitively tendered projects. A total of eight sub-themes were identified, namely:

(1) ECSA fee scale or time-based calculation;
(2) Resources;
(3) Complexity;



Source: Adapted from Braun and Clark (2006)

Figure 1.
Six stage thematic analysis process

(4) Duration of project;
(5) Construction value;
(6) Scope of services;
(7) Risk; and
(8) Client.

Table 4 provides a selection of verbatim responses that illustrate corresponding sub-themes.

Table 4.
Sub-themes and selected verbatim survey data extracts for theme 1: "considerations when determining consulting engineering fees on competitively tendered projects" (total pieces of coded text relating to this theme = 282)

Sub-theme	Verbatim data extract	Participant
ECSA fee scale or time-based calculation	"Undertake calculation of actual time and resources to be used and compare with gazetted rate. Then offer a discount from gazetted rate"	P05
	"For large projects the ECSA guidelines. For smaller projects or if the scope is undefined then I make use of time and cost estimates"	P28
	"Gazetted fee"	P02, P06, P08, P12
	"ECSA guideline"	P03, P07, P13, P19, P25, P27, P28
Resources	"Available resources"	P04
	"Resources required to complete the project"	P08
	"Resources"	P01, P03, P04, P07, P08, P09, P12, P16, P28
Duration of project	"Time"	P01, P02, P03, P05, P09, P12, P13, P14, P15, P16, P18, P20, P24
Complexity	"Complexity of the assignment"	P08
	"Complexity"	P01, P06, P07, P08, P09, P12, P13, P14, P17, P21, P24
Scope of services	"Consider the scope (and its completeness)"	P18
	"Scope"	P02, P03, P05, P14, P16, P17, P18, P23, P25, P27, P28
Risk	"Level of risk"	P14
	"Risk"	P12, P13, P14, P16, P20, P21, P23
Client	"Client"	P01
	"For certain clients where there may be a large number of tenderers, we may factor in a larger discount, than with others"	P06
	"Will price slightly higher for an 'uninformed client' or a client that lacks technical skills and knowledge"	P10
	"Established Client who pay within 30 days would get preferable fee proposals"	P21
	"Some clients require additional support and this needs to be considered in the pricing"	P28
Construction value	"Construction cost"	P04, P06

Source: Authors' own work

Engineering Council of South Africa fee scale or time-based calculation

When determining professional fees on competitively tendered projects, use of the ECSA fee guideline and/or a calculation based on resources, hourly rates and a work breakdown structure were the two common methods raised by participants. Several participants mentioned "discounting" fees (relative to the fees gazetted by the ECSA) to ensure their bids were competitive. Many participants lamented competitive tendering which forced them to reduce rates and time spent on projects, while still delivering a high-quality product for clients. A few participants stated that regardless of the fee level, they ensured quality services were delivered. On the other hand, other participants expressed a firm view about a certain "minimum" calculated fee that enabled the delivery of quality services. Those participants did not price lower than the "minimum" fee when submitting competitive bids.

Resources

Several factors were considered by participants when determining an appropriate professional fee. The most common factor was resources. The number of resources and experience of those resources are critical factors when determining professional fees. Participants mentioned resourcing projects with a blend of young and experienced engineers as a balancing exercise. Typically, experienced engineers have higher rates opposed to junior engineers, therefore, using them on projects will increase the tendered fee. Since junior engineers have lower rates, their time can be spent on projects without significantly inflating fees.

Duration of project

The use of resources on a project directly corresponds with another key factor mentioned by several participants, namely, duration of the project. Several participants mentioned the duration of a project was critical to determine fees. Longer project durations requiring input from project resources, results in a higher fee. The increase in fee is more pronounced if senior resources are used.

Complexity

Complexity of projects was another factor cited by several participants. Complexity of a project determines the amount and level of resources required on a project. One of the participants stated that complex projects required a higher level of input.

Scope of services

A few participants highlighted the importance of having a good understanding of the scope before pricing. Without understanding the scope, it is difficult to provide an accurate fee proposal. Some participants admitted to including a premium on their fee if there was uncertainty or incomplete project scope.

Risk

Several participants mentioned risk as one of the factors they considered when pricing consulting engineering services. Risk can manifest in several forms on a project and needs to be managed accordingly.

Client

A few participants admitted adding a premium on fees when tendering for uninformed clients. Existing relationships with clients were raised by participants as a factor

influencing the level of fee submitted. One participant mentioned the number of tenders advertised by a client influenced the fee submitted. Another participant added that clients paying invoices timeously received favourable fee proposals.

Construction value

Construction value was also a factor considered by a few participants. Most participants citing construction value as a factor, paired it with project complexity. A few participants stated that construction value was an indicator of the quantum of consulting engineering work required.

Theme 2: Impact of reduced fees due to competitive tendering, on delivery of consulting engineering services

The second theme was the impact of reduced fees due to competitive tendering on the delivery of consulting engineering services. A total of six sub-themes were identified, namely:

(1) Time spent on projects;
(2) Design optimisation/value engineering;
(3) Training;
(4) Meetings;
(5) Construction monitoring/Site supervision; and
(6) No effect on delivery of services.

Table 5 shows a selection of verbatim responses that illustrate corresponding sub-themes.

Time spent on projects

The reduction of time spent on projects/project tasks overlaps with other sub-themes. Several participants mentioned lack of time available on projects impacted the level of design optimisation/value engineering, construction monitoring and training. Participants stated that reducing time significantly impacts on usage of experienced resources on projects. Many in the study asserted that junior resources were given more responsibility on projects, including "day to day" management of projects, while senior resources had an oversight role. Several participants highlighted the need for quality assurance to be conducted on projects, however, reduction of time spent on projects especially by senior resources may adversely impact quality assurance of consulting engineering services.

Design optimisation/value engineering

Only a few participants stated that reduced fees arising from competitive tendering, did not influence the level of design optimisation and value engineering performed on projects. Most participants mentioned that design optimisation and value engineering were negatively impacted by reduced fees. The general sentiment was that functional designs were developed without being fully optimised due to lack of budget. However, one participant asserted that design optimisation was conducted regardless of the fee level. This was done to distinguish their company from the competition.

Training

All participants recognised the importance of training staff. However, most participants mentioned that reduced fees made it difficult to conduct training on projects. A few

Table 5. Sub-themes and selected verbatim survey data extracts for theme 2: "impact of reduced fees due to competitive tendering, on delivery of consulting engineering services" (total pieces of coded text relating to this theme = 274)

Sub-theme	Verbatim data extract	Participant
Time spent on projects	"Reduced time on tasks"	P01
	"Due to the limited hours assigned to projects, design optimisation as well as value engineering is sometimes not fully considered"	P06
	"Seniors cannot spend enough time on site with juniors"	P07
	"Young people are pushed into the market and need to deal with things they have not been exposed to in industry, because companies cannot afford to have both Senior and Junior staff working side by side"	P08
	"Senior staff must deliver on time to enable us handle more projects"	P09
	"In fact you design more conservatively because you cannot afford to utilise resources to spend time on the design"	P14
	"The more time you can spend doing a design for example, the better the design will be"	P19
	"You cannot afford to allocate extra time on the project to look for opportunities for optimisation"	P27
Design optimisation/ value engineering	"Different technologies cannot be assessed - tried and tested options preferred"	P02
	"Due to the competitiveness of the profession, most consultants will utilise standard design principles"	P06
	"Try to get to a workable, technically feasible solution, without exploring design options in detail"	P10
	"This is an issue. Designs are often functional without being optimised"	P16
	"The design process is a search for 'a solution that works' rather than an optimum solution"	P24
	"We still do design optimisation and value engineering. This is the only way to show to the client that we can offer a better service than other"	P26
Training	"Training is still undertaken despite the fee tendered"	P01
	"Training opportunities are limited. Cross-subsidise training through other more profitable projects"	P10
	"Projects with big discounts have no 'money' for multiple resources and for juniors to shadow the more senior engineers for experience"	P12
	"In a low profit environment training is one of the first places where savings are achieved. Reduced training will rapidly damage destroy the capability of our built environment professions"	P24
Meetings	"Mainly reduce number of meetings"	P04
	"Varied attendance of non-critical meetings"	P09
Construction monitoring/site supervision	"Time spent in meetings and on site minimised"	P07
	"Reducing the level of contract management and supervision"	P17
	"You can give a good service for design but the administration and monitoring is where you fall short as there is no fees for this"	P22
No effect on delivery of services	"We always try to give the same service on projects"	P03
	"None really. Deliverables do not change"	P25
	"We do not minimise or omit service offerings"	P26
	"I try to maintain good quality irrespective of the price. This requires a combination of high and lower experienced engineers working together on the project"	P28

Source: Authors' own work

participants stated being unable to duplicate resources on projects to facilitate senior resources mentoring junior resources. One participant mentioned that they did not have the "luxury" of training junior staff in their organisation as senior resources needed to complete their tasks on time so they could be used on other projects. Another participant asserted that lower profit margins due to competitive tendering caused lack of training stating, "in a low profit environment, training is one of the first places where savings are achieved". In instances where training was conducted by participants, it was usually subsidised from profitable projects or had a low budget allocation.

Meetings

Participants indicated time spent at meetings was minimised when working on projects with reduced fees. Meetings appeared to be one of the easier tasks for participants to reduce their time commitment.

Construction monitoring/site supervision

A handful of participants stated that reduced fees result in less time spent on construction monitoring/site supervision. Although this overlaps with the sub-theme "time spent on projects", this item was recorded separately due to the significant adverse impact it may have during implementation of construction projects.

No effect on delivery of services

Several participants mentioned that the level of fees did not impact delivery of consulting engineering services indicating that services were not omitted nor minimised on projects, regardless of the fee tendered. A few participants mentioned balancing using experienced and junior resources on projects as an effective mechanism to ensure quality services were delivered. One participant highlighted using efficiency and innovation when executing tasks, to ensure profitability was maintained.

Theme 3: Interventions to prevent unsustainably "low" professional fees

The third theme addressed interventions to prevent unsustainably "low" professional fees in the consulting engineering industry. A total of four sub-themes were identified, namely:

(1) More emphasis should be placed on technical evaluation during procurement.

(2) Clients should be more knowledgeable and have an idea of reasonable fees to implement projects.

(3) Clients should institute a maximum fee discount that consultants cannot exceed.

(4) Clients should produce better quality tender documents to enable consulting engineers to accurately price their services.

Table 6 shows a selection of verbatim responses that illustrate corresponding sub-themes.

More emphasis should be placed on technical evaluation during procurement

Majority of participants stated that competitive tendering in South Africa was detrimental to the consulting engineering industry and caused risks to projects due to incompetent companies being appointed. Several participants stated that competitive tendering was also adversely impacting quality of services delivered by consulting engineers. Most participants proposed that clients in South Africa focused on identifying technically competent consultants during the tender process. To this end, participants posited that tender

Table 6. Sub-themes and selected verbatim survey data extracts for theme 3: "interventions to prevent unsustainably low professional fees" (total pieces of coded text relating to this theme = 130)

Sub-theme	Verbatim data extract	Participant
More emphasis should be placed on technical evaluation during procurement	"Emphasis should be placed on technical criteria of tenderer, history of tenderer, references, etc. Clients shouldn't place such a big emphasis on price. Clients should look at the overall picture"	P03
	"Have a quality gate then award the tender to the company offering a price closest to the median. NOT THE LOWEST"	P21
Clients should be more knowledgeable and have an idea of reasonable fees to implement projects	"Client needs to be knowledgeable and understand how much a job costs"	P02
	"Clients need to have an understanding of what a reasonable cost would be to deliver the service required"	P10
	"Client's should have a realistic comparative price produced ahead of the tender process and discard (preferably) or vigorously interrogate bids received lower than this value"	P17
Clients should institute a maximum fee discount that consultants cannot exceed	"There must be a ceiling to the discount offered based on gazetted rates"	P05
	"Implementing a minimum fee cap or maximum discount that will be accepted on gazetted rates"	P06
	"In my opinion the clients must stipulate a maximum discount that will be acceptable in the tender"	P13
Clients should produce better quality tender documents to enable consulting engineers to accurately price their services	"Firstly improve the description of scope and deliverables and the pricing schedules in RFPs"	P17
	"The scope of works need to be clearly defined"	P28

Source: Authors' own work

evaluations should focus more on technical competence as opposed to financial preference. Many participants asserted that tenderers should not be appointed based on lowest fee tendered. One participant emphasised that "value for money does not equate to lowest cost". This statement was made in reference to the South African constitution which states that all procurement should be cost effective.

Clients should be more knowledgeable and have an idea of reasonable fees to implement projects

Several participants asserted that clients should be more knowledgeable and have a better understanding about costs of performing engineering services (preferably before a project is tendered). A mechanism can then be implemented as part of the tender evaluation process to identify financial proposals that are "unreasonably" low. One participant mentioned that clients should be educated about unsustainably low fees.

Clients should institute a maximum fee discount that consultants cannot exceed

A few participants asserted that clients should institute a maximum fee discount based on gazetted fees. However, this was reliant on clients having knowledge of a "reasonable" fee to perform engineering services, which will inform the maximum fee discount. Many participants believed that current levels of fee discounting were unsustainable in the industry. One participant stated, "competitive tendering has the effect of companies under cutting each other to such an extent that the industry is no longer sustainable".

Clients should produce better quality tender documents to enable consulting engineers to accurately price their services

Two participants noted the benefits of clients improving the quality of tender documents when procuring consulting engineering services. A good quality tender document with a clear scope will enable consultants to accurately price their services without having to include contingencies to mitigate "unknowns" on projects.

Discussion

This paper discussed how competitive tendering influences pricing and delivery of consulting engineering services in South Africa. Qualitative data from 28 experienced consulting engineers was generated from the questionnaire feedback. A thematic analysis of the questionnaire feedback was conducted, and three key themes were identified.

The first theme explored different considerations when determining consulting engineering fees on competitively tendered projects. Several of the previous studies in this field did not address the question of how consulting engineers priced their services on competitively tendered projects (e.g. Hoxley, 2000; Sturts and Griffis, 2005; Akampurira and Windapo, 2018; Okonkwo and Wium, 2018; Quapp and Holschemacher, 2021). It was interesting to note that participants in South Africa still make use of professional fee scales to price their services. Many participants mentioned this was either their sole method of pricing or it was used together with a time and cost-based comparison. One of the key methods of reducing fees included limiting time of experienced resources (with higher rates) in favour of junior resources (with lower rates). This was an effective method to reduce costs but can affect quality of deliverables, as senior resources may have insufficient time to meaningfully contribute to the quality of deliverables.

The second theme explored the impacts of reduced fees due to competitive tendering on the delivery of consulting engineering services. There were varied opinions on whether the level of

fee impacted consulting engineering services. Several participants stated that certain services were omitted due to "low" fees, however, others asserted that the level of fee had no effect on the service rendered, which corresponded with a few previous studies (e.g. Hoxley, 2000; Awolesi and Ayedun, 2012; Laryea *et al.*, 2021). Some participants indicated that time spent on projects, design optimisation/value engineering, attendance of meetings and site supervision were adversely impacted by reduced fees. This was generally congruent with literature citing time boxing practices caused by low fees (e.g. Parks and McBride, 1987; Love *et al.*, 1999; Love *et al.*, 2000; Ling, 2004; Koutsikouri *et al.*, 2008; Lopez *et al.*, 2010; Assaf *et al.*, 2018; Akampurira and Windapo, 2018; Okonkwo and Wium, 2018; Ali and Au-Yong, 2021). Time boxing impacts a range of services such as design optimisation, site supervision and attendance of meetings. Participants also highlighted that junior resources were given more tasks, to prevent projects being overburdened with costs of senior resources. This was also congruent with findings in several previous studies which noted low fees impacting deployment of resources on projects (e.g. DeFraites, 1989; Love *et al.*, 1999; Ling, 2004; Gransberg *et al.*, 2007; Koutsikouri *et al.*, 2008; Lopez *et al.*, 2010; Slater and Radford, 2012; Shrestha and Mani, 2014; Assaf *et al.*, 2018; Akampurira and Windapo, 2018; Okonkwo and Wium, 2018; Quapp and Holschemacher, 2021).

The third theme in the paper dealt with preventing unsustainably low professional fees. Several participants highlighted their concern around sustainability of excessively low fees in the industry. This issue needs to be addressed to ensure that the industry does not reach a state where infrastructure projects fail because consulting engineers experience financial difficulties and are unable to deliver on projects. Remedies to prevent unsustainably low fees were not provided in previous studies. From an ethical perspective, a consultant that tenders a reduced fee or below cost, cannot use this an excuse for providing inferior quality. As professionals, consulting engineers are obligated to deliver quality services once they are appointed. There are many mechanisms available to address the pervasive issue of unsustainably "low" fees tendered by consulting engineers. One remedy is to appoint a technically competent person that is familiar with built environment projects and consulting services, to participate in evaluation of tenders, rigorously scrutinise tenderers' fees and highlight potential risks associated with the preferred bidder as part of a final vetting process – a similar approach has been highlighted in *ISO 10845-Part 1*. A further option entails obtaining clarity from preferred bidders regarding the basis of their fees and whether they can execute projects at tendered fees without compromising quality. It is critical that final vetting of preferred bidders is conducted by technically competent personnel. This requires a fundamental change in mindset of South African public sector clients and reconfiguration of procurement teams to be adequately resourced with technically competent personnel.

Many participants insinuated that the tendering system in South Africa was the primary source of challenges related to the level of fees in the consulting engineering industry. However, competition is used throughout the world as a mechanism to ensure clients obtain value for money. Competitive tendering does not mean that consulting engineers should price below cost. Instead, tendering competitively requires a systematic process of building up costs from first principles using several factors (e.g. resource allocation, risks, profit, etc.). Consulting engineers in South Africa should adopt this approach when competing for work.

This paper provides clients in the construction industry valuable information about unintended consequences of competitive tendering. Clients can use findings in the paper to inform the procurement of consulting engineering services. This paper also highlighted improvements to the tender process that may assist in improving project outcomes. From an

academic perspective, the paper provides researchers with findings about the impact of competition on pricing and services rendered by consulting engineers.

Although theoretical saturation was achieved, the sample of 28 participants may be considered "too small" and a limitation to the study. The scope of the investigation which focused on consulting engineering services was another limitation. Future research should be conducted in other professional service disciplines in the construction industry to determine the implications of competitive tendering. However, it is expected that similar results will be produced across built environment disciplines.

Conclusion

Most public sector projects in South Africa use competitive tendering to procure consulting engineering services. This paper investigated how competitive tendering influenced pricing and delivery of consulting engineering services in South Africa. Surprisingly, many consulting engineers still used professional fee scales as the sole method to determine their fees. There were mixed views on whether the reduced level of fees from competitive tendering had an impact on provision of consulting engineering services (e.g. design optimisation/value engineering, training, meetings and construction monitoring). However, there was sufficient concern from participants to suggest that unsustainably low fees in industry needs to be addressed. Consultants should build up their professional fees from first principles to ensure projects are priced appropriately. Failure to remedy unsustainably low fees on competitively tendered projects will jeopardise project outcomes and have long-term implications on the sustainably of consulting engineering companies in South Africa. One recommendation to address this issue includes capacitating client bodies with technically competent personnel that provide input during procurement processes and rigorously scrutinise fees tendered by preferred bidders. Improved technical capacity within client bodies will assist to ensure that due diligence is undertaken on construction related tenders and competent consulting engineers are appointed at sustainable fee levels while maintaining value for money.

References

Akampurira, E. and Windapo, A. (2018), "Factors influencing the quality of design documentation on South African civil engineering projects", *Journal of the South African Institution of Civil Engineering*, Vol. 60 No. 3, pp. 41-48.

Ali, A.S. and Au-Yong, C.P. (2021), "Risk factors in the refurbishment design process: the case of Malaysia", *International Journal of Building Pathology and Adaptation*, Vol. 40 No. 4, pp. 622-635.

Andi. and Minato, T. (2003), "Design documents quality in the Japanese construction industry: factors influencing and impacts on construction process", *International Journal of Project Management*, Vol. 21 No. 7, pp. 537-546.

Assaf, S., Hassanain, M.A. and Abdallah, A. (2018), "Review and assessment of the causes of deficiencies in design documents for large construction projects", *International Journal of Building Pathology and Adaptation*, Vol. 36 No. 3, pp. 300-317.

Awolesi, J.A.B. and Ayedun, C.A. (2012), "An assessment of the effect of remuneration on the construction performances of the professionals in the Nigerian building industry", *Mediterranean Journal of Social Sciences*, Vol. 3 No. 1, pp. 401-412.

Braun, V. and Clarke, V. (2006), "Using thematic analysis in psychology", *Qualitative Research in Psychology*, Vol. 3 No. 2, pp. 77-101.

Boddy, C.R. (2016), "Sample size for qualitative research", *Qualitative Market Research: An International Journal*, Vol. 19 No. 4, pp. 426-432.

Boyatzis, R. (1998), *Transforming Qualitative Information: Thematic Analysis and Code Development*, Sage, Thousand Oaks, CA.

Bubshait, A.A., Al-Said, F.A. and Abolnour, M.M. (1998), "Design fee versus design deficiency", *Journal of Architectural Engineering*, Vol. 4 No. 2, pp. 44-46.

Cohen, L., Manion, L. and Morrison, K. (2007), *Research Methods in Education Sixth Edition*, Routledge, London and New York, NY.

Competition Commission South Africa (CCSA) (2016), *Competition Commission South Africa Annual Report 2015/2016*. Competition Commission South Africa, South Africa.

Consulting Engineers South Africa (CESA) (2021), Bi-Annual Economic and Capacity Survey: January – June 2021. Consulting Engineers South Africa: Johannesburg.

DeFraites, A.A. (1989), "Fee versus quality", *Journal of Professional Issues in Engineering*, Vol. 115 No. 2, pp. 125-128.

Dosumu, O. and Iyagba, R. (2013), "An analysis of the factors responsible for errors in Nigerian construction documents", *Ethiopian Journal of Environmental Studies and Management*, Vol. 6 No. 1, pp. 49-57.

Elliott, R., Fischer, C.T. and Rennie, D.L. (1999), "Evolving guidelines for publication of qualitative research studies in psychology and related fields", *British Journal of Clinical Psychology*, Vol. 38 No. 3, pp. 215-229.

Forbes, L.H. (2002), "Does Compensation Affect Quality?", *Leadership and Management in Engineering*, Vol. 2 No. 1, pp. 40-43.

Gransberg, D.D., Del Puerto, C.L. and Humphrey, D. (2007), "Relating cost growth from the initial estimate to design fee for transportation projects", *Journal of Construction Engineering and Management*, Vol. 133 No. 6, pp. 404-408.

Horns, K.W. and Jenkins, R.B. (2011), "Is the profession of civil engineering becoming a commodity? You should know the answer", *Leadership and Management in Engineering*, Vol. 11 No. 1, pp. 40-44.

Hoxley, M. (2000), "Are competitive fee tendering and construction professional service quality mutually exclusive?", *Construction Management and Economics*, Vol. 18 No. 5, pp. 599-605.

Hoxley, M. (2007), "The fee tendering and service quality issue revisited", *Property Management*, Vol. 25 No. 2, pp. 180-192.

Kavanagh, P. (2016), "A case for negotiated performance-based contracting rather than competitive tendering in government public transport (bus) service procurement", *Research in Transportation Economics*, Vol. 59, 313-322.

Koutsikouri, D., Austin, S. and Dainty, A. (2008), "Critical success factors in collaborative multi-disciplinary design projects", *Journal of Engineering, Design and Technology*, Vol. 6 No. 3, pp. 198-226.

Lam, T.Y.M. (2012), "Economic perspective on outsourcing of property management services", *Property Management*, Vol. 30 No. 4, pp. 318-332.

Laryea, S., Watermeyer, R. and Govender, N. (2021), "The influence of fees on the quality of professional services in South Africa", *Proceedings of the Institution of Civil Engineers – Management, Procurement and Law*, pp. 163-173. doi: 10.1680/jmapl.20.00022

Liebenberg, J.J.E. and Wilson, S.J. (2011), "Tendering for professional services: both sides of the coin", *Proceedings, 10th Conference on Asphalt Pavements for Southern Africa, KwaZulu-Natal, South Africa*, 11-14 September.

Ling, F.Y.Y. (2004), "Consultancy fees: dichotomy between A/E's need to maximize profit and employers' need to minimize cost", *Journal of Professional Issues in Engineering Education and Practice*, Vol. 130 No. 2, pp. 120-123.

Lopez, R., Love, P.E.D., Edwards, D.J. and Davis, P.R. (2010), "Design error classification, causation, and prevention in construction engineering", *Journal of Performance of Constructed Facilities*, Vol. 24 No. 4, pp. 399-408.

Love, P.E.D., Edwards, D.J. and Smith, J. (2006), "Contract documentation and the incidence of rework in projects", *Architectural Engineering and Design Management*, Vol. 1 No. 4, pp. 247-259.

Love, P.E.D., Mandal, P. and Li, H. (1999), "Determining the causal structure of rework influences in construction", *Construction Management and Economics*, Vol. 17 No. 4, pp. 505-517.

Love, P.E.D., Mandal, P., Smith, J. and Li, H. (2000), "Modelling the dynamics of design error induced rework in construction", *Construction Management and Economics*, Vol. 18 No. 5, pp. 567-574.

Marisa, A. and Yuso, N.A. (2020), "Factors influencing the performance of architects in construction projects", *Construction Economics and Building*, Vol. 20 No. 3, pp. 20-36.

Mbachu, J. and Nkado, R. (2007), "Factors constraining successful building project implementation in South Africa", *Construction Management and Economics*, Vol. 25 No. 1, pp. 39-54.

National Treasury (NT) (1999), *Public Finance Management Act No. 1 of 1999*, National Treasury, Pretoria.

National Treasury (NT) (2017), *Preferential Procurement Policy Framework Act, 2000: Preferential Procurement Regulations*, National Treasury, Pretoria.

Okonkwo, P.N. and Wium, J. (2018), "Impact of discounted professional fees on the risk exposure of civil and structural engineering services consultants in South Africa", *Journal of the South African Institution of Civil Engineers*, Vol. 60 No. 1, pp. 10-20.

Patton, M.Q. (2002), *Qualitative Evaluation and Research Methods*, 3rd Edition. Sage, Thousand Oaks, CA.

Parks, G.A. and McBride, R.R. (1987), "Competitive bidding for engineering services", *Journal of Professional Issues in Engineering*, Vol. 113 No. 1, pp. 66-76.

Philips-Ryder, M., Zuo, J. and Jin, X.H. (2013), "Evaluating document quality in construction projects – Subcontractors' perspective", *International Journal of Construction Management*, Vol. 13 No. 3, pp. 77-94.

Phua, F.T.T. (2005), "Determining the relationship between fee structure and project performance between firms: an empirical study based on institutional and task environment perspectives", *Construction Management and Economics*, Vol. 23 No. 1, pp. 45-56.

Quapp, U. and Holschemacher, A. (2021), "Appropriateness of fees for construction planning services of architects and civil engineers as a question of morality", *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, Vol. 13 No. 2, p. 04521004.

Saunders, M. and Townsend, K. (2016), "Reporting and justifying the number of interview participants in organization and workplace research", *British Journal of Management*, Vol. 27 No. 4, pp. 836-852.

Saunders, M., Lewis, P. and Thornhill, A. (2019), *Research Methods for Business Students Eighth Edition*, Pearson Education Limited, Harlow.

Shrestha, P.P. and Mani, N. (2014), "Impact of design cost on project performance of Design-Bid-Build road projects", *Journal of Management in Engineering*, Vol. 30 No. 3, p. 04014007.

Slater, R. and Radford, A. (2012), "Perceptions in the Australian building industry of deficiencies in architects' design documentation and the effects on project procurement", *Construction Economics and Building*, Vol. 8 No. 1, pp. 23-33.

Sturts, C.S. and Griffis, F.H. (2005), "Pricing engineering services", *Journal of Management in Engineering*, Vol. 21 No. 2, pp. 56-62.

Wimalasiri, V.P., Beesley, N., Cheyne, A. and Daniels, K. (2010), "Social construction of the aetiology of designer error in the UK oil and gas industry: a stakeholder perspective", *Journal of Engineering Design*, Vol. 21 No. 1, pp. 49-73.

Further reading

Burati, J.L., Farrington, J.J. and Ledbetter, W.B. (1992), "Causes of quality deviations in design and construction", *Journal of Construction Engineering and Management*, Vol. 118 No. 1, pp. 34-49.

Engineering Council of South Africa (ECSA) (2011), "Engineering Profession Act (46/2000): guideline for services and processes for estimating fees for persons registered in terms of the Act", Gazette No. 34875. Board Notice 206. South Africa: Engineering Council of South Africa.

FIDIC (2019), *FIDIC Guidelines for the Selection of Consultants*, International Federation of Consulting Engineers (FIDIC), Geneva.

International Organization for Standardisation (ISO) (2020), *Construction Procurement —Part 1: Processes, Methods and Procedures*, ISO, Geneva.

World Bank (WB) (2003), *South Africa Country Procurement Assessment Report*. Report No. 25751-SA.

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