AN IDENTIFICATION OF COST MANAGEMENT CHALLENGES IN PUBLIC SECTOR PROJECTS

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ABSTRACT

The prevalence of cost overruns in public sector projects is a call to all stakeholders to address cost management issues in the construction industry. This study seeks to make sense of these existing cost management practices. Such sense-making will enable an evaluation of the status quo, and it will identify challenges hindering effective cost management during project delivery. Adopting a qualitative case study research design, this study relies on data obtained from a purposively selected list of interviewees from a cluster of cases, i.e., recently completed public sector construction projects in the Free State. These interviews will be juxtaposed with evidence from project-related documents. Based on the data, the study will provide a profile of existing cost management frameworks applied to these projects. Encompassing various stages of the project delivery life cycle, this profile will enable an identification of the challenges in terms of cost management on these projects. It is expected that findings from this study will provide an outline of the failings of current cost management frameworks.

Keywords: construction, cost management, projects, public sector, South Africa

1. INTRODUCTION

The construction industry in South Africa has remained an essential role player in the country's gross domestic product. The contribution made by the industry amounted to 4.9% in 2014 (Nimbona and Agumba, 2014). The importance of the industry in contributing to job creation is highlighted by Mbatha and Mokhema (2014), where the industry became the highest hiring industry in the third quarter of 2014, with 99,000 jobs. The importance of performance improvement in the construction industry is underscored by the role the industry is playing in the economy. However, the industry is notorious for various forms of overruns recorded on projects (Ramabodu and Verster, 2010, 2013; Baloyi and Bekker, 2011; Monyane and Okumbe, 2012; Mukuka et al., 2014). Management of construction projects is evaluated through the lens of project management parameters. Cost management is a parameter with multiple pathways of monitoring and control. Consistent reports of cost overruns on projects is sufficient

reason to assess whether current cost management practices are successfully dealing with the challenges of modern construction.

As mentioned earlier, cost performance of projects in the industry is cause for concern. For the purposes of this article, cost management challenges manifest through "dissatisfactions" which are linked to either non-expenditure of the budget or over-expenditure of the budget. Challenges such as poor project estimating practices hamper the delivery of construction projects (Nimbona and Agumba, 2014). In a recent study to address global cost management issues, Smith (2014) mentioned several blowouts of cost budgets on major projects around the world, which amount to hundreds of millions and billions of dollars. The problem is exacerbated by the 2008 global financial crisis, which continues to have a significant impact on project financing around the world, as financiers tighten controls on lending and avoid lending to projects lacking sufficient risk control (Smith, 2014). Similarly, Ali and Kamaruzzaman (2010) stress the importance of controlling costs to improve project performance. Construction projects are unique, and they tend to assume greater complexity as they increase in size. In developing countries, cost management approaches to construction projects have proven to be less efficient when compared to time management approaches (Mohamad, 2003).

A construction project is an inter-organisational process, which requires the contribution of all stakeholders to achieve the goal of successfully completing the project within agreed-upon constraints. According to Namadi et al. (2017), the current project delivery system still treats design and cost as a separate and independent function carried out discretely. Similarly, the United Kingdom (UK) and South Africa have traditionally assigned cost management duties to the chief quantity surveyor (QS). Namadi et al. (2017) argue that this practice of assigning cost management mainly to the chief QS accounts for much of the cost overruns that are prevalent in the construction industry, due to its lacking a collaborative approach to costing.

In the South African context, numerous studies have established cost overruns as a common problem that requires appropriate interventions (Ramabodu and Verster, 2010, 2013; Baloyi and Bekker, 2011; Monyane and Okumbe, 2012; Mukuka et al., 2014). In response to the call for interventions, this study was commissioned. The research that is reported in this article forms an integral part of the broader lean-led study. The failings of current practice could provide opportunities for the introduction of lean-based solutions. The article thus presents a profile of existing cost management practices in public sector-driven projects. Incorporating various stages of the project delivery life cycle, this profile enables an understanding of the cost management challenges on the identified projects.

2. LITERATURE REVIEW

2.1 Challenges of current cost management practices

Some studies have highlighted the problems of cost management performance of the industry. For instance, Ndihokubwayo and Haupt (2009) identified waste arising from variation orders on projects in the South African construction industry. The study also found that excessive occurrence of variation orders results in unnecessary costs to the project. The study concluded that clients regard variation orders as linked to additional scope approvals. Changes in scope are indicative of haste in project planning.

Similarly, Ramabodu and Verster (2010) established that cost overruns are a problem in the Free State province of South Africa. They identified critical factors contributing

to cost overruns, by ranking them in order of importance. Furthermore, the latter study concluded that an essential consideration for minimisation of cost overruns was removal of the human element.

The traditional practice of delivering public sector projects is to assign all professionals to handle the predesigned tasks in a fragmented manner. However, the research conducted by Mukuka et al. (2014) revealed that the traditional way of improving cost performance is not providing value in the construction industry. Akinyede and Fapohunda (2014) confirmed that the cost increases that occur daily on-site are due to valuable construction resources demanded for production.

2.1.1 Outcomes of traditional cost management approaches

Hanid et al. (2011) identified seven key issues in cost management. They described the problems as shortcomings of cost management practice. The issues were first identified through the literature, and they were then validated through exploratory interviews. The seven critical issues and/or shortcomings were the following:

- Failure to forecast;
- Failure to support improvement opportunities;
- Costs are considered as resulting from action;
- Relative neglect of value consideration;
- Poor support for inter-organisational cost management;
- Negative influence on behaviour; and
- Constraints created by budgeting.

The severity of ineffective and poor cost management in public sector projects in South Africa is illustrated in Figure 1. Figure 1 indicates that cost performance amounts to only 60%, instead of the desired 95% (Samuel, 2008).

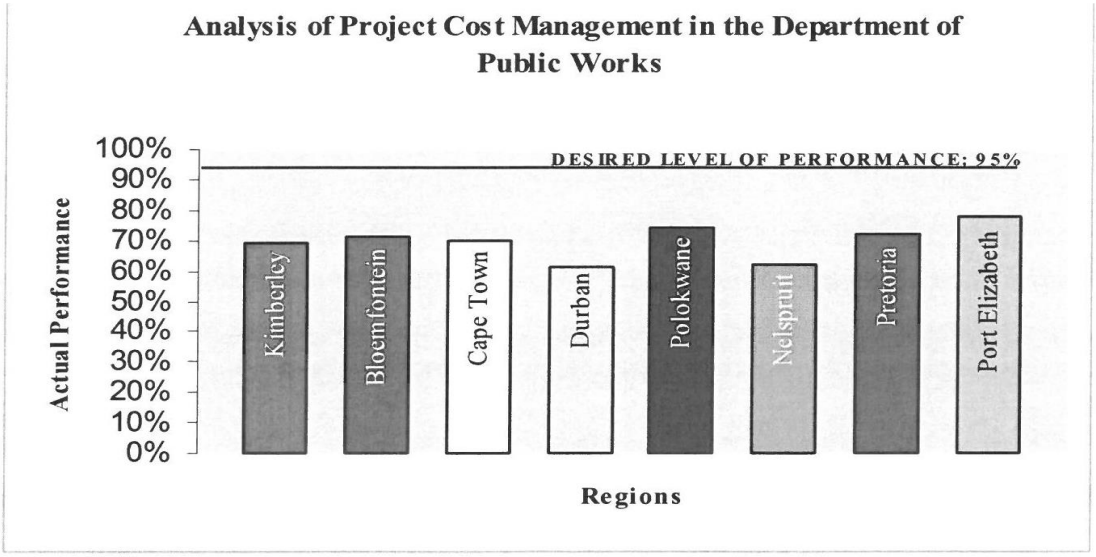

Figure 1: An analysis of project cost management

(Adapted from Lesele, 2006, cited in Samuel, 2008)

Figure 1 shows that public sector projects were still performing poorly in terms of cost management. Bowen and Edwards (1985) asserted that a paradigm shift was imminent, where we must move from a deterministic stance, where cost models and price forecasts

are based on a "single figure", to a scenario that is more representative of reality, where price variability is explicitly considered. It is now 33 years later, it appears that this paradigm shift is yet to occur, as underwhelming project cost performance figures are on the increase, particularly in South Africa, hence this study.

2.1.2 Effective cost management and the quantity surveyor

Poor cost performance emanating from construction project delivery is not just a local dilemma but a global phenomenon affecting owners' budgets, affordability of end users, and competency levels of project teams (Obi et al., 2015; Memon et al., 2014; Smith, 2014; Mbachu and Nkado, 2004). The quantity surveying (QS) fraternity has traditionally conducted cost management functions in South Africa (and in many other Commonwealth countries). The QS profession evolved in the 17th century. The Royal Institute of Chartered Surveyors (RICS) established it as a practice in 1864 (Seeley and Winfield, 1999, cited in Ashworth et al., 2014). The contribution of QSes has traditionally been to offer cost advice, assist with alternative design solutions, and provide cost estimates of preliminary designs and procurement, using elemental cost planning and checking (Kirkham, 2007, cited in Namadi et al., 2017). Ashworth et al. (2014) list the duties of QSes as encompassing post-contract cost management tasks, such as interim valuations, change control, and assessing variations in the final account.

Quantity surveyors employ traditional cost planning. A study by Zimina et al. (2012) views traditional cost planning as ineffective and inadequate for effective cost management that produces value for money. The authors express their view as a challenge, since the initial decision-making is dependent solely on the architect, rather than on collaborative decision-making from all the project participants. Thus, it is assumed that the reduced cost performance observed in public sector projects could be because of a lack of adequate techniques employed.

3. RESEARCH METHOD

The study adopted a qualitative research design. Case study research is commonly used when researchers want to understand a current phenomenon within a particular context, and when they have little control over events. The choice of descriptive case studies was motivated by the expectation that it could produce context-specific insights (Yin, 2014). Furthermore, case studies have a reputation for promoting in-depth investigation of a phenomenon within its natural context. The use of multiple cases also encourages and sustains enhanced replication across cases. Use of multiple sources of evidence ensures construct validity (Yin, 2014). Use of multiple cases to test a range of cross-case propositions enhances the external validity and the replicability, in terms of both literal and theoretical replications. The study purposefully selected four cases from the Department of Public Works. The projects were constructed in the last 10 years. Document analysis was conducted to analyse the textual data. The document analysis data was supplemented with semi-structured interview data collected from project actors in the selected cases.

Organisational consent was sought from the Department of Public Works head office in Pretoria, through a letter to the Director-General. The interviewee sample consisted of a select group of experts who were part of the case study projects sampled for evaluation. In all, 15 interviewees were recruited. Six interviewees each were drawn from the construction project management, architecture, civil engineering, electrical engineering, mechanical engineering and quantity surveying cohorts, respectively. Sampling was guided by project cases, which prevented bias from the authors. Interview sessions lasted an average of 25 minutes each. Semi-structured questions were asked in

the interview format. Semi-structured interviews were chosen because of the use of similar questions, instead of identical questions, as would be the case if structured interviews were espoused (Denscombe, 2010). Interviewees were requested to discuss their roles in various stages of the life cycle of construction projects. The interview sessions were recorded and transcribed with the permission of the interviewees. To make sense of the data, the transcripts emanating from the transcription were read more than once by the researchers, independently of each other. Predetermined themes were aligned to the research objective and questions. Pre-set themes evolved from the coded data.

4. FINDINGS AND DISCUSSION

Table 1 illustrates two case projects in extreme positions regarding poor cost performance, as advocated by Samuel (2008). However, Table 2 demonstrates a different picture, of two other project cases showing better cost performance from the public sector client. The reason for the difference was because the client demanded value engineering exercises to improve the outcome. Secondly, project performance was measured after completion, without really looking at the cause and effect of different reasons for the result. Table 1 shows the two projects that indicated poor cost performance. Table 2 shows the two projects that indicated good cost performance compared to the projects shown in Table 1.

Table 1: Project 1 and Project 2

PROJECT 1 INFORMATION		PROJECT 2 INFORMATION	
Department	Department of Health	Department	Department of Education
Project name	Extension to Boitumelong Hospital	Project name	New Primary School
Town	Kroonstad	Town	Bothaville
Date of site handover	28 July 2011	Date of site handover	2 October 2013
Actual start date	21 November 2011	Actual start date	2 October 2013
Completion date	November 2014	Completion date	29 May 2015
Actual completion date	April 2015	Actual completion date	29 May 2015
Contract amount	R138,263,009.29	Contract amount	R28,152,536.86
Final amount	R170,339,718.37	Final amount	R32,758,734.81
Overrun amount	R32,076,709.05	Overrun amount	R4,606,197.95

Table 2: Project 3 and Project 4

PROJECT 3 INFORMATION		PROJECT 4 INFORMATION	
Department	Department of Health	Department	Department of Education
Project name	New Mantsopa Hospital	Project name	New Special School
Town	Ladybrand	Town	Kroonstad
Date of site handover	12 August 2010	Date of site handover	2 March 2016
Actual start date	12 August 2010	Actual start date	2 October 2017
Completion date	12 January 2013	Completion date	2 October 2017
Actual completion date	12 January 2013	Actual completion date	2 October 2017
Contract amount	R264,662,777.29	Contract amount	R39,400,000.00
Final amount	R264,662,777.29	Final amount	R38,977,652.13
Overrun amount	R0.00	Overrun amount	- R422,347.87

4.1 Observed cost management practice from project participants

Figure 2 is a profile of the current mode of project delivery and cost management processes carried out on public sector projects. The profile is derived from semi-structured interviews conducted in the case studies. It is worth noting that the method of delivering public sector projects can be classified as a traditional design by employers, according to the Integrated Development Management System toolkit used by the National Treasury. It must be noted that school projects utilised the design-build model of project delivery, because designs are standard, and there is no need for new drawings. However, despite the difference in project delivery method, recorded cost performance experienced by both the design-build projects was poor, and another project performed exceptionally well. Figure 2 is a profile for stages 1 to 6 of the professional consultant service agreement (PROCSA) signed between the client and each professional team. The stages detail what service is expected of every professional appointed, as well as the anticipated outcomes in each stage to enable an opportunity for fee claim after each stage is completed. Consultants carry out tasks related to the project at each stage, and after each phase is completed, a fee claim can be submitted for payment to the professional. These are stages that are critical in identifying cost management approaches employed by professionals, as well as various tasks that are carried out to highlight opportunities for lean thinking strategies to improve the status quo of how professionals deliver projects to the client to the intended outcome of the project's parameters. Each stage represents the activities carried out related to each project executed by these professionals.

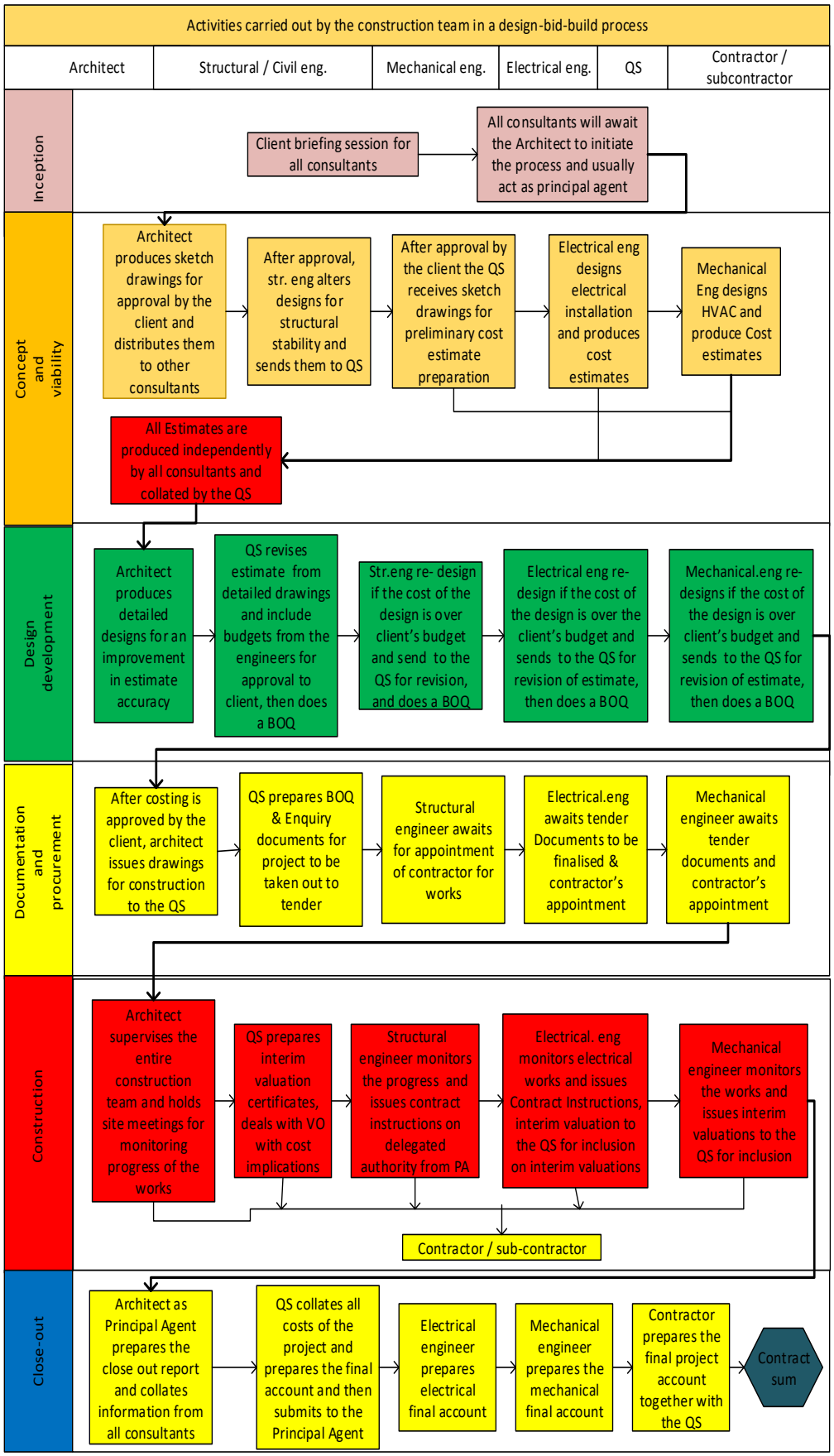

Figure 2: Observed activities from project participants

PROJECT 1		Cost management process on Design-bid-build projects		PROJECT 3
Cost element		Responsibility.	Cost element	Responsibilty.
Inception	Number of meetings held - 2	Client	Number of meetings held - 3	Client
Concept and viability	Period for sketches – 3 weeks Period for QS estimate -2 weeks Period for electrical designs - 2 weeks, Period for mechanical designs 2 weeks. Number of meetings – 2 for approval	Architect as principal agent (PA)	Period for sketches – 5 weeks, Period for QS estimate - 4 weeks Period for Electrical designs - 2 weeks Period for Mechanical designs - 2 weeks Number of meetings for approval - 5	PA
Design development	Detailed drawings and specifications – 2 weeks BOQ production – 3 weeks Electrical costing – 2 weeks Electrical BOQ – 1 week Mechanical costing – 2 weeks Mechanical BOQ – 1 week Number of meetings – 2 for approval	PA	Detailed drawings and specifications – 6 weeks BOQ production – 4 weeks Electrical costing – 4 weeks Electrical BOQ - 2 weeks Mechanical costing – 4 weeks Mechanical BOQ – 2 weeks Number of Meetings – 5 for approval	PA
Documentation & procurement	Collating all BOQs – 2 weeks Tender document – 2 weeks Compiling and printing and binding tender – 1 week Meetings for approval – 1 week Advertising of tender - 8 weeks Adjudication of tender - 8 weeks Appointment of contractor – 2 weeks	QS & PA.	Collating all BOQs – 2 weeks Tender document – 2 weeks Compiling and printing and binding one tender doc – 1 week Meetings for approval – 3 week Advertising of tender - 8 weeks Adjudication of tender – 6 weeks Appointment of contractor – 2 weeks	QS & PA & Client departments
Construction	Site handover – 3 weeks Start date – contractually Revision of drawings – 5 revisions Number of RFIs from contractor – 12 Project delay – 5 months Delays with Contractor payment – Yes, 3 months Scope creep – Yes, with cost Time overruns - Yes Cost overruns - Yes Number of site meetings - 54	Client & PA.	Site handover – 1 week Start date – contractually Revision of drawings – No revisions Number of RFIs from contractor – None Project delay – none Delays with contractor payment – Yes, 1 month Scope creep – none Time overruns - No Cost overruns - No Number of site meetings - 19	QS & PA & Client departments
Close -out	Agreement of final account – 4 months, Close out report – 2 weeks	QS, mechanical, electrical engineers. & PA.	Agreement of final account – 4 months, Close out report – 2 weeks	QS, mechanical, electrical engineers. & PA.

Figure 3: Cost management process from project participants

5. DISCUSSION

Figure 3 above presents what the respondents revealed transpired in projects 1 and 3 only. The study analyses only project 1 and project 3 of the four project cases, as these are preliminary findings of an ongoing study. The study exposed the inefficiencies of the existing cost management processes in selected cases in Figure 2 and Figure 3. From the foregoing, it can be seen that costing is still carried out independently by the design team early on in the project. The current practice encourages the so-called "silo mentality"; this indicates failure to support improvement opportunities and inability to forecast (Hanid et al., 2011). Figure 3 shows that the pre-contract planning in project 1 was done quicker than that in project 3, which led to a large number of variations during construction, hence the poor cost and time performance. From the findings of Hanid et

al. (2011), this is confirmed as relative neglect of value consideration. Project 3 in figure 3 indicates successful cost performance due to better planning and a high number of approval meetings observed from clients for design and costing, unlike project 1. Respondents also revealed that project 1 had less commitment from the side of the client, hence major changes came later. Hanid et al. (2011) demonstrate in their findings a negative influence on behaviour.

However, project 3 recorded better project performance concerning time and cost. Project 1 shows quicker pre-contract planning. It is worth noting that in the case studies, the QS is still the custodian of the costing process. Again, findings of Hanid et al. (2011) show failure to support inter-organisational cost management, inability to sustain improvement opportunities, and constraints created by budgeting. The only exception is the mechanical and electrical subsections of a project, which are handled by their respective engineers for costing. Again, this creates a silo mentality, where collaboration for cost management is still fragmented. The PROCSA stages of construction are mostly followed, instead of a rationale for professionals to claim for fees, which is why the stages of the latter were followed in the projects. The relationship of different organisations and individuals involved in projects impacts on the delivery of construction projects for the public sector.

6. CONCLUSION

The study first showed a profile of the activities carried out by the professional team and interaction with the client during planning and execution of public projects, using the PROCSA document, which is a service level agreement in the South African construction industry. The study then demonstrated how respondents went about the process of cost management in the two project cases from the selected four projects. Figure 3 demonstrates the inefficiencies of the existing cost management processes, by comparing two of the projects taken from Table 1 and Table 2.

From the evidence of the case studies, it can be concluded that spending sufficient time on planning for the project does not necessarily equate with a favourable outcome expected concerning project parameters. However, the cases also reveal that there is an opportunity to spend just the right amount of time but use it efficiently and collaboratively to achieve the intended outcome for the client.

7. ACKNOWLEDGEMENT

This article was language-edited by a freelance language editor, Anthony Sparg. He has edited several academic journal articles in the field of construction management. He has an MA *cum laude* in African Languages (isiXhosa), an MA *cum laude* in Linguistics, and a Higher Diploma in Education.

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