

Athenkosi Sogaxa

Mr Athenkosi Sogaxa, Lecturer,
Walter Sisulu University, 19
Manchester Road, Chiselhurst, East
London, 5247, South Africa. Phone:
0437094098
email: <asogaxa@wsu.ac.za>

Eric Simpeh

Dr Eric Kwame Simpeh, Centre
for Settlements Studies, Kwame
Nkrumah University of Science
and Technology, PMB UPO,
KNUST, Kumasi, Ghana. Phone:
+233553697932
email: <eric.simpeh@knust.edu.gh>
ORCID: <https://orcid.org/0000-0002-5123-7468>

Ruben Ndiokubwayo

Prof. Ruben Ndiokubwayo,
Associate Professor, Walter Sisulu
University, 19 Manchester Road,
Chiselhurst, East London, 5247,
South Africa. Phone: 0437094013,
<rndiokubwayo@wsu.ac.za>
ORCID: <https://orcid.org/0000-0002-5855-7982>

DOI: <http://dx.doi.org/10.18820/24150487/as28i1.5>

ISSN: 1023-0564

e-ISSN: 2415-0487

Acta Structilia 2021 28(1): 117-141



Published by the UFS

<http://journals.ufs.ac.za/index.php/as>

© Creative Commons With Attribution (CC-BY)

How to cite: Sogaxa, A., Simpeh, E. & Ndiokubwayo, R. 2021.
Assessment of time management practices of small medium
sized contractors in project delivery in the Eastern Cape
Province, South Africa. *Acta Structilia*, 28(1), pp. 117-141.

ASSESSMENT OF TIME MANAGEMENT PRACTICES OF SMALL MEDIUM SIZED CONTRACTORS IN PROJECT DELIVERY IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA

Received: March 2021

Peer reviewed and revised: April 2021

Published: June 2021

**The authors declared no conflict of interest
for the article or title*

ABSTRACT

The purpose of this article is to assess the effective time-management practices adopted by construction SMEs to enhance successful construction project delivery. A mixed methods approach, consisting of both quantitative and qualitative research methods was adopted. A questionnaire was distributed to Small and Medium Enterprises (SMEs) management team purposively selected from CIDB Grades 1 to 4 registered contractors under the general building category. The quantitative data were analysed, using descriptive statistics. To validate quantitative findings, semi structured interviews were conducted with randomly selected respondents who were part of the survey study where content analysis was adopted. The findings revealed that the most adopted effective time-management practices to enhance the sustainable success rate of construction SMEs in South Africa included progress meeting with consultants to ensure regular

monitoring of the work progress, strategic planning to recover time lost, effective management of subcontractors, and allocation of tasks to workers according to their skills and expertise. It should be noted that the quantitative findings were consistent with the qualitative findings, and revealed that effective project planning, periodic progress meetings and labour production contribute to the sustainable success rate of SMEs. The results obtained from this article could be adopted as SMEs' effective time-management practices to enhance sustainable construction project delivery.

Keywords: Construction projects, leadership and sustainable success, project delays, SMEs, time-management, South Africa

ABSTRAK

Die doel van hierdie artikel is om die bestuurspraktyke van Klein tot Medium Ondernemings (KMO's) te ondersoek vir effektiewe tydsbeplanning om die volhoubare sukses te verhoog vir die afhandeling van konstruksieprojekte. 'n Gemengde navorsingsmodel bestaande uit 'n kwantitatiewe sowel as 'n kwalitatiewe aanslag is toegepas. 'n Vraelys is versprei onder die bestuurspanne van KMO's wat geregistreer is by die CIDB, vlakke 1 tot 4. Semi-gestruktureerde onderhoude is gevoer om die resultate van die vraelys te bevestig. Die kwantitatiewe en kwalitatiewe data is geanaliseer deur beide beskrywende statistiek en inhoudsanalise tegnieke toe te pas. Daar is bevind dat gereelde vergaderings die mees aanvaarbare metode is deur die bestuur van KMO's vir die effektiewe bestuur van tyd om die sukses van konstruksieprojekte te verhoog in Suid-Afrika. Dit sluit in vorderingsvergaderings, beplanningsvergaderings en die toekenning van take aan kontrakteurs en konsultante. Tydsraamwerke word dan ook bespreek. Die kwantitatiewe sowel as die kwalitatiewe benaderings het gewys dat die effektiewe beplanning is gefokus op gereelde vorderingsvergaderings en produksie van werkers. Die resultate van hierdie studie kan aangeneem en toegepas word as 'n riglyn deur die bestuur van KMO's vir die effektiewe tydsbeplanning om die sukses van konstruksieprojekte te verhoog. Die studie bied effektiewe tydbestuursmodaliteite wat die prestasie van die KMO's sal verbeter.

Sleutelwoorde: Boup projekte, leierskap en volhoubare sukses, projekvertragings, KMO's, tydsbestuur, Suid-Afrika

1. INTRODUCTION

While Small and Medium Enterprises (SMEs) are regarded as key to South Africa's economic growth (Adendorff, Appels & Botha, 2011: 54), Olawale and Garwe (2010: 729) emphasise that SMEs create more job opportunities in South Africa that are of great importance to the economy and that contribute significantly to the Gross Domestic Product (GDP). In addition, Ladzani and Van Vuuren (2002: 154) and Lampadarios (2017: 3) describe the success rate of SMEs as one element that conveys social solidarity and creates economic benefits globally. However, SMEs are faced with difficulties in competing with well-established firms in the industry, despite being the first preference in respect of government projects and government business development structures (Love, Irani, Li, Cheng & Tse, 2001: 33). According to Martin and Root (2012: 210), newly formed SMEs mostly fail to be sustainable businesses, with many failures in their first five years of existence, due to ineffective management practices and techniques (Love *et al.*, 2001: 38). SMEs are confronted with some project management

failures (Gabula, 2012: 2) and failures to execute effective planning, which is related to basic management skills and leads to non-profitable business (Bikitsha & Amoah, 2020: 2). In addition, Bouazza, Ardjouman and Abada (2015) claim that SMEs are challenged with business operations such as legal requirements, lack of trust from financial institutions, low business capacities, lack of managerial skills to manage construction projects successfully, and lack of technological skills. Moreover, Martin and Root (2010: 65) argue that construction SMEs are confronted with unprofitable tender prices, abuse by main contractors, poor general management, and technical difficulties. Assaf and Al-Hejji (2006: 350) indicate that lack of experience, lack of planning, inadequate estimate practices, and poor managerial competence in regulating company policies are some of the factors that cause delays in SMEs' project delivery. According to Arditi, Nayak and Damci (2017: 137), these are non-excusable delays, caused by the contractor's fault, for which the contractor is generally penalised.

Traditionally, the client, in consultation with the project team, sets time frames in the conditions of contracts within which the contractors have to successfully deliver a construction project. Failure by SME contractors to complete the project within specified time frames eventually puts the contractor at risk of having to pay penalties to the client (Bajari & Lewis 2009: 6). Although significant studies (Martin & Root, 2012; Mauro, Ancarani & Hartley, 2020: 379; Khoshnodifar, Ghonji, Mazlounzadeh & Abdollahi 2016: 84; Lande, Shrivastava & Seth, 2016: 615) have been conducted to ascertain the success rate of construction SMEs in terms of project delivery, there is no evidence of effective time-management practices adopted by SMEs to achieve sustainable success rates in terms of construction project delivery. Therefore, it is important to assess why SMEs are confronted with time-management practices problems and are unable to complete construction projects on time. This article identifies the most effective time-management practices that can be adopted by construction SMEs to enhance construction project success.

2. LITERATURE REVIEW

2.1 SMEs' time-management practices

For SMEs to compete in a diverse environment, it is significant to monitor and understand their performances (Sa'eed, Gambo, Inuwa & Musonda, 2020: 202) in terms of completing projects timeously, in order to achieve the set objectives. In each contract, clients stipulate a time frame based on their future plans (Hatush & Skitmore 1997: 130; Tunji-Olayeni, Mosaku, Fagbenle & Amusan, 2016: 50). According to Chan and Kumaraswamy (1997: 55), the vast majority of project delays occur during the project

delivery stage, where there are many unforeseen factors. Thus, for SMEs to manage construction time effectively, all construction project participants need to have all the relevant qualities such as good leadership skills, good project understanding, and common objectives with regard to achieving construction project delivery (Fapohunda, 2014: 27). In addition, Le-Hoai, Lee and Lee (2008: 368) are of the opinion that, in order to minimise construction-time delays, effective project planning during project design is needed, including the selection of a competent consulting team to develop the work plan for the SMEs, and a reliable contractor to undertake the required work. During construction project planning, SMEs need to consider work scheduling, project monitoring and controlling, leadership, progress meetings, subcontracting work, and corrective actions concerning project delays (Tunji-Olayeni *et al.*, 2016: 51).

2.1.1 SMEs' construction project work schedule

Work schedule is known as coordinating resources of works, machines and materials timeously, in order to complete a construction project within budget (Wu, Borrmann, Beibert, König & Rank, 2010: 79). Similarly, Desgagne-Lebeuf, Lehoux, Beauregard and Desgagne-Lebeuf (2019: 1843) define work scheduling as the relationship among schedule elements that are governed by various factors such as project constraints, construction methods, code of conduct, and regulations. Hence, there is a need to develop an adequate work schedule for SMEs, in order to successfully deliver the project on time and within the client's budget. However, Sigalov and König (2017: 456) contend that SMEs are faced with challenges in developing an adequate work schedule for construction projects. This is corroborated by Han, Cline and Golparvar-Fard (2015: 890), who maintain that there is a lack of detailed planning by SMEs in terms of the work schedule, and subsequently and consequently a failure to capture all operational levels of activities such as reinforcement, formwork, and waterproofing on concrete.

2.1.2 SMEs' construction project monitoring

Yang, Park, Vela and Golparvar-Fard (2015: 211) characterise 'project monitoring' as the process of keeping a close eye on the entire project management life cycle and ensuring that project activities are on the right track. It is essential for construction SMEs to anticipate potential schedule delays and exceptions at the early stages of the project (Srewil & Scherer, 2013: 178). In most cases, SMEs do not have adequate skills with respect to monitoring the project at the operational level, thus causing project delays and affecting the cost of the project (Yang *et al.*, 2015: 212). There is thus a need for SMEs to take prompt action on construction project delivery systems, in order to manage project time frames and be operative and productive at project level (Omar & Nehdi, 2016: 144).

2.1.3 SMEs' leadership on construction projects

SMEs leadership has been defined in many ways, often inconsistent but somewhat complementary to each other. Archer, Verster and Zulch (2010: 431) describe leadership as a quality possessed by a person who understands the need for SMEs to develop, direct, control and motivate, including communicating the vision to the followers with regard to sharing, mentoring and coaching subordinates and integrated construction decisions. Thus, SMEs need to engage a leader who can manage uncertainty and competition in an increasingly diverse workforce, in order to achieve the desired sustainable project success. However, Nubuor, Hongyi and Frimpong (2014: 85) note that many work-related factors such as employee's attitude, motivation among team members, and performance of manpower can affect SME leadership on a construction project, thus affecting the outcome of the project. Jowah (2016: 11) believes that poor leadership and unsuitable leadership competencies are the principal causes of SME business failures, particularly at project delivery stage.

2.1.4 SMEs' site progress meeting

The SME progress meeting is regarded as the most important tool used to ensure that the project is successfully delivered with respect to time, cost and quality (Ayodeji, Bhekisia & Clinton, 2016: 84). Ayodeji *et al.* (2016: 84) further state that all issues arising on a project are discussed and resolved during the site progress meeting. Similarly, Gorse and Emmitt (2009: 984) explain that SMEs need to have project progress meetings on a regular basis throughout the project delivery, in order to review the construction project time frames. Nonetheless, Emmitt and Otter (2007: 1073) view the progress meeting as a shared dialogue, where the design team exchange the meanings and understandings of the project with the construction team involved. In addition, Salehi and Yitmen (2020 1669) allude to the fact that site meetings are the way of project data acquisition system adopted by SMEs to enable accurate project knowledge about processes and operations on a job site. Hence, it is imperative to improve the flow of construction progress by adopting site meetings and formalising effective implementation of site progress meetings (Alvares & Costa, 2019: 1447).

2.1.5 Subcontracting work

Manu, Ankrah, Proverbs and Suresh (2013: 1018) define subcontracting as a method of transferring project performance of the work. This subsequently negatively affects manpower recruitment status in the project and the manner in which the activities are performed, in terms of the degree of control and patterns of regulations within the project. Chiang (2009: 81) regards subcontracting as a response to improbability that mainly arises

from construction project complexity, given bounded rationality of the company. In construction projects, most of the work is subcontracted to specialist contractors. Manu *et al.* (2013: 1018) confirm that roughly 80% of construction work that is tendered by the main contractor is subcontracted to SMEs. Manu *et al.* (2013: 1018) also note some of the factors that influence the subcontracting of the work to SME contractors. These include the ability to motivate labour flexibility; to undertake a construction project within the stipulated time, and to reduce labour cost, as well as the transfer of financial responsibility, and the avoidance of work compensation costs.

2.2 SMEs sustainable business performance

Athapaththu and Karunasena (2017: 52) define sustainable business performance as the business that has distinctive construction project practices and dissimilar priorities in various countries, due to market economies. Nevertheless, Labuschagne and Brent (2005: 159) indicate that SME businesses constitute one of the pillars of the country's economy and that SMEs have the responsibility to prioritise the significance of sustainability in the construction industry. Presley and Meade (2010: 436) opine that a firm intending to start a sustainable business needs to take note of stakeholders that influence or will be influenced by sustainability, including but not limited to environmental and social sustainability, while ensuring a reasonable ongoing return on investment. Although government infrastructure increases job opportunities in the general African economy, it also has an impact on the sustainable construction environment (Ugwu & Haupt, 2007: 666). Therefore, to be sustainable, the analysis of management techniques is a significant strategy that needs to be developed by SMEs in the construction industry (Lee, Lim & Tan, 1999: 301). Smit and Watkins' (2012: 6326) study reveals that SMEs need to employ competent teams, in order to ensure a sustainable and successful delivery of construction projects. Moreover, Olawale and Garwe (2010: 731) opine that managerial competencies are the key elements to the sustainability of emerging contractors in the construction industry.

3. METHODOLOGY

3.1. Research design

This study adopted a mixed methods approach comprising both quantitative and qualitative techniques to determine and propose effective time-management practices, in order to enhance the sustainability of construction SMEs' construction project delivery. A mixed methods approach allows for both quantitative and qualitative data to be collected simultaneously, analysed separately, and thereafter merged (Creswell &

Plano-Clark, 2018: 8; Isah, Shakantu & Ibrahim 2020: 8). A quantitative structured questionnaire survey on time-management practices was used to collect data from respondents to enable the researchers to generalise their findings from a sample of a population (Bryman, 2012: 232). Semi-structured face-to-face interviews were held to solicit qualitative information from some key informants on issues relating to the achievement of sustainable success rate of SMEs (Isah *et al.*, 2020: 8). The reason for collecting both quantitative and qualitative data is to elaborate on specific findings from the breakdown of the interviews, and to cross-check this data against the questionnaire data set such as similarities in the most significant time-management practices (Creswell & Plano-Clark, 2018: 27).

3.2. Population, sampling, and response rate

A combined list of 2,721 Grades 1 to 4 contractors who are busy with project or previously undertaken a construction project, registered on the CIDB Eastern Cape contractors' online list, was obtained from the CIDB database. This includes 2,554 registered contractors under Grade 1; 71 under Grade 2; 40 under Grade 3, and 56 under Grade 4 as construction SME's, making it impossible to obtain responses from the entire population. For the quantitative questionnaire survey, a purposive sampling approach (De Vos, Strydom, Fouche & Delpont, 2005: 202) was used to select 128 construction SME's, from metropolises (East London, Port Elizabeth, Mthatha, Butterworth) of the Eastern Cape province in South Africa, who had previously completed a construction project and those who are currently busy with a construction project to participate in the study, indicating a 4.7% sample size for the study. From the recommended sample size table of Krejcie and Morgan (1970: 608), the recommended sample size for a population of 2,600 is 254, and this recommendation does not validate the sample size of 128 as efficient for the population of 2,721 in Table 1. It must be noted that this study focuses on the quality of the results rather than on the quantity of the population. Thus, the population of the study was selected based on SMEs' experience and previous construction project success to determine effective modalities for SMEs to achieve a sustainable success rate. 128 questionnaires were sent to the participants by email and hard copies were administered to the firm's management team available on construction sites. A total of 59 questionnaires were completed correctly and returned, representing a 46% response rate. This response rate is good to support this empirical study, as built-environment survey response rates vary between 7% and 40%, in a broader perspective (see Moyo & Crafford, 2010: 68).

Table1: Eastern Cape metropolises CIDB grading

<i>Grade of the contractor</i>	<i>No. of SMEs in general building (GB) (population)</i>	<i>Sample</i>
Grade 1	2554	56
Grade 2	71	20
Grade 3	40	20
Grade 4	56	32
Total	2721	128

For qualitative data collection, purposive convenience sampling was used to sample four participants for interviews. Purposive sampling allows the researcher to choose participants based on their characteristics, pre-knowledge and capability of providing adequate knowledge deemed necessary for a study (Bless, Higson-Smith & Sithole, 2013: 172).

3.3. Data collection

A structured questionnaire survey was distributed to 128 Grades 1 to 4 contractors (including directors, project managers, quantity surveyors, contract managers, commercial managers, site agents, site engineers and/ or any other company representative from 15 June 2019 to 17 July 2019. The questionnaire consisted of three sections. The first section obtained the biographic profile of the targeted population, namely age, gender, position in the business, highest educational level, number of years' experience in the business, and the CIDB grade. Section two is a set of 16 Likert-scale items relating to the construct 'time management' for SMEs to enhance sustainable success rate. Section three covers a set of 7 Likert-scale items regarding the construct 'leadership, project work schedule and control'. Participants were requested to rate their level of agreement on the statements regarding time-management practices that can be implemented by SMEs to avoid time-overrun and achieve sustainable construction project delivery in South Africa. The results from these measurements form the items used in the descriptive analysis. To reduce the respondents' bias, closed-ended questions were preferred for sections two and three (Akintoye & Main, 2007: 601).

The semi-structured interview guide contains only one major question: "What are the most effective time-management practices / strategies adopted by your SME firm to avoid or minimise project delay to achieve sustainable success rate?" This question was asked to gain, from the perceptual views of the participants, a broad understanding of time-management practices employed by SMEs in the Eastern Cape Province.

3.4. Data analysis and interpretation of the findings

The Statistical Package for the Social Sciences (SPSS), version 25 was used to analyse time-management, by means of descriptive statistics (Pallant, 2013: 134). The frequencies and percentages of responses were generated and reported, in order to describe the respondents' profile.

To analyse which of the time-management practices could achieve sustainable construction project delivery, the measures were rated on a five-point Likert scale, and ranked, in terms of their mean scores, on the following scale measurement, where 1 = Strongly disagree (SD) (≥ 1.00 and < 1.80); 2 = Disagree (D) (≥ 1.81 and ≤ 2.60); 3 = Neutral (N) (≥ 2.61 and ≤ 3.40); 4 = Agree (A) (≥ 3.41 and ≤ 4.20), and 5 = Strongly agree (SA) (≥ 4.21 and ≤ 5.00). Likert-type or frequency scales use fixed choice response formats and are designed to measure attitudes or opinions and even perceptions (Leedy & Ormrod, 2014: 185).

For the analysis of the internal reliability in the statements on the questions on time-management, Cronbach's alpha values were tested (Kolbehndori & Sobhiyah, 2014: 347). Taber (2018: 1279) suggests that the acceptable values of Cronbach's alpha would range from 0.60 to 0.95. For this study, a cut-off value of 0.80 was assumed.

Using content data analysis, a nuanced account of the data could be presented by transcribing, coding and setting themes from the responses of the interviews (Flick, 2011). For this article, the raw data on time-management was analysed and transcribed under conceptual themes such as 'effective time-management practices' and 'time-management through leadership project work schedule and control'.

4. RESULTS

4.1 Profile of the respondents

Table 2 presents the profile of the 59 SME respondents. Based on frequency of occurrence, most of the respondents (62.7%) were males, aged between 18 and 39 years (64.4%). Of the respondents, 10.2% are in the age group 18-25 years. This shows that there are few participants aged between 18 and 25 years in the management team of SME contractors. Just over half the respondents (57.6%) are either construction managers (20.3%) or site agents/foremen (37.3%) and have between 6 to 15 years' experience in SME contractor work (50.8%). In addition, 32.2% of the respondents were other professionals (site engineers, site representatives, and directors). This indicates that SME projects are mostly run by site agents, foremen or other professionals.

Most of the participants (72.9%) had either a national diploma (47.5%) or bachelor's degree (25.4), and 11.9% had matriculated. This proves that most of the respondents within SMEs management team have tertiary qualifications and are qualified to work in the construction industry.

Respondents were almost equally distributed for Grades 2 to 4 in CIDB grading with 22% in Grade 2, 35.6% in Grade 3, and 32.2% in Grade 4 contractors. Most of the active firms (89.8%) employed contractors with CIDB grading between 2 and 4.

Table 2: Profile of the respondents

<i>Characteristic</i>	<i>Category</i>	<i>Frequency (N = 59)</i>	<i>%</i>
Age	18-25 years	6	10.2
	26-39 years	32	54.2
	40-49 years	14	23.7
	50-59 years	7	11.9
Gender	Male	37	62.7
	Female	22	37.3
Position	Quantity surveyor	6	10.2
	Construction manager	12	20.3
	Site agent/foreman	22	37.3
	Others	19	32.2
Qualifications	Below matric	1	1.7
	Matric certificate	7	11.9
	National diploma	28	47.5
	Bachelor's degree	15	25.4
	Others	8	13.6
Experience	1-5 years	22	37.3
	6-10 years	15	25.4
	11-15 years	15	25.4
	16-20 years	4	6.8
	20 years and above	3	5.1
CIDB grading	Grade 1	6	10.2
	Grade 2	13	22.0
	Grade 3	21	35.6
	Grade 4	19	32.2

4.3 Effective time-management practices

Table 3 ranks the mean scores to show the level of agreement with the 16 items rated in the construct 'time-management' on how effective time-management practices are for construction SMEs, as perceived by respondents in practice.

Table 3 indicates a composite score (average MS) of 4.03 for the 'time management' construct, indicating that, on the mean evaluation scale,

Table 3: Effective time-management practices

Statements	(N = 59)						Cronbach's alpha 0.84 Descriptive statistics			
	1 = Strongly disagree (SD) ... 5 = Strongly agree (SA)						Mean	Std.	Rank	
	SD %	D %	N %	A %	SA %					
Progress meetings with consultants to ensure regular monitoring of the progress of work	0.0	0.0	11.9	47.5	40.7		4.29	.67084	1	
Strategic planning to recover time lost	0.0	1.7	10.2	47.5	40.7		4.27	.71512	2	
Effective management of subcontractors	1.7	0.0	3.4	59.3	35.6		4.27	.69059	2	
Allocation of tasks to workers according to their skills and expertise	0.0	1.7	11.9	47.5	39.0		4.24	.72728	3	
Effective decision-making by management team	0.0	0.0	15.3	52.5	32.2		4.17	.67345	4	
Recruiting management team with relevant experience	0.0	1.7	16.9	50.8	30.5		4.10	.73567	5	
Client project changes during construction stage influence the project delivery	0.0	3.4	22.0	40.7	33.9		4.05	.83921	6	
Timeously requesting outstanding drawing information or specification	0.0	3.4	20.3	47.5	28.8		4.02	.79852	7	
Effective coordination of available resources	0.0	0.0	22.0	55.9	22.0		4.00	.66953	8	
Time management on project is set as the culture of the company	0.0	1.7	20.3	57.6	20.3		3.97	.69397	9	
Administration of contract instruction on time	0.0	1.7	16.9	64.4	16.9		3.97	.64236	9	
Availability of sufficient funds to avoid project time overrun	1.7	1.7	15.3	62.7	18.6		3.95	.75255	10	
Timeous payment by client	3.4	3.4	23.7	39.0	30.5		3.90	.99473	11	
Timeous response by the design team on requested information	0.0	1.7	33.9	47.5	16.9		3.80	.73765	12	
Common objectives with regard to achieving construction project delivery	1.7	0.0	35.6	44.1	18.6		3.78	.81087	13	
Project bonuses for fast-tracking project delivery	1.7	3.4	37.3	35.6	22.0		3.73	.90650	14	
Average MS (composite score)							4.03			

respondents agree that all the measurement items are effective time-management practices for construction SMEs to achieve sustainable success rate in construction project delivery. The Cronbach's *alpha* was greater than 0.80 at 0.84, indicating good internal reliability, as recommended by Taber (2018: 1279).

It is noticeable that 88.2% of the respondents agreed that effective progress meetings with consultants to ensure regular monitoring of the progress of work (MS=4.29) is the core time-management practice. Only 11.9% of the respondents were neutral, whereas none of the respondents disagreed. Strategic planning to recover time lost, together with effective management of subcontractors are equally ranked second, with MV=4.27. Nonetheless, effective subcontractor management was most important, with std=0.69, compared to 0.72 for strategic planning, to recover time lost. It is notable that 94.9% of the respondents agreed that effective management of subcontractors, (MS=4.27) is important in respect of SME time-management. Nevertheless, 3.4% of the respondents were neutral and 1.7% disagreed. With respect to strategic planning to recover time lost, an overwhelming 88.2% of the respondents agreed to adopt the modality, while 10.2% of the respondents were neutral and 1.7% disagreed. However, 86.5% of the respondents agreed on effective allocation of tasks to workers according to their skills and expertise, shown by a MS=4.24 and ranked third; 11.9% of the respondents were neutral, and only 1.7% disagreed on this modality. With a MS of 3.73, the lowest rated modality is project bonuses for fast-tracking the project delivery.

4.4. Effective time management through leadership, project work schedule and control

Table 4 ranks the mean scores to show the level of agreement with the 7 items rated in the construct 'leadership, project work schedule and control' on how effective time-management practices through leadership, work schedule and control are for construction SMEs, as perceived by respondents in practice.

Table 4: Time management through leadership, work schedule and control

Statements	(N = 59)					Cronbach's alpha 0.80		
	SD	D	N	A	SA	Descriptive statistics		
	%	%	%	%	%	Mean	Std.	Rank
Progress meeting to resolve uncertainties	0.0	0.0	13.6	57.6	28.8	4.15	.63825	1
Adequate sequencing of activities on site to avoid unnecessary idle time	0.0	1.7	16.9	49.2	32.2	4.12	.74475	2

Statements	(N = 59)					Cronbach's alpha 0.80		
	1 = Strongly disagree (SD) ... 5 = Strongly agree (SA)					Descriptive statistics		
	SD %	D %	N %	A %	SA %	Mean	Std.	Rank
Effective communication between the contractor and the design team	0.0	1.7	15.3	55.9	27.1	4.08	.70192	3
Effective as built project sensing	0.0	0.0	18.6	54.2	27.1	4.08	.67691	3
Continuous monitoring at project level	0.0	1.7	15.3	57.6	25.4	4.07	.69144	4
Effective on-time project monitoring	0.0	0.0	27.1	49.2	23.7	3.97	.71838	5
Effective works schedule development and control	0.0	3.4	18.6	59.3	18.6	3.93	.71594	6
Average MS (composite score)						4.06		

Table 4 indicates a composite score (average MS) of 4.06 for the 'leadership, project work schedule and control' construct, indicating that, on the mean evaluation scale, respondents agreed that all the measurement items are effective time-management practices for construction SMEs to achieve sustainable success rate in construction project delivery. The Cronbach's *alpha* was 0.80, indicating good internal reliability, as recommended by Taber (2018: 1279).

From Table 4, it is notable that effective progress meetings to resolve uncertainties is ranked first, with MS=4.15. This is indicated by the fact that an overwhelming 86.4% of the respondents agreed that effective progress meetings to resolve uncertainties is a significant time-management modality that could enable construction SMEs to achieve sustainable success rate in project delivery. However, a notable 16.9% of the respondents were neutral, and a minority of 1.7% disagreed. In addition, adequate sequencing of activities on site to avoid unnecessary idle time is ranked second, with MS=4.12, with 81.4% of the respondents agreeing on this modality, while only 1.7% disagreed. Of the respondents, 83% agreed that effective communication between the contractor and the designing team is significant, and this ranked third, with MS=4.08. Of the respondents, 15.3% were neutral and 1.7% disagreed. From the results, it can be noted that the least ranked modality is effective works schedule development and control, with MS=3.93.

4.5. Interview results

4.5.1. Rationale of interviews

Semi-structured interviews were performed as a tool to validate the quantitative data. These interviews were conducted with participants who were part of the questionnaire survey. The focus was on the most effective

time-management practices and time management through leadership project work schedule and control adopted by construction SMEs. Thus, the results from the quantitative data were adopted as the guide in conducting the interviews.

4.5.2. Background information on the interviewee and the firm

The first interview (referred to as respondent A) was conducted with the firm's director on 5 September 2019 in King William's Town, a suburb of East London in the Eastern Cape province. The second interview (referred to as respondent B) was conducted with the firm's director, on 6 September 2019 in Southernwood suburb of East London at 14:45 pm in the meeting room of the SME contractor during office hours. The third interview (referred to as respondent C) was conducted with a firm's director, who was the sole management executive at the company. The fourth interview (referred to as respondent D) was conducted on 23 September 2019 with the contract manager, who managed all the construction sites of the company.

4.5.3 Effective time-management practices

Respondent A defined 'planning' as time-management practice, and the planning of activities carried out directly with people who are directly involved in the project. The director also pointed out that planning is carried out, using software and manual planning sheets. For instance, respondent A mentioned: "The programme is managed through weekly progress meetings, and if there are any changes to the programme, these get communicated to everyone involved in the project, who also check safety issues on the project." The respondent also indicated that a monthly meeting is also held with the consultants and the contractor to evaluate the progress of work.

Respondent B revealed that the firm normally planned the time per task, using the estimated time and the experience on the task performance possibilities that were used as the basis for the construction programme at the beginning of the project. With that accurate programme developed, the firm can develop a projected cash flow for the project, and that construction programme is developed using MS Project. The respondent cited examples such as: "For some small projects, the firm does not necessarily develop the construction programme, but rather the project is built based on previous experience. Project plans are carried out by integrating the team involved on construction sites, and the team looking after sites are hired based on their qualifications and experience."

Respondent C pointed out that when the project fell behind, the firm increases labour working hours, including working on weekends to catch up

on the programme, and working on holidays. The respondent stated: “The time required for the project was managed through effective communication among the team involved in the project.”

Respondent D stated that the drawings were an important part of project scope, and that periodic meetings (technical or progress) are held on site to address any missing information on the project. The firm timeously requested the missing information and put time frames on the request, as the information missing on the drawing is provided.

4.5.4 Effective time management through leadership, project work schedule and control

Respondent A noted that leadership qualities were scrutinised during the recruitment of the management team, and that people are employed based on their skills and expertise. Respondent A was quoted as saying: “A leader on a construction site has to be willing to work with the team and also to be responsible for controlling and managing the team.”

Respondent B noted that, at the beginning of each project, the firm organises a team-building session, where the team discusses the scope of work and how to successfully deliver the project. The respondent further stated that the key is to continuously monitor and revise the programme as work progresses and communicate the changes with the team. The respondent noted: “Every month during the construction stage, the company had a team-building meeting to reflect on the progress of the work and used those meetings to avoid previously experienced mistakes. During the team-building meeting, everyone is given the opportunity to advise.” The respondent further mentioned that the firm has no manuals of time-management practices, as they are always rushing to work on the projects.

Respondent C claimed that there is effective communication among the project team, which included the team on site and the directors of the company, as a tool to keep update on the project progress. On the other hand, respondent C stated that the time on project is managed through effective communication among the team involved on the project. As an example, the respondent noted: “The drawings are an important part of project scope and periodic meetings (technical or progress) are held on site to address any missing information on the project.”

4.6 DISCUSSIONS OF THE FINDINGS

4.6.1 Effective time management practices

The quantitative findings revealed that effective progress meetings with consultants to ensure regular monitoring of work progress was the most significant effective time-management practice, with MS=4.29. This finding aligns with that of Emmitt and Otter (2007: 411) who point out that meetings are used for different purposes, from team-building and maintenance to discussions of progress, the resolution of arising problems, and closure of tasks. Ayodeji *et al.* (2016: 85) adds that each party working on a construction project has different expectations for how to gauge the project success, which is carried out through communication between all parties involved.

The quantitative results revealed strategic planning to recover time lost, together with effective subcontractor management, as the second notable time-management practice employed by SMEs during construction project delivery, with MS=4.27. With regard to strategic planning, Hazir (2015: 808) opines that a strategic planning, monitoring and control system works to minimise time overrun from project plans and consists of identifying and reporting the project status and comparing the progress with the planned progress, including analysing the problems and implementing the corrective action. Regarding effective subcontractor management, Wang and Liu (2005: 395) reveal that a good project management strategy is to pay more attention to subcontractors, in order to prevent any delay that might arise in construction projects. In an effort to deliver sustainable projects, SMEs rely on the effectiveness of both strategic planning and management, as well as communication with subcontractors. The quantitative findings indicated the allocation of tasks to workers according to their skills and expertise as the third significant modality to be adopted by construction SMEs, with MS=4.24. This is corroborated by Nagaraju and Roddy (2012: 375), who note that, in a construction project, each and every activity is allocated a specific number of resources that must be completed within the available time, in order for SMEs to successfully complete the project on time.

Qualitative analysis revealed that the following factors were significant: effective project planning, weekly progress meetings, effective communication (respondent A), using experience to determine activity duration, monthly progress meetings (respondent B), labour production, early project completion (respondent C), clear planning, setting realistic project goals, and periodic progress meeting (respondent D). Using experience to determine activity duration (respondent A) is in line with Shi, Ye, Lu and Hu (2014: 237) who refer to experience as the ability of the firm to schedule and control activities during sustainable construction projects.

However, construction SMEs adopt setting of realistic goals for the team as a tool in order to complete the project on time, as indicated by respondent D. This is corroborated by Hsiaw (2013: 602), who points out that people react to goals in a way that is consistent with the outcomes of the project. This is the reason why the project management team need to set realistic goals for the team working on site.

4.6.2 Effective time management through leadership, project work schedule and control

Among effective time-management practices, construction SMEs manage time through effective leadership, work scheduling and control. As indicated in Table 4, progress meetings to resolve uncertainties, with MS=4.15, is the most significant leadership modality adopted by construction SMEs to complete projects in time. This finding is supported by Maki (2015: 233) who maintains that sustainable success is achieved through SMEs behaviour, interaction and communication in construction projects, and the clarification on issues relating to the project by different parties to share their knowledge.

Adequate sequencing of activities on site to avoid idle time is the second most significant time-management modality of effective leadership. This finding correlates with Harris and McCaffer (2013: 99-221), who argue that effective scheduling of activities forms the basic logic to achieve planning models and help the project manager in understanding the project and interrelationships between the major activities. Furthermore, Table 4 also indicates that effective communication between the SME and the project design team as the third most significant leadership skill applied by construction SMEs, with MS=4.08. This finding is in line with normative literature such as Zuo, Zhao, Nguyen, Ma and Gao (2018: 427) and Ochieng and Price (2010: 1160) and Myers and Eike (2020: 294) who suggest that effective communication among project teams is the evidence that indicates that an integrated team is significant in terms of improving productivity. In addition, Baiden and Price (2011: 131) conclude that effective communication adopted by construction SMEs and other parties involved in construction projects is central to effective performance with regard to the fulfilment of different skills required in the construction industry.

With respect to effective leadership adopted by construction SMEs to achieve sustainable construction project success, SMEs employ the following: employment of human resources based on their skill, willingness of the team to deliver (respondent A), increased working hours, involving site management team in planning (respondent B), effective communication among the team (respondent C) and requesting outstanding information (respondent D). However, employment of human resources based on their

skills confirms quantitative findings in recruitment of management team with relevant experience, with a value of $MS=4.10$. This finding is justified by Wright and McMahan (2011: 8), who suggest that construction firms need to employ skilled human resources with multiple skills in order to fill the gap, and those individuals can be moved between the construction sites. The qualitative results revealed that requesting outstanding information from the designing team constitutes the most significant tool adopted by SMEs to manage time in construction projects. In support of this finding, Higgins, Fryer, Stratton, Simpson and Reginato (2012: 3) opine that request for information is a tool for SME contractors, subcontractors and designing teams to record circulated information to achieving sustainable construction project success.

5. CONCLUSIONS

This article assessed effective time-management practices adopted by construction SMEs to achieve sustainable construction project success. Among effective time-management practices adopted by construction SMEs, site progress meetings held between the contractor and the design team members ($MS=4.29$), strategic planning to recover time lost ($MS=4.27$), effective subcontractor management ($MS=4.27$) and allocation of tasks to workers according to their skills and expertise ($MS=4.24$) were perceived as the most important ones. These findings were validated using qualitative interviews. The results align with the quantitative analysis, as the respondents noted effective time-management practices that are adopted by construction SMEs include effective project planning by construction SMEs and effective progress meetings which relate to strategic planning to recover time lost. It is important that SMEs adopt these time-management practices to limit construction project failure as a result of ineffective time-management. However, the qualitative findings were not in line with the quantitative findings in respect of communication between parties involved in the project. The respondents believed that effective communication between the SME contractors and the design team members and the willingness of the team within the company to deliver is significant towards effective time-management. Also, increasing working hours to recover time lost on construction projects and setting realistic goals for construction projects are the most significant time-management practices adopted by construction SMEs. Notwithstanding, the quantitative results shows that SMEs does not really consider project-based bonuses to fast-track construction projects.

The limitation of this study is that it focuses on Small to Medium Enterprise (SME) contractors with CIDB grading between 1 and 4 who are registered in the Eastern Cape Province. Therefore, further studies should focus on SMEs based in other provinces to establish if similar findings would emerge.

REFERENCES

- Adendorff, C., Appels, G. & Botha, B. 2011. Strategic management: An Eastern Cape construction SME case study. *African Journals Online*, 18(2), pp. 40-63.
- Akintoye, A. & Main, J. 2007. Collaborative relationships in construction: The UK contractor's perception. *Engineering, Construction and Architectural Management*, 14(6), pp. 597-617. DOI: <https://doi.org/10.1108/09699980710829049>
- Alvares, J.S & Costa, D.B. 2019. Construction progress monitoring using unmanned aerial system and 4D BIM. In: *Proceedings of the 27th Annual Conference of the International Group for Lean Construction*, 1-7 July, Dublin, Ireland: IGLC, pp. 1445-1456. <https://doi.org/10.24928/2019/0165>
- Archer, M., Verster, J.J.P. & Zulch, B.G. 2010. Leadership in construction project management: Ignorance and challenges. In: *Proceedings of the 5th Built Environment Conference*, 18-20 July, Durban, South Africa, (Vol. 18), p. 20. ISBN: 978-0-620-46703-2
- Arditi, D., Nayak, S. & Damci, A. 2017. Effect of organizational culture on delay in construction. *International Journal of Project Management*, 35(2), pp. 136-147. <https://doi.org/10.1016/j.ijproman.2016.10.018>
- Assaf, S.A. & Al-Hejji, S. 2006. Causes of delay in large construction projects. *International Journal of Project Management*, 24(4), pp. 349-357. <https://doi.org/10.1016/j.ijproman.2005.11.010>
- Athapaththu, K.I. & Karunasena, G. 2017. Framework for sustainable construction practices in Sri Lanka. *Built Environment Project & Asset Management*, 8(1), pp. 51-63. <https://doi.org/10.1108/BEPAM-11-2016-0060>
- Ayodeji, O., Bhekisia, M. & Clinton, A. 2016. Site meeting as a sustainable construction tool. *The Scientific Journal for Theory & Practice of Socio-economic Development*, 5(9), pp. 83-92.
- Baiden, B.K. & Price, A.D.F. 2011. The effect of integration on project delivering team effectiveness. *International Journal of Project Management*, 29(2), pp. 129-136. <https://doi.org/10.1016/j.ijproman.2010.01.016>
- Bajari, P. & Lewis, G. 2009. Procurement contracting with time incentives. *Quarterly Journal of Economics*, 126(3), pp. 1173-1211. <https://doi.org/10.1093/qje/qjr026>
- Bikitsha, L. & Amoah, C. 2020. Assessment of challenges and risk factors influencing the operation of emerging contractors in the Gauteng Province, South Africa. *International Journal of Construction Management*. [Online]. Available at: <<https://www.tandfonline.com/doi/abs/10.1080/15623599>

.2020.1763050?journalCode=tjcm20> [Accessed: 2 June 2020]. DOI: 10.1080/15623599.2020.1763050

Bless, C., Higson-Smith, C. & Sithole, S.L. 2013. *Fundamentals in social research methods: An African perspective*. 5th edition. Cape Town: Juta & Company Ltd.

Bouazza, A.S., Ardjouman, D. & Abada, O. 2015. Establishing the factors affecting the growth of small and medium-sized enterprises in Algeria. *American International Journal of Social Science*, 4(2), pp. 101-115.

Bryman, A. 2012. *Social research methods*. 4th edition. New York: Oxford University Press.

Chan, D.W.M. & Kumaraswamy, M.M. 1997. A comparative study of causes of time overruns in Hong Kong construction projects. *International Journal of Project Management*, 15(1), pp. 55-63. [https://doi.org/10.1016/S0263-7863\(96\)00039-7](https://doi.org/10.1016/S0263-7863(96)00039-7)

Chiang, Y. 2009. Subcontracting and its ramifications: A survey of the building industry in Hong Kong. *International Journal of Project Management*, 27(1), pp. 80-88. <https://doi.org/10.1016/j.ijproman.2008.01.005>

Creswell, J. & Plano-Clark, V. 2018. *Designing and conducting mixed methods research*. 3rd edition. Thousand Oaks, CA: Sage Publications.

Desgagne-Lebeuf, A., Lehoux, N., Beauregard, R. & Desgagne-Lebeuf, G. 2019. Computer-assisted scheduling tools in the construction industry: A systematic literature review. *IFAC-Paper Online*, 52(13), pp. 1843-1848. <https://doi.org/10.1016/j.ifacol.2019.11.470>

De Vos, A.S., Strydom, H., Fouche, C.B. & Delport, C.S.L. 2005. *Research at grass roots for the social sciences and human service professions*. 3rd edition. Pretoria: Van Schaik Publishers.

Emmitt, S. & Otter, A.D. 2007. Managing design with the effective use of communication media: The relationship between design dialogues and design team meetings. In: *Proceedings of the 17th CIB World Building Congress 'Construction for Development'*, 14-17 May, Cape Town, South Africa: CIDB, 213, pp. 1072-1079.

Fapohunda, A.J. 2014. Evaluation of site manager's hindrances towards optimal utilisation of construction resources. *Journal of Engineering, Design and Technology*, 12(3), pp. 348-363. <https://doi.org/10.1108/JEDT-03-2012-0013>

Flick, U. 2011. *Introducing research methodology – A beginner's guide to doing a research project*. London: Sage publications.

Gabula, Z.H. 2012. Factors influencing the construction project success rates of reconstruction development programme housing in the Eastern Cape. A quality perspective: A census study. Unpublished M thesis, Faculty of Management Sciences, Durban University of Technology, South Africa.

Gorse, C.A. & Emmitt, S. 2009. Informal interaction in construction progress meetings. *Construction Management and Economics*, 27(10), pp. 983-993. <https://doi.org/10.1080/01446190903179710>

Han, K.K., Cline, D. & Golparvar-Fard, M. 2015. Formalized knowledge of construction sequencing for visual monitoring of work-in-progress via incomplete point clouds and low-LoD 4D BIMs. *Journal of Advanced Engineering Informatics*, 13(29), pp. 889-901. <https://doi.org/10.1016/j.aei.2015.10.006>

Harris, F. & McCaffer, R. 2013. *Modern construction management*. 7th edition. Oxford, UK: Wiley-Blackwell Ltd.

Hatush, Z. & Skitmore, M.R. 1997. Criteria for contractor selection. *Construction Management and Economics*, 15(1), pp. 19-38. <https://doi.org/10.1080/014461997373088>

Hazir, O. 2015. A review of analytical models, approaches and decision support tools in project monitoring and controlling. *International Journal of Project Management*, 33(4), pp. 808-815. <https://doi.org/10.1016/j.ijproman.2014.09.005>

Higgins, D., Fryer, S., Stratton, R. & Reginato, J. 2012. Using the forward thinking index to reduce delays related to request for information process. In: Tommelein, I.D. & Pasquire, C.L. (Eds). *Proceedings of the 20th Annual Conference of the International Group for Lean Construction*, 18-20 July, San Diego, California, USA, pp. 1-10.

Hsiaw, A. 2013. Goal-setting and self-control. *Journal of Economic Theory*, 148(2), pp. 601-626. <https://doi.org/10.1016/j.jet.2012.08.001>

Jowah, L.E. 2016. The impact of leadership styles on effective project execution. *Journal of Business Administration and Management*, 4(3), pp. 10-17.

Isah, Y., Shakantu, W. & Ibrahim, S. 2020. Utilisation of forecasting technology for improving construction logistics in Nigeria. *Acta Structilia*, 27(1), pp. 1-28. DOI: <http://dx.doi.org/10.18820/24150487/as27i1.1>

Khoshnodifar, Z., Ghonji, M., Mazlounzadeh, S.M. & Abdollahi, V. 2016. Effect of communication channels on success rate of entrepreneurial SMEs in the agricultural sector (a case study). *Journal of the Saudi Society of Agricultural Sciences*, 15(1), pp. 83-90. <https://doi.org/10.1016/j.jssas.2014.04.001>

Kolbehkori, S. & Sobhiyah, M.H. 2014. Effect of negotiations about the formation of construction consortium on consortium successful performance in Iran's construction industry. *International Journal of Management, Accounting and Economy*, 1(5), pp. 346-349.

Krejcie, R.V. & Morgan, D.W. 1970. Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), pp. 607-610. <https://doi.org/10.1177/001316447003000308>

Labuschagne, C. & Brent, A. 2005. Sustainable project life cycle management: The need to integrate life cycles in the manufacturing sector. *International Journal of Project Management*, 23(2), pp. 159-168. <https://doi.org/10.1016/j.jproman.2004.06.003>

Ladzani, M. & Van Vuuren, J.J. 2002. Entrepreneurship training for emerging SMEs in South Africa. *Journal of Small Business Management*, 40(2), pp. 154-161. <https://doi.org/10.1111/1540-627X.00047>

Lampadarios, E. 2017. An insight into entrepreneurial success factors for SMEs: The case of the UK chemical distribution industry. *International Journal of Small Business and Entrepreneurship Research*, 5(2), pp. 1-20. <https://doi.org/10.5296/csbm.v4i1.10359>

Lande, M., Shrivastava, R.L. & Seth, D. 2016. Critical success factors for Lean Six Sigma in SMEs (small and medium enterprises). *The TQM Journal*, 28(4), pp. 613-635. <https://doi.org/10.1108/TQM-12-2014-0107>

Lee, K.S., Lim, G.H. & Tan, S.J. 1999. Dealing with resource disadvantage: Generic strategies for SMEs. Faculty of Business Administration, National University of Singapore. *Small Business Economics*, 12(2), pp. 299-311. <https://doi.org/10.1023/A:1008085310245>

Leedy, P. & Ormrod, J. 2014. *Practical research: Planning and design*. 10th edition. London: Pearson Education Limited.

Le-Hoai, L., Lee, Y.D. & Lee, J.Y. 2008. Delay and cost overruns in Vietnam large construction projects: A comparison with other selected countries. *Journal of Civil Engineering*, 12(6), pp. 367-377. <https://doi.org/10.1007/s12205-008-0367-7>

Love, P.E.D., Irani, Z., Li, H., Cheng, E.W.L. & Tse, R.Y.C. 2001. An empirical analysis of the barriers to implementing e-commerce in SMEs construction contractors in the state of Victoria, Australia. *Construction Innovation*, 1(1), pp. 31-41. <https://doi.org/10.1108/14714170110814497>

Maki, T. 2015. Multi-disciplinary discourse on design related issues in construction site meetings. In: Kalle, K. (Ed.). 8th Nordic Conference on Construction Economics and Organization, 28-29 May, Tampere, Finland.

Procedia Economics and Finance (Vol. 21), pp. 231-238. [https://doi.org/10.1016/S2212-5671\(15\)00172-0](https://doi.org/10.1016/S2212-5671(15)00172-0)

Manu, P., Ankrah, N., Proverbs, D. & Suresh, S. 2013. Mitigating the health and safety influence of subcontracting in construction: The approach of main contractors. *International Journal of Project Management*, 31(7), pp. 1017-1026. <https://doi.org/10.1016/j.ijproman.2012.11.011>

Martin, L. & Root, D. 2010. Emerging contractors in South Africa: Interactions and learning. *Journal of Engineering, Design and Technology*, 8(1), pp. 64-79. <https://doi.org/10.1108/17260531011034655>

Martin, L & Root, D. 2012. Profiling emerging contractors for effective transformation in the South African construction sector. *Development Southern Africa*, 2(2), pp. 209-223. <https://doi.org/10.1080/0376835X.2012.675693>

Mauro, C.D., Ancarani, A. & Hartley, T. 2020. Framework for sustainable construction practices in Sri Lanka. *Built Environment Project and Asset Management*, 8(1), pp. 51-63. <https://doi.org/10.1108/BEPAM-11-2016-0060>

Moyo, T. & Crafford, G. 2010. The impact of hyperinflation on the Zimbabwean construction industry. *Acta Structilia*, 17(2), pp. 53-83.

Nagaraju, S.K. & Roddy, B.S. 2012. Resource management in construction projects: A case study. *Engineering Science and Technology, International Journal*, 2(4), pp. 2250-3498.

Nubuor, S.A., Hongyi, X. & Frimpong, K. 2014. The impact of transformational leadership style on project success: An empirical study of banking projects in Ghana. *International Journal of ICT and Management*, 2(1), pp. 85-95.

Ochieng, E.G. & Price, A.D.F. 2010. Managing cross-cultural communication in multicultural construction project teams: The Case of Kenya and UK. *International Journal of Project Management*, 28(5), pp. 449-460. <https://doi.org/10.1016/j.ijproman.2009.08.001>

Olawale, F. & Garwe, D. 2010. Obstacles to growth of new SMEs in South Africa: A principal component analysis approach. *African Journal of Business Management*, 4(5), pp. 729-738.

Omar, T. & Nehdi, M.L. 2016. Data acquisition technologies for construction progress tracking. *Journal of Automation in Construction*, 70, pp. 143-155. <https://doi.org/10.1016/j.autcon.2016.06.016>

Pallant, J. 2013. *SPSS survival manual – A step by step guide to data analysis using the SPSS program*. 4th edition. Berkshire: McGraw Hill.

Presley, A. & Meade, L. 2010. Benchmarking for sustainability: An application to the sustainable construction industry. *International Journal of Production Research*, 17(3), pp. 435-451. <https://doi.org/10.1108/14635771011049380>

Sa'eed, A., Gambo, N., Inuwa, I.I. & Musonda, I. 2020. Effects of financial management practices on technical performance of building contractors in northeast Nigeria. *Journal of Financial Management of Property and Construction*, 25(2), pp. 201-223. <https://doi.org/10.1108/JFMPC-07-2019-0064>

Salehi, S.A. & Yitmen, I. 2020. Modelling and analysis of the impact of BIM-based field data capturing technologies on automated construction progress monitoring. *International Journal of Civil Engineering*, 16, pp. 1669-1685. <https://doi.org/10.1007/s40999-018-0320-1>

Shi, L., Ye, K., Lu, W. & Hu, X. 2014. Improving the competence of construction management consultants to underpin sustainable construction in China. *Habitat International*, 41, pp. 236-242. <https://doi.org/10.1016/j.habitatint.2013.08.002>

Sigalov, K. & Konig, M. 2017. Recognition of process patterns for BIM-based construction schedules. *Advanced Engineering Informatics*, 33, pp. 456-472. <https://doi.org/10.1016/j.aei.2016.12.003>

Smit, Y. & Watkins, J.A. 2012. A literature review of SMEs risk management practices in South Africa. *African Journal of Business Management*, 6(21), pp. 6324-6330.

Srewil, Y. & Scherer, R. 2013. Effective construction process monitoring and control through a collaborative cyber-physical approach. In: Camarinha-Matos, N.L. & Scherer, R.J. (Eds). *Proceedings of the 14th Working Conference on Virtual Enterprises, (PROVE)*, 30 September to 2 October 2013, Dresden, Germany, pp.172-179, https://doi.org/10.1007/978-3-642-40543-3_19

Taber, K.S. 2018. The use of Cronbach's Alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), pp. 1273-1296. DOI: <https://doi.org/10.1007/s11165-016-9602-2>

Tunji-Olayeni, P.F., Mosaku, T.O., Fagbenle, O.I. & Amusan, L.M. 2016. Project management competencies of indigenous contractors in Nigeria. *African Journal of Built Environment Research*, 1(1), pp. 49-58. <https://doi.org/10.5171/2016.482398>

Ugwu, O. & Haupt, T.C. 2007. Key performance indicators and assessment methods for infrastructure sustainability – A South African construction

industry perspective. *Building and Environment*, 42(2), pp. 665-680. <https://doi.org/10.1016/j.buildenv.2005.10.018>

Wang, W.C. & Liu, J.J. 2005. Factors-based path analysis to support subcontractor management. *International Journal of Project Management*, 23(2), pp. 109-120. <https://doi.org/10.1016/j.ijproman.2004.07.011>

Wright, P.M. & McMahan, G.C. 2011. Exploring human capital: putting human back into strategic human resource management. *Human Resource Management Journal*, 21(2), pp. 93-104. <https://doi.org/10.1111/j.1748-8583.2010.00165.x>

Wu, I., Borrmann, A., Beibert, U., König, M. & Rank, E. 2010. Bridge construction schedule generation with pattern-based construction methods and constraint-based simulation. *Advanced Engineering Informatics*, 24(4), pp. 379-388. <https://doi.org/10.1016/j.aei.2010.07.002>

Yang, J., Park, M.W., Vela, P.A. & Golparvar-Fard, M. 2015. Construction performance monitoring via still images, time-lapse photos, and video streams: Now, tomorrow and the future. *Journal of Advanced Engineering Informatics*, 29(2), pp. 211-224. <https://doi.org/10.1016/j.aei.2015.01.011>

Zuo, J., Zhao, X., Nguyen, Q.B.M., Ma, T. & Gao, S. 2018. Soft skills of construction project management professionals and project success factors: A structural equation model. *Engineering, Construction and Architectural Management*, 25(3), pp. 425-442. <https://doi.org/10.1108/ECAM-01-2016-0016>