Volume 11
Issue 3
ISSN 1994 – 7402
2018

Journal of Construction

AIMS AND SCOPE

The Journal Of Construction (JOC) is the official journal of the Association Of Schools Of Construction Southern Africa (ASOCSA). ASOCSA has committed itself to foster excellence in construction communication, scholarship, research, education and practice and the JOC provides the medium to achieve this commitment. JOC is at this stage a bi-annual refereed journal serving all stakeholders and participants in the building construction and civil engineering sectors.

JOC publishes quality papers written in a conversational style aiming to advance knowledge of practice and science of construction while providing a forum for the interchange of information and ideas on current issues. JOC aims to promote the interface between academia and industry, current and topical construction industry research and practical application by disseminating relevant in-depth research papers, reviews of projects and case studies, information on current research projects, comments on previous contributions, research, innovation, technical and practice notes, and developments in construction education policies and strategies. Some issues might be themed by topic.

Topics in JOC include sustainable construction, education and professional development, service delivery /customer service, information and communication technology, legislation and regulatory framework, safety, health, environment and quality management, construction industry development, international construction, risk management, housing, construction-related design strategies; material, component and systems performance; process control; alternative and new technologies; organizational, management and resource issues; human factors; cost and life cycle issues; entrepreneurship; design, implementing, managing and practicing innovation; visualization, simulation, innovation, and strategies

In order to maintain and ensure the highest quality in JOC, all papers undergo a rigorous system of blind peer review by acknowledged international experts.

//OPEN ACCESS

The Journal of Construction is committed to open access for academic work and is, therefore, an open access journal, which means that all articles are available on the internet to all users immediately from the date of publication. This allows for the reproduction of articles, free of charge, for non-commercial use only and with the appropriate citation information. All authors publishing in the Journal of Construction accept these as the terms of publication.

Benefits of open access for authors, include:

- Free access for all users worldwide
- Authors retain copyright to their work
- Increased visibility and readership
- Rapid publication
- No spatial constraints

The Journal of Construction 2018, produced by Master Builders Print Studio.
Contact : printstudio@masterbuilders.co.za

ADVISORY BOARD

Dear Construction Industry Stakeholders,

It is customary to reflect on the year's achievements in the final issue for the year. 2017 was a remarkable year with a large number of achievements worth mentioning. After the turmoil experienced in 2016 a level of normality returned to most campuses providing the opportunity to focus on the import objective of empowering our future leaders to address the infrastructure needs of the nation.

After several years of dedicated service, the leadership baton of the Associated Schools of Construction of Southern Africa (ASOCSA) was passed on to the newly elected council and leadership. Dr Hendrik Prinsloo was elected as the new President, Mr Victor Smith as the new Vice President and Prof Kahilu Kajimo-Shakantu as the chairperson of the Heads Forum. Dr Breda Strasheim (Honorary Treasurer), Mrs Elke Heffer, Prof Kahilu Kajimo-Shakantu and Mr Ephriam Zulu (Honorary Secretary) were elected as the new members of the council.

On behalf of the new leadership I want to express my gratitude to all the past presidents and office bearers, who over a long period of time worked tirelessly to make ASOCSA the successful organisation it is today. I also want to pay tribute to the unselfish contribution of the immediate past president, Mr Ferdinand Fester, who for a long period of time executed the duties as president with vigour and with unwavering commitment.

One of the highlights of 2017 was the very successful, 11th Built Environment Conference that took place in Durban. The success of this Conference cannot only be attributed to the 62 research papers presented (more than any of the previous conferences) and the large number of participants, but more importantly the strides that were made to set in motion a common industry goal to #MakeConstructionGreatAgain.

During 2017 the Journal of Construction once again delivered high impact research papers with a strong industry focus. I want to express my sincere gratuity to all involved, who has made the Journal of Construction one of the most distinguished and popular academic publications in the construction industry during the past decade. May the next decade also be filled with accomplishments and may the Journal continue to serve the industry as platform for quality industry focussed research.

Dr Hendrik Prinsloo
President
Associated Schools of Construction of Southern Africa (ASOCSA)

JOURNAL OF CONSTRUCTION

Volume 11
Issue 2
ISSN 1994 - 7402

CONTENTS

EDITORIAL

The 1st issue of Volume 11 of the Journal of Construction (JoC) comprises four papers which cover various topics in construction discussed below.

Firstly, Mali-Swelindawo, Botha, Franks and Yan discuss a performance model for public sector property management function in South Africa. Secondly, Mollo and Emuze explored casual construction workers' job security difficulties in the central region of South Africa. Thirdly, Van Eck and Burger investigate the. Finally, Monyane and Emuze look at controlling construction cost overrun in public projects in the Free State province of South Africa

Bongiwe Mali-Swelindawo[1]; Brink Botha[2]; Oswald Franks[3] and Bingwen Yan[4]
[1]Property Management Department
Tygerburg Region (Goodwood Office)
[2,3]Department of Construction Management, Faculty of Engineering, the Built Environment and Information Technology, Summerstrand North Campus, Nelson Mandela University, Port Elizabeth, Eastern Cape, South Africa.
[4]Department of Operations Management, Faculty of Business and Management Sciences, Cape Peninsula University of Technology
Corresponding Author: Bongiwe Mali-Swelindawo
Email: Bongiwe.Mali-Swelindawo@capetown.gov.za

Lesiba George Mollo[1] and Fidelis Emuze[2]
[1,2]Department of Built Environment,
Central University of Technology, Free State, South Africa
Corresponding Author: Lesiba George Mollo
Email: lmollo@cut.ac.za

Theo C. Haupt

Research Professor, School of Engineering

Mangosuthu University of Technology
Durban, South Africa
theo.haupt@mut.ac.za

Bekale Mba Marie Francoise, University of Johannesburg, Cnr. Siemert & Beit Streets, Doorfontein Campus, Johannesburg, Tel. +27118860009,

Email: mariefrancoisebm@gmail.com
Justus Ngala Agumba, Durban University of Technology, Cnr. Botanic Gardens street & Steve Biko streetS, Berea Campus, Durban, Tel. +27313732466, Email: JustusA@dut.ac.za

A PERFORMANCE MODEL FOR PUBLIC SECTOR PROPERTY MANAGEMENT FUNCTION IN SOUTH AFRICA

Bongiwe Mali-Swelindawo[1]; Brink Botha[2]; Oswald Franks[3] and Bingwen Yan[4]

[1]Property Management Department
Tygerburg Region (Goodwood Office)

[2,3]Department of Construction Management, Faculty of Engineering, the Built Environment and Information Technology, Summerstrand North Campus, Nelson Mandela University, Port Elizabeth, Eastern Cape, South Africa.

[4]Department of Operations Management, Faculty of Business and Management Sciences, Cape Peninsula University of Technology

Corresponding Author: Bongiwe Mali-Swelindawo
Email: Bongiwe.Mali-Swelindawo@capetown.gov.za

ABSTRACT

Purpose

In the last decade, there has been increasing interest in addressing issues linked to poor operational performance and unsatisfied stakeholders in South Africa, particularly the area of public sector property management. This study developed a performance model for an effective public sector property management function in South Africa.

Methodology

The research employed a quantitative approach and positivist research paradigm. Data were collected with a Likert-scale based questionnaire completed by 171 professionals from higher educational institutions and public sector of property management in South Africa. Structural Equation Modelling was utilised to analyse the fitness of variables in the proposed model link to the management of public sector properties.

Findings

The study indicated that obsolescence and strategic factors, global alignment, transformation and sustainability, monitoring, measurement and control, and perceived successful management of public properties were identified as good fit, where other factors were acceptable fit in the performance model. The Goodness-Of-Fit Index (GFI) and Comparative Fit Index (CFI) of all the variables were greater than 0.9, Root Mean Square Error of Approximation (RMSEA) was less than 0.08, and X2 was less than 5.0, which indicated that the validity of these variables was achieved.

Value

This study contributed a performance model that could be of assistance in guiding public sector property management function in South Africa. The study further added valuable to public sector property management leadership for effective property management in the African continent at large.

Keywords: Property management, public sector, performance model, leadership, governance

1 . INTRODUCTION

Public Sector Property Management (PSPM) is most often referred to a set of strategies aimed at preserving public assets and boosting economic growth by implementing optimal solutions1. In a democratic state, citizens' voices are heard where government leadership is concerned. Citizens choose who administers the country. The fact is, people shall always 'govern'. In addition, public sector properties in the form of buildings are very important to the public as they provide services that support human wellbeing, and in turn, deliver economic prosperity2. In the case of South Africa, as the country has been a democratic country since 27 April 1994. The country has three spheres of government: national, provincial and local. Each of these spheres is mandated with specific responsibilities to accomplish and specific authorities to administer. These spheres are not interdependent; each sphere is measured independently based on relevant stakeholder's requirements. Then again, there are externalities that impact on the operations of each of these spheres.

For instance, the local government's management of properties is heavily impacted by issues of obsolescence, global alignment, finance and cost control, including direct pressures associated with political power, environmental degradation, social instabilities, technological exaltations, economic fluctuations and legal requirement pressures. All these impact on

perceived successful management of public sector properties. The property asset is considered a resource that must be improved in order to make a more significant contribution to the overall effectiveness of local government3. If not systematically monitored, measured and controlled, current expectations and changes within the PSPM function will negatively impact on public property stakeholder requirements. This will result in endless problems that are related to overall poor operational performance, unsatisfied stakeholders and inadequacy in global and competitiveness alignment. Therefore, this becomes critical for this study to develop a systematic approach for improving performance and management of public sector properties.

In order to develop a performance model for the effective management of public sector properties, the key factors that impact on successful management of public properties was explored. These include obsolescence and strategic factors, global alignment, finance and cost control and PESTEL impact; transformation and sustainability; leadership and governance; as well as, monitoring, measurement and control.

2. LITERATURE REVIEW

Public Sector Property Management Review

On a daily basis, the public sector has to deal with pressures of balancing budgets, quality service provision and most importantly, avoiding retrenchments of employees4. This is one of the reasons why the study saw local government as having a need to adopt and implement a holistic practical solution facilitating successful management of public sector properties whilst also fulfilling its stakeholders' requirements. On the other hand, when it comes to statutory requirements, local government's share of total public expenditure is so great that the national government has no other choice but to exert strong pressure of control over local government expenditure in order to maintain macro-economic stability5. Researchers point out that property has different, yet imperative purposes to different property owners or potential investors; with property, the owner could acquire capital gain and profits6. A property investment is a source for gearing capital; used as an individual company; a core business where the entrepreneur has experience and interest; and a property could be a real estate asset for business purposes such as a bed and breakfast, hotel or farm.

Property investment diversification can result in risk reduction. A property could be used for tax purposes, used as the first step and source of growth for overall business portfolio such as small scale development or rental property6. A property is a tangible asset to diversify a portfolio of intellectual property. Additionally, properties can be used to provide an income even though it might not be a significant part of the business. Moreover, a property could be subdivided, such as a farm undergoing subdivision for development, etc.6 Most of the above-mentioned property usages are readily practiced by the public sector as it is also a property owner. In all, properties are an excellent investment. It is argued that the real estate business is like a laboratory for testing theories and techniques of decision theory, economics, probability, psychology, sociology and other research areas7. In supporting this view point, the real estate business involves many problems or puzzles that fascinate both amateur and professional scientists.

Identified possible usages of a property and challenges faced by PSPM validates the reality that properties are closely connected to human issues such as economic and social aspects. Therefore, local government powers and functions could have a marked impact on the social development of communities if exercised efficiently. Based on the abovementioned, there are several variables that impact on PSPM. These are not limited to obsolescence and strategic factors; global alignment; finance and cost control as well as PESTEL impact. There were several proposed hypotheses however, not all of those were positively validated by survey. Validated hypotheses were formulated in line with each key factor as discussed below.

Obsolescence and strategic factors

Obsolescence and strategic factors have an impact in PSPM because public sector owns properties. This research variable is explained by firstly discussing urban and building obsolescence, including strategic factors. Property obsolescence is defined as a phenomenon of decline in the value of the building structure on the property8. Obsolescence is a serious threat to immovable property because it rarely accounts for the immobile, long-lasting and capital intensive aspects of the property9. Therefore, building obsolescence could be summarised as a condition where a building is no longer able to meet its primary requirements, including durability and value. These are challenges such as urban and building obsolescence. This is a demonstration that while 'blue sky' thinking on the part of leadership certainly has its place, these plans have to be based on property management realisms if this function is to be successful. The relationships between

obsolescence and strategic factors, transformation and sustainability (H1), leadership and governance (H2), and monitoring, measurement and control (H3) were hypothesised as the following:

H1 There is a positive relationship between obsolescence and strategic factors and transformation and sustainability towards successfully managing public sector properties.

H2 There is a positive relationship between obsolescence and strategic factors and leadership and governance towards successfully managing public sector properties.

H3 There is a positive relationship between obsolescence and strategic factors and monitoring and control towards successfully managing public sector properties.

Global alignment

The challenge presented to the international built environment at the end of the 20th century to address global environmental sustainability effectively, was substantial and required international coordination and organization10. The global sanctions against South Africa during the Apartheid era disadvantaged the economy of that country for many years, as there were minimal trade relationships between South Africa and many other countries out there. It was in the year 1994 that South Africa's political democratisation allowed this country to reintegrate into the world's economy11. The new democracy then opened imports, exports and investment doors. This benefited the country in terms of being a global business partner. This meant that, South Africa (or in fact any country) had better be serious about global alignment since South Africa welcomes international foreigners and tourists in large numbers on a daily basis. The global alignment aspect is explained with reference to very significant subjects relevant to global alignment and these are globalisation, competitiveness and service quality. These are also considered to have an impact on the successful management of South African public sector properties.

In addition, the chronic problem that we observe in developing countries such as South Africa is that, it is very difficult for local government to also focus on competitiveness goals. In most cases, time and focus is only related to social goals. There are many reasons for this, however: a prominent one is that of poverty. In developing countries, majority of citizens are living below the poverty line. Whilst municipalities are self-financed, it becomes very difficult for them to yield profits if only focusing on social goals. They cannot shy away from economic realities or the challenges of a developing country24. This is because global competitiveness also means maintaining a positive bottom line. Nevertheless, despite social challenges faced by South African local government, the organisation has to sustain competitiveness and abide by quality principles as these will positively impact on global alignment. The relationships between global alignment and transformation and sustainability (H4), leadership and governance (H5) and monitoring, measurement and control (H6) was hypothesised as the following.

H4 There is a positive relationship between global alignment and transformation and sustainability towards successfully managing public sector properties.

H5 There is a positive relationship between global alignment and leadership and governance towards successfully managing public sector properties.

H6 There is a positive relationship between global alignment and monitoring, measurement and control towards successfully managing public sector properties.

Finance and cost control

There are anxieties related to public sector financial controls. Although much has been done to ensure sound financial management at local government level, some municipalities still have an inadequate financial management capacity. This poses a sizable risk because budgeting, accounting, credit control and financial reporting systems are weak12. Sound financial management in a public sector is necessary for cost control because, although a property owner gains rental advances, the reality is that the same rents also covers the exact costs of providing accommodation services13. However, this should not encourage misuse of financial resources. A property management function ought to manage associated costs efficiently.

The advantage of this is that good cost management in property management function affords a correct environment for carrying out core business on a cost-effective and best-value basis14. The relationship between finance and cost control and transformation and sustainability (H7), leadership and governance (H8) and monitoring, and measurement and control H9)

was hypothesised as below.

H7 There is a positive relationship between finance and cost control and transformation and sustainability towards successfully managing public sector properties.

H8 There is a positive relationship between finance and cost control and leadership and governance towards successfully managing public sector properties.

H9 There is a positive relationship between finance and cost control and monitoring, measurement and control towards successfully managing public sector properties.

PESTEL Impact

PESTEL is an abbreviation of the words Political, Economic, Social, Technological, Environmental and Legal. All these factors, are some of the crucial influencers in PSPM, hence there was a need to analyse them so as to determine how these aspects impact on PSPM.

Political impact

South African political arena is not stable or matured; as a result, politics incapacitate SA government in proactively responding to citizens' concerns and needs. The government is reluctant to take decisive action on important matters and as a result people are said to have lost faith in government and its agencies15. This results in rising levels of dissatisfaction and anger amongst those that are recipients of poor services and those that are observing real or perceived corruption by government officials. These negativities have a knock-on-effect on PSPM.

Environmental Impact

There is a global threat to the natural environment16. This study identified power supply, catastrophes and climate change as some of the worst impacts to the environment. Mostly the actions of urban areas are heavily impacting on the environment, but the burning issue is that urban population do not understand their dependence on both local and distant ecosystems16. Thus the public sector has the responsibility of ensuring that this challenge is taken up through the democratic decision-making process including public education.

Now more than ever, there is a strong need for education that is directed at ensuring that citizens are responsible for sound environmental preservation. For example, walking on the 'economic' areas of Nyanga Township in Cape Town (e.g. bus and taxi terminus), the main source of informal business in Nyanga and other townships of Cape Town (and South Africa as a whole) is that of clinching meat by grilling it directly on coals or fire. In South African townships, this is referred to as 'Ukubenga','Tshisa-nyama' or 'uKoja', where a variety of meat cuts are clinched directly on coals and sold to the community at affordable prices. Due to these types of businesses, there are always fumes and smoke from burning fires in South African townships such as Nyanga.

Social impact

The issue of social responsibility is speedily intensifying in businesses and corporations due to the significant impact of their operations on the society. Public sector has a huge social responsibility to the communities and citizens it serves17. However, the issue of social responsibility to the public sector's major stakeholders (i.e. the public itself) is also a big part of the 'puzzle' that should not be ignored. The issue of social responsibility is speedily intensifying in businesses and corporations due to the significant impact of their operations on the society17. Surely this is a primary focus for PSPM as well, as this function serves the citizens.

Technological impact

Property management is also impacted by technology. Nowadays there are service acceleration programs that aid in efficient service delivery. For instance, researchers found that mayors are the driving forces behind the effort of e-government18. South African mayors could also generate citizen support and a way of leveraging citizen support and conflicts through e-government. There is also Information and Communication Technology (ICT) in which South African PSPM could really benefit from programmes such as these and attract public participation on issues such as developing vacant land, legal evictions, and identification of areas for expropriation, piloting of urban renewal projects, disposal or expropriation by the PSPM, etc. Nonetheless, for e-government and any other relevant programs to be effective, a majority of the citizens should have access to computers; mobile phones; internet etc. these are also a limitation in a development country such as South Africa. Therefore, local government should first facilitate provision of relevant aid (e.g. Wi-Fi) and implement technological contact devices for its communities38.

Economic impact

Economics also impacts on PSPM. For a very long time, local government real estate was never measured as an economic asset or basis for income19. This is unfortunately the reality even today, due to exclusive focus on social goals in South Africa, some prime properties that could be enhanced for global market attraction are leased at insignificant or non-market values based on very low council-determined annual tariffs. Yet again, there is a strong correlation between quality services and profitability20. As a result, superior quality service providers are more successful than those who provide poor service delivery. This also validates the contention that for South African PSPM to be successful in the global economy, it should be serious about providing quality services. The government's economic role in any country is strongly linked to people's livelihoods, employment and the stability of the nation. One critical factor is that shelter; food; and clothing are a few of the core basic needs for human beings13.

Regardless of identified negative economic effects on property matters, the salient point is that: "property industry is one of the service industries that play a significant role in most economies" 21. The evolution of construction and real estate sectors significantly affects the general development of any country's economy22. As a result of construction and real estate, people have jobs that allow them to fulfil their social and other needs. This proves correlation between the built environment (including property management) and economic standing of any country.

Legal impact

Any PSPM is impacted by lawfulness. Legal impact on PSPM is analysed based on relevant statutory and regulatory requirements. As municipalities enjoy more discretion in employment and financial operations, and have the right to own property, there are statutory and regulatory requirements to which a PSPM function should conform. These include ensuring that the municipality is legally the rightful owner of its properties23. In agreement, local government does have property management responsibilities due to the fact that local government own properties24. The relationship between PESTEL Impact and transformation and sustainability (H10), leadership and governance (H11) and monitoring, and measurement and control H12) was hypothesised as below:

H10 There is a positive relationship between PESTEL Impact and transformation and sustainability towards successfully managing public sector properties.

H11 There is a positive relationship between PESTEL impact and leadership and governance towards successfully managing public sector properties.

H12 There is a positive relationship between PESTEL impact and monitoring, measurement and control towards successfully managing public sector properties.

Transformation and sustainability

Transformation and sustainability together make up one of the most significant research variables in this study. Such transformation is influencing the PSPM, especially in the area of property markets. Numerous developing countries are required to undertake a transformation of their property markets25. It is then apparent that one of the transformation indicators that the property management sector has to deal with is investment. Participants in real estate investment are faced with large transactional costs, carrying costs, illiquidity and tax considerations, as well as large search costs26. This will help in staying abreast of all property management current dynamics. Industry research facilitates the awareness of significant contribution of PSPM to sustainable development.

Numerous categories of learning and development programmes provide skills, change employee behaviour and increase job satisfaction as employees become capable of doing their jobs27. The outcome of learning is enhanced through performance. Currently, sustainability and energy efficiency for the market position of built property and energy performance improvement is becoming a meaningful justification for structural improvement of buildings and dwellings9. If this aspect is ignored, there are possibilities of risks associated with investment threats, including opportunities for the current older housing stock. The relationship between Transformation and Sustainability and perceived successful management of public sector properties was hypothesised as follows:

H13 There is a positive relationship between transformation and sustainability and perceived successful management of public sector properties.

Leadership and governance

Continual changes occurring in government environments are indeed rooted in external influences, but also are influenced by internal factors28. Due to these internal and external influencers, the management of governmental or public organisations is very different from managing a private entity29. Public sector leadership is important, however, the significance of public sector leadership stems from the fact that public service systems need continuous mobilisation, direction, galvanisation and revitalisation to achieve its mandate30. Thus, local government's property management has the responsibility of creating added value by knowing how to deal with various stakeholders so that they can make a precise assessment of their interest in property management24. National governments should oversee local governments, but they also have the role of advising the local government on matters that are difficult to effectively perform5. In a nutshell, this could be referred to as good governance. Through good governance practices, PSPM leadership is expected to excel in resolving new problems or fulfilling new requirements posed by both internal and external influencers. The relationship between Leadership and Governance and perceived successful management of public sector properties was hypothesised as follows:

H14 There is a positive relationship between leadership and governance and perceived successful management of public sector properties.

Monitoring, measurement and control

Due to political sensitivity concerning most public sector performances, local government deals with questions of organisational performance and external environment responses, including the development of new ways of service delivery31. However, the problem is that although there is more than enough performance information out there, governments have somewhat neglected the question of facilitating implementation of such information32. The public sector is always on 'spot light' from media, political parties, and the citizens for what is observed as public administration an academic subject. Hence, PSPM requires staying relevant on many measures and this could be achieved through application of relevant performance management measures.

Other than performance management, public sector property leaders are also responsible for ensuring that influencing risks are monitored and controlled for adequacy. They should therefore establish methodologies for mitigating prevalent risks. For instance, the acts of lease agreement violation include consistent failure to pay rent at an agreed time, meddling with the landlord's rights or meddling with the rights of other tenants in a noteworthy manner such as, loud music and unacceptable behaviour13. Other behaviours which constitute violations might include tenants that refuse to vacate the premises at the end of the lease agreement. There is an advisory agreement that risk should be a critical option for shaping budgeting, planning and strategy processes33. This means that if leadership want to implement winning strategies, such strategies should be periodically reviewed for risk factors. Leadership should drive risk management in a pre-emptive manner. The relationship between monitoring, measurement and control and, perceived successful management of public sector properties was hypothesised as follows:

H15 There is a positive relationship between monitoring, measurement and control and perceived successful management of public sector properties.

3. RESEARCH METHODOLOGY

Structural Equation Modelling (SEM) was applied as a means of statistical testing in order to analyse data obtained from research respondents. SEM methodology is a causal-inference engine evaluating qualitative causal claims, conditional on the input assumptions, together with data-fitness ratings to precise statistical tests34. In addition, SEM is globally-known and extensively utilised by applied researchers in the social and behavioural sciences35. SPSS-AMOS version 23 was used to analyse the fitness of variables in the proposed model measure interrelations between sets of variables identified as influencing a perceived success of property management. These include obsolescence and strategic factors, global alignment, finance and cost control and PESTEL impact (independent variables); transformation and sustainability; leadership and governance; as well as, monitoring, measurement and control (intervening variables), and perceived successful management of public sector properties (dependent variable).

The research employed a quantitative approach and positivist research paradigm. The study population size determined to be a minimum of

5000. The research population was gathered from a group of people that were deemed competent in the built environment. Consequently, due to their familiarity with the research environment, respondents that were exclusively selected to complete the research instrument were built environment professionals from higher education institutions (i.e. Academics and Students); professional bodies and companies as well as public sector built environment professionals of South Africa.

To effectively apply the SEM model directly, a sample size of at least 500 was needed for the study. Therefore, the sample size was identified to be a minimum of 500. The sample size was determined based on the general sample size model applied for the type of research questionnaire used in this study in relation to the stated population. A non-probability sampling procedure was applied.

The type of non-probability sampling used was snowball sampling also known as the networking method. This is a practice of obtaining a studied subject via a referral system. This method of conducting the survey is more favourable and could positively yield referrals and enlarge survey responses39. Data were collected with a Likert-scale based questionnaire. Nonetheless, only 171 respondents successfully completed the survey.

4 DATA ANALYSIS

As survey questionnaire (i.e. Likert-scale) was utilised as a research instrument for data collection, the research instrument was found to be valid through content validity in terms of pre-test and pilot studies. Similarly, for data measurement, a construct validity testing was also applied in this study. The construct validity was measured based on the following measures:

Table 1 - Validity Measures

Name of Category	Index	Level of acceptance	Comments
Convergent Validity	AVE (Average Variance Extracted)	AVE > 0.50	The validity is achieved when all items in a measurement model are statistically significant.
Construct Validity	GFI	GFI > 0.90	This validity is achieved when the fitness indexes achieve the following requirements.
	CFI	CFI > 0.90	
	RMSEA	RMSEA < 0.08	
	Chisq/Df	Chisq/Df < 5.0	
Discriminant Validity	Square Root of AVE and correlation of latent constructs	All the correlation between these construct should below 0.85.	This validity is achieved when the measurement model is free from redundant items.

Source: Afthanorhan (2013)[40]

Ultimate results demonstrated that the tested hypothesized model achieved validity in all respects. Below are validity results:

Table 2 - Construct Validity Results

Construct	GFI	CFI	RMSEA	Chisq/df	Comment about goodness of fit	Comment about Construct validity
Obsolescence and Strategic Factors	0.9951	1	0.0	0.8273	Good fit	Validity achieved
Global Alignment	0.997	1	0.0	0.254	Good fit	Validity achieved
Facilities Management	0.989	1	0.0	0.639	Acceptable fit	Validity achieved
PESTEL Impact	0.929	0.971	0.014	1.032	Acceptable fit	Validity achieved
Transformation and Sustainability	0.97	0.993	0.024	1.095	Good fit	Validity achieved
Monitoring, Measurement and Control	0.965	1	0	0.735	Good fit	Validity achieved
Leadership Governance	0.941	0.863	0.042	1.303	Acceptable fit	CFI <0.9, but the others are within the correct limits
Perceived Successful Management of Public properties	0.989	0.989	0.028	1.131	Good fit	Validity achieved

Source: IBM SPSS AMOS SEM

The Normal Cronbach's Alpha of all model variables is 0.747, demonstrating moderate reliability as the result is very close to 0.80, where most of research variables achieved a reliability that was more than 0.70. The model was found to be good and significant (i.e. model fitness proven) as seen below:

Scale: Perceived Successful Management of Public Sector Properties

Case Processing Summary

		N	%
Cases	Valid	167	96.5
	Excluded	6	3.5
	Total	173	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.747	6

5. RESULTS AND DISCUSSION

Demographic Data

Based on the study results, it showed that more males than females completed the survey. Males were at 60%, whilst females were at 40%. This could be an indication that built environment industry has more males than females. According to Figure 2 below, (i.e. participated built environment professional) although the research instrument catered for almost all built environment professionals to partake in the survey, professionals such as engineering geologists; estate agents; facilities designers; facilities managers; facilities space planners; geotechnical engineers; heritage practitioners; structure engineers and urban designers did not participate in the study.

Having noted this, SEM discarded the FM and spatial planning variables in this study. The lack of participation by facilities managers; facilities space planners; facilities designers; and urban designers could be a reason the FM and Spatial Planning research variables were rejected by SEM measurement, meaning there was no 'significant' response from FM and spatial planning targeted professionals.

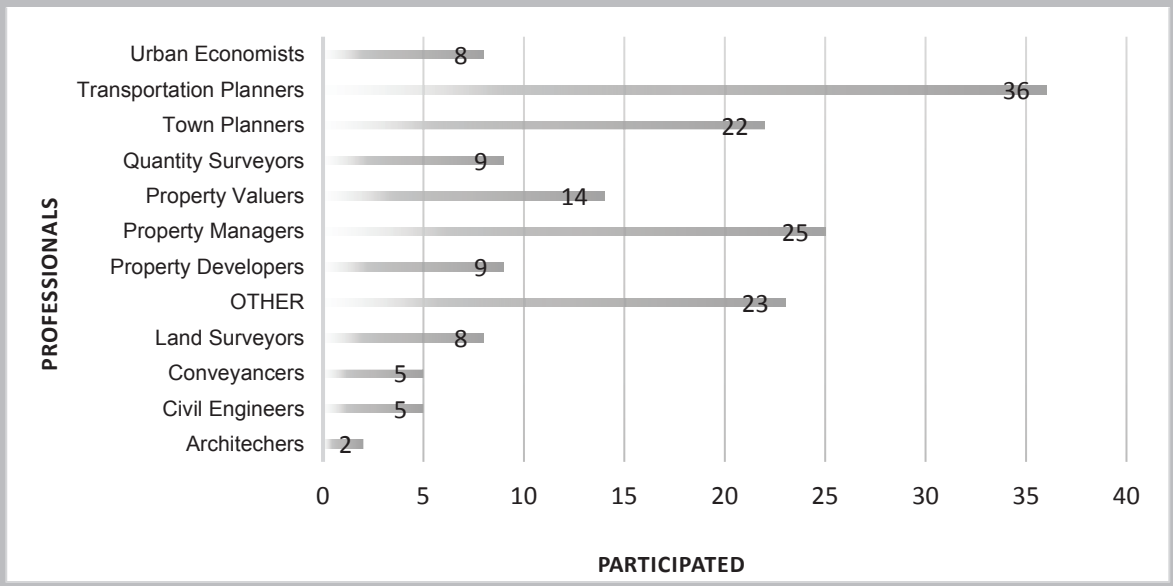

Figure 1: Built Environment Professionals

Statistical Results

The indices were tested for the eight constructs: GFI (Goodness of fit index), CFI (Comparative Fit Index); RMSEA (Root Mean Square Error of Approximation) and Chi-square (2)/df. The variables of obsolescence and strategic factors, global alignment, transformation and sustainability, monitoring, measurement and control, and perceived successful management of public properties were identified as good fit, where other factors were acceptable fit in the performance model.

Obsolescence and strategic factors

This empirical study validated that South African municipal owned properties undergo a process of obsolescence. Three hypotheses on obsolescence and strategic factors were initially offered in this study; however, only two were confirmed by SEM measurement. It was confirmed that there is a positive relationship between obsolescence and strategic factors and transformation and sustainability (H1). Public sector has been formulating strategies over the last 25 years, but now is the time to ensure that strategic planning plays an improvement role so as to successfully manage change completely and address new challenges that are rapidly increasing in this sector36. It is therefore argued that there is a need for urgent transformation concerning upgrading municipal owned buildings and urban areas into sustainable properties. The study results revealed that the PSPM needs to enhance collaboration of built environment functions; manage urban obsolescence through legislation; and control urban obsolescence through the management of vagrants.

Global alignment

This study validated global alignment impact on perceived successful management of public sector properties. Out of the three initially proffered hypotheses, two were validated by the study. There is, therefore, a positive relationship between global alignment and leadership and governance (H5). The argument is that it is leadership's responsibility and authority to drive PSPM into the position of a global player by providing service quality and being competitive. Similarly, there is a positive relationship between global alignment and monitoring, measurement and control (H6). During the 1990s, the policy of public sector real estate was mainly focused on advancing public interest rather than being stimulated by economic rationality and profitability24. For globalization to be favourable to South African PSPM, it needs to be monitored, measured and controlled so that opportunities for quality fulfilment and for competitiveness in the property market will be generated. Moreover, there was an observed relationship between global alignment and PESTEL impact which re-instated that South Africa is not an 'island' or isolated from the 'world'. The study results indicated that global industry research, inter-country personnel exchange and management system certification were determined for global alignment.

Finance and cost control

Initially, the study stated three suppositions around finance and cost control. Only one of these hypotheses was validated by SEM measurement. The hypothesis was: there is a positive relationship between finance and cost control and leadership and governance (H8). It is then evident that there are a lot of different costs associated with property or property management22. A positive relationship was demonstrated between leadership and governance, as well as finance and cost control. Again, a PSPM function has lots of costs associated with its operations and is guided intensively by finance management legislation such as the Municipal Finance Management Act (MFMA) in the case of South African local government. The implication is that leadership should ensure that funds are responsibly dispersed according to legislation. Factor analysis and correlation studies could not identify any relationship or positive relationship between a finance and cost control variable and other research variables.

PESTEL impact

All the origional three suppositions on PESTEL impact were confirmed as significant to the model. Therefore, it was confirmed that there is a positive relationship between PESTEL impact and transformation and sustainability (H10); the implication is that a decision to transform public sector housing stock into sustainable properties depends on various aspects: politicians need to be 'satisfied'; socio-economic status has to be conducive to this; as well as satisfying environmental, technological and legal requirements in various aspects that are not limited to financial standing. There is also a significant interrelation between PESTEL impact and leadership and governance (H11), as PESTEL impact advantages or disadvantages management is in the hands of leadership. Leadership must either improve or resolve these based on available governance statutory and regulatory requirements. Finally, there is a positive relationship between PESTEL impact and monitoring, measurement and control (H12). Decisions regarding the property contribute greatly to the municipality's attractiveness and the future development of society24. The argument is that PESTEL impact should be monitored, measured and controlled to ensure that it does not reflect negatively on PM's operational environment. The study results revealed that the major impact that politics has on property management is negatively exerting 'power' over public sector property transactions.

Transformation and sustainability

There are many aspects that relevant public sector built environment functions including property management can possibly consider implementing in terms of transformation and sustainability. Public sector transformation has obligated re-engineering

and a refocus on global competitiveness, effectiveness and efficiency. This is carried out with the intention of mandating quality service delivery10. These are not limited to developing sustainable legislation governing both private and public sector built environment; including transformation and sustainability goals that should form part of each municipal Integrated Development Plan (IDP), etc. Overall, leadership and governance had a direct impact on the perceived successful management of public sector properties. Again, this validation strengthens the role and necessary competence of leadership in an overall performance of PSPM function. The study results revealed that a consistent public sector property stakeholder study to better understand public sector property stakeholder requirements needs to be carried out.

Monitoring, measurement and control

It was found that monitoring, measurement and control have positive relationship against four different research variables: obsolescence and strategic factors; global alignment; PESTEL impact, including the newly formulated hypothesis; and leadership and governance. The performance measurement process is very important to any organisation or process for the reason that it indicates where the process or organisation is and where it is heading37. Such measurement should be effected in almost all processes of a property management function. Whilst there is a strategic formulation process which determines business goals and objectives that are cascaded down to appropriate business levels and functions within the organisation, each business level and function is supposed to measure objectives that are relevant to them in order to fully support the operational environments' effectiveness. This became a very interesting research finding as it further verified the significance of monitoring, measurement and control within a PSPM environment. The study results revealed that on this variable touched on subjects of performance management; risk management and measurement analysis.

6. CONCLUSION AND RECOMMENDATIONS

The study is original and ground-breaking in the sense that prior to its conception, a performance model for effective management of public sector properties in South Africa did not exist. It revealed that several dynamics, such as economic, environmental and political power, clearly demonstrate that PSPM in South Africa is no longer a matter of a 'business as usual' type of scenario. Currently, there is an obvious need for change control, sense of balance and continual improvement. This is hence it was imperative to conduct a study of this nature. Consequently, as there are various factors impacting on South PSPM, it is necessary to pursue capacity building and empowerment of the function so that property management can successfully perform its mandate with no breakdown of its systems. In view of that, to balance South African socio-economic goal execution, PSPM practice should first and foremost direct its attention to the fact that South African is not an 'island' isolated from the rest of the world. More than ever, South Africa should strive in fully aligning itself globally in a manner that benefits its different aspects of socio-economic standing as well as built environment profession. This could be achieved by learning from other countries, give and take with the intention of developing the country's acumen towards PSPM discipline. With wisdom gained, South African PSPM would be capable of better dealing with issues of its built environment: obsolescence, facilities management, spatial planning, sustainability and so on. It is recommended that Investment and portfolio analysis, facilities management, and spatial planning – although discarded by SEM measurement for this particular study – could be further investigated by similar studies, as these aspects are significant to PSPM. This will further authenticate research findings and facilitate continuity.

The study recommends that there should be a memorandum of understand and service level agreements between politicians and municipal leadership. On the other hand, to control the effects of environmental impact, PSPM should be a leader in developing climate change studies and strategies; adaptation plans; public education etc. Renewable energy options are also recommended to combat against further environmental weakening. To fight against societal negative impact, it is recommended that Ward Councillors should be empowered by municipal council to carry out SWOT (Strength, Weakness, Opportunity and Threat) analysis for communities they lead and, escalate outcomes to the municipal council for communities' wellness. It is recommended that municipal technological innovation should be dealt with by means of continual global research, in order to constantly advance the state of South African municipalities' technological practices. It is recommended that municipalities should focus more on community's economic development based on the SWOT analysis outcome of each community. To intensify South African's legislative framework, it is recommended that there should be continual legislative research and awareness to PSPM functions.

In conclusion, eleven out of 15 initially offered hypotheses were positively validated by SEM testing. Moreover, all research objectives for both primary and secondary investigation where achieved. All below estimates are significantly different from zero.

Table 3 - Regression Weights Results

			Estimate	Standard.Error.	Critical.Ratio.	p-value
Transformation and Sustainability	<--	PESTEL Impact	.202	.035	5.774	< 0.001
Monitoring, Measurement and Control	<--	PESTEL Impact	.477	.084	5.706	< 0.001
Monitoring, Measurement and Control	<--	Obsolescence and Strategic Factors	.462	.082	5.598	< 0.001
Monitoring, Measurement and Control	<--	Global Alignment	.251	.052	4.855	< 0.001
Transformation and Sustainability	<--	Obsolescence and Strategic Factors	.103	.033	3.159	.002
Leadership Governance	<--	Global Alignment	.178	.034	5.173	< 0.001
Leadership Governance	<--	PESTEL Impact	.534	.063	8.513	< 0.001
Leadership Governance	<--	Transformation and Sustainability	.302	.113	2.677	.007
Leadership Governance	<--	Monitoring, Measurement and Control	.292	.048	6.151	< 0.001
Leadership Governance	<--	Finance Cost and Control	-.024	.010	-2.324	.020
Perceived Successful Management of Public properties	<--	Leadership Governance	.532	.029	18.213	< 0.001

Source: IBM SPSS AMOS SEM

The final model as seen below, was proved to be good and significant:

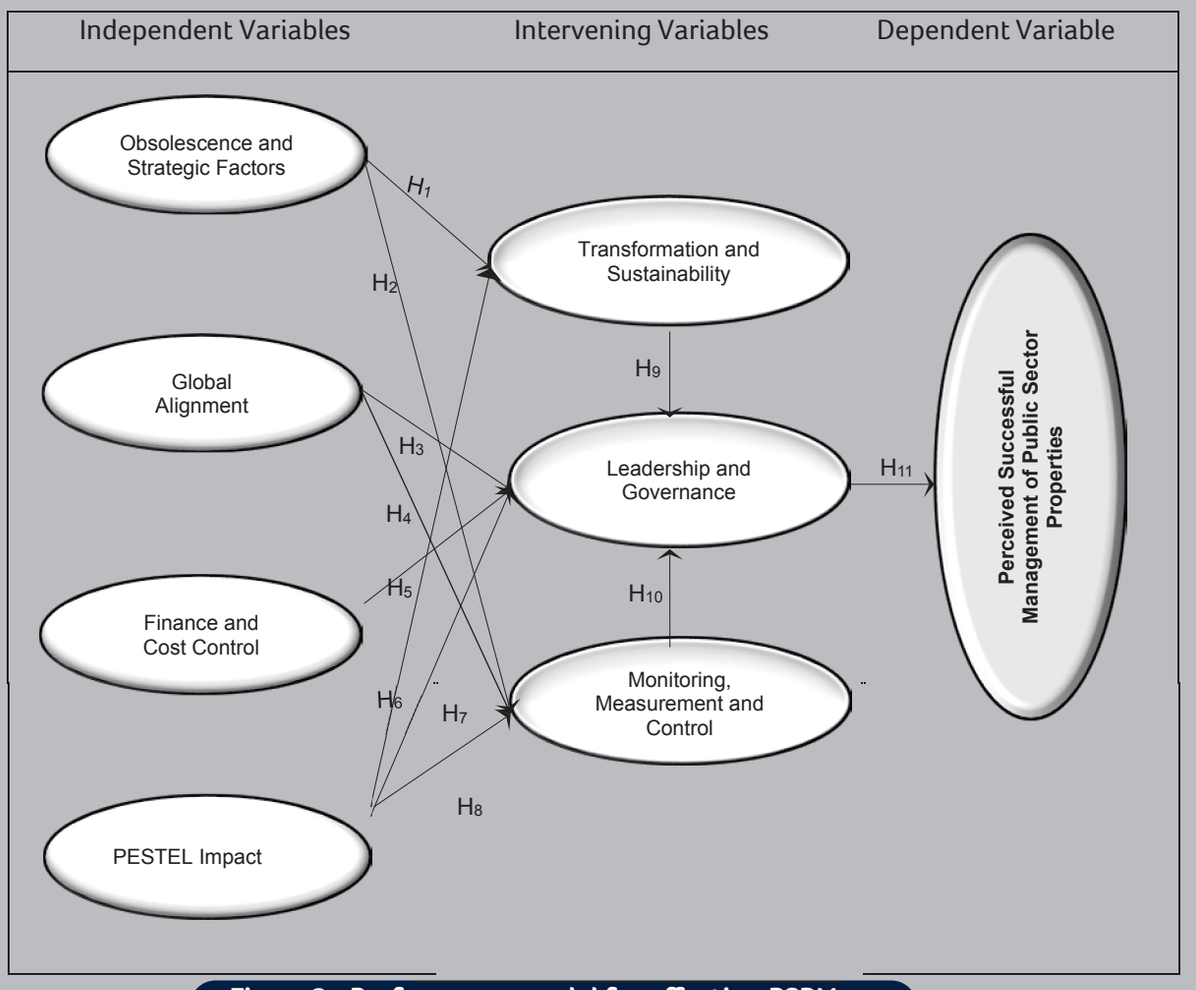

Figure2 : Performance model for effective PSPM

7. REFERENCES

[1] Vašiček, D., & Roje, G. (2018). Public sector property management reform to enhance the economic development: Croatia and Bosnia and Herzegovina current state and international perspectives. 443-61.

[2] Warren, C.M.J. (2010). "The role of public sector asset managers in responding to climate change". Emerald Group Publishing Limited, 28(4), 245-256.

[3] Gibson, V. (1994). Strategic Property Management: How can local authorities develop a property strategy? Property Management, 12(3), 9-14.

[4] Gerber, E.R., & Hopkins, D.J. (2011). "When Mayors Matter: Estimating the Impact of Mayoral Partisanship on City Policy", American Journal of Political Science, 55(2), 326–339.

[5] Nickson, A. (2011). "Where Is Local Government Going in Latin America? A Comparative Perspective", ICLD: Swedish International Centre for Local Democracy, 1-20.

[6] Morrish, S.C., Levy, D., & Dong, Z. (2009). "The Role of Property in the Portfolio of Small and Medium Enterprises", Pacific Rim Property Research Journal, 15(3), 261-277.

[7] Egozcue, M., Garc, L.F., & Zitikis, R. (2012). "An optimal strategy for maximizing the expected real-estate selling price: accept or reject an offer?" Munich Personal RePEc Archive, 1-17.

[8] Bokhari, S., & Geltner, D. (2014). "Characteristics of depreciation in commercial and multi-family property: An investment perspective", MIT Center for Real Estate and Department of Urban Studies and Planning, 1-43.

[9] Thomsen, A., & van der Flier, K. (2011). "Understanding obsolescence: a conceptual model for buildings", Building Research and Information, 39(4), 352-362.

[10] Hoffman, D. (2017). "Renting in converted green buildings: exploratory study on office tenants views". Journal of Construction, 10(1): 24-31.

[11] Gwenhamo, F., & Fedderke, J.W. (2013). "The composition of foreign capital stocks in South Africa: The role of institutions, domestic risk and neighbourhood effects". Economic Modeling, 35, 763-770.

[12] South African Government: GenN 423 in GG 18739, 1998, White Paper on Local Government, Author, Juta and Co. Ltd

[13] Gbadegesin, J.T., & Ojo, O. (2012). "Menace of recalcitrant tenants in metropolitan Ibadan area's residential property market, Nigeria". Emerald-Property Management Group Publishing Limited, 30(1), 65-85.

[14] Atkin, B., & Brooks, A. (2009). "Total Facilities Management". UK: Wiley-Blackwell Publishing Ltd.

[15] Tait, S., & Marks, M. (2011). "You Strike a Gathering, you Strike a Rock: Current debates in the policing of public order in South Africa", SA Crime Quarterly, 38, 15-22.

[16] Wilkinson, C., Saarne, T., Peterson, G. D., & Colding, J. (2013). "Strategic spatial planning and the ecosystem services concept–an historical exploration", Ecology and Society, 18(1): 1-19.

[17] Yam, S. (2013). "The practice of corporate social responsibility by Malaysian developers". Emerald-Property Management Group Publishing Limited, 31(1), 76-91.

[18] Ahn, M.J., & Bretschneider, S. (2010). "Politics of E-Government: E-Government and the Political Control of Bureaucracy", PUAR, 935-946.

[19] Weymouth, S. (2010). "Political Institutions and Property Rights: Veto Players and Foreign Exchange Commitments in 127 Countries", SAGE Publications, 1-30.

[20] Oyedokun, T.B., Oletubo, A., & Adewusi, A.O. (2014). "Satisfaction of occupiers with management of rented commercial properties in Nigeria: An empirical study". Emerald-Property Management Group Publishing Limited, 284-294.

[21] Baharum, Z.A. Nawawi, A.H., & Saat, Z.M. (2009). "Assessment of Property Management Service Quality of Purpose Built Office Buildings". International Business Research, 2(1), 162–74.

[22] Urbanavičiene, V., Kaklauskas, A., & Zavadskas, E.K. (2009). "The conceptual model of construction and real estate negotiation". International Journal of Strategic Property Management, 13, 53-70.

[23] Bel, G., & Fageda, X. (2010). "Partial Privatisation in Local Services Delivery: An Empirical Analysis of the Choice of Mixed Firms", Taylor and Francis - Local Government Studies, 36(1), 129–149.

[24] Vermiglio, C. (2011). "Public property management in Italian municipalities: Framework, current issues and viable solutions". Emerald Group Publishing Limited, 29(5), 423-442.

[25] Oladokun, T.T. (2012). "An evaluation of the training needs of Nigerian estate surveyors for corporate real estate management practice". Emerald-Property Management Group Publishing Limited, (30(1), 86-100.

[26] Ghysels, E., Plazzi, A., Torous, W.N., & Valkanov, R.I. (2012). "Forecasting real estate prices, Handbook of economic forecasting", 1-191.

[27] Azasu, S. (2012). "A survey of reward management practices in the Swedish real estate sector". Emerald-Property Management, Group Publishing Limited, 30(5), 449-464.

[28] Jarbandhan, D.B. (2012). "Transformational leadership and organisational change: A public sector perspective", Journal of the association of Southern African School and Management, 20(2), 34-53.

[29] Lazenby, S. (2010). "The Adequacy of MPA Course Content in Preparing Local Government Managers", Journal of public affairs education, 16(3), 337-360.

[30] Sing, D. (2012). "Enhancing insights on the leadership role of South African Public Servants Theoretical and conceptual perspectives." Journal of the association of Southern African School and Management, 20(2), 8-33.

[31] Cox, R., Gabris, G.T., & Levin, M.M. (2010). "Educating Local Government Managers for the Twenty-First Century: A Preface to the Symposium." Journal of public affairs education, 16(3), 325-336.

[32] Moynihan, D.P., & Pandey, S.K. (2010). "The Big Question for Performance Management: Why Do Managers Use Performance Information?" Oxford University Press on behalf of the Journal of Public Administration Research, 849–866.

[33] Power, M. (2009). "The risk management of nothing." Accounting, Organizations and Society, 34, 849–855.

[34] Judea, P. (2012). "The Causal Foundations of Structural Equation modelling." Chapter for R. H. Hoyle (Ed.), Handbook of Structural Equation modeling. New York: Guilford Press, 1-37.

[35] Rosseel, Y., & Lavaan, R. (2012). "A Package for Structural Equation modelling." Journal of Statistical Software, 48(2), 1-36.

[36] Poister, T.H. (2010). "The Future of Strategic Planning in the Public Sector: Linking Strategic Management and Performance." Public Administration Review, 246-254.

[37] Myeda, N.E., Kamaruzzaman, S.N., & Pitt, M. (2011). "Measuring the performance of office buildings maintenance management in Malaysia", Emerald - Journal of Facilities Management, 9(3), 181-199.

[38] Basili, V., Heidrich, J., Lindvall, M., Münch, J., Regardie, M., Rombach, D., Seaman, C., Trendowicz, A. (2013). "Linking software development and business Strategy through measurement", Cornell University Library - IEEE Computer, 43(4), 57-65.

[39] Wahyuni, D. (2012). "The Research Design Maze: Understanding Paradigms, Cases, Methods and Methodologies", JAMAR 10(1), 69-80.

[40] Afthanorhan, W. (2013). "A comparison of partial least square structural equation modeling (PLS-SEM) and covariance based structural equation modeling (CB-SEM) for confirmatory factor analysis", International Journal Engineering and Science Innovative Technologies (IJESIT), 2 (5), 8.

EXPLORING CASUAL CONSTRUCTION WORKERS' JOB SECURITY DIFFICULTIES IN THE CENTRAL REGION OF SOUTH AFRICA

Lesiba George Mollo[1] and Fidelis Emuze[2]

[1,2]Department of Built Environment, Central University of Technology, Free State, South Africa

Corresponding Author: Lesiba George Mollo
Email: lmollo@cut.ac.za

ABSTRACT

PURPOSE

The lack of job opportunities in the industrial sectors has increased the unemployment rate in most developing countries. This situation is evident in South African construction where people struggle to find and keep decent permanent jobs. The situation has encouraged the proliferation of the casualisation of employment in the industry.

METHODOLOGY

This article illustrates the challenges experienced by casual workers in the central region of South Africa. Mixed-methods data were used to understand the phenomenon in the construction industry context. The quantitative strand of the study involved 19 participants familiar with labour-intensive construction while the qualitative strand involved 24 interviewees and have lived expereinces of the casual labour phenomenon.

FINDINGS

The results show that the lack of economic growth, inadequate education, poverty, inequality, and systematic corruption contribute to the casualization and low job security among construction workers. The persistence of casualization marginalised the psychosocial wellbeing of workers, apart from the negative image of the industry through poor cost, health and safety, time and quality performance.

VALUE FOR AUTHORS

The article focuses on the need to pay close attention to the wellbeing of people in the front line of construction.

KEYWORDS

Casual workers, Construction, Labour, People, Unemployment

1. INTRODUCTION

Construction labour productivity has a major influence on the economic development of a country[1]. However, labour productivity is not improving in South African construction because labour unrest such as strikes, and protests produces a negative impact on the cost, quality, safety, and duration of work in construction[2]. Although employment practice woes plague many industrial sectors in general, and it is explained that the construction industry is seen by the unemployed as a pathway out of poverty[3,4]. Uneducated people struggling to get permanent jobs chooses to earn a living by becoming casual construction workers[4,5]. The pipeline of casualisation seems to be on the rise in recent decades. Similar to reported news in developing economies, the use of casual workers in South African construction has increased because of heighted employer preference[2]. The reason why uneducated people choose to seek employment in the construction industry is because the construction work generally attracts unskilled workers[6]. The intensive use of manual labour in the industry makes it easier for people with little or no education to obtain employment.

As a result of low barriers to entry, the construction industry in South Africa as at 2014 is a significant job opportunity vehicle for general workers as statistics show that employment in the industry accounts for around 8% of the total formal employment and around 17% of the total informal employment (casual workers)[2]. Previously, contractors used to employ their labour operatives (general workers) on a permanent contract. However, in recent years, contractors globally are more inclined to employ general workers, often called 'labourers', on a casual (often daily) basis[4]. It is reported that unemployed people migrate from rural areas to big cities in the hope of changing their lives[7]. The International Labour Organization (ILO) corroborates the previous statement by reporting that casualisation is on the rise as the number of people employed as casual workers have grown significantly, especially in the construction industry[8]. Casual workers in construction started to grow in numbers at the turn of the century when casual workers were estimated at 85% in the Philippines, 66% in Mexico, 77% in the Republic of Korea, and 74% in Malaysia[4]. The estimations are in relation to the entire labour force in the industry in each country. In fact, the ILO contends that the construction industry experienced a major phenomenon regarding casualisation and

outsourcing of labour work in many countries such as China, India, the Russian Federation, Brazil and the Gulf States[9].

The demand for casual workers in the industry has increased worldwide[4]. According to the reports issued by the ILO, globalisation and technological change have led to a decline in permanent jobs in the manufacturing industry[8]. The decline of permanent jobs in the industry elevated the extent of job insecurity, stress and other psychosocial factors confronted by people in construction. Within the South African context, casualisation of employment is commonly adopted in industries where demands for employment are highly variable and business owners shy away from employing people on a permanent basis[5]. Such employment is found in construction work, migratory farm labour and other jobs which require manual labour or unskilled workers[10.] Across the world, the employment of labour on a casual basis leads to job insecurity, low wages, poor working conditions, and non-membership of trade unions[4]. Most researchers have emphasise that general workers employed on a casual basis are often victims of loss in the form of the absence of medical care allowance, lack of promotion at work, lack of gratuity and other severance benefits, lack of leave or leave allowance, and lack of accident insurance at work[4.5.10.11.]

Most countries experiencing an increase in casual workers fail to protect and honour the rights of casual workers, which are highlighted in the constitutions of most countries[12.] In other words, casual workers are subjected to inappropriate labour practices despite a measure of legislative cover for them. For example, in South Africa, it should be noted that there is no definition of a 'casual worker' in the current labour legislation. However, 'casual workers' were acknowledged in the old Basic Conditions of Employment Act of 1983, but the recent Act of 1997 does not mention them. Nevertheless, casual workers' rights in South Africa are generally similar to the rights of permanent employees if they work more than 24 hours in a month[13.]

This article is aimed at illustrating the challenges experienced by casual workers, which are likely to make a significant contribution to the socioeconomic concerns of people. The motivation for this study is the notion that casual workers' dilemma has multiple effects (such as poor payment arrangement, unsafe working conditions and lack of respect) on people in construction, apart from the concerned operatives. The problem that is reported in this article, is grounded in the fact that casual construction workers are experiencing challenges. Most of the casual workers working in construction suffer from a poor payment arrangement (cheap labour) compounded by unsafe working conditions[4.] These reported challenges are connected to social and economic conditions[4.] The construction industry hires most of the casual workers because the industry is labour intensive and uneducated people settle in easily[6.]

2. AN OVERVIEW OF CASUALISATION OF WORK IN CONSTRUCTION

The term 'casual worker' is described as someone employed without a clear written contract for a short period. The employment is designed for a short period and, the duration of the work is often not stipulated[10]. Bamidele described casualisation as the method adopted by the construction business to employ people as a freelancer, on an occasional basis, and on a short-term period instead of a permanent period[14.]
For example, in physical labour-intensive work environments, casual employment is classified as a vibrant feature of operations, especially in developing countries[8]. However, this phenomenon is not limited to developing countries. Reports from the European Union (EU) suggest that general workers are no longer employed on a permanent basis, but are employed on a temporary basis, on apprenticeship contracts, and for a part-time contract[15]. In understanding the causes of casual employment in Europe, Cuyper et al. stated that the deviation in the employment relations in most of the European countries was the consequence of changing the technical and economic environment in the early 1970s by the EU to strengthen working relationships16.

In the EU, casual construction workers have developed a culture of moving in and out of temporary employment on a regular basis to seek higher wages. Such a mindset and actions have made casual workers vulnerable to unemployment[15.] In most countries in the EU, casual workers working in the construction industry do not belong to a trade union. They either work on an individual contract of employment between them and the contractor or out of the collective agreement which governs their work[17.] It is important for the casual construction workers to fall under a trade union. This is because union representatives are responsible for negotiations with contractors for a suitable health and safety working environment and the working hours of the labourer[8], as well as in the case of wage disputes. Not belonging to a union makes general workers vulnerable to exploitation, which may be encouraged by the fact that they do not fall under a trade union. Also, they do not have the capital to challenge the contractors or seek legal guidance[17].

It is reported that in the British construction industry, majority of the registered construction companies use casual and insecure employment and 'labour-only' subcontractors as a method of employment[18.] Lack of labour regulations, especially in developed countries such as Britain, encourages construction companies to employ workers using methods such as learning on the job, casual employment, and output-based pay[18.] The method of using casualisation in the British construction industry has resulted in a shortage of skilled workers[19.] The contractors who fail to employ general workers but make use of labour-only subcontractors instigate the lack of skilled workers in the construction industry. Moreover, most of the labour-only subcontractor companies fail to provide skills' training to their casual workers[19.] They are always

unable to provide skills training to casual workers because of a short-term contract. The labour-only subcontractors fear that their relationship will not last long enough to recoup their investment[20.] It is evident that the EU is experiencing increased casual employment in labour-intensive operations as Pirani and Salvini discovered in Italy. It is reported that the situation was the highest in the EU over the period from 1997 to 2008 when most of the victims of casualization were the youth[15.]

The reports outside Europe are similar. A recent study by the ILO reported that in Bangladesh and India (South Asia) nearly two-thirds of wage employment is casual; while in Mali and Zimbabwe (Africa), one in three employees is casual8. Even in Australia, it has been reported that casual employment is under a specific employment category and one out of four employees is casual[8]. The above narrative, therefore, shows that casualisation of work is a global phenomenon that is not localized to South Africa.

3. METHODOLOGY

The research data presented in this paper used both quantitative and qualitative analyses. A mixed-methods research approach was adopted [21.] The data for this study were collected from 2016 to 2018. Quantitative analysis was carried out to rate factors contributing to the growth of casualization in the industries[21.] Based on a detailed literature review, five critical factors contributing to the growth of casualisation
were identified[18,20,7,10,4,5.] These factors that have been highlighted in section 1 and 2 include lack of economic growth, inadequate education, inadequate legislation, poverty and inequality, and systemic corruption. More than forty (42) questionnaires were distributed to directors of medium-sized construction companies working on labour-intensive projects in the Free State Province. The survey questionnaire was purposive and consisted of closed-ended questions 21. The survey was limitted to 42 participants who are contracted by the Department of Roads, Transport and Police in the Free State Province to work on road maintenance using labour-intesive method of construction. The selected participants often make use of casual workers on their road maintenance projects. However, out of 42 potential survey respondents, only 19 contractors returned a validly completed questionnaire. The response rate for the survey is therefore 45%. The closed-ended questions in the instrument were based on a five-point Likert scale. With the inclusion of an unsure option 'U' = 0, the scale ranged from 1 = minor to 5 = major. Descriptive statistics in the form of a mean score (MS) and inferential statistics were used to analyse the data. Statistical Package for the Social Sciences (SPSS) helped to compute the reliability measures in the form of cronbach alpha, which provide a measure of the internal consistency of the sacle.

Qualitative data was used to investigate the challenges experienced by casual workers in the same study. The qualitative data helped the researchers to understand social issues from 'lived experiences' of the participants in a study[22.] The qualitative data were collected from groups of casual construction workers in Bloemfontein (Free State Province) and Kimberly (Northern Cape Province). The selection of the 'casual construction workers' was based on purposive sampling techniques, that the interviewed participants should have the necessary knowledge and experience relating to a phenomenon[22.] The researchers visited the locations where casual workers were situated in the two cities. An invitation was extended to the casual construction workers to take part in the study and semi-structured focus group interviews were conducted to obtain the required data. The use of focus group interviews helped the researchers to gain knowledge of the attitude, beliefs and values of the casual workers in the two cities. The focus group interviews were structured under the titled theme 'challenges experienced by the casual workers in the construction industry.

To be specific, 15 casual construction workers were selected in Bloemfontein, while nine of them were selected in Kimberly for data collection. The total number of interviewees was 24 casual construction workers. In both cites, focus group interviews were used to understand the challenges experienced by casual workers. The focus group interview sessions often lasted between 45 and 60 minutes in duration. In total, seven interviews session were conducted in both cities, five in Bloemfontein and two in Kimberly. In all interviews, the language of the interviews between the researcher and participants was in Sesotho (South African home language) and was translated into English. The sessions were recorded and transcribed. Thereafter, the transcribed data were analysed by focusing on the research question and eliminating responses which did not answer the question. The interviewed participants were aged between 25 and 40 years old (10 particiapnts were below 25 yrs and 14 participants were above 40 yrs), and none of them had completed their secondary (high) school education. In addition, the race of the participants was black Africans and there were no female interviewees.

There are several ways of linking textual data to research questions and propositions. These are not limited to pattern matching, explanation building, time-series analysis, logic models, and cross-case synthesis. Pattern matching, which is at the core of tthematic analysis, was adopted in this research. As shown in the textual data in section 4, pattern matching involves the comparison of a predicted theoretical pattern with an observed pattern in the collected primary data. The themes used to explian in the textual data in section 4 evolved through pattern matching conducted with the transcribed interview data.

4. RESEARCH FINDINGS

4.1. Challenges experienced by the casual workers in the construction industry

It was discovered that failure by both the public and private sectors to consistently produce decent permanent jobs has resulted in the perpetuation of a situation whereby uneducated people choose to earn a living through casual construction work. It was noted that casual construction workers have limited chances of obtaining decent permanent jobs in the mining sector or selected governmental intervention programmes such as the Expanded Public Works Programme (EPWP). This is because of the unethical decisions by ward councillors and community liaison officers (CLOs) when hiring people in the community projects. The interviewees cited several incidents where the relevant ward councillors and CLOs who, when appointing people to work for mining companies and government projects or programmes, overlooked them. A ward councillor is an official elected by the community to represent an area on the council. This councillor can represent either a political party, stand as an independent candidate, or represent a local association[23.] However, a CLO plays a crucial communication role and acts as the connection between local communities, stakeholders and project developers by facilitating the project objectives[24.] The interviewees from Kimberly had the following to say relating to the influence of a councillor and CLO:
"Should the mining companies wish to employ people, they communicate with the ward councillor and would tell the councillor to provide the name list of people they seek to employ. However, the councillor sends the list of people who are related or close to him to the companies. Often should those people on the list be employed, they are forced to pay a certain amount of money to the councillor from their monthly salary".

"In the case of the government projects or programmes such as EPWP. The councillor nominates a CLO and the CLO will recommend people who are selected by the councillor to be employed by the contractor. You find a situation whereby the councillor controls the CLO and the CLO controls the construction workers. If you are not part of the club, you must just forget about being part of the EPWP programme".

It is important to know that the EPWP project is designed to employ workers on a temporary or ongoing basis, either by the government, contractors, or non-government organizations under the Ministerial Conditions of Employment for the EPWP or leadership employment conditions. The programme contributes to economic growth, using job opportunities to address social issues[25.] However, it is worrying that the casual construction workers have no expectations of ethical practices in the programme designed to empower them because of political decisions. Interference of government representatives in the process of labour employment might also be the reason behind the contention that the construction industry is experiencing labour unrest[2.]

The interviewees also explained that their lack of a high school certificate makes it difficult for them to secure permanent employment. Their opinions are based on the notion that most employers require a minimum qualification of either a university or a college qualification for permanent jobs. An interviewee from Kimberly explained that because of apartheid, his parents neither went to school nor saw the importance of schooling. His parents advised him to go to school only to learn how to read and to write. Later in life, he joined his father to work for a mining company. In the early 2000s, it was easy to obtain employment in the mining industry in Kimberly. It should be known that Kimberly is called 'The City of Diamonds' because of its diamond mining history. However, at the onset of the recent economic problems in 2008, he was retrenched from his mining work. Another interviewee from Bloemfontein explained that he had been working in the manufacturing industry prior to the economic recession. However, in 2007 the factory shut down, and he was forced to become a casual worker because of lack of education. Ten years on he has remained a casual worker in the construction industry. The stories from these interviewees are not strange/unusual? in a country where unemployment remains high at around 25% 26. Furthermore, high levels of unemployment combined with low levels of job creation and educational achievement have resulted in many semi- and unskilled workers at a time when labour-intensive industries such as construction, farming, mining and manufacturing have reduced their workforce's[26.] This statement corresponds to the perceptions of the interviewees from Kimberly and Bloemfontein who previously worked in the mining and manufacturing industries.

For a proper understanding of the term 'casual construction worker', the interviewees were asked to provide a definition for it. It was defined as the process adopted by unemployed people to seek labour-intensive work by walking to the town in the morning and standing at the traffic light to seek employment. The target jobs include painting and renovating houses, cleaning the yard and cutting the grass. These groups of people are employed without a contract and do not have the right to negotiate their wages with their employers. It should be noted that the casual construction workers are experiencing challenges related to payment abuse by employers. For example, an interviewee said:
“The employers are not paying us according to our agreement, especially those who own construction companies. Yesterday the owner of a construction company took me to go and excavate the foundation of a house. After I finished the work, he told me that he does not have money, he will pay me in the morning, I'm still waiting for him, I arrived here at 6 o'clock in the morning, now is almost 12:00 in the afternoon he

never comes and pay me as he promised".

To address the issues of health and safety (H&S) on a construction site, the interviewees explained that their employers do not address it. Owing to the temporary nature of their engagement, the employers of casual workers do not expend any effort in providing the required personal protective equipment (PPE) for them. The construction sites on which they are working do not have any site safety measures. They stated that their employers do not care about their well-being since they only care about production work. An interviewee further explained that "...when you're working on a construction site, you must be intellectual; you must be able to determine areas which are not safe to carry out a task on your own." This comment implies that ignorance could be dangerous where important H&S signage and instructions are missing. The notion contradicts the advice by McAleenan and McAleenan who elucidated the importance of site safety warning signs[27]. The importance of a sign is that it warns construction workers or visitors that they are about to enter a dangerous workplace where hazards could easily become risks.

4.2. Factors influencing the growth of casualization in the industries

Table 1 shows the ranking of five factors influencing the growth of casualization. The ranking of the factors is in terms of percentage responses on a scale of 1 to 5 where 0 = unsure, 1 = minor and 5 = major. The mean score (MS) ranking is between a minimum value of 1.00 and a maximum value of 5. 0021. The analysed statistical survey data show that the highest ranked factor is 'lack of economic growth' at MS 3.26 with a response percentage of 23.0%, and the lowest ranked factor is 'systematic corruption' at MS 2.53.

It is not surprising that 'lack of economic growth' ranked first as it is reported that South Africa's economic prospects remain largely unfavourable over a short-term period. For example, the gross domestic product (GDP) growth is projected to increase from 1.3% in 2017 to 1.4 % in 201828.

The factor ranked second is 'inadequate education' at MS 3.16 (22.3%). The third-ranked factor is 'inadequate legislation (law)' at MS 2.63 (18.6%), while the fourth-ranked factor is 'poverty and inequality' at MS 2.58 (18.2%). The macro state of the economy is well documented when, the Minister of Economic Development, Ebrahim Patel, issued a statement on September 01, 2017 that corruption costs the country GDP at least R27 billion ($2.01 billion) annually as well as the loss of 76 000 jobs that would have been created[29]. The statement of the Minister underscores the perceptions shown in Table 1. It can be concluded that the lack of economic growth, inadequate education, inadequate legislation and poverty and inequality are rooted in a system that should be addressed.

Cronbach alpha was adapted to test whether the collected statistical data was reliable or not[21]. Table 2 indicates the values of the reliability statistics, cronbach's alpha is recorded at 0.705 and the cronbach's alpha based on Standardized Items is recorded at 0.712. Based on the reliabilty test results in Table 2, it can be concluded that the represented cronbach alpha of 0.705 is acceptable and this alpha value suggests that the the staitistical reults in Table 1 are reliable. In-addition, Inter-Item Correlation Matrix represented in Table 3 was also adapted to measure the internal reliability of the Likert scale questions as described in the methodology section. Please note that Q1 represents poverty and inequality, Q2 represents inadequate education, Q3 represents systematic corruption, Q4 represents lack of economic growth, and Q5 represents inadequate legislation (Law).

Table 1: Factors influencing the growth of casualization in construction

Factors	Response (%)							
	Unsure	Minor.....Major					MS	Rank
	U	1	2	3	4	5		
Lack of economic growth	0.0	10.5	21.1	21.1	26.3	21.1	3.26	1
Inadequate education	0.0	5.3	26.3	31.6	21.1	15.8	3.16	2
Inadequate legislation (Law)	5.3	31.6	15.8	15.8	5.3	26.3	2.63	3
Poverty and inequality	0.0	21.1	31.6	26.3	10.5	10.5	2.58	4
Systematic corruption	5.3	31.6	15.8	21.1	5.3	21.1	2.53	5

Table 2: Reliability statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.705	0.712	5

Table 3:Inter-Item correlation matrix

Casualisation factors	Q1	Q2	Q3	Q4	Q5
Q1	1.000	0.703	-0.132	0.256	0.573
Q2	0.703	1.000	-0.092	0.144	0.549
Q3	-0.132	-0.092	1.000	0.538	0.245
Q4	0.256	0.144	0.538	1.000	0.524
Q5	0.573	0.549	0.245	0.524	1.000

5. DISCUSSION

The discourse on casualization highlights negative consequences for people in construction. Hence, in this study, the focus is on the casual workers employed in the construction industry because the industry is regarded as a significant employer in South Africa, spending around R262 billion ($19.53 billion) on construction projects in 2013 and (R310 billion) $23.11 billion in 2010 2. Dainty et al. explained that the construction industry remains one of the most reliable industries, employing almost two million people in the United Kingdom (UK), despite the growth in technology and manufacturing techniques20. Regardless of the high numbers of people employed in construction, most of the medium and large construction companies in the UK no longer employ general workers on a permanent contract but use labour-only subcontractors to fill the labour employment requirements, as explained in the literature18,19.

Doming and Jianxin explained the nature of the construction work, namely that it is a labour-intensive activity and can be executed anywhere30. The reason that the construction industry is able to employ millions of people is that it is a labour-intensive industry. According to Dainty et al., the construction industry comprises both educated (professional) and uneducated people (general workers)20. Perhaps, the foregoing argument is why 'limited education' was ranked second among the factors influencing the growth of casualization in the industries (Table 1). The uneducated people (casual workers) in this case are characterized by non-standard employment contracts. The evidence is highlighted in the literature4,9,7. In addition, the findings show that uneducated people choose to become economically active through casualization in the construction industry. This may be because the South African economy is not growing as expected28.

The interviewees explained that their lack of high school diplomas makes it difficult for them to secure permanent employment. Their opinion is based on the notion that most employers require the minimum qualification of either a university or a college qualification for permanent jobs in South Africa. In addition, casual construction workers in South Africa are employed without a contract and do not belong to any trade unions. In this study, the interviewees from both cities explained that they are the victims of poor payment and improper agreement implementation with their employers. The interviewees recalled many times when they had been appointed without a written contract and their employers often manipulate their verbal agreement. This statement points to the statistical results that ranked 'system corruption'. To support this statement, the interviewees from Kimberly indicated as follows:
"The employers are not paying us according to our agreement, especially those who own construction companies. Yesterday the owner of a construction company took me to go and excavate the foundation of a house. After I finished the work, he told me that he does not have money, he will pay me in the morning, I'm still waiting for him, I arrived here at 6 o'clock in the morning, now is almost 12:00 in the afternoon he never comes and pay me as he promised".

The above results show that employers do not respect casual construction. In addition, the construction casual workers' problems are experienced in both developing and developed countries. For example, in Hong Kong, young uneducated people migrating from the rural areas to the cities prefer to work at the construction sites, where their contracts are non-standard30. The study findings corroborate the statement of Daming and Jianxin. As one of the interviewees from Kimberly explained, he went to school to only learn how to read and to write; later in life he joined his father to work in the mining industry.

Unemployed people become casual workers because of their failure secured jobs. Daming and Jianxin stated that casual construction workers are a group of 'migrant job hunters' with little education30. This study identified factors persuading uneducated people to become casual construction workers. The five factors leading to casualization in the industries are highlighted in Figure 1. For an adequate understanding of the highlighted casualization factors in Figure 1, see Table 2. The description of the casualization factors is based on the social and economic conditions faced by people in South Africa.

Table 2: Description of casualization factors

Factors	Descriptions
Lack of economic growth	Failure of the South African economy to grow due to a tense political climate and corruption, compel the private sector, especially the mining and manufacturing industries to close businesses and retrench their workers. Because of the nature of these industries, their general workers often do not have an adequate university or college qualifications, a situation that compels them to become casual workers after job layoffs.
Inadequate education	Formal access to education in South Africa is not yet a reality for everyone irrespective of the government intervention to subsidise primary and high school in the township and rural areas and, college and university for middle-class people (students are not paying school fees). Besides the government intervention, most young South African from the historically disadvantaged individual (HDI) category struggle to complete high school education. It is difficult for the South African people to get a decent or a permanent job without a university or college qualifications. The lack of job opportunities for people with limited education is increasing the population of casual workers in the country.
Inadequate Legislation (Law)	The labour law in South Africa does not compel the employers of casual workers to pay them a decent wage because they are not regarded as permanent employees.
Poverty and inequality	In South Africa, people are migrating from the rural area (villages) to the cities with the hope of changing their lives. However, the majority of people migrating to the cities are failing to get decent jobs and are struggling to survive. As such, they become the victim of poverty and inequality where they are staying at the shacks (informal settlement). Because of their circumstances, they end up as casual construction workers to survive.
Systematic corruption	It appears that politicians are unethically manipulating the system. The people at the lower class of the society (for example, casual construction workers) are the victims of unethical practices by politicians as elucidated in the interviews. Corruption designed by politicians and their associates is a major challenge that is preventing equality and justice in society. The unethical practices linked to local councillors and CLO where projects are located are notable.

The conceptual casualization schema was developed using the highlighted five ranked factors, which include a lack of economic growth, inadequate education, inadequate legislation (law), poverty and inequality, and systematic corruption. Lack of economic growth is the first step or the benchmark of casualization in South Africa. Systematic corruption is the last step or the umbrella of casualization in South Africa. While, inadequate education, inadequate legislation (law), and poverty and inequality are the middle steps contributing to high number of casualization in South Africa. These five casualization factors highlight the causes of casualization which can be blamed both on the public and private sectors, also on the victim 'casual construction workers' themselves. These factors contribute to the reason that socioeconomic challenges are increasing casualization in construction. Therefore, it is important to address these factors and address the dilemma of casualization in society, especially in labour-intensive industries.

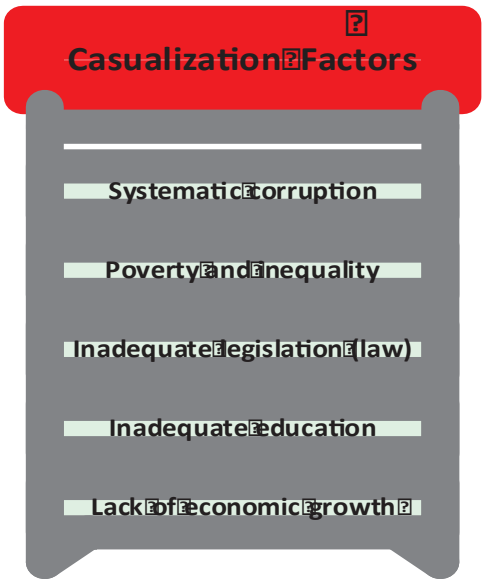

Figure 1: The conceptual casualization schema (Source: Authors' own, 2018)

To establish an authenticity of the schema illustrated in Figure 1, it is crucial to further explore this research through ideograph studies that would reveal nuances as yet uncovered in this work.

6. CONCLUSIONS

Unemployment have led to people becoming casual construction workers, especially in the big cities around the world. This is because people migrate from rural villages because of lack of gainful employment to cities in the hope of finding jobs. However, failure to find permanent employment makes them casual workers. In this study, it was discovered that the perceptions of the workers from both cities are the same. In both cities, the experiences of being a casual construction worker are the same. The reason why uneducated people become casual construction workers is that the industry is labour intensive and is dominated by general workers. Another factor influencing casual construction workers is the failure of the economy to grow and accommodate most of the country's labour force. Most companies in the manufacturing and mining industries have either closed their businesses or been forced to retrench their employees. This happened because of the failure of the economy of South Africa to grow or remain stable. In addition, systematic corruption is eroding the benefits of government programmes such as the EPWP. These are the reasons why people who are retrenched either choose to stay at home unemployed or to become casual construction workers. The study discovered that most construction employers using casual workers fail to provide PPE and site inductions to the casual workers. The fact that the construction is classified as a labour-intensive industry makes it easier for uneducated people to find employment.

7. REFERENCES

1. Adebowale, O. and Smallwood, J. (2016). A review of factors affecting construction labour productivity in developed and developing countries. In: F. Emuze (Ed.), 5th Construction Management Conference (pp. 168-176). Port Elizabeth, RSA: Department of Construction Management, Nelson Mandela Metropolitan University.

2. Construction Industry Development Board (CIDB). (2015). Labour & work conditions in the South African construction industry. Pretoria, RSA: CIDB.

3. Forbes, L.H. and Ahmed, S.M. (2011). Morden construction: Lean project delivery and integrated practices. New York, USA: Taylor and Francis Group.

4. Wells, J. (2013). Relieving chronic poverty among construction workers: An exploration of possibilities to improve the quantity and quality of jobs. London, UK: Engineers Against Poverty (EAP).

5. Mollo, L.G. and Emuze, F.A. (2017). Casualization of work in construction and the plight of workers in Bloemfontein. Joint CIB W099 and TG59 International Safety, Health, and People in Construction Conference (pp. 177-184), Cape Town, RSA., Central University of Technology, Free State: Department of Built Environment.

6. Emuze, F.A. and Sorenson, L. (2014). A case study of labour-intensive construction in South Africa: An exploratory study. Proceedings of the 8th cidb Postgraduate Conference on Construction Industry Development (pp. 57-66), Johannesburg, RSA: Cidb.

7. Danso, F. (2010). Occupational health and safety issues involving casual workers on building construction sites in Ghana: A Kumasi study. Kumasi, Ghana: The Department of Building Technology, Kwame Nkrumah University of Science and Technology.

8. International Labour Organization (ILO). (2016). Non-standard employment around the world: Understanding challenges, shaping prospects. Geneva, Switzerland: ILO Publications.

9. International Labour Organization (ILO). (2009). The sectoral dimension of the ILO's work - The current global economic crisis: Sectoral aspects. Geneva, Switzerland: ILO Publication.

10. Fapohunda, T. M. (2012). Employment casualization and degradation of work in Nigeria. International Journal of Business and Social Science, 3(9), 257-267.

11. Okafor, E. (2007). Globalization, casualization and capitalist business ethics: A critical overview of the situation in the oil and gas sector in Nigeria. Journal of the Social Sciences, 15(2), 169-179.

12. Okoye, P.U., Okilie, K.C. and Aderibigbe, Y.W. (2014). Correlation of casualization mechanism and construction workers' safety behaviour. International Journal of Engineering and Innovative Technology, 3(9), 135-141.

13. Measured Ability South Africa (MASA). (2017, June 23). Casual workers' rights in South Africa. Retrieved from Measured Ability South Africa: http://www.measuredability.com/casual-workers-rights-in-south-africa/.

14. Bamidele, R. (2011). Casualization and labour utilization in Nigeria. Osogbo, Nigeria: Fountain University, Osogbo.

15. Pirani, E. and Salvini, S. (2015). Is temporary employment damaging to health? A longitudinal study on Italian workers. Social Science & Medicine, 124, 121-131.

16. Cuyper, N.D., Isaaksson, K. and Witte, H.D. (2017). Employment contracts and well-being among European workers. Abingdon, UK.: Routledge.

17. Moonilal, R. (2001). Workers' protection: The case of Trinidad and Tobago. Geneva, Switzerland: International Labour Organization (ILO) Publication.

18. Clarke, L. (2006). Valuing labour. Building Research and Information, 34(3), 246-256.

19. Lockyer, C. and Scholarios, D. (2007). The "rain dance" of selection in construction: Rationality as ritual and the logic of informality. Personnel Review, 36(4), 528-548.

20. Dainty, A., Grugulis, I. and Langford, D. (2007). Understanding construction employment: The need for a fresh research agenda. Personnel Review, 36(4), 501-508

21. Creswell, J.W. and Plano Clark, V.L. (2011). Designing and conducting mixed methods research (2 ed.). California: SAGE Publications

22. Metzler, K. (2014). An introduction to qualitative research Uwe Flick. (5, Ed.) Thousand Oaks, California, USA: SAGE Publications.

23. Local Government Action. (2017, July 06). Local government action: Making local government work. Retrieved from How elections work: http://www.localgovernmentaction.org/activists-guide/key-processes/elections.

24. Global CCS Institute. (2017, July 06). Global CCS Institute. Retrieved from Electing a community liaison officer (CLO): https://hub.globalccsinstitute.com/publications/communication-and-engagement-toolkit-ccs-projects/electing-community-liaison-officer.

25. Department of Public Works (DPW). (2017, July 06). Welcome to EPWP. Retrieved from EPWP Background information: http://www.epwp.gov.za/.

26. Luke, L.G. (2016, April 12). South Africa - Economic challenges. Retrieved from: Future Directions International: http://www.futuredirections.org.au/publication/south-africa-economic-challenges/.

27. McAleenan, C. and McAleenan, P. (2017, April). Critical theory: Understanding the impact language has on workers safety and health. In: C. A. McAleenan (Ed.) Proceedings of the Institution of Civil Engineers (MP2), 52-58.

28. The World Bank. (2018). Overcoming poverty and inequality in South Africa: An assessment of drivers, constraints and opportunities. Washington DC: International Bank for Reconstruction and Development / The World Bank.

29. News24. (2017, September 01). Corruption costs SA GDP at least R27 billion annually, and 76 000 jobs. Retrieved from Business Tech: https://businesstech.co.za/news/government/196116/ corruption-costs-sa-gdp-at-least-r27-billion-annually-and-76-000-jobs/.

30. Daming, Z. and Jianxin, Z. (2009). An investigation into the group characteristics of casual construction workers. Chinese Sociology and Anthropology, 41(3), 31-39.

THE USE OF CANNABIS ON CONSTRUCTION SITES : A REVIEW

Theo C. Haupt

Research Professor, School of Engineering

Mangosuthu University of Technology
Durban, South Africa
theo.haupt@mut.ac.za

Value

The study highlights the need for site supervisors and construction employers to introduce improvement mechanisms to control the use of cannabis on construction sites.

Keywords

Cannabis, Construction site workers, Health and Safety, Substance use, South Africa

ABSTRACT

Purpose

There is increasing concern regarding the impact of the consumption of cannabis by construction site workers on workplace safety and performance. This preliminary study explores the use of cannabis and its consequences and effects on construction workers considering the decriminalisation of its private use and personal consumption in South Africa. This study is a precursor for a more detailed study which is ongoing.

Design

The paper was developed based on a review of empirical and theoretical studies previously published in a wide range of journals and commissioned reports. Literature relating to drug and substance use in the construction workplace was obtained from research databases. The keywords "cannabis" and "construction industry" were used to search the databases. Of the number of related articles found, 35 articles were cited in the study.

Findings

The study revealed that cannabis use had short-term health effects such as acute mental illnesses which could result in impaired reasoning and perceptions. Long-term effects of frequent and continuous cannabis use were found to include respiratory infections and hyperactivity. Furthermore, the after effects of the use and abuse of cannabis by construction workers poses numerous threats to the workplace safety of the construction industry. The paper identified loss of concentration and low productivity on site, abnormal and irrational behaviour, absenteeism from work and poor work quality as impacts of cannabis use on construction sites.

1. INTRODUCTION

The legalization of the personal use of cannabis also known as weed or marijuana in South Africa by the Constitutional Court on September 18 presents a challenge for the construction industry where its use has been covert or clandestine and in many cases seen to be synonymous with high levels of productivity on sites1. The ruling legitimizes the possession, purchase and cultivation of cannabis for personal use by an adult in a private dwelling[1]. South Africa is not the first country in the world to have taken this step. Others include Canada and Portugal[1], parts of the USA, Belize, Jamaica, Spain, Australia, Argentina, Uruguay, Cambodia, Belgium, Netherlands, Portugal, Switzerland and the list is growing.

Several challenges arise from the court ruling. These include what constitutes private use. Technically, if someone in possession of cannabis steps outside of their home retains the substance in their pocket and it is for personal use they have not broken the law[23.] Possession in itself would no longer carry the previous legal censure. Further, allowing people to purchase marijuana would amount to the court sanctioning dealing in the substance. Should the user want to grow their own cannabis they would have to purchase the seeds or small plants from another party who would be deemed to be a dealer in marijuana which is still an illegal practice. The purchaser would be an accomplice to dealing in cannabis. A decision by the South African government would need to be made about what quantities are allowed per person strictly for personal use[23.]

This paper seeks to explore the possible impact of cannabis use by construction workers on the industry given the legitimization of its use at home for personal use in South Africa with a view to increase awareness among construction employers. The paper outlines both the short and long term effects of the use of cannabis and impacts on construction sites and makes

recommendations for improved on site control.

WHAT IS CANNABIS?

Cannabis refers to the dried leaves, flowers, stems and seeds from the Cannabi sativa or indica plants. It is also referred to by the World Health Organization as a natural existing drug[2.]

2. HEALTH EFFECTS OF CANNABIS

Cannabis is a psychoactive drug. As such, it is a chemical substance that acts primarily upon the central nervous system where it alters brain function, resulting in temporary changes in perception, mood, consciousness and behaviour[3.] What makes cannabis so appealing and of interest is the fact that there are 483 known compounds in the plant including at least 65 other cannabinoids[4.] These cannabinoids form one of a class of diverse chemical compounds that acts on cannabinoid receptors in cells that alter neurotransmitter release in the brain. In simple terms, cannabinoids slow down communication between cells in the body and the brain[3.]

Delta-9-tetrahydrocannabinol (THC) is the chemical that is responsible for the manner in which the brain and body of a user reacts to cannabis[3]. It is argued that there are potential therapeutic benefits like feeling relaxed and happy and health risks in the form of unpleasant, unwanted or negative effects on the brain and body that arise from the use of cannabis[22.]
Short-term effects on the brain have been cited as:

- Confusion;
- Changes in mood;
- Fatigue or sleeplessness;
- Impaired ability to remember, concentrate or pay attention;
- Impaired body movement;
- Anxiety, fear or panic; and
- Reduced ability to react quickly.

The use of cannabis is reported to possibly involve psychotic episodes, which are severe mental disorders that cause abnormal thinking and perceptions[13.] Consequently, people with psychoses lose touch with reality. When cannabis is taken in high doses, these episodes are characterized by

- Temporary paranoia;
- Delusions;
- Worsening schizophrenia;
- Disorganized thinking; and
- Temporary hallucinations[8,9.]

Cannabidiol (CBD) is one of the over 100 phytocannabinoids identified in Cannabis sativa3 and constitutes up to 40% of the plant's extract, being the second most abundant component[4]. It is possible for cannabidiol which is a chemical in cannabis itself to reduce some of the psychoactive effects of its use such as disturbances in mood and psychotic symptoms[5].
There is evidence that when cannabis is used in combination with other substances such as tobacco in blunts and spliffs/mulled cigarettes or alcohol that the severity of some psychoactive effects[6] and the risk of mental health outcomes may increase[7]. Co-administration of marijuana and tobacco presents significant potential for nicotine exposure, and may lead to exclusive tobacco use patterns, nicotine addiction, and compounded health effects.

The effects of cannabis is felt within seconds of smoking and can last up to six hours while on the other hand after eating or ingestion the effects are felt within 30 minutes and last up to 12 hours afterward[12.]

3. SHORT-TERM EFFECTS

The short-term effects on the body include

- Damaged blood vessels caused by smoke;
- Decreased blood pressure resulting in fainting or passing out;
- Intense nausea and vomiting;
- Chest pain;
- Increased heart rate leading to increased risk of heart attack especially in people with heart conditions; and
- Headaches[8,9,10.]

In terms of impairment, Delta-9-tetrahydrocannabinol (THC) affects

- Co-ordination;
- Reaction time;
- Change in sense of time;
- Ability to pay attention;
- Decision-making abilities; and
- Ability to judge distances.

Impairment can last for more than 24 hours after the use of cannabis which is long after the other effects have faded[11]. One of the consequences in regular users could be the difficulty with skills needed to drive safely for weeks after their last use because cannabis smoking increases motor vehicle accident risk[12.]

4 LONG-TERM EFFECTS

Long-term effects of the frequent use of cannabis that continues over periods of weeks, months or years develop gradually over time[13.] Of concern is that these effects are found to last beyond when the use of cannabis has stopped and may not be fully reversible. Long-term effects on the brain that affect brain development include

- increased addiction,
- damaged memory,
- inability to concentrate,
- reduced intelligence quotient (IQ) up to 8 IQ points between ages[13] and[3814;] and
- reduced ability to think and make decisions.

Further, problems with child development during and post pregnancy have been found in several

studies[15,16,17,18.]

Long-term effects on the body have been found to include

- risk to lung function,
- increased frequency of lung infections,
- bronchitis,
- chronic long-term cough,
- increased mucus build up in the throat,
- cardiac arrest and strokes,
- seizures, and
- hyperactivity[19].

The frequent use of cannabis has also been linked to an increased risk of suicide, depression and anxiety disorders. If a person smokes cannabis daily the risk of addiction has been found to be between 25% and 50% [20.] Cannabis addiction has been found to lead to, inter alia,

- Absenteeism and failing to execute major tasks and duties at work;
- Giving up important activities because of cannabis use;
- Unintentional increased frequency of use in larger doses; and
- Inability to reduce or control the use of cannabis[21.]

4 WAYS OF USING CANNABIS

The two primary means of using cannabis are by means of smoking (inhalation) or eating (ingestion). In the case of smoking which includes vaping cannabis begins to work fastest as THC is carried to the brain in the bloodstream and a user may start to feel 'high' within seconds or minutes [35.] The amount of THC peaks in about 30 minutes and then fades after one to four hours. There are several ways in which cannabis can be smoked that include:

- Hand rolled into a cigarette known as a joint;
- In a pipe or water pipe referred to as a bong;
- In a cigar that has been hollowed out and refilled with cannabis referred to as a blunt; and
- In the form of sticky resins drawn from the cannabis plant which have a higher concentration of THC.

When cannabis is consumed or ingested the effects are slower than if smoked. Typical periods before the onset of the 'high' feeling are between 30 minutes and two hours. The after effects last up to eight hours [35.] Cannabis can be mixed, inter alia,

- In food such as brownies, cookies and candy;
- In teas in which it is brewed;
- In hash oil or honey oil which is a sticky glue-like liquid;
- In wax or butter form which is a soft texture-like lip balm;
- In vaporizer in liquid form;
- Shatter which is a hard amber-colored solid; or
- In tonics and tinctures.

5 REPORTED THERAPEUTIC BENEFITS OF USING CANNABIS

Several therapeutic benefits for the use of cannabis for medicinal reasons have been reported as, for example:

- Feeling of relaxed well-being and heightened senses making colors appear brighter;
- Increased sociability;
- Muscle relaxant in the case of stiff muscles or muscle spasms from multiple sclerosis;
- Analgesic effect to relieve ongoing pain which is most common use for medical cannabis;
- Help with sleep problems in persons suffering from fibromyalgia and sleep apnea;
- Appetite stimulation in cases where persons with AIDS suffer with loss of appetite and weight loss;
- Antiemetic effect which prevents vomiting such as from chemotherapy;
- Anticonvulsant effect; and
- Lower intraocular pressure, namely pressure in the eye[22.]

6 THREATS TO THE CONSTRUCTION INDUSTRY

Given that the after effects of the use of cannabis last for many hours, it is likely that construction workers who have used cannabis at home could come to work feeling high. Consequently, they do not only place themselves at risk on construction sites but also their fellow workers. There is emerging research into the effects of second-hand exposure from a cannabis smoker, for example, in close proximity[23,24.] In South Africa the Constitution which is the overarching piece of legislation in the country stipulates that employees are entitled to a working environment that does not present a threat to their health and safety. This entitlement is captured in the Occupational Health and Safety Act of 1993 as amended, in terms of which employers must ensure a working environment for all their workers that does not present a threat to their health and safety[1.] The Construction Regulations of 2014 requires the development, implementation, monitoring and review of the site- and project-specific health and safety plan to manage the health and safety aspects of the construction project[24.] This plan would incorporate the provisions of several policies that should include a substance abuse policy. This policy should ideally be a 'zero tolerance' one with clear censures for non-compliance with its provisions.

COMMON TERMS FOR CANNABIS

In order to deal with cannabis on construction sites it is necessary to know the terms that are frequently used by workers when they are referring to the use of the substance or discussing its use among themselves. There are more than 1,200 words used for cannabis around the world[6.] Some of the more common ones that could be heard on construction sites would include:

- Marijuana;
- Weed;

- Pot;
- Grass;
- Dagga;
- Ganga; and
- Herb;
- Joint;
- Reefer;
- Pill;
- Boom; and
- Zol.

7 REASONS FOR USING CANNABIS

Several reasons have been posited for the use of cannabis as a drug on construction sites. These reasons directly or indirectly relate to the working conditions on job sites or the workers themselves[25.] Directly related reasons or coping strategies include the need to:

- Increase concentration;
- Increase self-confidence;
- Have more physical strength; and
- Reduce anxiety and tension.

Other non-work related reasons include

- Tradition and customs;
- Personal lifestyles; and
- Peer pressure[26,27,27.]

8 POSSIBLE SIGNS OF HAVING USED CANNABIS

There are many tell-tale signs that could alert to the use of cannabis by workers and still being 'high.' However, these signs also might be indicative of the use of other substances that include alcohol [11.] These signs include the worker having or demonstrating, inter alia:

- Glassy red eyes;
- Poor muscle and limb co-ordination;
- Delayed reaction times;
- Increased appetite;
- Sudden mood shifts; and
- Abrupt symptoms of anxiety, panic or hallucinations.

The most distinctive sign of cannabis use is its skunk-like smell or odour, which permeates the clothes and body of the worker[13.]

9 IMPACT ON CONSTRUCTION SITES

The use and abuse of cannabis by construction workers given the likelihood that its use will be more visible and brazenly open particularly in South Africa after the court ruling will lead to several impacts on construction projects and eventually the sector unless its use on site or after effects from use at home are controlled on site[23.]

These include:

- High rates of absenteeism by workers who use cannabis and have after effects from use before work;
- Loss of productivity on site because of the lasting effects of use off site;
- Violent and unpredictable behavior that could even include crime to fund the cannabis habit;
- Steadily decreasing work quality resulting in rework;
- Increasing inability to pay attention;
- Needless risk taking threatening workplace safety; and
- High labor turnover with associated recruitment costs[28,29,30,31.]

According to a recent study, 15.1% of construction workers used drugs. In another study of 150 construction workers between the ages of 20 and 40 years the widespread use of cannabis was found because it was inexpensive and easily obtainable[25.]

10 PARAPHERNALIA AND HIDEAWAY PLACES

Cannabis users will be 'inventive' to conceal their cannabis-related activities on construction sites [25.] For example, the following paraphernalia, inter alia, could be found on site, namely

- Rolling papers;
- Pipes such as glass top of bottles (darkened from burn residue);
- Cigar papers with their content emptied; and
- Edibles with green hue.

Examples of places where cannabis users will hide cannabis on site have been found to include the following, namely:

- In cavities and crevices;
- Carved out spaces at the top of doors;
- Over-the-counter medication packages to avoid detection;
- Soda cans;
- In drop or suspended ceiling spaces;
- In water bottles;
- In their clothing;
- In toolboxes;
- In hammer handles; and
- In spirit levels to mention a few[25.]

11 RECOMMENDATIONS FOR ON-SITE CONTROL

Construction sites have been found to be the most susceptible and vulnerable workplaces for cannabis use[32,33,26]. In a study, it was found that third-parties such as women as food vendors were used to smuggle in cannabis under the guise of bringing or selling food to workers. Further, security guards were paid to turn a blind eye[25.]

Suggestions to improve the control of the use of cannabis itself onsite or to reduce the likelihood of construction workers coming on to the site with effects of cannabis use off site include:

- The need for management including foreman and site supervisors to be knowledgeable, aware and vigilant;
- Development of intensive awareness

programs presented using multiple media as part of toolbox talk programs;

- Implementation of peer interventions and support initiatives since workers are more likely to respond to their peers than their supervisors;
- Development and communication with the involvement of trade unions and health and safety representatives of a 'no or zero tolerance' substance abuse policy that includes random testing;
- Disciplinary action where the substance abuse policy has been breached;
- Improving access and egress control of construction sites that may include random physical body searches and restriction of worker exits during working hours;
- Conducting frequent routine inspections of workplaces and ablution facilities;
- Setting up an anonymous helpline for workers to report use and also to seek counseling if addicted to cannabis;
- Consideration for a strict no smoking policy or provision of designated smoking areas that are properly monitored;
- Reducing workplace stressors and improving workplace culture and controls through holistics wellness programs; and
- Provision of lockers on site for workers in properly monitored areas.

12 CONCLUSION

It is likely that at least 15% of construction workers irrespective of trades, levels of skills and experience are cannabis users. Management and supervisors need to know their workers well enough to detect sudden changes and symptoms of possible cannabis use. Younger male workers are most likely to use cannabis on site. Appropriate policies with support and involvement of worker representatives are necessary. Access control and regular inspections are required to prevent the smuggling of cannabis onto construction sites with particular emphasis on items usually allowed on site. Further study is necessary to determine the impact of the recent court ruling on the use of cannabis on construction sites in South Africa as well as the challenges that it presents to construction health and safety and their management. An amendment to the current construction health and safety legislation and regulations might be needed that specifically requires a substance abuse policy to be provided and implemented on all construction sites.

14 REFERENCES

1. Nel, M. (2018). “South Africa's top court legalizes the private use of marijuana. Why it's a good thing”. The Conversation, September 19

2. Possi, M. (1996). “Effects of Drug abuse on cognitive and social behaviours: a potential problem among youth in Tanzania”. Utafiti, 3(1): 111-128

3. ElSohly, M., and Gul, W. (2014). “Constituents of Cannabis sativa,” in Handbook of Cannabis, ed R. G. Pertwee (New York, NY: Oxford University Press), 1093.

4. Grlic, L. (1976). “A comparative study on some chemical and biological characteristics of various samples of cannabis resin”. Bulletin of Narcotics. 14, 37–46.

5. Bhattacharyya, S., Morrison, P., Fusar-Poli, P., Martin-Santos, R., Borgwardt, S., Winton-Brown, T., Nosarti, C., O'Carroll, C., Seal, M., Allen, P., Mehta, M., Stone, J., Tunstall, N., Giampietro, V., Kapur, S., Murray, R., Zuardi, A., Crippa, J., Atakan, Z., and McGuire, P. 2010. Opposite effects of delta-9-tetrahydrocannabinol and cannabidiol on human brain function and psychopathology. Neuropschopharmacology. 35(3):764-74. doi: 10.1038/npp.2009.184.

6. Ramo, L. and Prochaska, J. (2015). “Tobacco and marijuana use among adolescents and young adults: a systematic review of their co-use”. Clinical Psychology Review 32: 105-121.

7. Schauer, G.L, Rosenberry, Z.R and Peters, E.N. (2017). “Marijuana and tobacco co-administration in blunts, spliffs, and mulled cigarettes: a systematic literature review”. Addictive Behaviors. 64: 2011-2211.

8. Wang, X., Derakhshandeh, R., Liu, J., Narayan, S., Nabavizadeh, P., Le, S., Danforth, O., Pinnamaneni, K., Rodriguez, H., Luu, E., Sievers, R., Schick, S., Glantz, S. and Springer, M. (2016). “One minute of marijuana secondhand smoke exposure substantially impairs vascular endothelial function”. Journal of American Heart Association, 5 (8), DOI:10.1161/JAHA.116.003858.Thomas, G

9. ; Kloner, RA; Rezkalla, S.(2014). “Adverse cardiovascular, cerebrovascular, and peripheral vascular effects of marijuana inhalation: what cardiologists need to know”. American Journal of Cardiology. 113(1):187-90.

10. Galli, J; Sawaya, R; and Friedenberg, F. (2011). “Cannabinoid Hyperemesis Syndrome”. Current Drug Abuse Review. 4(4):241-249.

11. Leirer, V., Yesavage, J. and Morrow, D. (1991). “Marijuana carry-over effects on aircraft pilot performance”. Aviation Space Environmental Medicine. 62(3):221-7.

12. Karschner, E., Swortwood, M., Hirvonen, J., Goodwin, R., Bosker, W., Ramaekers, J. and Huestis, J.

(2016). “Extended Plasma Cannabinoid Excretion in Chronic Frequent Cannabis Smokers During Sustained Abstinence and Correlation with Psychomotor Performance”. Drug Test Analysis. 8(7): 682–689. doi:10.1002/dta.1825.

13. Meier, M., Caspi, A., Ambler, A., Harrington, H., Houts, R., Keefe, R., McDonald, K., Ward, A., Poulton, R., and Moffitt, T. (2012). “Persistent cannabis users show neuropsychological decline from childhood to midlife”. Proceedings of the National Academy of Sciences USA. 109 (40), E2657-64

14. Jackson, N.; Isen, J; Khoddam, R; Irons, D; Tuvblad, C; Iacono, W; McGue, M; Raine, A; Baker, L. (2016). “Impact of adolescent marijuana use on intelligence: Results from two longitudinal twin studies”. Proceedings of the National Academy of Science of the United States of America, 113 (5) E500-E508; https://doi.org/10.1073/pnas.1516648113.

15. National Academy of Sciences, Engineering and Medicine, (2017). The health effects of Cannabis and Cannabanoids: Current state of evidence and recommendations for research, Washington, DC., The National Academies Press.

16. Goldschmidt L, Day NL, Richardson GA. (2000). “Effects of prenatal marijuana exposure on child behavior problems at age 10”. Neurotoxicol Teratol. 22(3):325-336.

17. Richardson, G.A, Ryan, C., Willford, J., Day, N.L and Goldschmidt, L. (2002). “Prenatal alcohol and marijuana exposure: effects on neuropsychological outcomes at 10 years”. Neurotoxicol Teratol. 24(3):309-320.

18. Perez-Reyes, M., Wall, M. (1982). “Presence of delta9-tetrahydrocannabinol in human milk”. New England Journal of Medicine. 1982;307(13):819-820. doi:10.1056/NEJM198209233071311.

19. The National Academies of Sciences, Engineering, and Medicine, Health and Medicine Division, Board on Population Health and Public Health Practice, Committee on the Health Effects of Marijuana: An Evidence Review and Research Agenda. (2017). The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research.http://nationalacademies.org/hmd/Reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx.

20. Volkow, N., Baler, R., Compton, W. and Weiss, S. (2014). “Adverse Health Effects of Marijuana”. Use New England Journal of Medicine. 370(23): 2219–2227. doi:10.1056/NEJMra1402309.

21. Zwerling, C., Ryan, J. and Orav, E. (1990). “The efficacy of preemployment drug screening for marijuana and cocaine in predicting employment outcome”. JAMA. 264(20):2639-2643.

22. Ratini, M. (2018). WebMD Medical Reference Reviewed.

23. Herrmann, E; Cone, E; Mitchell, J: Bigelow, G; LoDico, C; Flegel, R; and Vandrey, R. (2015). “Non-smoker exposure to second-hand cannabis smoke II: Effect of room ventilation on the physiological, subjective, and behavioural/cognitive effects”. Drug Alcohol Dependency. 151:194-202. doi: 10.1016/j.drugalcdep.2015.03.019.

24. Cone, E; Bigelow, G; Herrmann, E; Mitchell, J; LoDico, C; Flegel, R; and Vandrey, R. (2015). “Non-smoker exposure to second-hand cannabis smoke. I. Urine screening and confirmation results”. Journal of Analytical Toxicology. 39(1):1-12. doi:10.1093/jat/bku116.

25. Mushi, F. and Manege, S. (2018). “Alcohol abuse and illicit drug use at construction sites: Perception of workers at construction sites”. International Journal of Construction Engineering and Management, 7(2): 65-72

26. Kikwazi, G. (2015). “Alcohol abuse and illicit drug use on construction sites: a norm or an emerging issue?” Proceedings of the 9th Built Environment Conference of the Association of Schools of Construction of Southern Africa, August 2-4, Durban. 363-372.

27. Laad, P., Abdul, B., Chaturveli, R., Shaikh, M. (2013). “Prevalence of substance abuse among construction workers”. Indian Journal of Research, 2(3): 281-282.

28. Ntili, M., Emuze, F. and Monyane, T. (2015). “The impact of substance abuse in construction: Examples from Bloemfontein, South Africa”. Proceedings of the 6th International Conference on Engineering and Production Management, September 2-4, Gold Coast Australia. 47-56.

29. Biggs, H. and Williamson, A. (2012). Safety impacts of alcohol and other drugs in construction: development of an industry policy and cultural change management program. Proceedings of 28th ARCOM Conference. September 3-5, Edinburgh, UK. 445-454.

30. Pidd, K., Roche, A., and Buisman-Pijlman, F. (2011). “Intoxicated workers: Findings from National Australian Survey”. Addiction, 106(90: 1623-1633.

31. Pidd, K., Roche, A., and White, M. (2011). “Workplace drug and alcohol testing”. National Center for Education and Training on Addiction, Flinders University, Adelaide.

32. Pidd, K., Shtangey, V., and Roche, A. (2008). “Alcohol use in the Australian workforce: Prevalence, Patterns and Implications”. National Center for Education and Training on Addiction, Flinders University, Adelaide.

33. Frone, M. (2006) a. “Prevalence and distribution of alcohol use and impairment in the workplace: A US National Survey”. Journal of Studies of Alcohol, 67: 147-156

34. Frone, M. (2006) b. “Prevalence and distribution of illicit drug use in the workforce and in the workplace: Findings and implications from a US National Survey”. Journal of Applied Psychology, 91(4): 856-869.

35. Hall, W.D., Degenhardt, L. and Teesson, M. (2009). Understanding comorbidity between substance use, anxiety and affective disorders: broadening the research base. Addict Behav. 34:526–30.

Factors impacting the performance outcome of joint venture construction projects in South Africa

Bekale Mba Marie Francoise, University of Johannesburg, Cnr. Siemert & Beit Streets, Doorfontein Campus, Johannesburg, Tel. +27118860009,

Email: mariefrancoisebm@gmail.com
Justus Ngala Agumba, Durban University of Technology, Cnr. Botanic Gardens street & Steve Biko streetS, Berea Campus, Durban, Tel. +27313732466, Email: JustusA@dut.ac.za

ABSTRACT

PURPOSE OF THIS PAPER:

Joint venture (JV) undertaken in construction projects is an initiative to improve the performance of construction projects. However, there has been unsatisfactory results as per the plethora of studies conducted to determine the factors for successful JV construction projects. Therefore, the purpose of this paper is to determine the critical success factors (CSFs) of JV construction projects that influence the performance outcome of JV construction projects in South Africa.

DESIGN:

A questionnaire survey was developed and piloted. The final questionnaire was distributed to conveniently sampled registered professionals of the South African Council for the Project and Construction Management Professions (SACPCMP) who have been involved in joint venture (JV) construction projects.
FINDINGS: The results revealed that management control influenced the achievement of JV project objectives.

VALUE:

The findings from this study alert construction industry stakeholders on the main critical success factors (CSFs) to be considered in JV construction projects in South Africa.

KEYWORDS:

Construction Industry, Critical Success Factors, Joint Venture, Projects

1 Introduction

Joints Ventures have become increasingly common in the construction industry [1]. The popularity of Joint ventures (JVs) depends on the fact JV has become a useful vehicle for collaborative housing development and future private rented sector projects which is regarded as a speculation for profit where the risks and benefits are shared by two or more parties [2,3]. The intricate and sophisticated nature of construction projects suggest the need of inter-professional temporary agreement in the form of a JV [4]. However, the formation of JV mainly depends on: the size of the project as the project requires specialist skills or abilities, also, the skills and expertise of emerging firms can be developed through their association in JVs with well-established experienced companies [5].
Moreover, the risks associated with JV formation include: agreement of the contract, partner selection, potential financial distress, improper project feasibility study, project delay, inadequate forecast about market demand, loss due to bureaucracy for late approvals and design changes [6,7]. Further, time and cost variations, skills and competence issues and lack of worker participation appeared to be the challenges experienced in JVs [8]. Yet, at least 40 to 70 percent of JVs experience failure [9]. Further, this failure rate of JVs is the results of delays and disruptions, as well as poor site management[8].

In order to overcome the failure rate of JV construction projects highlighted in the previous section, the following CSFs need to be implemented: openness, transparency and clear communication; clarity of roles, responsibilities, goals and ground rules; commitment of core organizational competencies; application of the same professional rigor and discipline; respect for differences in approach, competence, timeframes and objectives of different partners; focus on achieving mutual benefits; understanding the needs of local partners and beneficiaries [10]. However, several authors did not determine the influence of these CSFs to JV construction project success in South Africa. This paper therefore determines the validity and reliability of the CSFs and their influence on the performance outcome of JV projects in South Africa.

2 Literature review and hypotheses

The literature review identified eight independent variables as CSFs which directly influence project performance outcome. These variables (CSFs) were: comprehensive and fair written agreement, mutual

understanding, inter-partner trust, co-operation between the members, commitment of the partners, the ease of communication between the partners, management control and partner experience. The hypotheses associated with impacting the performance outcome is discussed herein.

Comprehensive and fair written agreement: The for possible disaster is when a JV is not constituted by means of a comprehensive and fair written agreement between the members. The agreement should set out the partners' obligations, rights, risks and rewards [3]. Moreover, a good JV agreement is an essential success factor and can avoid a great deal of trouble and conflict in future joint venture operations [15]. Similarly, the success of JVs can be evaluated by their stability and the duration of cooperation between partners [13]. Based on this discussion, the following hypothesis will be tested in this study:

Ha1 - A fair written agreement between the JV partners has a positive relationship with the joint venture project outcomes.

Mutual understanding: Mutual understanding may contribute to the success of joint venture construction projects [15,10]. In fact, it is extremely important that friendly personal contact is regularly maintained between the leaders of the partnering organizations [15]. The careful selection of people who are to work in an alliance will assist the prospects of mutual bonding of partners [13]. Thus the following hypothesis will be tested:

Ha2 - The joint venture performance is positively influenced when the partners forming the JV have mutual understanding.

Inter-partner trust: A high degree of trust and co-operation between the members for a successful operation of a joint venture is important [5]. Inter-partner trust is often considered to be a very important ingredient of managing relationships [15,13,11]. In other words, mutual trust is indispensable to overcome the restrictions of the contractual agreement [8]. However, within organizations, trust contributes to effective implementation of strategy, greater managerial coordination and effective work teams [15]. Moreover, the role of trust is presented as a component of social control [16]. The proposed hypothesis to be tested in this study is:

Ha3 – Inter-partner trust between partners, positively influence the success of joint venture projects.

Co-operation between the members: Cooperation is an important factor as problems solving reflects the degree to which the parties share responsibility both for dealing with problems and maintaining their relationship [15]. Yet, the review of the effect of cooperation/conflict on joint venture performance has been a prevalent topic for many researchers [8]. The partners must have a willingness to cooperate and share information and resources to enable essential coordination of activity [15]. Therefore, cooperation behavior between the parent companies help to reduce potentially difficult monitoring and maintains costs within the joint venture. Thus, the proposed hypothesis to be tested in this study is:

Ha4 - Co-operation between the members positively influence the success of joint venture projects.

Commitment of the partners: Indeed, commitment reflects the actions of some key decision makers regarding continuation of the relationship, acceptance of the joint goals and the values of the partnership, as well as the willingness to invest resources in the relationship [15,11]. It can be concluded that, without commitment the performance of the joint venture will inescapably suffer. Commitment is important as it provides a long-term relationship, resources and capabilities to the specific needs of a successful joint venture [15]. Therefore, the following hypothesis will need to be tested:

Ha5 - The commitment of the partners positively influences the success of the joint venture project.

The ease of communication between the partners: For any business to be run appropriately, the communication / information aspect plays a major role. Therefore, the ease of communication between the partners is another potential problem which should be considered when evaluating a potential partner's suitability [15,11]. In fact, without proper communication, problems can occur as a result of differences between national or ethnic cultures, including language, as well as differing corporate cultures [15,10]. Therefore, the proposed hypothesis to be tested is:

Ha6 - Communication between partners influence the success of joint venture projects.

Management control: The management aspect of a construction project plays a very significant role in the successful completion of a JV construction project as the role of project participants is vital [17]. More specifically, management control is defined as all the strategies managers use to ensure that the conducts and decisions of people in the organization are in line with the organization's goals and policies which includes the formal control mechanisms of outcome (outcome control and behavior control) and social control (capability trust, partner selection and goodwill trust) [16]. Similarly, management control is fundamental to successful joint venture performance, as the parent firms in a joint venture (JV) may have opposing interests [16]. Therefore, the proposed hypothesis to be tested is:

Ha7 - The performance of the joint venture project is positively influenced by management control.

Partner experience: Firms with multinational experience are considered more likely to have the ability to manage and monitor appropriately the joint venture [15]. Therefore, greater experience, understanding, competence and confidence in managing inputs will result in a more detailed and accurate perceptions of risks [15]. In addition, partners` experience contributes to the success of alliances because it has an indirect impact on positively influencing the acquisition of complementary resources [14]. Thus, the proposed hypothesis to be tested is:

Ha8 - JV project performance is successful when experienced partners are involved in the project.

3 Research methodology

A quantitative research methodology was used. The method entailed questionnaire survey with 31 measures that defined the eight CSFs which are identified for extant literature review. The respondents were required to indicate their level of agreement with the use of the measures of the CSFs in their JV projects. The CSFs measures were rated on a

five point Likert scale, where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. Other parts of the questionnaire were participants in terms of their position in the company, gender, race, experience in the construction industry and their qualification. The questionnaire also profiled the organization in terms of the type of business and geographic location. In order to achieve content validity, the questionnaire was piloted with 10 personnel knowledgeable on the issue of JVs construction projects and their main inputs for successful JV projects. The final version of the questionnaire was presented to 400 conveniently sampled professionals from Gauteng, Limpopo and Western Cape provinces who registered with the South African Council for the Project and Construction Management Professions (SACPCMP).

The data was collected using email and drop and collect method of which 115 questionnaires were returned representing 28.75% response rate. All the 115 questionnaires were deemed valid for analysis. It is important to mention that the response rate for mailed questionnaires are usually low, thus, a response rate ranging between 15% and 25% is considered appropriate and acceptable [18]. Furthermore, a response rate from 10% to 15% is considered appropriate [19]. The Statistical Package for Social Science (SPSS) version 23.0 was used to conduct descriptive statistics of the data computing the frequencies, mean scores and standard deviation. Furthermore, inferential statistics were conducted to analyze the factor analyzability of the CSFs and project performance outcome. The exploratory factor analysis (EFA) was used to determine the validity and reliability of the CSFs and project performance outcome. Reliability was tested using Cronbach alpha with a cut-off value of 0.60 [20]. However, a Cronbach alpha lower than 0.70 can be accepted if the number of variables in the construct are less than ten and the inter-item correlation mean values range between 0.2 and 0.4 [21]. In this current study this was achieved indicating that the instrument was reliable. The Maximum Likelihood with Varimax with Kaiser Normalization rotation techniques were selected as extraction and rotation methods from the EFA.

4 Results of analysis

4.1 Descriptive analysis and reliability

The predominant gender who participated in the survey were male with 86 participants that is 74.80% out of a total of 115 respondents. Majority of the respondents' age group were between the ages of 31 and 40 accounting for 35.7%. 25.2% of respondents were between the ages of 41 and 50. 48 participants (41.7%) had graduated with a baccalaureate degree, and 37 participants (32.2%) graduated with a diploma or certificate. 99 respondents were involved in JV project in the past 2 years, 79 respondents (52.3%) accounted for general building projects, 21 participants (13.9%) were involved in transportation/roads JV projects. 61 participants (53%) had been involved in one to two JV projects in the past 2 years; while only 18 participants (15.7%) participated in three to four JV projects. 39 participants (33.9%) had worked in JV projects for a period of less than 5 years, and 37 participants (32.2%) had worked in JV projects for a period of 5 to 10 years.

The initial analysis of the data using SPSS version 23.0 covered the reliability of the measurement scale and the factor analysis. The internal reliability of the measurement instrument was evaluated using Cronbach alpha. The Cronbach's alpha of performance outcome and CSFs ranged between 0.60 and 0.95, indicating satisfactory to good reliability [21].

The KMO results of the performance outcome and CSFs are 0.679 and 0.781 respectively, which are above the threshold [21]. This suggests that the correlation pattern between variables is compact. The results of Bartlett test of sphericity are 1680.20 and 149.61 with the associated p-value equal to 0.000 for both CSFs and performance outcome factors respectively. This indicates that the correlation matrixes of variables are not identity matrices. Thus the data of the study is suitable for PCA.

4.2 Principle component analysis (PCA) results

The PCA result of CSFs are shown in Table 1. The result of CSFs indicates that the total number of components extracted based on the threshold value of eigenvalues greater than 1 are nine components, contributing 69.66% variance of the total cumulative variance. The theoretical conceptualized model had eight components. It can therefore be concluded that the CSFs that are claimed to influence JV success are modelled by nine components. The nine components were renamed as follows: the first component is called "Co-operation between the members", and contributed 26.95% of the total variance to the CSFs, defined by five variables viz. "Willingness to share resources to enable coordination of activity from partners was undertaken", "Efficiency of implementing organization strategies were achieved" but to name a few. The second component is called "communication between the partners" and contributed 7.86% of the total variance to the CSFs and defined by four variables.

The third component is called "contract management" and contributed 7.49% of the total variance to the CSFs which was defined by three variables. The fourth component is "mutual understanding between partners" and contributed 5.85% of the total variance to the CSFs which is defined by three variables. The fifth component was called "management control" and contributed 4.99% of the total variance to the CSFs and was defined by five variables. The sixth component was called "inter-partner trust" and was explained by three measures representing 4.75% of the total variance. The seventh component was called "comprehensive and fair written agreement" and was explained by two measures. The variance percentage explained by this component was 4.36%. The eighth component was defined by four variables and is called "commitment of the partners" which represented a contribution of 3.85% of the total variance. The last component was called "implementation of contract agreement" and was defined by two variables and contributed 3.55% of variance of the CSFs.

Table 2: PCA results of performance outcome of joint venture construction projects

Component	Eigenvalue	Variance %	Variables	Factor loading
1.Co-operation between the members	8.354	26.950	Willingness to share resources partners was undertaken	0.812
			Efficiency of implementing organization strategies were achieved	0.654
			Mutual trust overcame the restrictions of the contractual agreement	0.573
			Monitoring and safeguard costs within the joint venture were reduced	0.508
			Willingness to share information to enable essential coordination of activity.	0.470
2.Communication between the partners	2.436	7.857	Proper communication prevented conflicts of cultural difference	0.813
			Effective communication prevented conflicts between different ethnicity.	0.692
			Effective communication prevented misunderstandings and suspicion.	0.487
			Full commitment to the joint venture and between partners was achieved.	0.399
3.Contract management	2.322	7.489	% participation by each member including risks, rewards, losses and liabilities were recorded.	0.687
			Conducts & decisions of partner in the organization in line with goals& policies	0.615
			Capability trust was implemented to ensure professional experience	0.416
4. Mutual understanding between partners	1.814	5.853	Partners were selected on the basis of technical competence	0.654
			Partners were selected on an assessment of their ability to form good relationships	0.593
			Consensus between the members was promoted	0.424
5. Management control	1.548	4.992	Ability of the partners to synchronize their project activities was achieved	0.644
			Multinational experience ensure acquisition of added resources	0.534
			Differences in interests in JV led to the incorporation of management control	0.529
			The firms' multinational experience ensured proper monitoring	0.486
			Efficiency of utilizing the partners' resources was met	0.454
6. Inter-partner trust	1.472	4.750	Contractual trust was met to fulfill contractual duties	0.702
			Meaningful input by partners to the policy-making & management activities of the JV was provided	0.493
			Goodwill trust was executed to ensure partners operate in the concern of the relationship within the JV	0.426
7. Comprehensive and fair written agreement	1.353	4.363	Management body for the joint venture was provided	0.783
			Losses to the JV by the default of a member were limited	0.640
8. Commitment of the partners	1.195	3.853	JV objectives, inputs by the parties, & management systems of the JV	0.677
			Friendly personal contact was regularly maintained between the partners	0.513
			Actions of key decision makers and acceptance of joint goals were achieved	0.447
			Partner selection were observed in order to achieve mutual understanding	0.435
9. Implementation of contract agreement	1.102	3.554	Contributions by each member were set out	0.562
			Effective implementation of strategy, greater managerial coordination and more effective work teams were enhanced	0.556

Extraction method: Principal component Analysis. Rotation method: Varimax with Kaiser Normalisation (rotation converged in 6 iterations)

Table 2: PCA results of performance outcome of joint venture construction projects

Component	Eigenvalue	Variance %	Variables	Factor loading
1. Achievement of project objectives	2.433	48.663	Project was within budget	0.856
			Project was within time	0.744
			Occupational accidents were minimized	0.539
2. Attainment of company objectives	1.152	23.043	Improvement of human resource capacity	0.701
			Raising of large capital funds from partners	0.671

Table 2 indicates the PCA results of JV performance outcome. The theoretical concept consisted of seven variables defining one component. However, the empirical results established five variables. Two components were further extracted with the eigenvalue greater than 1. The first component is renamed and called "achievement of project objectives" and contributed 48.66% of the total variance to the JV performance outcome. The component is defined by "project was within budget", "project was within time" and "occupational accidents were minimized". The second component is called "attainment of company objectives" and contributed 23.04% of the total variance to the JV performance outcome. The component is defined by "improvement of human resource capacity" and "raising of large capital funds from partners".

Table 2: PCA results of performance outcome of joint venture construction projects

4.2.1 Multiple regression analysis results

Further analysis using multiple regression analysis (MRA) was undertaken to determine the individual factors in the first order of factor analysis of CSFs that influenced the two project performance outcomes of JV projects. Figure 1 shows the empirical conceptualized model, where the nine empirical CSFs were modeled and hypothesized to individually influence the achievement of project objectives (PO1) and attainment of company objectives (PO2).

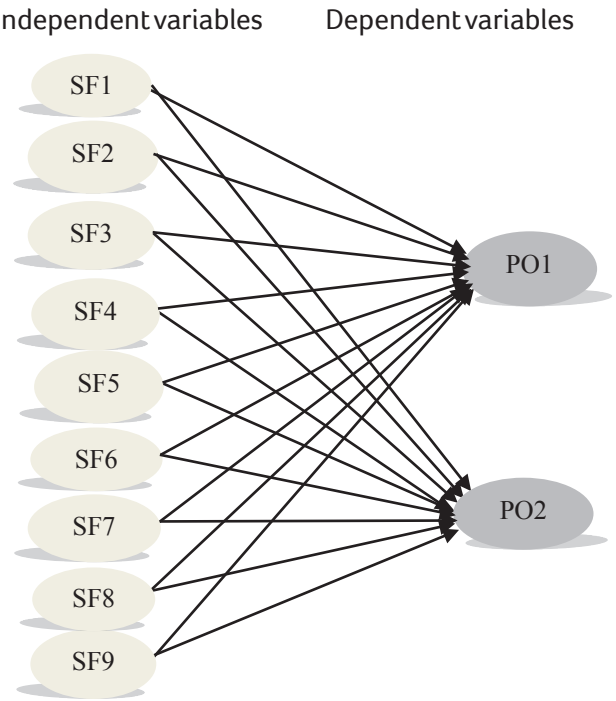

Figure 1: Empirically conceptualized model
The arrow indicates the relationship of the independent variables and the dependent variables

SF1-co-operation between the members; SF2-communication between the partners; SF3-contract management; SF4-mutual understanding between partners; SF5-management control; SF6-inter-partner trust; SF7-comprehensive and fair written agreement; SF8-commitment of the partners; SF9-implementation of contract agreement.
PO1=achievement of project objectives; PO2= achievement of company objectives.

Table 3 reveals that eight of the empirical factors did not influence project objective outcome as their level of significance of $p \leq 0.05$ were greater. These were; co-operation between the members, communication between the partners, contract management, mutual understanding between partners, inter-partner trust, comprehensive and fair written agreement, commitment of the partners and implementation of contract agreement. However, management control factor was found to influence project objective outcome with level of significance of $p \leq 0.05$ ($p = 0.001$), and contributing 36.8% (beta =0.368) of the variance in the nine-factor model.

Table3: Results of regression analysis on CSFs influencing achievement of project objectives (Po1)

Table3: Results of regression analysis on CSFs influencing achievement of project objectives (PO1)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Zero-order
	B	Std. Error	Beta			
(Constant)	1.573	0.553		2.846	0.005	
1. Co-operation between the members/ partners	0.202	0.108	0.194	1.861	0.066	0.283
2. Communication between the partners	-0.125	0.108	-0.133	-1.157	0.250	0.120
3. Contract management	-0.238	0.124	-0.210	-1.922	0.057	0.106
4. Mutual Understanding	0.122	0.128	0.113	0.956	0.341	0.290
5. Management control	0.403	0.112	0.368	3.591	0.001	0.392
6. Inter-partner trust	0.027	0.120	0.026	0.223	0.824	0.229
7. Comprehensive and fair written agreement	0.056	0.083	0.069	0.678	0.499	0.144
8. Commitment of the partners	-0.054	0.129	-0.047	-0.419	0.676	0.143
9. Implementation of contract agreement	0.208	0.113	0.190	1.839	0.069	0.303

Table 4 shows that the nine components i.e. co-operation between the members, communication between the partners, contract management, mutual understanding between partners, inter-partner trust, comprehensive and fair written agreement, commitment of the partners, implementation of contract agreement and management control did not influence the attainment of company objectives. Their level of significance at $p \leq 0.05$ were greater, hence they were not significant.

Table 4: Results of regression analysis on CSFs influence on attainment of company objectives (PO2)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Zero-order
	B	Std. Error	Beta			
(Constant)	2.793	0.724		3.857	.000	
1. Co-operation between the members/partners	0.145	0.142	0.121	1.025	0.308	0.143
2. Communication between the partners	0.035	0.142	0.032	0.246	0.806	0.077
3. Contract management	0.008	0.162	0.006	0.048	0.962	0.078
4. Mutual Understanding	-0.086	0.168	-0.069	-0.514	0.609	0.061
5. Management control	0.038	0.147	0.030	0.261	0.795	0.056
6. Inter-partner trust	-0.162	0.157	-0.134	-1.028	0.306	0.038
7. Comprehensive and fair written agreement	0.084	0.109	0.089	0.772	0.442	0.119
8. Commitment of the partners	-0.003	0.169	-0.002	-0.016	0.988	0.084
9. Implementation of contract agreement	0.214	0.148	0.169	1.444	0.152	0.157

5. Discussion of the results

5.1 CSFs of JV in South Africa

In order to identify the CSFs of JV, validity and reliability were undertaken. The findings revealed that nine components were valid and reliable as empirically extracted. This suggests that the eight factor model conceptualized from the literature review was not adequately conceptualized. This led to the re-naming of the components. It can be reported that the re-naming of the CSFs was based on the description of measures that defined them. Furthermore, justification from literature was considered. In line with this statement the CSFs were: co-operation between the members; communication between the partners; contract management; mutual understanding between partners; management control; inter-partner trust; comprehensive and fair written agreement; commitment of the partners and implementation of contract agreement.

Co-operation between the members expounds on the previous studies [15,8]. In order for the co-operation between the members/partners to thrive and manifest, the result infers that the involvement of each partner to share their resources and information will enable the coordination of activities. Further, the implementation of organizational strategies within the JV is proved to be critical. Thus, it is imperative that the mutual trust between the partners to overcome constraints of any contractual agreement need to be considered. The co-operation between the members will be evident when the partners are able to monitor and ensure the reduction of project cost within the JV projects. It is therefore suggested that co-operation between the members is a CSF of JV projects.

Communication between the partners is critical to ensure that communication is effective at cultural and ethnicity level in order to avoid misunderstandings and suspicion within the JV partners. Moreover, it is important to evaluate the full commitment from each partner within the JV as it reduces conflicts and facilitates the achievement of JV goals [15,10,22].

Contract management, refers to the process of thoroughly and efficiently managing contract creation, execution and analysis for capitalizing on operational and financial performance and reducing risk [23]. This factor was defined by three variables. These included, the percentage participation by each member and ensuring that risks, rewards, losses and liabilities are shared. Further, the conducts and decisions of the partner in the organization in alignment with the JV goals and policies is vital to ensure that contract management activities are achieved. Finally, trusting the capability of each professional in order to ensure professional experience from each partner should be fully utilized.

In order for mutual understanding between partners to be evident in a joint venture, the selection of partners based on their technical competence should be assured. Hence prejudice should not be encouraged. Furthermore, the ability of the JV partners to form good relationship is perceived to be critical for mutual understanding between partners. The promotion of consensus between the members involved in a JV is viewed as a critical aspect [15,10,11].

Management control, describes the ability of the partners to synchronize their project activities; multinational experience leading to the acquisition of complementary resources, and ensuring the efficiency of utilizing the partners' resources [15,8,16]. The firms' multinational experience further ensures proper monitoring of the JV as it is deemed to be a critical measure. It is important to indicate that differences in interests in the JV can be monitored through management control.

Inter-partner trust guarantees that the parties to the JV are not skeptical of each other and can be achieved by contractual trust as it fulfills contractual duties of the parties. The partners should participate in policy-making and management activities of the JV. This will ensure the trust between the partners to the JV. Further, the goodwill trust is executed to ensure partners operate in the confines of the JV relationship [8,15,13,11].

Comprehensive and fair written agreement emphasizes the need to limit the losses to the JV by the defaulting members based on the agreed terms and conditions put in place. Thus, it is a recipe for possible disaster if a JV is not initiated by means of a comprehensive and fair written agreement between the members which lays down obligations, rights, risks and rewards of each partner [3,15]. Furthermore, the study indicated that a management body for the JV should be provided.

Commitment of the partners consisted of four main aspects related to it. This included the varying nature of JV objectives, inputs given by the parties, and management systems of the JV. It was also established that the friendly personal contact between the leaders of the cooperating organizations, the actions of key decision makers

including acceptance of joint goals, and finally, the partner selection criteria [15,11,14]. This component will ensure that partners are committed to achieve the required results of the project.
It is indispensable for partners entering in joint venture to be aware of the implementation of contract agreement within the JV. The contribution by each member needs to be set out as well as the implementation of strategy, a greater managerial coordination and more effective team members. A good plan helps optimize the use of the project resources and limits the time spent on resolving complications during implementation[23].

5.2 Performance outcome of Jvs

The project success of joint ventures is measured by two criteria: achievement of project objectives and attainment of company objectives. The achievement of project objectives is a significant measure of JV project performance outcome as it indicates the highest component variance in project performance compared to attainment of company objectives. The JV partners should ensure that the project attains its project budget, project time and minimization of occupational accidents. Therefore, the identification of objectives directly reports to the project design. Among these measures project budget seems to be the most important followed by time and then occupational accidents [24].

The second component that contributed to the success of the JV performance was attainment of company objectives. In the current study, it indicates the possibility of the partners raising large capital funds and ensuring the improvement of human resource capacity. JVs offer a range of benefits to partner firms through access to new and/or countless resources including but not limited to market entry, distribution networks, capacity, staff, purchasing technology in the sense of intellectual property, and finance or increase of funds [25]. The new component investigated in this study provides advantages to the JV partners in terms of reputation and competitiveness.

5.3 Significant CSFs on JV performance outcome

The empirical model tested in Figure 1 was the first order model. The nine factors were regressed to establish if they influenced the achievement of project objectives and attainment of company objectives. The findings deduced that of the nine components, management control significantly influenced achievement of project objectives in JV projects [15,8,16]. It is important to note that for management control to influence achievement of project objective outcome, a number of activities should be undertaken. These activities are: the partners should synchronise their project activities, their involvement in multinational projects ensures soliciting of complementary resources. Most Importantly, the JV partners should ensure the efficiency of utilizing the partners' resources. Finally, the firms should ensure proper monitoring of the JV and the differences in interests in the JV. Management control will ensure that the JV partners have competitive and reputation advantage in undertaking or abiding to the JV projects.

6. Limitations and delimitations

This study was undertaken amongst practitioners registered with the SACPCMP. The respondents were construction managers and construction project managers in Gauteng, Limpopo and Western Cape provinces in South Africa hence a delimiter in the study. This suggests that, the findings cannot be generalized across South Africa and across all the professional bodies. Furthermore, the time frame as well as the finances allocated to the study was a barrier for collecting more questionnaires.

7. Future research

Future study should include the population of professionals from the remaining provinces and other professional bodies in order to compare their findings. This will include professional stakeholders from Engineering Council of South Africa (ECSA), and South African Council for the Quantity Surveying Profession (SACQSP). This will enable the findings to be generalized for South Africa. Despite the use of SPSS version 23.0 in the current study, the use of structural equation modelling (SEM) software is advocated for future research on JV based on the magnitude of the current tested conceptual model.

8. Conclusions

The purpose of this paper was to establish the reliable and valid CSFs that influence successful JV construction projects outcome in South Africa. Based on the empirical findings, the PCA extracted nine components and not eight components as conceptualized from the literature review. The nine components were

reliable and valid. This finding enabled an empirical model to be conceptualized using the nine components. These nine CSFs are: co-operation between the members; communication between the partners; contract management; mutual understanding between partners; management control; inter-partner trust; comprehensive and fair written agreement; commitment of the partners and implementation of contract agreement. Among these nine components co-operation between the members contributed significantly to the cumulative variance. However, it did not influence the achievement of JV project objectives outcome and attainment of company objective outcome. The findings established that management control which contributed 4.99% to the total variance of the CSFs significantly influenced the achievement of JV project objectives.

6. Recommendations

The CSFs identified in this paper, as well as the significant CSFs that influenced the project objective outcome provide a clear guideline for JV partners to achieve project success. The South African JV partners, especially those new in such projects, can use these CSFs before venturing into such projects. To conclude, the general definition and theory of CSFs for JVs includes nine components. It is important for JV partners to adopt the management control factor to achieve JV project objective success.

7. References

[1] Fitzpatrick, J., Hecker, D. and Hazard, G. (2011). Divided Loyalty: Ethical Considerations in Representing Joint Ventures. Construction Super Conference, Session E23 held in San Francisco. California: University of California.

[2] Umunna, P. (2014). PRS structure issues for hybrid joint ventures. Available from: http://www.wslaw.co.uk/site/uploads/tinymce/PRS/prs_booklet/PRS_structure_issues_for_hybrid_joint_ventures.pdf (Accessed 22 January 2015).

[3] CIDB document 1013. (2004). Construction: Joint venture arrangements. Available from: http://www.cidb.org.za/toolkit06/toolkitpages/module5/20supplementaryinformation/5s14%20pgd2-jv%20edition%201.0.pdf (Accessed 21 January 2015).

[4] Kamal, K.K.A (2010). Joint Ventures in Construction Firms in Saudi Arabia. Available from:http://faculty.kfupm.edu.sa/CEM/assaf/Students_Reports/Joint-Ventures-in-Construction-Firms.pdf (Accessed 22 January 2015).

[5] CIDB (2015). Construction monitor employment. Available from: http://www.cidb.org.za/publications/Documents/Construction%20Monitor%20-%20October%202015.pdf (Accessed 26 November 2016).

[6] Kwok, H.C.A., Then, D. and Skitmore, M. (2006). Risk Management in Singapore Construction Joint Ventures. Journal of Construction Research, 1(2): 139-149.

[7] Shen, L. Y., Wu, G. W. C., and Catherine, S. K. N. (2001). Risk assessment for construction joint ventures in china. Journal of Construction Engineering and Management, 127 (1): 76-81.

[8] Govindan, S. (1995). Determinants of joint venture performance in the construction industry: Cases from the mass rapid transit project in Singapore. PhD. London: University College London.

[9] Farrell, E.P. (2014). The 7 Deadly Sins of Joint Ventures. Available from: http://www.entrepreneur.com/article/236987 (Accessed 27 January 2015).

[10] Manitshana, B. (2012). Assessment of the critical success factors of joint ventures in the South African construction industry. Magister Technologiea thesis. Johannesburg: University of Johannesburg.

[11] Hong, Y. and Chan, D. W.M. (2014). Research Trend of Joint Ventures in Construction: A Two-decade Taxonomic Review. Journal of Facilities Management, 12 (2): 118-141.

[12] Kale, V.V., Patil, S.S., Hiravennavar, A.R., and Kamane, S.K. (2013).Joint Venture in Construction Industry. Journal of Mechanical and Civil Engineering. 3:60-65.

[13] Hyun, J.H. and Ahn, S.Y. (2013). Host Country Perspectives on Partner Selection Criteria for the Success of International Joint Ventures: An Empirical Survey of Korean Firms. Conference

proceedings of the 24th International Business Research Conference held in Las Vegas, USA Conducted by Planet Hollywood. Korea: Hankuk University of Foreign Studies.

[14] Lambe, C. J., Spekman, R. E. and Hunt, S.D. (2011). Alliance Competence, Resources, and Alliance Success: Conceptualization, Measurement, and Initial Test. Journal of the Academy of Marketing Science, 30 (2): 141-158.

[15] Adnan, H. and Morledge, R. (2003). Joint venture projects in Malaysian construction industry factors critical to success. Association of Researchers in Construction Management, 3(2):765-774.

[16] Talman, J.A. (2009). Management control in joint ventures: an analysis based on transaction cost economics and game theory. Unpublished doctoral thesis. Zurich: Erasmus University Rotterdam.

[17] Divakar, K. and Subramanian, k. (2009). Critical Success Factors in the Real-Time Monitoring of Construction Projects. Research Journal of Applied Sciences, Engineering and Technology, 1(2): 35-39.

[18] Wahab, S.A., Abdullah, H., Uli, J. and Rose, R.C. (2010). Inter-Firm Technology Transfer and Performance in International Joint Venture Firms. International Journal of Business and Management, 5 (4): 93-103.

[19] Fryrear, A. (2015). Survey Response Rates. Available from: https://www.surveygizmo.com/survey-blog/survey-response-rates/ (Accessed 13 April 2016).

[20] Hair, J.F, Black, W.C, Babin, J.B, Anderson, R.E and Tatham, R.L. (2006). Multivariate data analysis, 6th Edition. Upper Saddle River, New Jersey: Pearson/Prentice Hall.

[21] Pallant, J. (2013). SPSS survival manual: A step by step guide to data analysis using IBM SPSS. London: Allan and Unwin.

[22] Dikmen, I., Birgonul, M.T., Ozorhon, B. and Eren, K. (2008). Critical success factors for partnering in the Turkish construction industry. Conference proceedings of the 24th Annual ARCOM Conference held in Cardiff, UK, Conducted by Association of Researchers in Construction Management. Ankara Turkey: Middle East Technical University.

[23] Durr, B., Johnson, E., Rugh, J., Furany, K., Chen, M., Rubio, M. and Siles, R. (2003). The Basics of Project Implementation: A guide for project managers. Available from: http://www.careclimatechange.org/files/toolkit/CARE_Project_Implementation.pdf (Accessed 26 November 2016)

[24] Al-Tmeemy, S.M.H.M., Abdul-Rahman, H. and Harun, Z., (2011). Future criteria for success of building projects in Malaysia. International Journal of Project Management, 29(3): 337-48. https://doi.org/10.1016/j.ijproman.2010.03.003

[25] Terjesen, S. (2004). Joint Ventures: Synergies and Benefits. Available from: http://isites.harvard.edu/fs/docs/icb.topic1157739.files/joint-ventures-synergies-and-benefits.pdf (Accessed 26 November 2016).