

FACTORS INFLUENCING SUCCESS OF CONSTRUCTION PROJECTS BY EMERGING CONTRACTORS IN SOUTH AFRICA: A CASE OF MAHIKENG AREA

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Abstract

Emerging contractors play a critical role in the South African economy in terms of rendering services to government especially in the construction sector. However, literature findings reveal that some of the SMMEs are unable to deliver their projects successfully due to project management issues. The focus of this study was to establish the project management factors influencing the successful delivery of construction projects by emerging contractors in the Mahikeng area of South Africa.

A mixed design research method was used to collect, analyse and derive the findings. Findings revealed that projects do not comply with the time, scope, cost and quality requirements. Focus group interview results attributed these problems to lack of project management skills among the emerging contractors. It is recommended that more support initiatives from the South African Department of Public Works, and other key stakeholders in the construction industry be provided to these contractors

Keywords: South Africa, SMMEs, Mahikeng Area

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1 Introduction

The purpose of this study was to investigate factors influencing the success of construction projects by emerging contractors in the Mahikeng area of South Africa. This problem is grounded on the premise of good project management practices. Project management is herein defined as the application of knowledge, skills, tools and techniques to a broad range of activities in order to meet project requirements (Schwalbe 2012). The deliverables to be produced are specifically defined, the time is certain, the quality is documented and defined as well as the level of resources to be used. These processes should ensure that planned outcomes and benefits can be achieved (PMBOK 2013).

As documented in PMBOK (2013), successful projects are projects that are completed within the planned time, budget, scope and quality. These four requirements are then referred to as the quadruple constraint of project management. The reality in practice however has proven that most projects, especially by emerging contractors, lag in either one or all of the quadruple constraints. Ncwadi and Dangelazan (2006) claimed that impediments to deliver projects on time are associated with attributes like unskilled workforce, poor or no planning, absence of adequate supervision on site, lack of construction experience, poor projects management and governance, funding constraints, poor relationship with suppliers and limited project management expert advisors. In addition and concurring with Ncwadi and Dangelazan (2006), Kambuwa and Wallis (2002) state

that limited formal education and training are impediments for majority of the labourers who have limited work experience in the construction sector. The rest of the paper is structured as follows: the background and context is discussed next followed by the problem statement of the study. Extant literature on project management and the state of emerging contractors in South Africa is followed by the research methodology. The results derived from this study investigation and discussions will then conclude this paper.

2 Background and context

Mafikeng, originally known as Mahikeng, a Setswana name meaning place among rocks is the capital city of the North West Province of South Africa. It is situated next to the border of Botswana and South Africa. The total area of the Mahikeng Local Municipality is approximately 3 703 km². It is divided into 28 wards consisting of 102 villages and suburbs. The population of the municipality is estimated at 271 501 people (www.mahikeng.gov.za). The Mafikeng Airport situated 5 km west of the Mmabatho central business district (CBD) boasts a landing strip of 4.6 km, and is one of the longest runways in the world. North West Province has introduced a number of maintenance projects through the Department of Public Works to clean Mahikeng and improve its image as the capital city of the North West Province (www.mahikeng.gov.za). A clean Mahikeng project was introduced in 2011/2012 financial year and has

had significant success especially in rural areas (www.mahikeng.gov.za).

Mahikeng still has potential to grow in industrial, residential and business developments and therefore making it possible for construction projects such as building of dams, houses, roads, storm water drainages among other projects. With the advent of democracy in South Africa, the government has taken a conscious decision to empower historically disadvantaged individuals (HDIs) and small, medium and micro enterprises (SMMEs) by involving them in such projects. This is in line with the realization that SMMEs are a major feature of the economic landscape in developing countries. Thwala and Phaladi (2009) posited that emerging contractors are crucial in government service delivery projects as well as alleviating unemployment by employing semi-skilled and unskilled workforce. Ncwadi and Dungalazan (2005) further claim that government uses previously disadvantaged individuals (PDIs) to deliver on the infrastructure mandates such as water, sanitation, roads, storm water drainage under the programme of emerging contractors.

While acknowledging various initiatives taken by the Mahikeng Local Municipality, National Home Builders Regulatory Council (NHBRC), Construction Industry Development Board (CIDB) and other stakeholders to assist emerging contractors to deliver quality projects on budget and on schedule, it is still the authors' considered opinion that further research into the specific challenges facing emerging contractors can still be carried out to improve project time management and quality. Therefore, this study investigated the extent to which project management knowledge areas such as the quadruple constraints and other facilitating functions such as human resources, communication, risk and procurement management, project management techniques such as planning, activity definition and duration estimating, as well as scheduling control impact on emerging contractors' ability to deliver projects successfully.

3 Problem statement

Haried and Ramamurthy (2009) believed that reasons for not achieving project success can be attributed to poor project management skills in aspects such as project planning, financial planning and hands-off approach by key project holders. Kendra and Taplin (2004); Shore (2008); and Atkinson (1999) suggested that elements relating to good project delivery include the ability to meet the cost, time, quality and other elements such as biases and culture requirements. This research study related to constraints impeding successful delivery of projects. Whilst both emerging and established contractors are awarded construction projects in Mahikeng area on equal terms and under the same conditions, it would appear that emerging contractors in particular are unable to deliver their projects in line with all the requirements of the quadruple constraint compared to their established

counterparts. Hence the need to establish the project management factors that impede on their ability to deliver projects successfully.

According to Statistics South Africa (2014), the country is faced with high levels of unemployment which is estimated to be over thirty percent of the general population (www.statssa.gov.za). South Africa as an emerging economy has adopted a National Development Plan 2030 (NDP); where out of its many ideas, the construction industry has been identified to have a significant role to play in creating jobs and improving the local economy. (www.ceta.org.za).

Atkinson (1999) states that from the last 60 years of project management studies conducted by other researchers, the ability to meet the cost, scope, time and quality aspects of project management have appeared to be inextricably linked with measuring the success of project management. McFarlan (1981) and Wateridge (1995) postulates that at least three areas of managing project performance which are saving costs, timely delivery and end user satisfaction can be used to certify a project as successful. Thomas and Mengel (2008) also claimed that cost, time and quality are good measuring tools for project success and from a customer's perspective, project success can be attributed to meeting time and budget. However, not all projects can be measured on time, scope, quality and costs.

This study therefore sought to properly establish the dimensions of the project management performance that influence the ability of emerging contractors in the construction industry in the Mahikeng area to successfully deliver projects, and recommend a framework for improvement.

4 Research objectives

The aim of the research study was to establish a framework that would assist better understanding of the project management factors influencing success of construction projects by emerging contractors in the Mahikeng Area: The objectives of the research are:

- To identify the factors that influence the successful delivery of projects;
- To identify factors that lead to failure of projects;
- To develop a framework of factors to be used by contractors in successful delivery of projects

5 Research questions

The following three research questions were raised from these objectives:

- What are the critical factors that lead to successful delivery of projects?
- What are the barriers that lead to unsuccessful delivery of projects by emerging contractors in Mahikeng?

- What project management factors should be considered for emerging contractors to successfully deliver their projects?

By answering these research questions, from the empirical data, one can better understand the issues involved for emerging contractors to deliver projects successfully.

6 Brief literature review

6.1 Project management

According to Schwalbe (2012) project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet project requirements as expected by the stakeholders. There are nine knowledge areas in project management which are essential for every project manager to understand. These include project integration, scope, time, cost, quality, human resources, communication, risk, and procurement PMBOK (2004). These knowledge areas are used across the life cycle of a project. Therefore, project managers have to ensure that they are well-versed in all these project management knowledge areas and project process phases for successful delivery of projects (Moiwa, 2013). Human resources in project management involves getting skilled workers to do the job and a good team leader must drive the employees to complete the project (Moiwa, 2013). There are also phases of project management which are essential and require to be followed and understood. These also include project initiation where the project charter and knowledge of the limitations and assumptions are drafted. This is then followed by the project planning phase, project execution processes and lastly, the closing processes.

6.2 The State of Emerging Contractors in South Africa

The Department of Public Works (2004), in explaining the concept of the emerging contractors in South Africa, listed criteria which includes SMMEs owned and managed by HDIs. These have a number of employees and annual turnover below a specific threshold. The elements such as financial and technical capabilities, annual turnover, as well as capital availability are some of the grading criterion to categorizing emerging contractors in South Africa (Tshivase & Worku, 2012).

Moss (2008) in a study investigating the training and mentoring of emerging contractors in the Eastern Cape province of South Africa found that the project management literacy and skills levels of emerging contractors were low to an extent that they were not able to interpret charts, status reports and forecasts. These functions are some of the critical time management control functions for tracking project progress. Lazarus, Hauptfleisch and Verster (2006) found that lack of planning and the inability to

program project management activities were also some areas of weakness in the assessment of the Emerging Contractor Development Model (ECDM). Ramokolo and Smallwood (2008) also found in their study that emerging contractors possesses low levels of skills and knowledge on project management techniques such as crashing a project to get it back on track. This has been attributed to inadequate project management qualifications, lack of on-job-training, apprenticeship, tertiary qualifications, and experience relevant to the construction industry. This translated to the inability to deliver projects on time. Emerging contractors also use low skilled casual labour which is seldom experienced in executing many of the important tasks in the construction industry. In addition the period of experience in the construction industry plays a significant role in the timely or late delivery and especially quality of projects. Research reveals that established contractors have been able to adhere to timely delivery of their projects whilst emerging contractors are known to be mostly delivering their projects belatedly (Ramokolo & Smallwood, 2008).

Martin (2010) made an observation that project managers are forced to act as site agents, contract managers, foremen or surveyors due to lack of resources, lack of qualified workforce and the need to save on overheads. This the results in them being overloaded with work. The study done by Ramkhuse and Rugimbana (2010) at three (3) separate municipalities in Mpumalanga, South Africa indicated that micro enterprises owners were experiencing serious problems in terms of funding, dealing with crime, lack of appropriate education and training, lack of access to government funds and lack of business management skills. Their study further affirmed that a general mismatch between government intentions and practices where micro enterprises support is concerned are negatively affecting micro enterprises performance.

In another study, Mahadea and Pillay (2008) investigated the environmental factors that influence or constrain the development of business ventures in Pietermaritzburg, South Africa. They further examined if environmental conditions are perceived to be favourable or detrimental to the growth of SMMEs. They found out that the following issues namely: taxation, economy, crime, laws, regulations and competitiveness are major growth inhibiting factors. The other factors that cause challenges are recruitment, retention of staff, cash flow and access to finance which also impede the success of a business.

In agreement with the above assertions, Dlungwana and Rwelamila (2003) showed that challenges facing emerging contractors can be lack of resources such as funds, poor construction procurement systems, lack of management capacity and resources to equip managers to operate their business enterprises effectively and efficiently. In addition, sustainability issues such as environment and social responsibility also caused problems. It is a

proven fact that there can be internal and external factors that can impede on the success of emerging contractors. In view of these findings, it is imperative to investigate project management factors influencing success of construction projects by emerging contractors in the Mahikeng area, of South Africa. This is therefore a case study.

7 Research methodology and design

The previous section looked into an overview of project management issues and the state of emerging contractors. This section builds on the previous section by explaining the research methodology and design used in this study.

7.1 Theoretical Perspectives on Research Approaches

This study followed the interpretivist paradigm for the qualitative approach to establish and reconstruct the meaning and understanding on the subjects on the phenomenon under study. Then a descriptive survey was employed for the quantitative approach to establish association between variables in the study (Maree, 2007).

Qualitative approach has its roots embedded in interpretivism. The interpretivist perspective suggests that individuals socially construct their realities by sharing meaning (Nieuwenhuis, 2007). Interpretivism is further founded on the assumptions that the social world is the world perceived and experienced by its members, hence the researchers believe that the accounts to be given by the emerging contractors on factors influencing delivery of projects can provide understanding of their views (Babbie & Mouton, 2001). On the other hand, the quantitative approach posits reality as a given and is independent of the observer. This ontological stance then requires researchers to elicit distinct facets of the researched that can be quantified. It is the characteristics or trends inherent in these quantitative elements that will help researchers to reach to some findings.

7.2 Research methodology

The methodology comprises both the research design as well as the data collection techniques (Maree, 2007). In the design of this study a mixed method was applied which includes both quantitative and qualitative approaches... Quantitative data was collected by means of questionnaires, and qualitative data was collected through open ended questions on the questionnaire as well as face to face interviews. The qualitative investigation assisted in the interpretation and understanding of the phenomenon under study, while the quantitative provided structured and numerical data (Leedy & Ormrod 2005).

7.3 Research design and data Collection Questionnaire

Combined quantitative (closed-ended questions) and qualitative (open-ended questions) questionnaire were used for this study.

Questionnaires were effective for this study because each respondent received the same set of questions phrased in exactly the same way. Most questions were completed by groups of respondents in one sitting. If well-constructed questionnaires can be extremely fruitful in efficiently obtaining data. The use of questionnaires helped to save time because participants completed the questions without the assistance of the researcher. In addition, they were economical, anonymous, constituted a uniform procedure, were easy to score and afforded participants with time to think about their responses (McMillan & Schumacher, 2006). Challenges however with the use of questionnaires are that motivation is difficult to check and validity can be difficult to judge. Questionnaires also do not allow for probing and clarification of responses which contain bias and ambiguous statements and scoring of open ended questions can be problematic (McMillan & Schumacher, 2006). However, this problem was ameliorated by piloting the questionnaire before the proper data gathering phase.

7.4 Face-to-Face Interviews

Face-to-face interviews were also done to complement these questionnaires. The interviews were meant to assist in clarifying issues that were not covered or were not clear in the questionnaires. The purpose of these interviews was to collect in-depth qualitative data on the respondents' perceptions, attitudes and experiences on project management factors affecting emerging contractor's ability to deliver project successfully (Maree, 2007). Five (5) interviewees participated in helping the researcher clarify unclear answers from the questionnaires (Nieuwenhuis, 2007). The interviews involved open-ended questions. Interview data was grouped into categories and patterns, and thereafter interpretation of data was based on the themes that emerged from the responses (McMillan & Schumacher, 2006).

8 Analysis and presentation of results

8.1 Demographic data

This section of results sought to reveal data regarding the respondents' individual and company status in terms of employment, qualifications and experience as well as the number of projects completed, number of employees, employment categories, project manager's qualifications, construction categories and annual turnover.

Employment status: this data was analysed as the owners' interest and as shown in Table 1 below, 63%

of the emerging contractors are directors or partners of sole proprietors. their enterprises, 25% are shareholders and 13% are

Table 1. Ownership interests

What is your current position in the company?	Scale	Data	%
Shareholder in Closed Corporation	4	25	25%
Director of Company - Partner	3	63	63%
Sole proprietors	2	12	12%
Other (specify)	1	0	0%
Total		100	100%

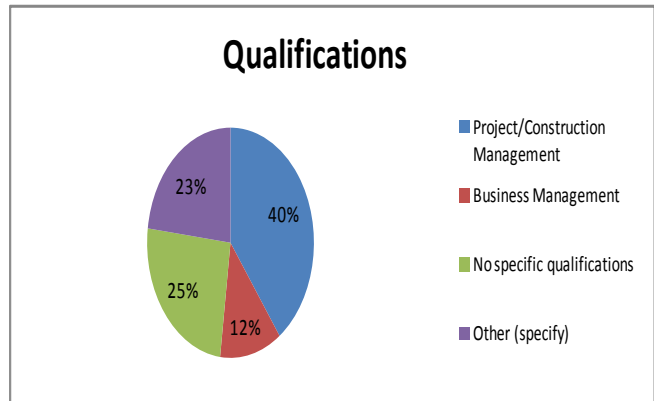
Qualifications: The study sought to investigate the level of qualification of the emerging contractors in terms of further training after secondary education specifically in project management and construction. Table 2 and Figure 1 below indicate that 40% of the

contractors have no construction or project management specific qualifications. Only 12% have business management qualifications and 25% have no qualifications.

Table 2. Different qualifications

What qualification in a Project Management related field do you have?	Scale	Data	%
Project/Construction Management	4	40	40%
Business Management	3	13	12%
No specific qualifications	2	25	25%
Other (specify)	1	23	23%
Total		101	100%

Figure 1. Different qualifications



Experience: This section sought to collect experience related data of the emerging contractors in number of years in the field of construction. Data

collected as shown in Table 3 below indicates that 40% of emerging contractors have been in the construction industry for more than ten (10) years.

Table 3. Experience in construction

What is your experience in the construction related field?	Scale	Data	%
10+ years	4	40	40%
8-10 years	3	20	20%
5-8 years	2	25	25%
0-5 years	1	15	15%
Total		100	100%

Projects completed: Data on the number of projects that a company managed to complete was also collected. Results show as given in Table 4

below that 50% of the companies have only completed 3 to 5 projects followed by 32% with 0 to 3 projects and only 5% have completed more than 10 projects.

Table 4. Projects completed

How many projects has your enterprise been involved in since its existence?	Scale	Data	%
10+ projects	4	5	5%
5-10 projects	3	13	13%
3-5 projects	2	50	50%
0-3 projects	1	32	32%
Total		100	100%

Employees in the company: Tables 5 below show that 93% of the emerging contractors have less than 50 employees. This gives a reflection of inadequacy of

human resources considering the requirements of staffing for construction projects.

Table 5. Employees in company

How many employees does your enterprise employ?	Scale	Data	%
150+	4	2	2%
100-150	3	2	2%
50-100	2	3	3%
0-50	1	93	93%
Total		100	100%

Employment categories: Results reveal in Table 6 that majority of the employees (38%) in the emerging contractor's companies are employed on a

casual labour basis or part time (25%) and only a few (13%) are full time employees.

Table 6. Employment categories

What is the nature of the labour/workforce does your enterprise employ?	Scale	Data	%
Full time employees	4	13	13%
Casual labour (piece jobs)	3	38	38%
Part time	2	25	25%
Other (specify)	1	24	24%
Total		100	100%

Construction related skills: On seeking to find out the skills level in the construction sector, results reveal as shown in Table 7 below that majority of the

employees (63%) are unskilled for the construction industry followed by 25% are semi-skilled and only 12% are skilled.

Table 7. Construction related skills

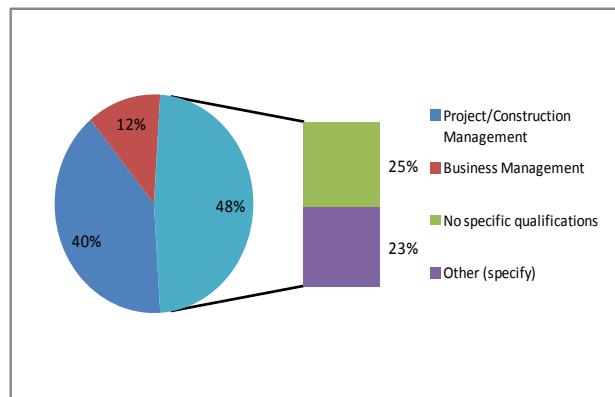
What is the construction related skills base/level being used by your enterprise for your projects? (e.g. artisans)	Scale	Data	%
Highly Skilled	4	12	12%
Semi-skilled	3	25	25%
Unskilled	2	63	63%
Other (specify)	1	0	0%
Total		100	100%

Qualifications of Project Managers: The highest percentage of project managers (40%) is qualified in both project management and construction. 25% of the

managers have no qualifications and only 12% have business management skills as presented in Table 8 and Figure 2 below.

Table 8. Qualifications of Project Managers

In which field is/are the project manager/s qualified?	Scale	Data	%
Project/Construction Manage	4	40	40%
Business Management	3	12	12%
No specific qualifications	2	25	25%
Other (specify)	1	23	23%
Total		100	100%

Figure 2. Qualifications of Project Managers

Construction categories: Most of the companies (45%) are in the civil engineering type of construction industry, 28% are in building and 24 % are classified as other types of construction industries as given in

Table 9 below. This gives an impression that Mahikeng has a favourable representation of companies in the construction industry.

Table 9. Construction categories

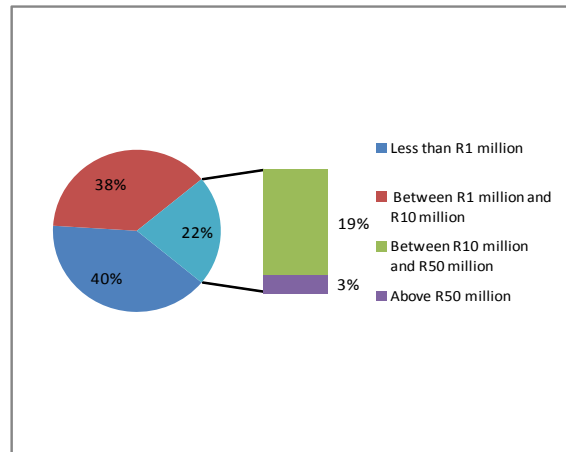
In what field of business does your company	Scale	Data	%
Building Construction	4	28	28%
Home Improvement	3	3	3%
Civil Construction Engineering	2	45	45%
Other (specify)	1	24	24%
Total		100	100%

Annual turnover: Table 10 and Figure 3 below indicate that the highest number of the emerging contactors' companies make below a million rand of

turnover, 38% are above 10 million rand while 19% earn below 50 million.

Table 10. Annual turnover

What is your company's estimated annual turnover?	Scale	Data	%
Less than R1 million	4	40	40%
Between R1 million and R10 r	3	38	38%
Between R10 million and R50	2	19	19%
Above R50 million	1	3	3%
Total		100	100%

Figure 3. Annual turnover

8.2 Findings on project management

This section of the study presents results on questions asked relating to project management factors as revealed in literature discussions and how they influence delivery of successful projects.

Project Integration is part of the project management nine knowledge areas this task involves

coordinating all the project management knowledge areas throughout a project's life span.

Project management planning: Table 11 indicates that 65% of emerging contractors do engage in planning of project prior to execution and only a few (3%) never engage in planning.

Table 11. Project management planning

Does your enterprise engage in a planning exercise prior to executing the project?	Scale	Data	%
Always	5	40	40%
Mostly	4	25	25%
Sometimes	3	23	23%
Rarely	2	9	9%
Never	1	3	3%
Total		100	100%

Stakeholder involvement: Table 12 indicates that 36% of the emerging contractors fall into the category which do not always involve shareholders, while majority of the respondents (40%) mentioned

that they do involve stakeholders and 24% also responded that they mostly do involve stakeholders in their project management processes.

Table 12. Stakeholder involvement

Does the clients and other stakeholders get involved in the project planning processes?	Scale	Data	%
Always	5	40	40%
Mostly	4	24	24%
Sometimes	3	23	23%
Rarely	2	10	10%
Never	1	3	3%
Total		100	100%

Execution of project implementation plan: trusted to follow the project plans. 51% can be grouped into a class that does not follow a project plan

Table 13. Project implementation plan

Are the defined activities carried out according to the implementation plan?	Scale	Data	%
Always	5	13	13%
Mostly	4	23	23%
Sometimes	3	13	13%
Rarely	2	48	48%
Never	1	3	3%
Total		100	100%

Project control: Control entails measures put in place to put the project back on track in case of any deviations. Data collected on control measures by the emerging contractors show on Table 14 that majority (75%) of the respondents, claim that they do regular

check-ups to see if the projects are still running according to the implementation plan. This is in stark contradiction with the findings of Table 13 which investigated adherence to a project plan.

Table 14. Project control

How often do you check if the project schedules are still on track according to the implementation plan?	Scale	Data	%
Always	5	23	23%
Mostly	4	15	15%
Sometimes	3	37	37%
Rarely	2	25	25%
Never	1	0	0%
Total		100	100%

Use of project management tools: Table 15 shows that 60% of management use project management tools to develop project plans, charts and

project progress reports. 40% can be said to pay lip service to the use of these tools.

Table 15. Project reporting

Does the enterprise' management develop technical project plans, charts, project progress reports to track project progress?	Scale	Data	%
Always	5	8	8%
Mostly	4	14	14%
Sometimes	3	38	38%
Rarely	2	40	40%
Never	1	0	0%
Total		100	100%

Project time management involves the processes required to ensure timely completion of a project. This was investigated by using *Activity sequencing*, *Activity estimation*, *Project forecasting*, *Project scheduling*, *Activity prioritisation* and *Estimating project completion date as lenses*.

Activity sequencing: Data on activity sequencing; a function of arranging activities in chronological order showed in Table 16 below that 65% of respondents mostly create a list of defined broken down activities that have to be performed in the projects.

Table 16. Activity sequencing

Does the enterprise develop a list of defined and broken down activities that have to be performed in the project?	Scale	Data	%
Always	5	25	25%
Mostly	4	40	40%
Sometimes	3	23	23%
Rarely	2	10	10%
Never	1	2	2%
Total		100	100%

Activity estimation: In Table 17, 86% of the respondents estimate duration of activities for each of the activities in the project to support activity sequencing since sometimes activities may depend on each other.

Table 17. Activity estimation

Is the duration of each activity estimated?	Scale	Data	%
Always	5	63	63%
Mostly	4	23	23%
Sometimes	3	11	11%
Rarely	2	3	3%
Never	1	0	0%
Total		100	100%

Project forecasting: 86% of the respondents confirmed that they perform activity forecasting for each activity in a bid to create a foresight of the delivery time for the project as shown in Table 18 below.

Table 18. Project forecasting

During the execution of the project is the management able to forecast if the project will still finish on time or not?	Scale	Data	%
Always	5	63	63%
Mostly	4	23	23%
Sometimes	3	11	11%
Rarely	2	3	3%
Never	1	0	0%
Total		100	100%

Project scheduling: Table 19 indicates that 86% of the respondents incorporate key milestones in the project schedule to monitor progress.

Table 19. Project scheduling

Has key events, milestones, progress evaluations been identified on the project schedule?	Scale	Data	%
Always	5	63	63%
Mostly	4	23	23%
Sometimes	3	11	11%
Rarely	2	3	3%
Never	1	0	0%
Total		100	100%

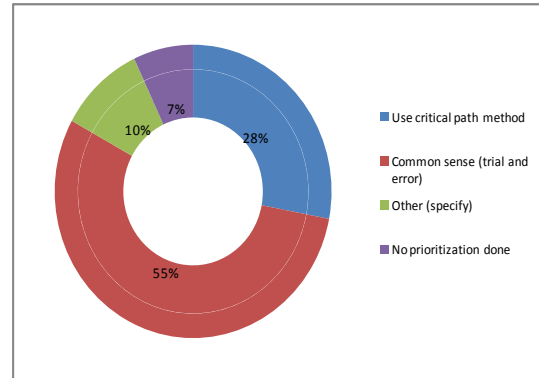
Activity prioritisation: Results presented in Table 20 and Figure 4 below show that, 28% of the respondents claim to use the critical path method, whereas the majority, 55%, use the trial and error

method and 17% either use other methods, or do not follow any method in determining which activities are critical to finish in time.

Table 20. Activity prioritisation

How does the enterprise prioritize which activities are critical to complete in order to keep the project on time?	Scale	Data	%
Use critical path method	4	28	28%
Common sense (trial and error)	3	55	55%
Other (specify)	2	10	10%
No prioritization done	1	7	7%
Total		100	100%

Figure 4. Activity prioritisation



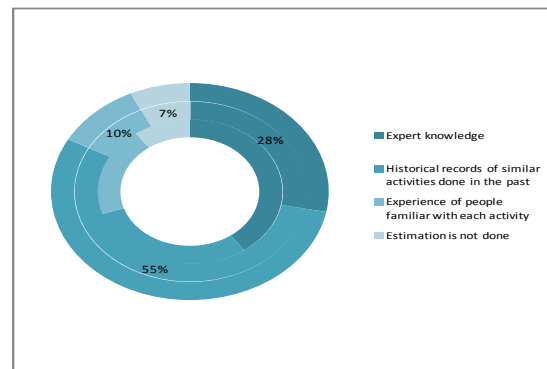
Estimating project completion date: Table 21 and Figure 5 indicate that 28% of the contractors make use of expert knowledge or consultants, whilst 10% make use of experience of the people within the

company and the majority, 55%, make use of historical data from previous projects to estimate project completion time.

Table 21. Estimating project completion date

How does the enterprise do the estimation of the project completion date?	Scale	Data	%
Expert knowledge	4	28	28%
Historical records of similar activities done in the past	3	55	55%
Experience of people familiar with each activity	2	10	10%
Estimation is not done	1	7	7%
Total		100	100%

Figure 5. Estimating project completion date



Project risk Management is defined as uncertainty that can have a negative or positive effect on meeting project objectives. Data on contingency measures in relation to risk that the emerging contractors have in place was collected and results are presented below.

Project contingency measures: Table 22 indicate that 65% of the contractors confirmed that contingency plans are in place in the event of the risk of projects running late or getting out of control.

Table 22. Project contingency measures

Does the planning include the contingency measures on what to do to get the project back on track in case it were to run late?	Scale	Data	%
Always	5	25	25%
Mostly	4	40	40%
Sometimes	3	23	23%
Rarely	2	9	9%
Never	1	3	3%
Total		100	100%

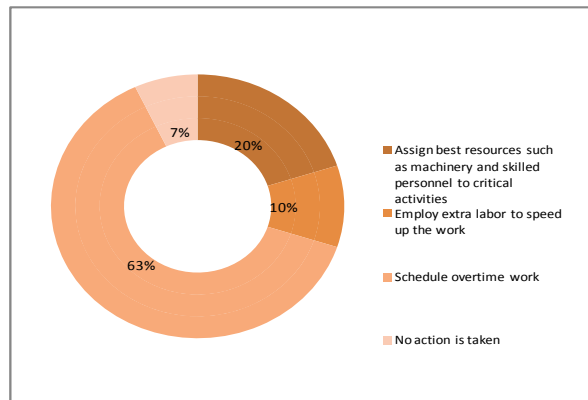
Project overrun contingency measures: Table 23 and Figure 6 indicates that most of the emerging contractors, 63%, rely on overtime programs to crash

projects when they surpass the planned schedule. 30% either resort to employing the best technology or personnel, while 7% take no action.

Table 23. Project overrun contingency measures

How does the project management deal with the signs (indications) that a project is likely to finish late?	Scale	Data	%
Assign best resources such as machinery and skilled personnel to critical activities	4	20	20%
Employ extra labor to speed up the work	3	10	10%
Schedule overtime work	2	63	63%
No action is taken	1	7	7%
Total		100	100%

Figure 6. Project overrun contingency measures



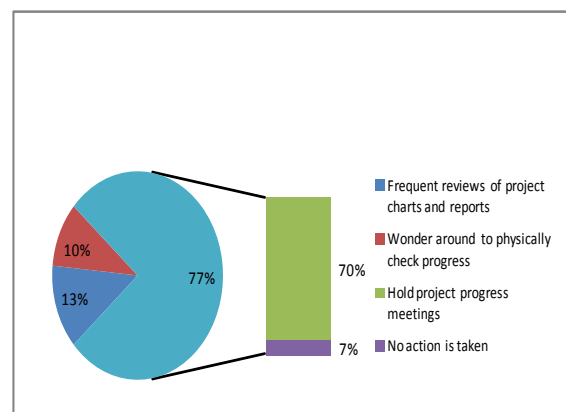
Project control contingency measures: Table 24 and Figure 7 indicate that 70% resort to holding constant project progress meetings to monitor and

control project progress, whilst 23% either hold frequent reviews or do physical site visits to verify project progress.

Table 24. Project control contingency measures

How does the project management deal with the signs (indications) that a project is likely to finish late?	Scale	Data	%
Frequent reviews of project charts and reports	4	13	13%
Wonder around to physically check progress	3	10	10%
Hold project progress meetings	2	70	70%
No action is taken	1	7	7%
Total		100	100%

Figure 7. Project control contingency measures



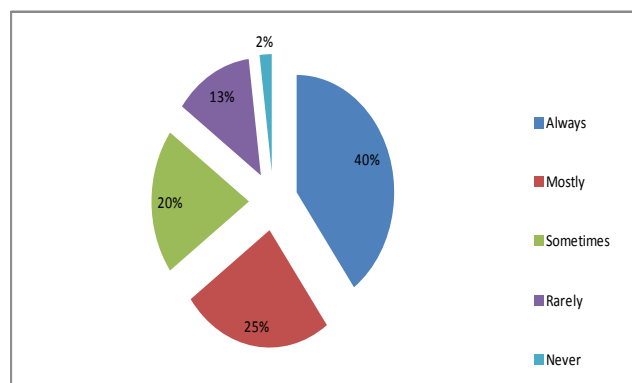
Project contingency budget: Table 25 and Figure 8 indicate that 65% of emerging contractors include

contingency amount for unforeseen expenses and cost overruns.

Table 25. Project contingency measures

Do you include a contingency amount in the total project baseline budget for unforeseen expenses and cost overruns?	Scale	Data	%
Always	5	40	40%
Mostly	4	25	25%
Sometimes	3	20	20%
Rarely	2	13	13%
Never	1	2	2%
Total		100	100%

Figure 8. Project contingency measures



Project overruns: On this point the study aimed to establish whether emerging contractors are able to plan for the risk of project cost overruns. Table 26 indicate that 65% of emerging contractors are not able

to determine that their projects might have cost overruns. This is despite the fact that they put aside some money to take care of this unforeseen event as shown in Table 25 and Figure 8 above.

Table 26. Project overruns

Are you as a project manager/owner able to forecast/determine during the project lifecycle that there may be cost overruns?	Scale	Data	%
Always	5	5	5%
Mostly	4	20	20%
Sometimes	3	10	10%
Rarely	2	40	40%
Never	1	25	25%
Total		100	100%

Project human resources management is concerned with making effective use of the people involved with a project.

Workforce competence: The study gathered data on human resources management with regards to their level of training and educational abilities with project

technical aspects. Results given in Table 27 below indicate that 78% of the general workforce have a limited capacity to understand the project plans and progress reports. Only 22% mostly are literate in these areas. This can be interpreted as a contributing factor to the failure rate of projects in this sector.

Table 27. Workforce competence

Is the general workforce able to read and understand the project technical plans, charts, project reports?	Scale	Data	%
Always	5	8	8%
Mostly	4	14	14%
Sometimes	3	38	38%
Rarely	2	40	40%
Never	1	0	0%
Total		100	100%

Project cost management: Questions in this section cover project cost management factors and how they influence delivery of projects. It includes the processes required to ensure that a project team completes a project within planned schedule.

Project cost estimation: Table 28 below indicates that 93% of emerging contractors are able to work out project costs in advance. This factor can indicate some positive elements of budgeting during the project.

Table 28. Project cost estimation

Are you able to workout upfront the cost of resources (no of people & their salaries, cost of material, cost of equipment) to complete project activities successfully	Scale	Data	%
Always	5	70	70%
Mostly	4	23	23%
Sometimes	3	4	4%
Rarely	2	3	3%
Never	1	0	0%
Total		100	100%

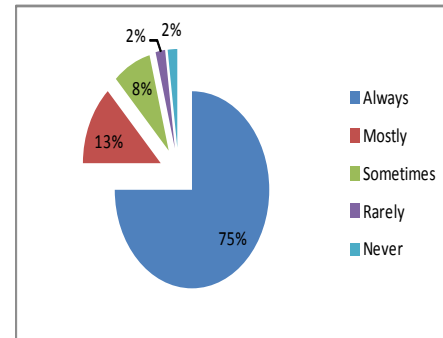
Tools for cost estimation: Project management involves the use of computerised software packages that enable the efficient calculation of project costs. Table 29 and Figure 9 indicate that 88% of emerging contractors use computerised management software

and spreadsheets to workout project costs. This again a positive sign in the work of these contractors. Generally, Information systems contribute to efficient work processes and reduction in costs.

Table 29. Tools for cost estimation

Do you use the computerized project mangement software and spreadsheets for estimating project costs?				
	Scale	Data	%	
Always	5	75	75%	
Mostly	4	13	13%	
Sometimes	3	8	8%	
Rarely	2	2	2%	
Never	1	2	2%	
Total		100	100%	

Figure 9. tools for cost estimation



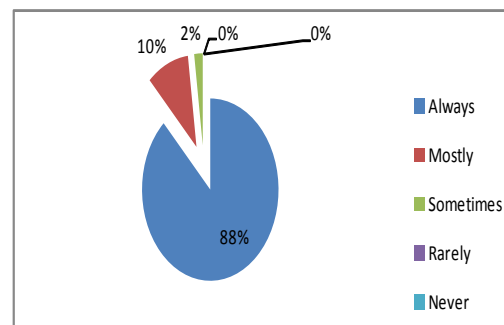
Cost estimation expertise: Table 29 and Figure 10 below indicates that 88% of emerging contractors

employ the services of experienced and professional project managers to assist with project cost estimates

Table 29. Cost estimation expertise

Do you enlist the services of experienced and professional Project Managers to assist with project cost estimates?				
	Scale	Data	%	
Always	5	88	88%	
Mostly	4	10	10%	
Sometimes	3	2	2%	
Rarely	2	0	0%	
Never	1	0	0%	
Total		100	100%	

Figure 10. Cost estimation expertise



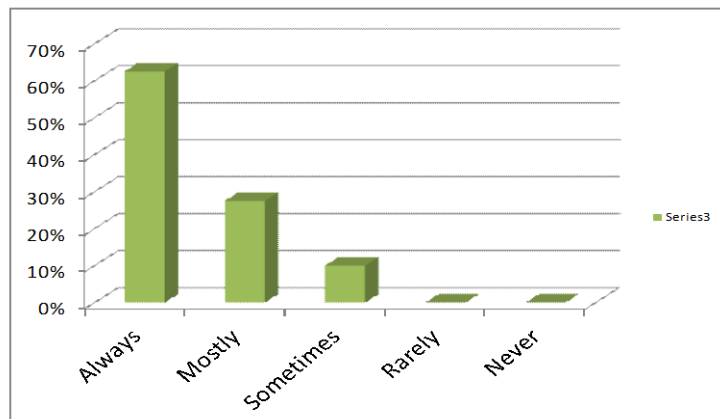
Project budgeting technique: Responses on the use of past records to make financial predictions and budget for project was collected and about 91% of the respondents indicated as shown in Table 30 and

Figure 11 that emerging contractors make use of historical information to assist with project cost estimations.

Table 30. Project budgeting technique

Do you ever tap into the historical information (previous project files, commercial cost estimating databases) to assist you organisation with project cost estimations?	
	%
Always	63%
Mostly	28%
Sometimes	10%
Rarely	0%
Never	0%
Total	100%

Figure 11.Project budgeting technique



Project scope management: Project scope changes: Table 31 and Figure 12 indicate that 73% of

emerging contractors find scope creep to be a challenge in project success.

Table 31. Project scope changes

How frequent to you find that cost overruns are as a result of scope changes during project implementation phase?	Scale	Data	%
Always	5	70	70%
Mostly	4	18	18%
Sometimes	3	6	6%
Rarely	2	3	3%
Never	1	3	3%
Total		100	100%

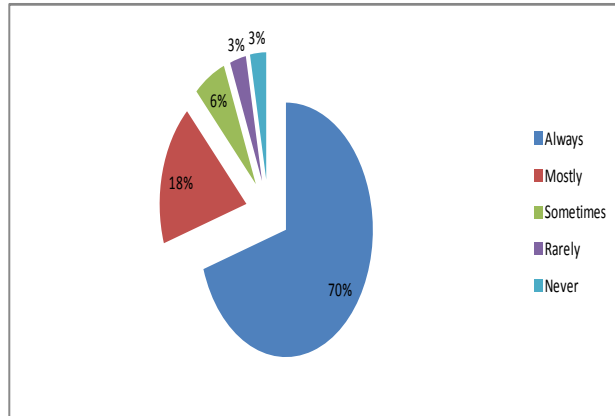
Depleting project funds: Data on the possibility of project activities getting out of scope causing budgeted funds to finish before project completion was gathered and results in Table 32 and Figure 13

Table 32. Depleting project funds

How frequent to do you find that despite having estimated the budget for a project, that money gets depleted before a project is finished successfully?	Scale	Data	%
Always	5	48	48%
Mostly	4	28	28%
Sometimes	3	12	12%
Rarely	2	9	9%
Never	1	3	3%
Total		100	100%

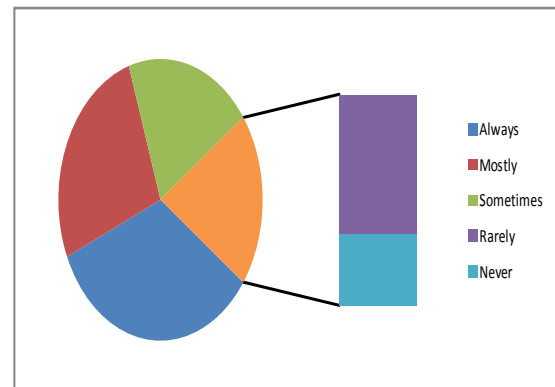
Project quality management: Results in this section cover project quality management factors according to how they influence delivery of projects. Project quality ensures that the project will satisfy the stated or implied needs for which it was undertaken.

Table 12. Project scope changes



below indicate that 76% of emerging contractors exhaust their budget before the project is completed. This element has to be scrutinised to check why this is the case.

Figure 13. Depleting project funds



Output measurement: Table 33 indicate that 93% of the respondents fall into the category that mostly define their activities in a manner that can enable them to measure their output.

Table 33. Output measurement

Are project activities defined in such a manner that project outputs/deliverables can be measured?	Scale	Data	%
Always	5	45	45%
Mostly	4	48	48%
Sometimes	3	4	4%
Rarely	2	3	3%
Never	1	0	0%
Total		100	100%

Project quality standards: Table 34 indicate that 60% of emerging contractors link quality with project success, whereas 23% rarely create that link.

Table 34. Project quality standards

Do you find that clients clearly identifies and defines the quality standards relevant to their project success expectations?	Scale	Data	%
Always	5	40	40%
Mostly	4	20	20%
Sometimes	3	13	13%
Rarely	2	10	10%
Never	1	17	17%
Total		100	100%

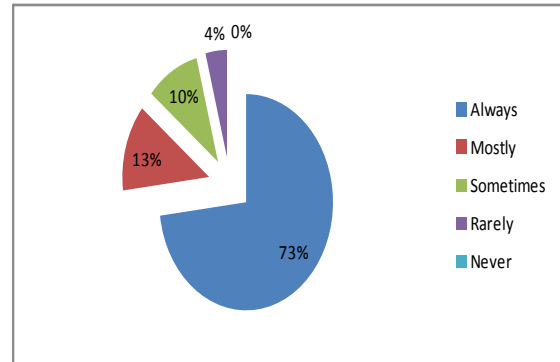
Quality considerations: Project management organisations have devised quality criteria that project need to conform to. Results of the study on this item are shown in Table 35 and Figure 13. These indicate

that 86% of emerging contractors buy materials that conform to SABS and ISO 9000 project quality standards.

Figure 35. Quality considerations

In procuring materials to be used in your construction projects, do you consciously go for materials that conform to quality standards of bodies such as the SABS, ISO 9000 series, etc?	Scale	Data	%
Always	5	73	73%
Mostly	4	13	13%
Sometimes	3	10	10%
Rarely	2	4	4%
Never	1	0	0%
Total		100	100%

Figure 14: Quality considerations



Quality management: The study aimed to establish whether emerging contractors define quality standards to guide quality expectations for their

projects. Table 36 indicates that 86% of emerging contractors have quality management guides.

Table 36. Quality management

Do you usually develop and monitor a quality management plan to guide quality issues during the project execution phase?	Scale	Data	%
Always	5	73	73%
Mostly	4	13	13%
Sometimes	3	10	10%
Rarely	2	4	4%
Never	1	0	0%
Total		100	100%

Quality audits: Table 37 indicate that most of the respondents, 86%, among the emerging contractors implement quality audits during project life cycle.

Table 37. Quality audits

Do you carry out quality assurance audits/inspections to check adherence to the quality of materials and quality of workmanship during the project lifecycle?	Scale	Data	%
Always	5	73	73%
Mostly	4	13	13%
Sometimes	3	10	10%
Rarely	2	4	4%
Never	1	0	0%
Total		100	100%

Deviating from quality material: Results gave that the majority of emerging contractors, 73%, always compromise quality to save costs. This is an indication that they may not exactly be considering the

importance of quality as shown in Table 38 below. The reader must note that a successful project is also judged through the quality of the finished project.

Table 38. Deviating from quality material

How frequent do you take shortcuts on quality to save on costs?	Scale	Data	%
Always	5	73	73%
Mostly	4	13	13%
Sometimes	3	10	10%
Rarely	2	4	4%
Never	1	0	0%
Total		100	100%

Importance of quality: Results presented in Table 39 indicate that the majority of emerging contractors, 86%, prioritise cost and time but rarely regard quality

as more important over cost-time variable during their projects.

Table 39. Importance of quality

Do you use quality as your utmost measure of project success as against cost and time consideration?	Scale	Data	%
Always	5	3	3%
Mostly	4	11	11%
Sometimes	3	38	38%
Rarely	2	48	48%
Never	1	0	0%
Total		100	100%

Project repetition due to quality: **Usually, after a poor job, some companies would consider reworking an activity to improve on the quality of the product.** Unfortunately, 31%, of the emerging contractors indicated that they would not rework on any project in order to adhere to quality requirements.

, 69% of the respondents would sometimes have to rework their projects. This item was addressed by only 32 of the respondents indicating that possibly, this decision lies with the management group of the personnel. Hence junior members could not address it.

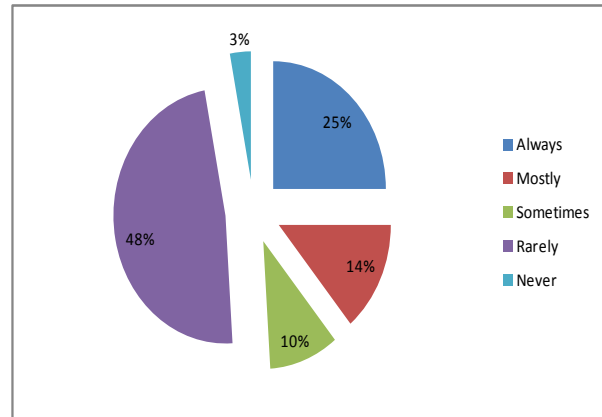
Quality expectations: Table 40 and Figure 15 indicate that only 39% of emerging contractors keep

up to quality standards, but the majority, 61% rarely do so.

Table 40. Quality expectations

As an emerging contractor, are you able to live up to quality standards required by your clients given the cost implications of such standards?			
	Scale	Data	%
Always	5	25	25%
Mostly	4	14	14%
Sometimes	3	10	10%
Rarely	2	48	48%
Never	1	3	3%
Total		100	100%

Figure 15. Quality expectations



The descriptive statistics results that are presented above will be considered together with the qualitative results from the focus group interview results discussed below.

8.3 Analysis of the results from the focus group interviews

Maree (2007) stated that qualitative data analysis is usually based on an interpretative philosophy and this can be done through content analysis of the qualitative data. Content analysis may be defined as a systematic approach to qualitative data analysis that identifies and summarizes message content and is usually used when analysing qualitative responses to open ended questions. An examination of how the participants made meaning of the phenomenon under study, their knowledge, perceptions, and experience was made in an attempt to approximate their construction of a phenomenon (Maree, 2007).

The focus group schedule consisted of five open-ended questions adapted from the questionnaire, which provided the structure for this discussion. The aim was to obtain greater detail and clarity on the phenomenon under study through the interaction between the participants in the group and the researcher as facilitator of the sessions. Like in all interpretive studies, the role of the researcher as the researched must be acknowledged. The qualitative research findings presented in this section emerged from the inherent themes in the raw data obtained from the focus group interview with five respondents.

8.4 Support granted to emerging contractors

Moss (2008) proposed that due to the documented poor performance of emerging contractors by failing to complete projects successfully, it is clear that there is a need for mentoring, training and coaching of

emerging contractors in South Africa. The common result that emerged from the respondents was that there is general lack of support in training, mentoring, coaching as well as materially and financially towards the emerging contractors from the concerned stakeholders of the construction industry in the Mahikeng area.

8.5 Support still needed by emerging contractors to finish the projects successfully

Results revealed that emerging contractors need assistance with access to financial support, financial management skills, as well as thorough project management training for the construction industry in all the nine knowledge areas of project management. The results from the descriptive study above also back this up. It was also found that they would be interested in being enlisted in the contractors' development programs offered by the Department of Public Works. This would go a long way in meeting the Broad Based Black Economic Empowerment (BBBEE) strategic intent of redressing the intentional and systematic exclusion of PDIs, with a sole purpose of building and enhancing the capacity of emerging contractors to deliver projects successfully (Moss, 2008).

8.6 Coaching and mentoring from established project managers and established companies

In the study investigating the training and mentoring of emerging contractors in the Eastern Cape, Moss (2008) found that the literacy and skills levels of emerging contractors were generally low. It was further found that the period of experience in the construction industry plays a significant role in the successful completion of projects.

It would therefore be expected that coaching and mentoring of inexperienced contractors by experienced contractors would be a given norm. However findings from the focus group interview showed that no or very little of such support is forthcoming. Some respondents whose enterprise experienced support and experienced added value in the ability to deliver projects successfully indicated that, they sub-contract work from well-established construction companies and get technical skills transferred from their well experienced personnel. This reflects that mentoring and coaching should be done.

8.7 Procurement and delivery of project materials and equipment, as well as its influence on successful delivery of projects

Procurement is one of the project management knowledge areas which entails acquiring goods and or services from an outside source (Schwalbe 2012). Dlungwana and Rwelamila (2003) showed that among the challenges facing emerging contractors, poor construction procurement systems could be one of them. On the contrary however, majority of the respondents expressed that there's very minimal struggle with procurement and delivery of materials for their projects. They indicated that their companies are committed to employing qualified or experienced personnel for their procurement functions. They added that they mostly create credit accounts with suppliers that are on a 30–60 days payment plan.

8.8 Experience with timely payments of invoices on work done and its influence on the completion of projects on time

There were mixed experiences in the focus group with regard to payments on work done, with responses ranging from slow payment methods to well managed payment system. However most respondents expressed concern over the impact of late payments of invoices for work done. Respondents stated that late payment of invoices affects the companies' cash flow and it causes some suppliers to become reluctant to deliver goods and services if they have not received their due payments. This impacts on the productivity within the project thereby causing failure of timely or successful project completion.

Summary of key findings, conclusions and recommendations

In this section the researchers provide a summary of the findings and derives conclusions from the study.

Summary of Key Findings

In trying to derive a clearer picture of the project management factors influencing success of

construction projects by emerging contractors in the Mahikeng Local Municipality area, the study was initiated on the following three objectives:

- To identify factors that lead to failure of projects
- To identify the factors that influence the successful delivery of projects

To develop a framework of factors to be used by contractors in successful delivery of projects Therefore, the presentation of the key findings in this section is aligned to these objectives.

Objective 1: Factors that lead to failure of projects

Lack of Project Management Skills and Experience

Ramokolo & Smallwood (2008) listed factors such poor knowledge of project management knowledge areas as well as tools and techniques such as inability to crash projects to get them on track, inability of the project leader to assign best resources to critical path project activities, inadequately qualified workforce, use of low-skilled casual labour, period of experience in the construction industry as some of the factors having a bearing on the ability of emerging contractors to deliver projects successfully. In this regard, the study found that the majority of the respondents (85%) have been in the construction industry for more than five (5) years, though during that period the majority of them (83%) only managed less than five (5) projects. Therefore experience of managing projects was found to be lacking.

Use of semi-skilled or unskilled labour

The results further pointed to a predominant use of casual labour (87%) and eighty eight (88%) of semi-skilled to unskilled labour in the execution of the projects, hence the 78% of the general workforce were said to be unable to comprehend project management technical concepts such as project plans and Gantt charts, project networks diagrams as well as progress reports which are key control instruments for tracking project progress. Normally this would lead to projects drifting off the project completion time schedules.

Poor execution of project activities according to the project plan

The results of the study indicate that the majority of the respondents (65%) conduct project planning before execution and they have contingency plans in place for late running projects in line with terms of the project time management requirements as outlined in the PMBOK (2013). 65% of the respondents pointed out that they also develop project schedules and perform task breakdown of project activities and key milestones in their plans. This relates to Gray & Larson (2011) proposition that during planning, a project scope with key deliverables is essential to clearly outline key project activities to a work package

level and also enhance proper forecasting of the duration of activities, development of project schedules and contingency plans, all of which are critical to managing project completion times. However the challenge remains that despite the project plans being in place, project activities are not being executed according to the plan as indicated by 48% of the respondents.

Failure to Prioritize Activities on the Critical Path

Findings of the study revealed that 70 % of the respondents hold project progress and phase review meetings in order to check of project activities are still on schedule. However study results also show that only 28 % of the project managers are able to prioritize activities on the critical path. This is contrary to Ramokolo & Smallwood (2008) assertion that best resources must be assigned to critical path activities which normally cause delays if allowed to stray out of time. Instead, the majority, 55%, of the respondents manage project activities on common sense. The resultant effect of this is that in trying to keep the project on schedule, most managers use costly options such as scheduling overtime as indicated by 63% of the respondents or employing extra labour as given by 10% of the respondents in order to catch up with the work. It can be postulated that these contractors do not appreciate the importance of treating their projects as a scientific process.

Inability to Manage Cost Overruns

93% of the respondents are knowledgeable on the cost area of project management and are able to work out the estimated costs of resources needed. 88% of the respondents use project cost estimation software and spreadsheets and they also hire experienced project managers to assist with project cost estimates. However, despite being able to work out estimated project costs, about 65 % of the respondents indicated that they lack the ability to forecast cost overruns during the project lifecycle. This finding, together with the fact that only 13% of the respondents had business management qualifications, may explain the reason why 76% of the respondents indicated that project funding gets depleted before the project is successfully finished. Therefore most emerging contractors fail to handle cost management, hence resulting in failing to deliver projects successfully (Atkinson, 1999).

Allowing Scope Creep

Lewis (1998) claimed that cost is a function of performance, time and scope. Among the respondents, 70% indicated that scope changes are one of the factors leading to cost overruns, and 48% stated that the project activities are not exactly carried out according to the activity implementation plan. It can therefore be predicted that poor performance of

emerging contractors in successfully executing their projects is also attributed to scope creep.

Taking Shortcuts on Project Quality to Save on Costs

Wateridge (1995) stated that quality is defined by the clients according to their own perceptions and desires. The results of this study showed that 60% of the respondents are aware of the quality specification of their clients. This is supported by Jyh-Bin and Sheng-Chi (2006) whose position is that production should be customer based and meet customer satisfaction expectations. Conversely, 73% of the respondents admitted to taking shortcuts on quality to save on costs while 48% of them do not regard quality as the most important measure of project success as compared to cost and time. Almost 50% of them are therefore not able to live up to the quality standards required by their clients.

Poor Monitoring of Project Performance

Moilwa (2013) asserted that project managers must possess all nine knowledge areas of project management as well as skills of the tools and techniques required for projects. Some of the areas within these knowledge areas include the general functions of management, namely planning, organizing, leading, and controlling. Larson and Gray (2011) as well emphasised the importance of the project manager being able to apply appropriate knowledge, skills, tools, and techniques in managing interrelated tasks that make up a project.

In line with this theoretical posture, this study found that only 40% of the respondents had construction related qualifications. Their strength was found to be in the management function of planning as indicated by 65% of the respondents who claimed they engage in planning before starting a project. Despite being able to plan, the study found that the control function of management lacks among emerging contractors as verified by 40% of the respondents who hardly monitor the project progress, hence they end up having projects that go out of control and therefore cannot be completed on schedule (Fritz & Kallis, 2010).

Objective 2: Factors that influence successful delivery of projects

The Project Management Body of Knowledge (PMBOK, 2013) postulates that successful projects are those that are completed on schedule, within budget, covering the scope and quality initially agreed upon (Duncan, 1996). Based on this assertion, the findings of this study could not clearly delineate any factor out of the quadruple constraint that clearly influence the successful delivery of construction projects by the emerging contractors in the Mahikeng. It was found that projects are completed beyond scheduled time, outside of the original budget, are of a lower quality

than initially envisaged and also involve a lot of scope creep.

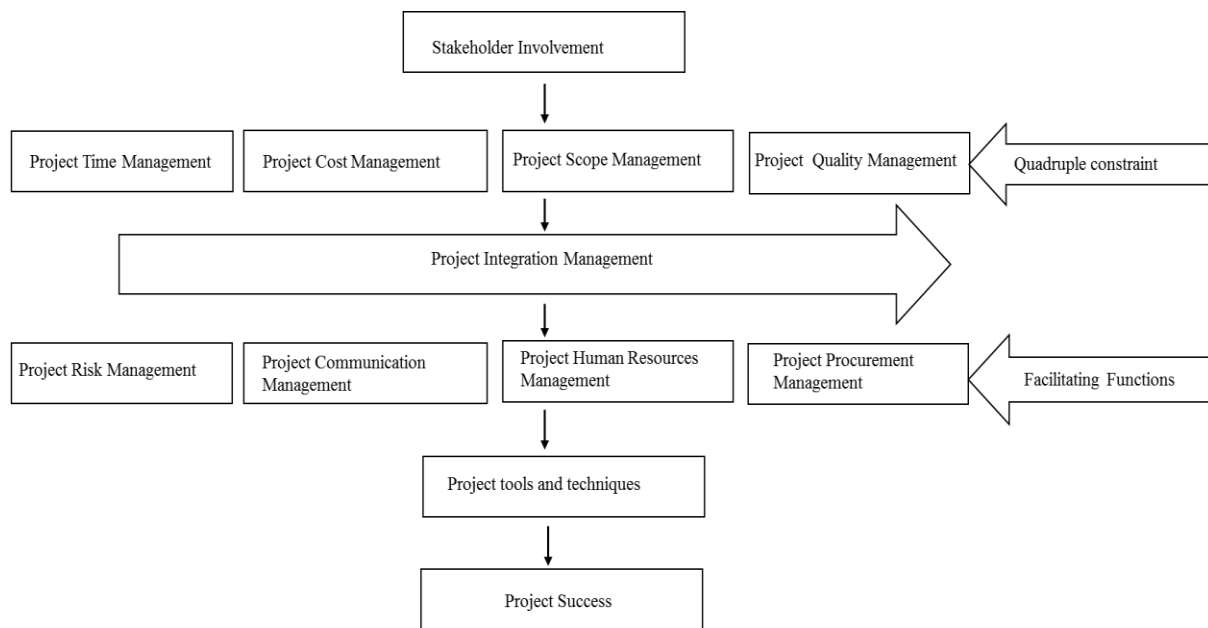
Further to the guide of success supported by PMBOK (2013), Solomon (2010) also asserts that project managers should be able to manage the quadruple constraint for successful delivery of projects. Each element of the quadruple constraint must be given equal attention and this should be balanced and maintained all the time. The discoveries of this study also picture that less than half of the project managers among the respondents have construction related qualifications and relevant project management technical skills, hence their inability to

manage the quadruple constraint towards successful delivery of projects.

Objective 3: Developing a framework of factors to be used by contractors in successful delivery of projects in Mahikeng area

The framework recommended to be used by the emerging contractors in the Mahikeng Local Municipality to aid successful delivery of projects was adapted from PMBOK (2013) and Schwalbe (2012). Figure 15 below presents the recommended framework.

Figure 16. Recommended project management framework; Adopted from PMBOK 2013 & Schwalbe 2010



The framework depicts that emerging contractors should consider all the nine knowledge areas of project management, involve stakeholders, ensure the knowledgeable use of project tools and techniques and this will lead to project success. Most importantly, project success can be guaranteed if contractors assume a disciplined, scientific approach to the management of their projects.

9 Conclusions of the research findings

Atkinson (1999) states that in project management there are four core components of the quadruple constraint that are inextricably linked with measuring the success of projects, namely time, cost, scope and quality. Solomon (2010) further stated that project managers should be able to manage the quadruple constraint for projects to be delivered successfully, and that each of the constraints must be given equal attention and a balance should be maintained.

In response to the research questions:

- What are the critical factors that lead to successful delivery of projects?

- What are the barriers that lead to unsuccessful delivery of projects by emerging contractors in Mahikeng area?

Most of the respondents, 87%, seem to rely mostly on unskilled and poorly educated and inexperienced casual labour in execution of their projects, and this has a bearing on the successful delivery of projects.

Results indicate that most of the respondents have little financial management skills to control and prevent cost overruns, hence 76% of them indicated that the projects financial resources gets depleted before the projects are completed.

Majority of the respondents, 73%, also admitted to taking shortcuts in project execution to save on costs thereby compromising on quality. They also indicated that they do not regard quality as one of the important measures of project success as compared to cost, scope and time, hence they believe that there is no problem in delivering sub-standards deliverables. These contractors do not appreciate that a completed project that is not fit for purpose is considered a failure.

Deducing from the results and as supported by literature, time, scope, quality and cost were found to be the core factors that have a bearing on the successful or unsuccessful delivery of projects by emerging contractors in the Mahikeng area.

Secondary to this, the ability and/or inability of the project managers to perform the other facilitating knowledge areas namely, project integration, human resources management, communications management, risk management and procurement management as well as make use of project management tools and techniques were also found to have a bearing on the ability to deliver projects successfully. Basic function highlighted within these nine knowledge areas include management functions such as planning, organizing, leading and controlling.

10 Recommendations

One of the objectives of this study was to propose a framework that may help emerging contractors to manage their projects successfully, hence the following recommendations were made in line with this framework.

Established contractors should be encouraged to initiate mentorship and coaching programs for emerging contractors for skills transfer purposes. This would benefit emerging contractors a great deal in enhancing their financial, project related technical skills as well as managerial skills.

Findings by Lazarus *et al* (2006) confirm that despite numerous attempts by different agencies and role players to develop emerging contractors, little success has been achieved due to the fragmented nature of such initiatives. It is thus recommended that a holistic Integrated Emerging Contractor Development Model (IECDM), which focuses on mentorship, Total Quality Management (TQM), quality assured accredited training, be adopted by Mahikeng Local Municipality through the Construction Industry Development Board (CIDB) and that they should also upgrade their Emerging Contractor Development Program (ECDP) training to IECDM. The exposure to this program will enhance the theoretical knowledge base and the project management technical skills required for successful delivery of projects.

After completion of the training programs, it is also recommended that there should be continuous site visits to support and monitor implementation of acquired knowledge and empowerment from the training interventions.

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