

PROVINCIAL ROADS CAPEX PROGRAMME IN SOUTH AFRICA: PLANNING AND MANAGEMENT INADEQUACIES

Fidelis Emuze¹, W S Norgbey² and John Smallwood³

^{1 and 2}Department of Built Environment, Central University of Technology, Free State, South Africa

³Department of Construction Management Nelson Mandela Metropolitan University Port Elizabeth, South Africa

The management of infrastructure programmes has been challenged with poor performance in South Africa. The implementation of road projects through Capital Expenditure (CAPEX) programmes by provincial Department of Public Works (DPW) is not an exception. To understand the performance challenges and proffer suggestions, a research study with the overall aim of identifying remedial actions that can mitigate the challenges in the programme was conducted. This research reports on the detrimental effects of planning and management issues experienced in the programme. The exploratory sequential research design method, which allows the collected qualitative data to build into the quantitative data for a broad interpretation of the findings, provides insights from the study. Analysis of the statistical and textual data points to rigid bureaucratic processes as the major cause of the CAPEX programme dilemma. Inadequate planning and insufficient in-house capacity also contributed to the problems encountered on the programme. The utilisation of the management structure in the programme can be deemed to be more ineffective in terms of the time lag relative to critical decisions that may stall the programme. The research findings imply that the Department should ensure that the Roads CAPEX Programme (RCP) is well resourced in terms of expertise, and the planning processes should be detailed enough to support the flow of both programme and project activities.

Keywords: programme management, roads, South Africa.

INTRODUCTION

In an effort to address the effects of a past policy of separate development, the South African government had to invest in areas that were previously under-developed (Fisher, 2008). To do this, infrastructure projects, such as schools, hospitals and roads, consume almost 18% of the national budget allocation in South Africa (Department of Treasury, 2008). The question is how to spend the allocations properly for the realisation of the anticipated benefits. This question is crucial as infrastructure development would not only boost the economy, but it will also correct the separate development of the country (Gorghan, 2012). The government of South Africa have therefore sought to implement CAPEX infrastructure programmes through the DPW at various level of governance so as to execute projects that can uplift under-developed areas in the country. The dilemma is that though the government invests a lot of resources into such programmes, there is not much in terms of functional

¹ femuze@cut.ac.za

infrastructure that can be shown for the effort. This is a major concern to stakeholders. The management of the CAPEX programme at the provincial level has been a concern to all stakeholders. For instance, it has been reported that a large proportion of government projects have failed due to ineffective project management practices (Molewa, 2008). The observations of Molewa (2008) highlight the fact that management structures seem to be ineffectively utilised; and protocols were bridged in some cases. Such problems leads to misinformation that leads to errors in reports as government bureaucratic structures hinder swift and timely processing of information. The mainstream media have made case examples of several provincial programmes.

This study therefore focuses on the problems by looking into the programme in a single province that is anonymous for research ethical reasons. According to the strategic plan of the case province, the Chief Directorate Roads Management at a Head Office (HO) and District Offices (DO) implement the RCP. The HO focuses on planning, design, and the implementation of capital projects, whereas the DO is mainly concerned with routine maintenance. The importance of the mandate of the HO cannot be over emphasised as provincial roads have continued on a downward spiral even in the face of paucity of funds. The RCP is a ten-year strategic development initiative that caters for the development of additional paved roads, and the rehabilitation of existing paved and unpaved roads in the province.

The case of this particular province is unique as most projects fail to achieve their goals due to either planning or implementation issues (Molewa, 2008). Therefore, it was deemed appropriate to examine the existing management approach so as to identify the potential causes of low performance, and then, evolve recommendations that could engender improvement. However, this particular paper reports on the planning and the management related factors in the RCP. As such, the objective of this paper is to present responses to two research questions:

What are the planning problems of an RCP in a South Africa province?

What are the inadequacies relative to management structures used in an RCP in a South Africa province?

CONSTRUCTION PROGRAMME MANAGEMENT DEFINED

Shehu and Akintoye examine programme management and defined it (2010: 27) as ..”an integrated, structure-framework to co-ordinate, align, and allocate resources, as well as plan, execute and manage a portfolio of construction projects simultaneously to achieve optimum benefits that would not have been realised has the projects been managed separately.” While project management is oriented toward the goals of a single project by focusing on the management of finance, progress and quality, programme management is oriented towards strategic goals involving more than one project. However, both project and programme management focus on integrated planning, control and coordination of required activities. Just like projects, the lifecycle of a construction programme include initiation, planning, bidding and tendering, implementation and termination. In contrast to project management where the team participates in all areas of management of the particular project, the programme management team does not play direct roles in daily administration of projects that make up the programme (Chen *et al.*, 2013).

RESEARCH RATIONALE

The literature on programme management in construction realise the inclusion of multiple projects in a programme and also acknowledged a range of implementation barriers. Such barriers are not limited to the lack of clarity and understanding (Shehu and Akintoye, 2009), lack of appropriate approach to risk management (Shi *et al.*, 2014), and administrative bottlenecks that is otherwise known as bureaucracy (Jia *et al.*, 2011). Both at the pre-construction and the actual construction stages, high level planning is required for successful programme management. Apart from planning, attention should also focus on excessive hierarchical bureaucracy and control, which is difficult to achieve if the relationships between programme managers and project managers is cumbersome (Lycett *et al.*, 2004). For instance, excessive bureaucracy and control creates increased overheads for reporting requirements and a culture of blame within the team (Lycett *et al.*, 2004; Shehu, 2008). The challenges of programme management is evident in late delivery of projects, which can be due to poor risk and financial management, lack of cross-functional communication, and the lack of required resources to assign and analyse various constraints (Shehu and Akintoye, 2010).

These reported challenges mirror the experience of the RCP in South Africa where performance problems adversely affect public sector service delivery. According to Consulting Engineers South Africa (CESA) (2012), inadequate delivery capacity within government has contributed to slow pace of infrastructure development in the country. The gaps in delivery capacity are evident at the design and implementation stages, especially in relation to constant scope changes, increased project cost, delayed hand over dates, and associated rise in service delivery protest nationwide. Thus, the premise of this research is to gain insights into the challenges of construction programme management in South Africa. This paper however presents the planning and management related challenges.

RESEARCH METHODOLOGY

The findings of this study emerge through the analysis of reviewed literature, semi-structured interviews and survey research. The data collection was conducted in 2013 with the use of mixed methods so as to provide broader perspectives (Tashakkori and Teddlie, 2010). The approach enabled the collection of both qualitative and statistical data, which were used to substantiate evidences (Creswell, 2009). Face-to-face interviews were used to explore the problems, and a survey among the actors involved in the programme was conducted to confirm the interview findings. This approach is termed “*exploratory sequential design*” by Creswell and Plano Clark (2011: 69) as the interviews builds into the survey so as to engender broader interpretation of the findings. As such, the researchers collected qualitative data about the RCP through interviews and analysed the textual data to identify the planning and management inadequacies in the programme. Relying on the themes that emerged from the textual analysis, the researchers developed a survey questionnaire and used it to assess the prevalence of these inadequacies within a larger sample of the RCP participants.

Given that the fieldwork focused on a single department (DPW) in a province in South Africa, the purposive sampling technique was deemed appropriate for the selection of the participants in the study. Thus, the interviewees and survey respondents were affiliated with the RCP in the DPW. Although the participants have various job titles, they can be categorized under clients (DPW employees), consultants, and contractors.

The overarching requirement for participation in the study is the knowledge of various practices and processes involved in the CAPEX programme.

Based on the reviewed literature, the interview protocol was piloted among three principal actors in the programme. After the finalisation of the protocol, fourteen programme actors were invited to participate in the study through emails that were followed up with telephone calls. Prior to the scheduled date and time of each face-to-face interview, the protocols were sent to the programme actors that agreed to take part in the study. Although fourteen programme actors were invited and accepted to take part in the study, only nine interviews were conducted due to various reasons, which can be linked to unexpected non-availability. Among the nine interviewees, three actors work for the DPW, four actors work for project management consultancies, and two actors work for contractors involved in the programme. The interview questions were open ended, and each session span almost an hour in the designated office of the interviewees.

Thereafter, a survey was conducted among an enlarged sample of actors in the programme. Through the information retrieved from the client, 83 survey questionnaires were circulated to obtain possible confirmatory data for the study. The structured questions of the questionnaire were based on the findings of the interviews. At the end of the survey period, 39 validly completed questionnaires were returned and processed. This constitutes a 47% response rate for the survey. In terms of demographic data, 94% of the survey respondents have post-secondary school qualification, 72% of them have construction related job titles, 69% offer project management as a core service in their forms, and most importantly, 13% of the respondents have executed seven or more projects in the RCP. The data also show that 56% of the respondents have done 1-3 projects, whereas 31% of them have concluded 4-6 projects in the programme. In other words, all the respondents were actively involved in the programme, albeit at varying level of responsibility. The survey thus provides the platform for obtaining confirmatory data from the programme actors. It should be noted that the interviewees were not included in the survey.

RESEARCH FINDINGS

The discussion of the responses to the questions in this paper is based on answers that echoed the most in the nine interviews. In broad terms, the interviews sought responses to planning related matters and management structure issues in the programme. The transcribed data show that all the interviewees agree that the DPW has infrastructure projects, which must be coordinated, so that limited resources can be appropriately allocated. The interviewees also mention that the programme is also expected to assist the DPW to align its projects with government policies, especially the preferential procurement policy. According to the interviewees, the most conspicuous planning problem on the programme is poor risk assessment and feasibility studies (Table 1). The interviewees also note that there is improper scoping of projects within the programme, and this is evident in many changes that are effected at the construction stage. Another issue mentioned by the interviewees is the sub optimal management of resources. The data show that resources, most especially materials, plants and equipment, have incorrect schedules at the project phases. It was noted that management emphasis on overall works programme that show activities, time frames and cash flow projections at the expense of detailed resource, material and plant schedules, has marginalised the programme.

Table 1: Overview of major implementation gaps in the RCP

Aspect	Comments of interviewees
Planning	Poor risk assessment and feasibility studies Improper scoping of projects within the programme Resources have incorrect schedules at the project phases
Management	Bureaucratic procedures, which are rigid are common place Approvals by the client is realised through many steps Late official decisions that delay the programme is prevalent Lack of capacity in terms of expertise exists in DPW

In specific terms, the interviewees note that the causes of the encountered planning problems pertain to improper design details and specifications, which always lead to poor resource, material and plant scheduling among projects. More often, designs are not detailed enough with appropriate specifications to enable planners to prepare the right schedules for projects in the programme. The resultant effect is that delays are usually experienced on such projects. Project costing and budgeting also suffer in this regard. Another issue is the frequent changes experienced on projects in the programme. Such changes are due to improper feasibility studies that embed the need analysis of stakeholders. This leads to scope creep, financing and budgeting shortfalls that eventuate in project delays, and improper work breakdown structure also leads to the failure to identify and assign work appropriately. Scope creep, delays and financial problems may also be a resultant effect in this regard.

The interviewees were of the opinion that solutions to these problems are multi-prong. First, stakeholders should adhere to the programme communication plan. This can be effective as organisation breakdown structure is in place to perform various activities in the programme. Clearly, defined roles are assigned to every personnel in the programme. The position and reporting lines are also clearly defined. Most notably, it should be clearly stated that only the project consulting team could give instructions and communicate officially with the contractors. The lines of project communication are routinely bridged. Second, design drawings should be detailed and adequately specified for proper planning to be done in terms of resources, plant and materials. A good work breakdown structure should identify various activities to be carried out on the programme. This should enhance proper scoping of each project, which includes activities needed for the successful completion of a project. Third, expert knowledge in planning should be acquired to plan the projects in the programme. It is crucial to have the correct scope of work in place before the start of planning so as to minimise unnecessary changes at succeeding stages.

At the administrative level, the programme has been vulnerable to structural problems in its management. To this end, the interviewees mentioned that the RCP management structure was bureaucratic because often times, procedures were rigid. Such rigidity negate the need for flexibility that is required if programme managers are to make decisions that would save time and money. For instance, most of the programme managers opine that they lack authority to make quick decisions on the programme without the approval of the client. The approval of the client is realised through many steps, and even more worrisome is the lack of enough professionals in the DPW to steer the programme towards its goals. The immediate consequences of these problems are exemplified in late official decisions that in turn contribute to programme delays with cost implications. The lack of authority on the part of the programme managers prevent them from making quick decisions to solve urgent

problems that always escalate to major ones. This decision-making gap is reportedly a major issue at project implementation stage.

Because of these experiences, the interviewees suggests that the DPW should incorporate an organisational structure that is flexible, to enhance quick decision making on the programme. To allow this flexibility, procedures should be reviewed to enable programme managers to run the programme without unnecessary interference. This will enhance quick decisions, which solves urgent problems that may escalate to major ones. The interviewees note that the DPW should endeavour to develop the necessary human resource capacity to manage the programme. For instance, since the programme is multi-year, in-house recruitment of programme managers should be considered, while training current employees on the programme.

As mentioned earlier, additional data emanated from a research survey. The survey, which was conducted after the analysis of interview data, confirms the veracity of the views of the interviewees. The survey data are herein shown in Table 2 and Table 3. The survey used a 5-point Likert scale to collect, analyse, and interpret the data. A scale of 1= strongly disagree to 5= strongly agree, was used. In order to determine inferences, Chi-square tests were conducted in accordance with the decision rule in Bagdonavicius and Nikulin (2011: 32). A confidence level of 95% was set for hypothesis testing. Two complementary statements, the null hypothesis, which is a claim of no difference and an alternate hypothesis, which is a claim of a difference in the population (Bagdonavicius and Nikulin, 2011: 34) were specified for this study. In brief, the null hypothesis is accepted if $p \leq \alpha$ whereas the alternative hypothesis is accepted if $\alpha \leq p \leq \beta$. Where p is the significance level, α is the pre-determined threshold probability (5%), and β is confidence level (95%).

It is notable that the general perception of the programme obtained through the survey was not dissimilar from the views obtained in the interviewees. The perceptions related to planning as shown in Table 2 indicate that proper risk assessment is not done on the RCP and its constituent projects. This appears to be the foremost planning problem encountered on the programme. The next issues, which are also important in terms of planning, are the improper activity definition and sequencing, and the lack of justifiable business case for each project in the programme. The respondents also agree that duration estimates are not established for all activities; high-level schedule of activities is not created for the programme, and resources to be used are not well understood / specified. In terms of planning, the study established that there is a positive relationship between ‘scoping and feasibility studies’ and ‘planning’ of the RCP. The mean responses to the various statements in Table 2 are greater than 3.00, which indicate that the respondents agree that ‘improper scoping and feasibility studies have led to the improper planning of the RCP. The Pearson Chi-square test revealed significance level ≥ 0.54 . The findings in Table 2 thus corroborate the views of the interviewees (Table 1) in term of the planning related problems of the RCP.

Table 2: Inferences related to the planning related gaps in the RCP

Statement	Mean	Rank	Chi-square
Improper risk assessments are done on the programme's constituent projects.	4.18	1	0.54
Improper definition and sequencing of activities.	3.90	2	0.59
Resources are not well understood / specified.	3.73	3	0.63
High level schedule is not created for the programme.	3.50	4	0.63
Duration estimates are not determined for each product.	3.41	5	0.71

Table 3 shows that the respondents were however; in doubt whether managers in DPW have the necessary management knowledge and skills to manage the programme successfully. The respondents were also less agreeable with the statements 'managers have the necessary authority and power to control the execution of the programme' and 'managers are allowed to attend executive meetings where programme strategic decisions are made'. In terms of management, the survey data show that there is a positive relationship between 'in-house capacity' and 'management' of the RCP. The mean responses indicates that the respondents agree that 'inadequate in-house capacity in the DPW has led to poor management of the programme'. The Pearson Chi-square test results revealed significance level ≥ 0.26 . The findings in Table 3 also corroborate the views of the interviewees (Table 1) in term of the management related inadequacies of the RCP.

Table 3: Inferences related to management related gaps in the RCP

Statement	Mean	Rank	Chi-square
There is a high level of top management commitment to the success of the programme.	3.59	1	0.26
Managers have the necessary authority and power to control the execution of the programme	3.41	2	0.26
Managers have the necessary management knowledge and skills to manage the programme successfully.	3.23	3	0.65
Managers are allowed to attend executive meetings where programme strategic decisions are made.	3.08	4	0.30

Another issue of significance pertains to communication. Though a communication plan is put in place in the RCP, little is done to adhere to it. For such a programme, grapevine model of communication is often responsible for discord among programme actors. To address this gap, stakeholders should adhere to the programme communication plan. This can be effective as organisation breakdown structure is in place to perform various activities in the programme. The existing programme shows defined roles that are assigned to every personnel in the programme, and the reporting lines are also clearly defined. Most importantly, it should be clearly stated that only the project consulting team could give instructions and communicate officially with the contractors. The lines of project communication should not be bridged routinely by programme actors.

DISCUSSION

Within the construction industry context, the implementation of a new system, such as programme management, is a challenging task (Shehu and Akintoye, 2010) because infrastructure projects are implemented in a socio-technical context in which events occur (Van Gils *et al.*, 2009). Similar to the issues discussed in the previous section of this paper, planning and management of construction programme are prerequisites for success. For instance, Shi *et al.* (2014) used the 2010 Asian Games construction programme to demonstrate the importance of risks management to programme delivery. Just as the respondents in the South African study have highlighted (Table 2), failure to address risks relative to programme schedule, coordination, communication, delay in design, design change, and resource utilisation, could severely affect the performance of a programme (Shi *et al.*, 2014). Given that the requirements for the aptitude of most contractors involved in programmes are complex (Buuren *et al.*, 2010), even in the face of possible conflicts relative to the utilization of resources and sharing of crucial information, the risks impacting on

contractors' ability to do the required work, communicate unambiguously, and coordinate activities and people, must be addressed appropriate at the programme and project levels (Alam *et al.*, 2008).

Major challenges have been encountered in the practice of construction programme management. Reported categories include strategic focus, human and communication, finance, leadership and commitment (Shehu and Akintoye, 2010). Under these categories proposed by Shehu and Akintoye (2010), the lack of cross-functional working (among projects), lack of coordination between projects, lack of training, people constraints, lack of knowledge of portfolio management techniques, lack of resources / poor allocation of resources (human and finance), lack of knowledge to evaluate risks, frequent scope changes (especially in projects), late delivery of projects (which was almost endemic), and lack of cross-functional communication; are the major challenges experienced on the case programme of this study.

Both the interview and the survey data confirm the impact of scope changes, poor planning, and lack of cross-functional communication in the RCP. Going forward, the programme would have to take care of programme alteration and unplanned changes by ensuring that at the implementation phase, all stakeholders reach a notarised agreement concerning project increases, and when major changes occurs, final approval is secured from the DPW (Chen *et al.*, 2013). Concerning communication, a programme management information system should be established to improve information sharing because managers often have to address and supervise a variety of projects at multiple stages within the programme (Chen *et al.*, 2013).

In a related South Africa study, the work of Rwelamila (2007) notes that there are strong indications to suggest that public sector organisations, such as the DPW, lack required project management competencies. Rwelamila (2007) evaluated a public sector programme, and conclude that the programme could be described as a 'white elephant' as it does not have appropriate organisation structure (herein referred to as management structure in this paper), appropriately qualified, and sufficient staff complement to fulfil its mandate. The recommendations of Rwelamila in 2007 found reverberations with this study in that the RCP in its current form will struggle to fulfil its mandate of road improvement in the province successfully without addressing its management structure in terms of competencies, qualification and management system. Similar to the work of Rwelamila (2007), the study affirms the good intentions of the DPW, but the planning and communication gaps would not be overcome without developing a structure for independent inputs, developing middle managers' ability to manage project managers, and also establishing a development programme for core staff members involved in the RCP.

The findings of this study, which resonate with the findings in the literature, demand that the problems in the RCP must be mitigated as Todorov (2014) contends that best project and programme tools and methods are able to positively impact the economic and social development of communities and countries that effectively implement them. Todorov's contention is based on the measureable positive socio-economic benefits that have accrued to Bulgaria through implemented European Union programmes.

CONCLUSIONS

This paper shows some of the challenges inherent in the management of a CAPEX programme at the provincial level in South Africa. The assessment of the RCP

through the lived experiences of actors in the programme confirms that planning and management challenges stalled the progress of the work, albeit at different stages of implementation. The findings inform that proper risk management and adherence to communication plans would better serve the interest of the programme.

The findings thus answered the two research questions mentioned earlier. In particular, the response to the planning question shows that poor plant and material schedules, poor feasibility studies, and poor assessment of risks inherent in the projects constitute major problems of the RCP in South Africa. In addition, decision-making gaps appear to be the major issue in the RCP. Such gaps are due to the lack of capacity and expertise as well as the bureaucratic nature of approval processes found in the client organisation. These gaps respond to the management structure question.

The literature on construction programmes has also highlighted some of the issues uncovered in this particular study. In relation to planning, detailed planning of activities at the programme and project levels should be done to ensure that activities are well defined and scheduled at various stages of implementation. The deployment of resources, human, material and finance, should also occur as planned. Further, programme manager requires the necessary authority to control the execution of the programme, and as such, they should be allowed to attend executive meetings where strategic decisions are made.

Although a single RCP has been examined in this study, similar on-going infrastructure programmes in South Africa should avoid the challenges documented in this paper. There are some limitations associated with this study. One of such limitations pertains to replication. The replication of the suggestions made in this paper would however carry more validity with a future study that addresses more than one CAPEX programme.

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