

# PROJECT MANAGEMENT MATURITY IN PUBLIC SECTOR ORGANISATIONS: THE CASE OF BOTSWANA

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Public sector organizations responsible for infrastructure development in most developing countries are project oriented organizations (POO). There are strong indications to suggest that a number of public project failures in Botswana are symptoms of PM immaturity of public sector infrastructure organizations. This paper reports on a case study that was carried out in one of the large public sector infrastructure department in Botswana –*referred to as BUS in order to maintain its anonymity*. A questionnaire was administered through a cross section of 20 randomly selected employees involved in project management at various capacities and also administered to another randomly selected sample of private project management practitioners who normally conduct business with BUS who formed some form of check on the level of project management maturity. Follow-up interviews on some of the aspects that were answered in the questionnaire were also done. The findings strongly suggest that an average maturity of 2.3 (*on a scale of 5, where level 1 is the lowest level of maturity*) being across all PM knowledge areas. Generally the results reveal serious inadequacies in project risk management maturity. Recommendations are made that project management capacity building through training should be strengthened and the process need to start from identification of PM training needs in the organization.

**KEYWORDS:** Project management maturity, public sector, infrastructure organizations, Botswana.

## INTRODUCTION

Project management as a formal managerial discipline is said to have evolved in the middle of the 20th century, when the first Program Evaluation and Review Technique (PERT) marked the beginning of a new discipline. Hamilton (2004), states that modern project management has really come to the ascendancy and has been developing over the past 40-50 years. Initially project management developed in a limited number of engineering based industries during the 1950s, 1960s and 1970s (Morris, 1994). With time, tools, techniques, and methods became standard across industries and businesses as more and more organisations began witnessing the benefits of organising work around projects. Garies (1990) indicates projects are becoming a way in which organisations (especially project oriented organisations) fulfil their business plans. In recent years, therefore, there has been a focus at not only looking at project management from the perspective of studying projects but also from the perspective of looking at the way organisations are using projects to achieve their goals (Andersen & Jessen, 2003). Management by projects is definitely here to stay but mechanisms to monitor the capability of public organisation in managing projects are yet to be established. It is recognised that projects and their management involve a complex

environment brought about by the nature of the projects themselves and the environment in which these projects are executed.

Rwelamila (2007), notes that management by projects is an organisational strategy of organisations dealing with an increasingly complex environment. He further states that this environment is affected by a number of forces originating from the project itself, the organisation sponsoring the project, and the organisations involved in project implementation, the sector or industry relevant to the service or product resulting from the project, forces from the country/economy and forces coming from the world environment on economics, politics and other social pressures. Garies & Huemann (2000) state that to sail through the forces indicated, an organisation must pursue the following objectives: 1) Organisational differentiation and decentralisation of management responsibility; 2) Quality planning, control and assurance by project team work and holistic project definitions; 3) Goal orientation and personnel development; 4) Organisation of organisational learning by projects.

So, while projects are now recognised as a means to achieve competitive advantage, project management competences are not being monitored in public organisations. Successful delivery of projects is dependent on organisational capability in project management. In the budget speech of 2007 the Government of Botswana recognised the poor delivery of projects across the public sector and proposed strengthening this aspect of the public sector. However, you can only strengthen that which you know its strength. There has been no research conducted in Botswana to show the level of public organisation competency in project management.

This paper aims to fill this gap by presenting results from a study conducted on one public sector infrastructure department. The survey conducted between February and March 2007 focussed on project management maturity with respect to nine knowledge areas espoused by the Project Management Institute (PMI).

## PROJECT MANAGEMENT MATURITY-THEORY AND PRACTICE

According to Kerzner(2003), maturity in project management is the implementation of a standard methodology and accompanying processes such that there existed a high likelihood of repeated success. Andersen & Jessen (2003) refer to maturity as “a state where an organisation is in perfect condition to achieve its objectives. Project maturity would then mean that the organisation is perfectly conditioned to deal with its projects.”

Through the widely adopted capability maturity model developed by Software Engineering Institute (SEI) of Carnegie-Mellon in 1986 and 1993 for software organisations (Skulmoski, 2001), the concept of process maturity migrated to a measure of organisational process maturity. Integral to the model is the concept that organisations advance through a series of five stages of maturity: *initial* level- No formal methodology, no project portfolio management, the score is from 0 to 1; *repeatable* level- Systemic Planning and control with a standard methodology, the score is from 1.1 to 2.0; *defined* level- Merging of product and PM processes, the score is between 2.1 and 3.0; *managed* level - Integrated PM and business systems with a score between 3.1 and 4.0; *optimising* level- Continuous PM process improvement with a score between 4.1 and 5.0.

## Maturity Models

One can identify the following prominent models, Project Management Process Maturity (PM<sup>2</sup>) model also known as Ibbs model which emphasise the aspect of financial return on investment, the Kerzner model (Kerzner, 2005), Organisational Project Management Maturity Model (OPM3) by PMI, and the Garies model (Garies,2003) which views maturity in the form of a spiral rather than a stepwise process.

According to Powell (2003) all the models inherently have some of the following characteristics: An assessment of project management practices, processes and people competencies; A benchmark with other organisations within the sector and with industry in general; A review of the average performance of projects in terms of cost, time, quality, scope (or other measures such as user satisfaction, Safety Health Environment etc.) against others in the sector or general industry.

## Maturity Studies elsewhere

Various studies have been done on project maturity assessment in organisations e.g. Ibbs & Kwak, 2000. In their studies of different types of industry i.e. *Information Systems, Information Management and movement, High tech manufacturing* in the United States of America, they found that High tech manufacturing had the highest knowledge maturity of **3.4** while the level of maturity for Engineering Construction companies was **3.3**. The lowest was Information Systems with **3.0**. In this study Ibbs & Kwak compared maturity level with project performance and showed that it was possible to correlate project maturity with project performance.

A major study of project management maturity at a global level was conducted by PriceWaterHouseCoopers in 2004 in which two hundred responses were gathered from a balanced group of companies from thirty different countries across the globe. Some of the relevant key findings for the study were as follows: That there was a positive correlation between project maturity and project performance. A higher project management level would most likely deliver superior performance in terms of overall project delivery and business benefits; that the current level of maturity is 2.5 indicating that the current state of project management in organisations is at the level of informal processes; that many of the project failures are due to an imbalanced organisation; Organisational structure has a big influence in overall project performance. Organisation structure influences the performance and outcome of projects.

## RESEARCH DESIGN, METHOD AND RESULTS

### Design and Methods

In this study the researchers adopted a version of the Organisation Project Management Model (OPM3) of the PMI to investigate BUS- a public sector infrastructure department. BUS is involved in the design and construction of public civil engineering infrastructure. The study was done through administering a questionnaire to staff involved in projects in the organisation. The data collection tool i.e. the questionnaire, used an affective test using the LIKERT scale and consisted of 90 questions with 10 questions in each of the nine project management body of knowledge (PMBok) areas. The questionnaire was adapted from

Bolles(2002) in which project management maturity knowledge levels are measured through affective tests. The study is informed by other studies of project management maturity which tend to measure organisations through the use of such tests. For example Kwaks & Ibbs(2000) and Andersen and Jessen(2003) have used similar test to determine project management maturity in organisations.

The organisation's members of staff targeted were involved at various levels of project management from initiation to project monitoring and evaluation. A total number of 20 participants were targeted in the organisation and 11 (**55%**) responded. The respondent consisted of **eight Engineers** and **three Technicians**. Although the ideal would have been to have respondents from across all levels of the organisation, it was not possible to get responses from other staff not involved in the conceptualisation, supervision and monitoring of projects in BUS. The questionnaire survey was followed by interviews on some of the aspects that were answered in the questionnaire with the view of addressing any gaps between responses and fundamentals. As a check the questionnaire was administered to project staff in different organisations who interact with the BUS.

## **Research results**

The findings of the study were focused on determining maturity levels of the organisation being investigated in the following knowledge areas:

Project integration, Scope Management, Time Management, Cost Management, Quality Management, Human Resources Management, Communication Management, Risk Management and Procurement

On the basis of maturity of each knowledge area the final maturity level was then determined as an average of the 9 areas. A scale of knowledge levels was used from 1 to 5- 5 being the highest level.

### **Project Integration**

Project integration involves coordinating project activities and integrates all efforts into a project plan. The study sought to find the level of project integration in BUS. The respondents were asked 10 questions in this category and were to fill in a questionnaire and on a scale of 1 to 5 where 1(never) and 5 (always). A higher score reflected a higher maturity. The overall maturity for project integration was **1.52** indicating that on an overall basis the organisation did not have a proper project integration management process in place.

### **Scope Management**

Under scope management the research sought to find out how scope was managed and whether respondents rated the way in which scope was managed in their organisation highly. This was again done through a set of 10 questions. The overall score for scope management was **2.08**. This was better than the project integration management. However compared to time and cost management scope management was scored lowly as shown in Figure 1.

### **Time Management**

Questions on Time Management centred on issues around the use of Work Breakdown Structures and the use of scheduling. The overall score in this category was **2.39** which

indicated a reasonably high mature project management style in as far as time management was concerned. However, when asked whether this meant that projects came in on time because of the maturity level in time management it became apparent that almost 100% of the jobs never finished on time. This was attributed to issues of inclement weather, and initial wrong estimations. Respondents indicated therefore that in almost all cases contractors were given extensions of time. The respondents when interviewed explained that they use the tools for scheduling as well as they could and failure by contractors to complete projects in time although scoping had been done properly.

## Cost Management

Cost Management maturity seems to have been the highest in the organisation with a maturity score of **3.23**. This signifies the fact that the organisation focuses on cost management to ensure that projects do not go beyond the estimated cost. However, empirical evidence shows that most projects have serious cost overruns. The high maturity in cost management is consistent with findings in a study by Ibbs & Kwak (2000) in which they found that cost management maturity in the construction industry in America. Typically, the same can be said about cost in public sector infrastructure departments and therefore stringent measures are put in place to ensure that cost controls are in place. However, the study also reveals that most of respondents felt that very few project team members had any training in cost management i.e. on financial standards and procedures.

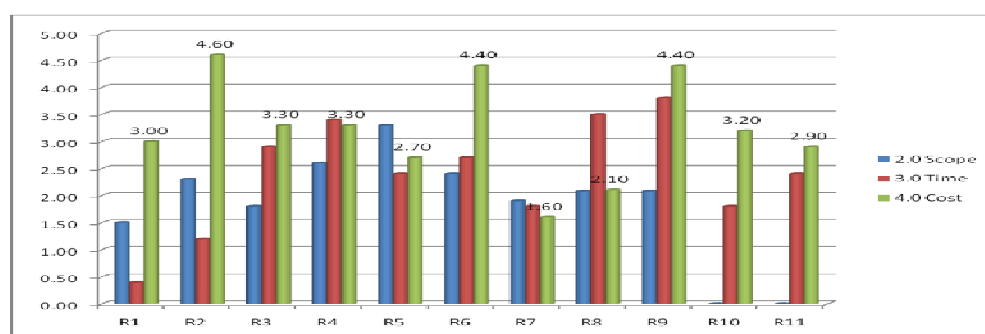


Figure 1: Comparing scope, time and cost management scores

## Quality Management

Quality management involves both quality control and quality assurance procedures in an organisation. The overall score for quality management was **2.25**. Quality Assurance is a means by which an institution satisfies itself that standards and quality of its service provision can be maintained and enhanced while Quality Control involves the operational techniques and activities that are used to fulfil requirements of quality. Although respondents scored highly on Quality Assurance Plans (QAPs) being available for each project further interviews seemed to have contradicted this because the respondents indicated that they relied mostly on documented processes and had no QAPs because these were considered expensive. BUS had not attempted to start the process of accreditation to ISO9002.

## Human Resource Management

The average maturity with respect to Human Resources Management is **3.06**. Despite this good value there is glaring lack of staff to manage most of their projects. In one respect the respondents state that there were indeed organisational plans in respect of the projects BUS

undertook although they were guided mostly by the consultant who also normally worked as project managers. BUS would appoint a staff member to a project while the bulk of the project activities were done by the consultant.

### Communication Management

Findings on communication management involved determining among others, whether there was a communication plan, project information was updated and was readily accessible and whether any variance in schedule, budget was communicated on a regular basis. Respondents scored communication management highly with an overall score of **3.64** which was the highest rating of maturity for the organisation.

### Risk Management

Risk management assessment sought to find out if there were any risk mitigation plans and whether there were reviews on regular basis on risks in a project life cycle. The overall maturity with respect to risk management was **1.76** which was the lowest in all the knowledge areas.

### Procurement Management

Assessment of procurement management involved determining whether BUS had standard contracts and whether the organisation had a procurement plan for each project start. It also sought to understand whether contract administration formed an integral part of the project management organisation. The organisation uses traditional procurement methods as all public organisations in Botswana. The overall maturity for this knowledge area was **2.58**.

## SYNTHESIS AND ANALYSIS OF RESULTS

### Overall Maturity of the organisation

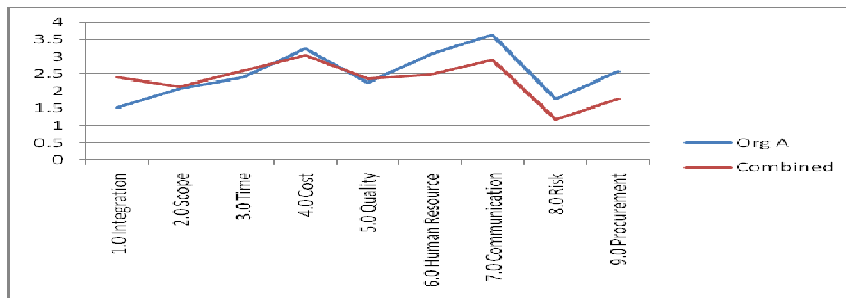
An analysis of the overall maturity of BUS was done based on the components of the knowledge areas hitherto highlighted. A summary of the scores were entered in Table 1 and calculation of the overall maturity of the organisation was then done. The overall maturity of organisation A was found to be 2.5. This represents a maturity of level of 3.

**Table 1: Summary table of maturity in knowledge area**

Maturity Level	L1	L2	L3	L4	L5
Knowledge Area	0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0
1.0 Integration		1.52			
2.0 Scope			2.08		
3.0 Time			2.39		
4.0 Cost				3.23	
5.0 Quality			2.25		
6.0 Human Resource				3.06	
7.0 Communication				3.64	
8.0 Risk		1.76			
9.0 Procurement			2.58		

## Comparison across industry

A comparison with other responses taken during the testing of the questionnaire revealed a small difference and can be seen in Figure 2. It is seen in the figure that there is a similar pattern in which cost and communication management are rated highly while risk and quality management are rated lowly. The overall maturity for the combined responses, which provided a check, was **2.3**. This signifies a level 3 maturity according to the standard set. This falls in this same category as the one found from the respondents from BUS.



**Figure 2: Comparison of Rating of Maturity between BUS respondents (Org A) and Clients**

The revelation of maturity in organisation A of 2.5 suggests that the organisation is at level 3 in the maturity scale. Level 3 is a managed level. However, it is important to observe that some knowledge areas scored highly because respondents did not think that they had any problems with them in the organisations. For example communication management was perceived to be matured in this functional organisation because as a public organisation any project information must be readily available for scrutiny by the political system as and when it is needed. However, there was no evidence of communication plans specifically set up for projects.

## Knowledge areas versus Project life cycle

An analysis was done based on process groups versus knowledge areas to understand the strength of BUS with respect to the whole project life cycle. Figure 4 shows that most of the maturity of the organisation is derived from the planning process where human resources, cost and time management maturities contribute a significant amount towards the maturity of the organisation. The average maturity with respect to planning is **1.34**. Under the execution process communication management has a high maturity according to the respondents although the average maturity was found to be **0.70**. A similar average of **0.70** was found for the monitoring and control process with the highest maturity coming as a result of the cost control process. Initiation and closing did not seem to pre-occupy the minds of the respondents and scored an average of **0.30** and **0.18** respectively.

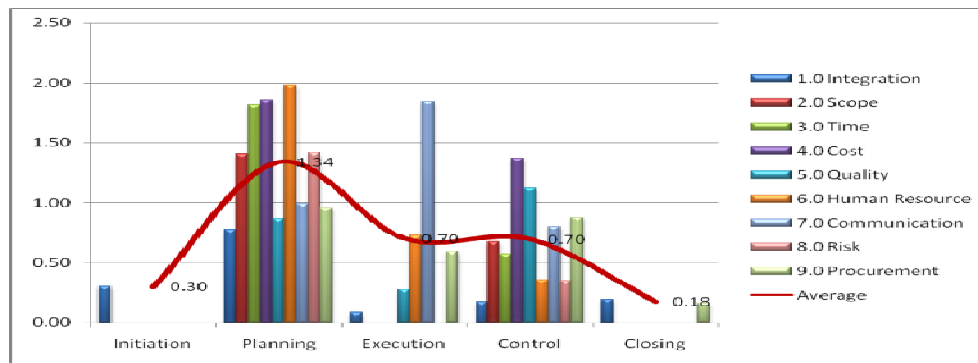


Figure 4: Maturity within the project life cycle

## CONCLUSIONS AND RECOMMENDATIONS

The project management maturity level in the public sector organisation was found to be **2.5** which seem to indicate that there are a good number of project management practices in the organisation. Comparison with other responses from the same sector revealed a score of **2.3**. It would therefore appear that maturity in the civil engineering sector of the construction industry in Botswana is at **level 3**. While a level 3 maturity would be considered very good this study puts a caveat that a broader sample will have to be undertaken in the organisation to validate the findings obtained from those who are directly involved in projects in BUS.

It can be said that the organisational dilemma faced by most of project managers in public sector organisations in Botswana are similar in that most of them work within the framework of a functional government structure with its reporting and control systems. Project managers are not given enough latitude to make decisions on projects because of the nature of the organisation. Some government departments have created Project Implementation Units (PIUs) with a view to enhance project management practices in the departments and assigning teams to be responsible for different projects. This is seen to be a step in the right direction but more still needs to be done with respect to ensuring that project management practices become embedded in these PIUs. The transformation of these PIUs into Project Management Offices will be a starting point in ensuring that Project Management Methodology Guidelines (PMMG) begin to be introduced in the public sector organisations. In the public sector Civil Engineering infrastructure industry the general observation is that there is an over-reliance of consultants in managing projects and most public sector organisations tend to merely get reports and “oversee” the process of construction.

## Recommendations

### Improving project maturity level

Having established that the organisation is at level 3, it is recommended that if it needs to advance to the next level the organisation will need to establish a project office or a centre of excellence. It must also begin to think at how best it can begin the process of benchmarking itself with similar organisations. Benchmarking will involve both quantitative and qualitative benchmarking.



### **Improving project integration**

It is recommended that the organisation endeavour to establish Project Management Information Systems for its projects either through an established project office or on individual projects. The recommendation is to establish a configuration management process for managing projects in the organisation.

### **Project Scope Management**

The organisation's management of scope revealed the need for improvement in developing Work Breakdown Structure Dictionaries. It is recommended therefore that change control documentation be implemented and that work breakdown structure dictionaries be created for all the projects through a central project office which will act as the knowledge base for the organisation.

### **Project Time Management**

The study recommends that the organisation should consider improving identifying schedule constraints on each project evaluation. Further, it is recommended that the organisation should consider adopting methodologies such as critical-chain methodology when devising project time management strategies.

### **Project Cost Management**

The recommendation therefore is that project staff should be introduced to financial standards and procedures in the organisation irrespective of whether they are accountants or not.

### **Project Quality Management**

It is recommended that change control processes for each project must be established and followed to minimize the erosion of quality of projects. This would protect the contractor as well as the client when this is strictly observed. It is further recommends that quality control procedures be put in place.

### **Project Human Resources Management**

The major deficiency cited by the respondents was the lack of documentation of training and developmental needs of team members of a project. It is therefore recommended that each project team members' training needs should be documented and training developed to match the training needs. Team members should also be encouraged to take up professional project management qualifications in order to help develop an effective project team that can deliver consistently. Most members of staff are "seconded" to a project because they have been involved in similar projects and are perhaps qualified in a technical area. Following the observation by Toney (2002) that the project manager has about 34 to 47% direct influence of project success BUS should try and maximise the probability of consistently attaining project goals by recruiting, developing, nurturing and retaining well qualified project managers.

### **Project Communication Management**

No specific recommendation can be cited with respect to communication management although it was not clear whether indeed there were communication plans drawn up

specifically for each project. The organisation is however advised to document project successes in order for these to be used in close down announcements of projects.

### **Project Risk Management**

It is recommended that the organisation should prepare risk management plans for each project and carry out risk identification and analysis together with a risk response plan for each project. Further it is recommended that the organisation should carry out risk monitoring and control based on the plans that are established at the beginning of the project. It is little wonder that most of the projects that fall under the ambit of BUS are not completed on time and are above budget. While the blame can be placed on the contractors for their failures it is apparent that BUS should implement realistic risk assessment strategies before awarding work to contractors.

### **Project Procurement Management**

It is recommended that the organisation should formalise an evaluation process for reviewing and accepting proposals. This involves setting up proper evaluation criteria for the assessment of the project proposals from consultants in a manner that will reflect true costs and schedules. While it is accepted that the organisation is guided by the Public Procurement and Asset Disposable Board Act in terms of procurement, it appears that there is a general tendency for the least cost method of evaluation of tenders which at times do not achieve the necessary savings for the organisation.

### **Introduction of project management methodology guidelines**

The observation in this study is that the organisation which was studied has no formal project management methodology in place. It relies a great deal on the experience of “project managers” assigned to specific projects and also on consultants who did the initial designs. It is however being proposed that for any organisation to move towards more proficiency and increased efficiency there is need to be consistent in applying procedures or standards. Consistency in applying standards can be achieved if an organisation establishes a project office which will set up guidelines for which each project team will follow. The first step in establishing project management methodology guidelines, therefore, is to establish dedicated project management offices. These offices will be responsible for the evaluation of project management in the organisation from a strategic point of view.

As Bolles (2002) has suggested education and training should firmly anchor the introduction of project management methodology guides.

### **Acknowledgements**

The authors would like to thank the respondents who found time to fill in the questionnaire and answer some of the subsequent questions.

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