

AN INVESTIGATION OF CONSTRUCTION PROJECT PERFORMANCE IN BOTSWANA USING TIME PREDICTABILITY

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This paper develops an understanding about how construction project performance is achieved in Botswana in relation to time predictability. This aspect has increased in importance in Botswana as the construction industry has experienced changes since 2001 from a slump in the economy and from the implementation of policies to increase the participation of local contractors in the industry. The Botswana construction environment is characterized by projects being managed as separate entities within companies because of the country scale and the spread of work. This makes the project process more complex and gives difficulties in delivery. The research used a qualitative research method with an interpretivist approach using semi-structured in-depth interviews with 3 managers in 4 medium scale Botswana construction companies. The findings confirmed the applicability of known factors in delays in project deliverability and identified some Botswana specific factors such as multi-cultural issues, government influence, and geographical supply problems. It was also determined that companies develop strategies to counteract some of these real problems to improve project performance. This study will give an insight into issues related to project management in a developing country.

Keywords: Botswana, contractor performance, project performance, project deliverability, time.

INTRODUCTION

The construction industry can be described as a mix of complex processes where there is no guarantee that targets will be achieved smoothly due to unpredictable situations such as weather, conflicts in decision making, unavoidable resource issues and fragmentation of the industry. In developing countries, such as Botswana, these issues are exaggerated. The business environment in Botswana has become highly competitive and so construction companies have to cope with this added complexity by managing their projects closely. Therefore, construction project management has become very important both to maintain profitability and to survive in the market in Botswana. Similar to any other developing country, the construction industry plays an important role in the economy of Botswana. It makes a significant contribution towards economic aspects as it has been contributed 7.0% and 6.1% of the GDP in 1989/1990 and 1999/2000 respectively (Kaboyakgosi and Sengwaketse, 2003). The construction industry employs a relatively large number of employees compared to other industries in Botswana and it maintains more than 10% of total employment (Kaboyakgosi and Sengwaketse, 2003). Due to the economical significance of the

construction industry, the performance of construction companies and projects is extremely important in Botswana.

Botswana's construction industry is comprised of small, medium and large contractors including international companies. The majority of construction companies, owned by Botswanan citizens fall into the small and medium-size categories. The government of Botswana is the major client; therefore, government projects take precedence over all types of major construction activities. This also creates complications in projects. Any government project involves many different departments, each with different funding, design and user requirements; thus, even though consultants represent the government there is often confusions and conflicts. The construction performance was also affected due to a slowdown of implementation of Government's development programme in 2000/01 (dti RSA, 2006). Like any other developing country, in Botswana there is a substantial gap between the standards required and actual standards achieved in the construction industry (Mselle and Manis 2000). Trying to improve project based performance in Botswana is a challenge. The contractors have to face the challenge to earn profits and to survive in the market. Thus they need to be fully aware of complexity in traditional project performance measures of time, cost and quality.

The word 'performance' in the construction industry covers a broad area which is at different levels: at construction company level, at individual project level, at supply chain level and even at individual or team work level. This research was limited to study of deliverability at project level with a focus on time to create a manageable project for an MSc. dissertation. Project performance is normally assessed through the establishment of time, cost and quality criteria (Ankrah and Proverbs, 2005; Xiao and Proverbs, 2003 a; Walker, 1995 and Mohsini and Davidson, 1992). Cost factors are influenced by the market and it is difficult to separate this from the overall company performance on site. Quality is a subjective issue which requires observation of actual construction as well as the perception of it, thus requires extensive research resources. Time predictability provides a suitable measure of on site project performance. In this qualitative study it was used as the entry point for establishment of a company's understanding, planning and organizational skills. Four construction companies were chosen for the study; the selection was limited to medium-size contractors because of their considerable and significant representation compared to other size categories and hence their high contribution towards the economy of Botswana.

This research employed an interpretivist approach (Seymour and Rooke 1995) using in-depth semi-structured interviewing as it sought to understand the complex social phenomena of construction in Botswana. This method provides an understanding of the viewpoint of the social actor (Bryman, 1999) which in this case was the contractor. In-depth interviews were recorded with three managers in each of four medium-size construction companies. Table 1, below shows a summary of the companies investigated and roles of the people interviewed.

The following three questions were used to investigate project deliverability in terms of time predicted:

Is it possible to complete projects on time? If not, what usually causes delays?

How do you identify any repetitive factors which delay projects?

What remedies can be adopted to minimize delays?

Respondents were further probed in detail about the factors involved in both time prediction and delivery to time. It was expected that the repetitive nature of delays might allow them to be identified beforehand and corrective actions to be taken.

Table 1: Company and Interviewee profiles

Item	Company 'A'	Company 'B'	Company 'C'	Company 'D'
Nature of core business	Building construction	Building construction	Pipe laying and pump houses	Road construction
Turnover in 2005 (M.Pula) 1GBP±11 Pula	13.320	8.258	16.134	25.186
Number of Employees	≈ 32	≈ 15	≈ 18	≈ 22
Positions of persons interviewed	Managing Dir., Commercial Manager and Site Agent	Owner/ Managing Dir., Estimator and Site Agent	Owner/ Managing Dir., Contracts Mgr and Site Agent	Project Mgr., Contracts Manager and Site Agent

THE BOTSWANA CONTEXT

Botswana is a land-locked country in Southern Africa, surrounded by Namibia to the west, Zimbabwe and Zambia to the north and South Africa to the south and east. The country covers a large area of about 582,000 km², with a small population of 1.736 million in 2002 with 46% urbanized. The climate is semi-arid with mild winters and hot summers (BBC 2006). It is also known as the world's largest diamond producer, thus Botswana has been classified as a middle-income nation by the World Bank (BBC 2006). Botswana is a cosmopolitan economic environment which is conducive to growth and diversification.

The diamond mining industry dominates the economy in Botswana and it accounts for one third of GDP with the construction industry contributing about 7% of the GDP (Kaboyakgosi and Sengwaketse, 2003; Ngowi and Pienaar, 2005), (dti RSA, 2006). The diamond industry is operated through the government in an equal partnership joint venture with a private company (Debswana). The growth of the construction industry is always linked to the government's investment in infrastructure and buildings mainly related to the mining industry (Ngowi, 1999, Kaboyakgosi and Sengwaketse, 2003). Thus, the government is extremely influential in the development of construction. Construction companies need to register with Public Procurement and Asset Disposal Board (PPADB) which is under the Ministry of Finance and Development Planning, to operate in Botswana except for large scale international companies. The PPADB has six categories of contractors (see Table 2), where categorization is based upon the maximum value of a single project that a particular company can handle. PPADB takes into consideration of several factors such as available resources (plant, vehicles, funds etc.), the number of trained professionals involved in the business, previous projects undertaken (locally or internationally) and references of good standing in the industry, when determining the category. Citizen-owned companies belong to the lower classes up to Class 'D' with a very few at Class 'E'. The government would like to develop Botswana's own construction company capacity. Thus, the government has implemented a number of policies to increase the participation of local contractors such as 40% of the construction work is reserved for local contractors, price preference up to 2.5% of the tender price, a mobilization advance of 10% of the contract sum paid in advance and a waiver or reduction in performance bond (Ngowi and Pienaar, 2005).

Table 2: Categories of Construction Companies in Botswana (Kaboyakgosi and Sengwaketse, 2003)

Class	Maximum contract value (in Million Pula)1£ ± 11 Pula			Total number of contractors (local and foreign)		
	Buildings	Civil	E & M	Building	Civil	E&M
OC	0.3	0.6	0.04	782	224	08
A	1.0	2.0	0.10	114	57	35
B	2.0	10.0	0.25	88	28	30
C	4.0	20.0	0.50	44	15	22
D	8.0	40.0	1.00	22	19	13
E	8.0	40.0	1.00	43	10	31

Regulatory issues in Botswana construction industry prior to August 2003 were handled by several government departments, which were under different ministries: Ministry of Works and Transport, Ministry of Local Government and Ministry of Minerals, Energy and Water Affairs. In 2002, the government realized that performance and relationships in the construction industry was very poor due to the diverse responsibility (DBES Strategic Plan, 2004-2009). Thus, in August 2003 the current Department of Building and Engineering Services (DBES) was formed merging two different units which were responsible for Botswana construction industry. (DBES Strategic Plan 2004-2009).

There is also acute shortage of skills in the Botswana construction industry (Mselle and Manis 2000). Much of the labour force arrives from other countries causing cultural problems. Mselle and Manis (2000) determined that management in this complex environment lacked: professionalism, accountability, training and knowledge. Therefore, this complex environment makes the achievement of project performance difficult.

PROJECT PERFORMANCE

The construction industry performance is the summation of individual construction and construction related company performances. Thus many academic researchers have analysed it from an organizational perspective (Bassioni *et al.*, 2005; Handa and Adas, 1996 and Venkatraman and Ramanujam, 1996). The term company performance relates more specifically towards the factors that contribute to improving market share or profitability of an organization as a whole. Market share or profitability of a company can be considered in tangible and non-tangible terms (Yeo, 2003). Venkatraman and Ramanujam (1996) stated that the concept of performance is widely recognized and adopted in the area of organizational effectiveness. They have described 'business performance' as a major player in strategic management in any organization. The business performance is divided into two branches as financial performance and operational performance and financial performance being the dominant one. Nevertheless, they have identified financial performance as the narrowest conception and operational performance as the broader conception of business performance. In making the above point stronger, Kagioglou *et al.* (2001) criticized financial performance measures as results and decisions based on the past and do not encourage the continuous improvement of the overall performance through the identification of the factors that contributed towards performance. Therefore, to improve performance, research needs to focus on operational issues (Kagioglou *et al.*, 2001).

Many researchers (Ankrah and Proverbs, 2005; Xiao and Proverbs, 2003 a; Takim et.al., 2003; Kagioglou *et al.*, 2001) have focused on project performance in their studies. Much of this research is based at the generic level on the nature and inherited characteristics of the construction industry such as – complexity (Dubois and Gadde, 2002; Gidado, 1996 and Boyd and Wild, 1993) fragmentation (Preece *et al.*, 2003), uniqueness (Boyd and Wild, 1993) of projects. There is a need to research down at specific project level. As mentioned previously, construction project performance analysis has been based on time, cost and quality. This paper addresses project performance in terms of time predictability as a suitable measure of on site project performance.

Time predictability becomes an important factor for construction projects due to high competition (Kumaraswamy and Chan1995), continuous demand to build faster (Gidado, 1996) and forms the base to evaluate project successfulness and efficiency of the project organization (Nkado, 1995). However it depends on numerous factors. Some of those factors have been identified as: workers' attitude, management policies and control, control of project organizational structure and client experience (Walker 1995). In addition structure and form of procurement and construction planning under managerial functions are considered as vital factors (Gidado, 1996). It is also based on commercial and or political considerations as well as planning, programming methodologies and resource allocation (Kumaraswamy and Chan1995).

Nkado (1995) described construction time as an important part of the life-cycle duration of buildings where the greatest part of the resources is committed irreversibly. Time predictability can be defined in numerous ways. The most adopted definition is – construction time is the elapsed period from the commencement of the site works to the completion and handover of a building to the client Nkado (1995). However, it will depend upon the type of contract between the client and the contractor as some contracts include the design stage while some exclude it when estimating the project duration. Assaf and Al-Hejji (2006) defined the time delay as the time overrun either beyond completion date specified in a contract or beyond the date that the parties agreed upon for delivery of a project. This paper defines time predictability as the estimated time of a construction project from its inception to completion excluding defect liability period.

All construction projects have uncertainties and distinctive differences such as they are unique, complex and fragmented (Kumaraswamy and Chan 1995 and Boyd and Wild, 1993). Consequently, the complexity of construction projects have effectively resulted in linear, un-coordinated and highly variable project processes (Koskela 2000). Thus the time overruns are constituted by the way the project is managed. Overrunning construction projects are apparent in every country.

Researchers from other developing countries have studied the causes of time delays in construction projects. For Nigeria, Elinwa and Joshua (2001) described how time overrun was high and occur in all projects irrespective of its size. They identified that client's contribution towards time overrun was almost double that of contractors. For Saudi Arabia, Assaf and Al-Hejji (2006) identified that owners, consultants and contractors were responsible for time delays in projects. They established that 'change orders' were the most common cause of delay in sites. More generally, clients have been identified as being unwilling to acknowledge their role in delays as it adds to their cost (Xiao and Proverbs, 2003 b). For Indonesia, Kaming *et al.* (1997) identified predominant causes of delay as design changes, poor labour productivity and

inadequate planning. For Kuwait, Kaushki and Kartam (2004) confirmed that nearly one fourth of the total project delays were due to late delivery of materials and established it as a contractor related factor. Furthermore they demonstrated statistically that the impact of late material deliveries caused further time delays in other areas. For Botswana, Mselle and Manis, (2000) and Kaboyakgosi and Sengwaketse, (2003) found that skills shortages caused delays on projects.

INTERVIEW RESULTS

The interviews generated contractor's perspective on time delay and their understanding of causes and opportunities for improvement.

All companies except company C saw time delays as inevitable. According to them the causes for late delivery of projects were due to delays in the procurement process, changes in client/Architect's instructions, variation orders, inflexible work force, individual performances, delay in material supplies, plant breakdown, communication gaps, skill shortages and tribal issues. According to the managing director in Company A:

...late and incorrect instructions from architects, variation orders from architect/client have become part of our work habits; it creates a constraint for cash flow and eventually affects the performance of us as a contractor.

Company C undergoes the same except 'delay in material supplies' was also considered important.

Project manager in company D stressed that success or failure of an infrastructure project depends upon planning.

...lack of planning affects project duration, cost, quality and ultimately its performance.....success of the company is related to the pre tender planning stage

However,

...new road projects are not located in direct and easily accessible areas unless it is an upgrade to an existing road.....Botswana is not an industrialized country..... local purchases are limited ..

Many interviewees commented on the poor 'relationships' at all levels as an issue responsible for project delays. Company A stated that:

...at present, the construction industry does not enjoy good relationships between the parties involved in construction.

Company B included a cultural explanation:

...relationships within the supply chain make a significant impact on performance in a project. In Botswana 'there is no hurry' for anything.

They continued that at the bottom most level, site agents' role becomes crucial as s/he has to deal with inflexible and unsupportive workforce mainly due to tribal issues.

All companies were able to identify delays which were due to repetitive or common or prominent factors from their past experience. However they stated that they could not rectify these problems before they occurred due to the differences in project context:

...there is not full control over different types of delays. Very few of the delays can be accommodated in our scheduled programme.

During a job all the companies actually admitted to seeking ways to find reasons for delays which they could charge to the client. As company B stated that

...we are able to get additional time and increase the project budget to compensate us.

Only company C proactively tried to create strategies for delivering projects on time. They dealt with this through contract, sub contractor selection and project control. They also invested in materials supply by pre ordering them in bulk quantities. As they expressed it: they needed to:

... get down materials from South Africa in bulk quantities.....

This study identified common factors contributing to time predictability in Botswana as – type of contract; inaccurate estimates which originates from lack of clear ideas about client's requirement; delays in site handover by the client; changes or late/incorrect Client/Architect's instructions due to lack of management practices; inadequate planning and construction methods; financial difficulties of the contractor due to delay in payments by the client; communication and co-ordination gaps between all parties involved; skill shortages due to incompatible government policies such as Department of Works and Transport and Department of Immigration; inflexible, inefficient and unqualified work force; mismatch in individual performance levels; delays in material supplies due to shortages; late ordering and geographical location and size of the country; plant breakdown creates uncertainty as backing up is costly and timely and multi-cultural issues creates anxiety and human related issues.

DISCUSSION OF RESULTS

The results of this study confirmed the conclusions of other studies; that the most significant problems in time delay from the contractors' perspective were design changes and material supply. However the particularities of the Botswana context made this operate differently and involved other factors such as geographical issues, government issues and multi-cultural issues.

Like many developing countries the role of the government in creating time delays in projects is complex. The Government of Botswana is very interventionist in both attempting to control construction through legislation and to develop construction through business initiatives. It is also the major client of construction and so projects tend to reflect the current Government economic success or failure. As regards legislation, the variety of ministries with responsibility caused confusion which the Government has now recognized by creating a single unit which is responsible for construction activities. However, the issue of capacity building by giving incentives to citizen owned contractors can reduce their need to improve performance. Finally, as the Government is the major client, then the different objectives for the project as expressed by the different funding departments and political parties become exposed by the project and these take time to resolve thus causing delay.

The issues related to 'delays in material supply' and 'plant break down' have a crucial country specific component when consider Botswana. Botswana is not an industrialized country and depends upon South Africa for most manufacturing activities and required services for plant and machinery. Though it has a few manufacturing plants for a few building items and limited skills for servicing plant

and machinery; these are totally inadequate to meet the demand. Botswana is a land locked country where the nearest port is Durban- South Africa 1500KM away and also Botswana has strict regulations on imports. Although, Botswana has a border with South Africa giving it access to a very good sources of materials, technology and technical expertise; the supply of materials, parts or services required for construction projects is costly and time consuming. Hence only a well experienced contractor with proper planning will be able to 'get down' required materials, plant and equipment on site from South Africa. This issue is influenced by many disparate factors including: government policies, management strategies of companies involved, the type of contract procurement used, and the management practice adopted to run the project. The improved performance in company C as was shown was related to its proactive management towards supply of materials, plant and equipment in construction projects.

The multi-cultural issues surface many differences between people. Due to globalization and economic stability in Botswana, a blend of African tribes and other foreigners inhabit Botswana and these contribute significantly to unskilled, skilled and highly skilled categories in the Botswana construction industry. These different people have their own beliefs and values regarding different issues which cause problems when they work together. The indigenous Botswana labour force sees this influx of people as a threat fearing that their wealth will be grabbed by outsiders. The government wants to empower the citizen contractors however the multi-culturalism issue becomes more complex as the government also encourages the engagement of international companies for large scale projects. Those companies prefer to employ trained and skilled people, but due to the lack of that caliber among the native workforce pave the way for them to hire non-citizens. Skill shortage in Botswana has been identified by Mselle and Manis (2000). At present; construction companies like company C are trying to manage this complexity by improving relationships at different levels, sub-contracting majority of work and employing strict project control.

CONCLUSION

Botswana is the fastest growing economy in Africa which is providing a driver from the construction industry. Time predictability of construction projects is an important issue for the economic development of the country as well as the success of particular companies. The paper has confirmed the applicability of known factors in time predictability of projects and also identified the Botswana specific context. This includes government influence making projects more complex, the geography constraints making material and plant supply difficult and multi-cultural issues adding people management problems to projects. Other developing countries experience such contextual problems and these contextual problems need to be investigated more universally.

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