Addressing infrastructural challenges to local economic development in Kwazulu-Natal province, South Africa: An investigation of the causes and impacts of projects' overrun

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Key words
Local Economic Development, economic development, infrastructure development, socio-economic impacts, project overrun

Abstract

This article explored the causes of infrastructural project cost and schedule overruns as well as some of their impacts on the outcomes of local economic development (LED). It established the relevance and importance of infrastructure to LED and its outcomes.

A cross-sectional survey was used to solicit the opinion of a group of independent built environment professionals on the causes of project delay and its socio-economic impact. The results showed a combination of factors that borders on project management, technical skills and administrative procedures. It was also shown that some of the LED outcomes that should be derived from the execution of large projects in poor communities are lost to poor project performances in terms of cost and schedule overruns. The results also showed that the widespread use of consultants to oversee the implementation of government projects in order to ensure speedy and quality delivery is more often than not counter-productive.

Introduction

Local economic development (LED) is one of the most widely adopted contemporary economic development approach (Walo, 2016). It essentially a collaborative approach to exploiting the resources and potentials of a locality to boost its economic development (Leigh and Blakely, 2010, Walo, 2016) either by focus on poverty reduction (Nel and Rogerson, 2005), increasing the competitiveness of the locality (Sam, 2014) or via a combination of both (Rogerson, 2010).

Government being part of LED stakeholders has as part of its major role of in microeconomic development, the provision of quality, efficient, an appropriate physical infrastructure as part of a bouquet of general-purpose inputs to business activities (Porter, 2000, Evans, 2009) and it is usually a significant component of most governments' economic intervention policies (Evans, 2009). This is because physical infrastructure development has been positively linked with many economic development outcomes (Sawada, 2015, Rives and Heaney, 1995). Thus the characteristic inadequacy of physical infrastructure in developing countries thus have significant implications for economic development. Meaning that anything that hinders infrastructural development vicariously hinders economic development (Bhattacharya et al., 2015).

Based on the foregoing background, we examine the causes of the endemic problems of delivery delay and poor budgetary performance issues that are endemic in South African government infrastructural projects delivery using a provincial case study in this paper. We started by exploring the relationship between infrastructural development and local economic development, then we looked extensively into the traditional causes of project delays and budget overruns as well as other infrastructural projects delivery challenges in order to identify the major contributory factors in the context studied. Thereafter, we documented the findings from an empirical work conducted among project managers and engineers working with an independent government institution that oversees government infrastructural projects.

Local Economic Development

Currently one of the major contemporary development approaches in the developing countries, the LED concept can be conceived as locally induced, bottom-up, and decentralised participatory approach to stimulation of the local economy drawing on locally available resources and local potentials (Walo, 2016). LED as a form of local or decentralised response to development as well as to economic challenges and crises (Nel and Rogerson, 2007) has evolved to become a global phenomenon. It is an initiative employed by governments to revive the dwindling response of states to local responsibilities as a result of the onslaught of globalization and economic crises (Bodhanya and Quazi, 2014).

Though what constitute LED varies across climes, the fundamental objective remains largely the same and is succinctly captured by Leigh and Blakely (2010) to include the establishment of a decent minimum standard of living that increases over time, reduction in inequality and promotion of sustainable resource use and production. These authors maintained that these outcome will be achieved via a process of both human and physical development. Generally in order to achieve LED outcomes, the overarching policy across nations and in South Africa specifically has been between operationalising LED as a form of state driven poverty alleviation intervention through direct job creation jobs directly through projects, or the facilitation of economic growth through improving the enabling environment or a mix of both (Heideman, 2011). While the pro-poor LED focus is dominant in rural and semi urban localities in South Africa, the enablement facilitation approach is the dominant in the urban cities (Rogerson, 2010). Consequently the pro poor or poverty alleviation approach is operationalised in form of set of municipal projects aimed at creating jobs (Rogerson, 2006, Bodhanya and Quazi, 2014).

Importance of Infrastructural development to LED Success

Regardless of how LED is defined or practiced in a country or locality, there is no denying the fact that government investment in infrastructure in a locality do positively impact economic development in such locality (Barberia and Biderman, 2010). While addressing the importance of infrastructure in economic development, Bodhanya (2014) explained that "*assets and infrastructure are a basic foundation for economic growth, the absence of which means that there cannot be successful LED. Water, sanitation, electricity, transport and communications infrastructure together with associated service delivery to individuals, communities and firms are all components that are required for basic economic activity. The more sophisticated these components are, the more opportunities arise for higher level combinations and more advanced level enterprises. Ailing or deteriorating infrastructure are impediments to efficiency and adds costs to economic activity*". Similar sentiment was expressed by Bodhanya and Hardman (2008).

The linkages and impacts of infrastructure to LED outcomes is multifaceted. Access to infrastructure have been noted to increase household income through the mediatory roles of both productivity and production improvement (Sawada, 2015). Similarly, it has a spectrum of indirect effects, such as changing consumption, saving, and investment decisions as well as facilitating accumulation of social capital (Aoyagi et al., 2014). Studies have also confirmed the positive impacts of different physical infrastructures on economic development outcomes; these include the impact of mobile phone network on consumer and producer welfare (Jensen, 2007), the effect of rail network in increasing income per unit of agricultural input (Donaldson, 2010), and positive effect of road network on gross domestic product (GDP) (Banerjee et al., 2012) to mention just a few.

All these underscores the importance of adequate provision and proper maintenance of physical infrastructures to LED on a general note (Rives and Heaney, 1995). However, South African historical peculiarities makes it investments in basic physical infrastructure a major prerequisite for development of many of the localities in the country (Rogerson and Nel, 2016). Thus, accordingly, infrastructure provision has remained one of the LED priority in urban cities where LED is about improving competitiveness and providing enabling environment for business activities. While service delivery related infrastructure remains primary goal of LED in the more rural areas (Rogerson, 2008).

Public Projects' delay and Cost Overrun

Infrastructural projects' schedule and cost overrun is a global concern that is more acute in developing economies and south Africa is no exception (Ismail et al. 2014). A typical example of infrastructure project delay and cost overrun in the South Africa is the construction of the stadia for FIFA

2010 world cup event. While 6 out of the 10 stadia were completed behind schedule, the entire project suffered massive cost overrun which amounts to about 267 million USD (which represents 40% above the initial provision) as confirmed by the then South African Minister of Finance in 2010 (Baloyi and Bekker, 2011). The major causes of these performance drawbacks was identified to be material cost inflation, delays in payments and design errors (Baloyi and Bekker, 2011). Ismail et al. (2014) argued that any factor that leads to schedule overrun or delay will logically lead to cost overrun; this is consistent with the correlational relationship embedded in the concept of triple constraints in project management which dictates that any change in any of the triad of schedule, cost and scope of a project will lead to a change in at least one of the other two (PMI, 2010).

The literature have documented numerous causes of these project overruns which include technical factors like design and quality issues, project management and planning issues, client induced factors like delayed payment, change request, relational factor like team members dispute or client contractor disputes, economic issues like inflation etc, contractors issues like inadequate staff complement, skill deficit etc (Ali et al. 2010; Alinaitwe, Apolot, and Tindiwensi, 2013; Baloyi and Bekker, 2011; Ismail et al., 2014; Kikwasi, 2013; Papke-Shields, Beise, & Quan, 2010; Priemus, Bosch-Rekveldt, and Giezen, 2013). It's worth noting that all these factors works in different combinations on different projects to cause project overruns (Ismail et al., 2014). Murwira and Bekker (2017) categorised the various factors identified across the literature broadly into contractor related, client related and consultants' related factors. One significant thing about this categorisation is that looking critically at the literature, we discovered that majority of the studies conducted into the causes of project overruns are usually conducted based on one of the three perspectives i.e. client, contractors or consultants'. The uniqueness of this study is that it was conducted from the perspective of a fourth entity which work collaboratively with the aforementioned three.

The construction of physical Infrastructures like roads, sewage and water systems, energy supply, etc is an integral part of economic growth which usually constitutes a very significant conduit of resources into and out of an economy, thus delays in construction often places a huge burden on the clients' cash flow position (Subramani, Sruthi, and Kavitha, 2014). The South African government budget planning is based on cash flows and projected spending patterns. Poor spending often results in under-provisioning which is detrimental in infrastructure backlogs and associated economic benefits (Madue, 2007).

Methodology

Study design

The study was designed to be a cross-sectional quantitative study. Thus the data was collected using a self-administered survey questionnaire. The study was conducted within KwaZulu-Natal province in South Africa

Target population and sample

The participants for this study comprised of a group of professional staff of a government owned independent entity that was created to help various government departments fast tract infrastructural project delivery. They are mainly architects, quantity surveyors, civil engineers, mechanical engineers, electrical engineers and project managers. Though the entity in question has a national foot print, the study population involved the professional staff with current responsibility for at least one project within KwaZulu-Natal province. This amount to 156 personnel. Using the Barlett et al. (2001) formula, the sample size of 108 participants was selected.

Data collection and analysis

The questionnaire was developed based on previously identified causative factors and impacts of project overruns in the literature. The factors included were however carefully chosen with due consideration to the nature of the participant thus excluding factors like increasing cost of raw materials, staff turnover etc. that can only be addressed by contractors or consultants. The questions were further refined during the pilot study. The questions solicited the participants' responses to certain statements which sought participants' views using a five point Likert scale response format seeking their level of

agreement or disagreement with each question/proposition. The Cronbach Alpha coefficient was 0.72 which is within the acceptable range.

Considering the fact that Likert scale that is an ordinal scale and its associated data is usually not normally distributed, Chi square test of association was found suitable and thus employed (McHugh, 2013). However, as a result of incidence of some missing values, Fisher exact test was employed in lieu if T-test to determine the statistical significance of the associations (Gorard, 2013, McDonald, 2014). Frequency tables were also used to check preponderance of opinions where need be.

Results

Though project overruns in South Africa is well documented as mentioned earlier, we used two measures to solicit the opinions of the study participants. These are completion of project s on budget and completion on schedule. The survey results indicated that 72% of the respondents agreed that government projects are not being completed within budget while 84% also agreed that those projects are not being completed on time (see Table 1). This the results showed that the infrastructural projects within the KwaZulu-Natal province which is the study location are replete with cost overrun and project delays.

Table 1: Frequency table for project performance measures.

Question	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Total
Q13: Government projects are not being completed on time	22	37	12	6	5	82
% Response	27%	**45%**	15%	7%	6%	**100%**
Q14: Slow completion of government projects	37	32	7	5	1	82
% Response	**45%**	39%	9%	6%	1%	**100%**

Chi square test of independence was used to investigate the major causes of the two poor projects' performance indices. The null hypothesis for all the test runs tested assumed the independent factors bear no statistically significant association with dependent factors which are cost overrun and project delays, based on the fact that the default null hypothesis for the chi square test is independence of the factors (McHugh, 2013). A p-value less than 0.05 is taken to show significant association.

Four major causes of cost overrun were identified (see Table 2), these include delays associated with administrative processes during the project, deliberate costs inflation, use of inexperience staff and erros in design and documentations. On the other hand, we tested to see if the practice of basing consultants' fee as a percentage of total project cost could have influenced them to deliberately allow costs to soar for their own indirect benefit but this did not bear a significant relationship to cost overrun. All the aforementioned factors were found to account for project (schedule) delays.

Table 2: Major causes of cost and schedule overruns.

Measure	Factor	p-value	Inference
Cost overrun	Long scope change management and approval processes	0.283	It's a causative factor
Cost overrun	Design errors, poor quality of documentation and estimation	0.959	It's a causative factor
Cost overrun	Deployment of inexperience staff by consultants	0.323	It's a causative factor
Cost overrun	Deliberate cost estimates inflation to cover potential shortfalls	0.472	It's a causative factor
Cost overrun	Construction cost as the basis of total consultants fees chargeable	0.039	Not a causative factor
Delivery delay	Design errors, poor quality of documentation and estimation	0.240	It's a causative factor
Delivery delay	Deployment of inexperience staff by consultants	0.131	It's a causative factor
Delivery delay	Construction cost as the basis of total consultants fees chargeable	0.277	It's a causative factor
Delivery delay	Deliberate cost estimates inflation to cover potential shortfalls	0.266	It's a causative factor

The tests for social economic impacts of the poor project performance lead to lower level of direct and indirect jobs creation and lower level of skill transfers in the poor recipient communities compared to what could have accrued in both cases. However, despite the poorer than expected project's perfoemance, the results showed that participation in some of the projects still help to levate some of the previous project employees to become startups (SEE Table 3).

Table 3: Socio-economic impacts of poor project performance

Measure poor performance	**Socio-economic impact**	**p-value**	**Inference**
Cost overrun	Low/poor contribution of infrastructural project delivery to skill level in poor communities	0.588	Impacted
Cost overrun	Less than expected level of employment creation	0.399	Impacted
Cost overrun	Elevation of project employees to become start-ups	0.377	No Negative impact
Delivery delay	Low/poor contribution of infrastructural project delivery to skill level in poor communities	0.042	No negative impact
Delivery delay	Less than expected level of employment creation	0.323	impacted
Delivery delay	Elevation of project employees to become start-ups	0.036	No Negative impact

Discussion

Given the status of the project participants it will be noticed that majority of the causes identified for poor performance of projects are project management related. While others speak to the issues of skills and technical competence some are purely administrative. Worth noting is the identification of long approval processes which is characteristic of government bureaucracies.

The issues bothering on technical competence and skills availability is also worth noting, these should be taken together with the problems that arises from the deployment of inexperienced staff to government projects by consultants because that equally relates to skill shortage. A previous study within South Africa has noted that consultants sometimes add marginal or no value to the successful implementation of government projects (Ojugbele and Bodhanya, 2015). Ethical issue was also evident as deliberate inflation of estimated was one of the identified factors.

It was noted that budget or cost overrun limits the contribution of project delivery to skills development and employment creation in the poorer communities; this could be attributable to the fact that cost overrun sometimes lead to abandonment of projects without completion or because of its propensity to lead to rationing of staff. Though delivery delay did not really affect these socio economic outcomes adversely with the exception of employment creation level.

Implications of the study

The study present very insightful findings for LED. Though when infrastructures are ultimately delivered, they will still stimulate and enhance LED outcomes and economic activities especially in the poorer rural communities, but the study shows that a lot of other LED related benefits would have been lost to the poor project performance. Secondly it shows that even if delivery delay did not adversely affect some socio economic impacts like propelling of project employee to start their own business and low skill development within the host communities, prompt delivery could have added more value to those outcomes of LED.

The study findings also lend credence to the thinking that economic development burden cuts across all spheres of government as some if not most of the causes are not within the purview of the government departments in charge of LED to correct, but lies within the mandate of other departments especially those in charge of the different categories of infrastructure.

A close examination of the nature of the causes of the poor project performances also require that attention be paid to the issue of ethical conducts within government projects, and it our opinion that paying more attention to oversight functions on these projects directly by the relevant government departments instead of total reliance on consultants will make a significant difference in this repect.

Conclusion

Though the scope of the results is somewhat limited because of the nature of study participants, nevertheless it still remain very insightful. There is a need for a major rethinking of the widespread reliance on the use of consultants to implement government projects in the country. More effort is also required in the drive towards addressing skill shortage in the country as well as ethical practices within the professional cadres.

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