

RESEARCH PAPER

A CONCEPTUAL MODEL FOR EVALUATING INFRASTRUCTURE DELIVERY TEMPORARY MULTI-ORGANISATIONS

Abstract

Purpose: The absence of an effective model for conceptualising and evaluating the interaction of actors within infrastructure delivery systems has been blamed for the attendant implementation gap (disjuncture). Infrastructure delivery systems have become a means of implementing government policy. This is particularly so in emerging economies where the governments are trying to deliver socio-economic benefits to their citizenry through investments in infrastructure. This study seeks to develop a conceptual model with such capabilities based upon the diagnostic principles of a base model-the Viable Systems Model (VSM) to bridge this gap. To do this however, the implementation process is viewed from a Temporary Multi-Organisation (TMO) perspective.

Methodology: This qualitative study adopted a Computer-Mediated Communication (CMC) approach to preliminary data collection. Systems practitioners were engaged through online discussion forums to assess the suitability of the VSM's principles for evaluation of TMOs. A new conceptual model was proposed based on the findings. This proposed model was validated through face-to-face interviews within an infrastructure project case study situated in Nigeria.

Findings: The suitability of the VSM's evaluative capabilities within TMOs was established hence leading to the development of a new model-the Viable Infrastructure Delivery Model. The VIDM was further validated within the context of emerging economies.

Research Implications: It is expected that the VIDM would allow for improved conceptualisation and evaluation of the actual interactions between the various actors within the policy implementation process, particularly those concerned with infrastructure delivery systems.

Keywords: *VSM, Infrastructure, Modelling, Emerging Economies, Temporary Multi Organisations, Policy Implementation,*

Introduction

Effective infrastructure asset delivery and management has remained central to the growth of the emerging economies. More so with infrastructure having been described as largely responsible for improved productivity (Akinyosoye, 2010, Awuzie and McDermott, 2012, Baldwin and Dixon, 2009, Calderon and Serven, 2008). Recently, several economies have become more concerned with infrastructure asset delivery and management processes in their bid to boost productivity(Calderon and Serven, 2008). Their areas of concern whilst not being limited to, include; financing, procurement, effective and efficient delivery, transparency and accountability issues, project governance and management, administration and partnership oriented issues.

The attention to infrastructure delivery has become more prevalent within emerging economies as they continue to grapple with inadequate and/or obsolete infrastructure stock. These countries, knowing the impact of adequate infrastructure investment and asset provision, have sought to attract substantial investments in their respective infrastructure sectors. The attainment of regional integration and economic cooperation among neighbouring countries has also been central to new infrastructure-based policies (AUC and UNECA, 2012). Through the enactment of new infrastructure delivery policies, they have also sought to deliver socio-economic benefits such as job creation, improved access to employment centres and skill acquisition through apprentices (Arrowsmith, 2010).

This desire of the emerging economies to boost their infrastructure stock brought in its wake, the sudden realisation that there was in existence an acute scarcity of the required infrastructure skills; thus leading to a near complete reliance on matured economies. The trend has been described as unsustainable due to the largely aging workforce in the matured economies and the incessant occasions of capital flight. The continued rise in unemployment and poor living conditions in the emerging economies community despite huge investments in infrastructure delivery have been ascribed to instances of capital flight (Soludo, 2007). This was not a surprise as majority of the skills for the delivery and maintenance of this infrastructure was hired from the matured economies thus reducing the amount of infrastructure delivery spend that was retained within the local economy. However, Well and Hawkins (2008) have observed that the infrastructure delivery process could be organised in such a manner that the required skills would be transferred to the local economy. They argued that this would encourage the development of the local supply chain to internationally competitive standards. Furthermore, they pointed to the procurement and construction skills as among such skills that could be easily transferred during the delivery process. Recently, governments in emerging economies have enacted several policies centred upon granting patronage to local suppliers during infrastructure. It was expected that this would lead to a greater retention of the procurement spend and also allow for the enhanced acquisition of skills, in-country. Surprisingly, these policies, particularly those in Africa, appear to have failed to achieve their objectives given the continuing issues of high unemployment, declining levels of cooperation among neighbouring states and rampant cases of abandoned projects despite increasing investments in infrastructure (Dessy, 2007, Gidado, 2010, Foster and Pushak, 2011). Ineffective implementation has been deemed responsible for such failures (Dessy, 2007).

The policy implementation process as it concerns infrastructure delivery consists of several contractual arrangement(s) which bind various actors and defines their responsibilities towards ensuring successful implementation. However, it has been established that the actual relationships which exist between these actors often differ from these contractual agreements (de Blois and Lizarralde, 2010). They reiterated the disparity between the actual relationships of these actors and the expected relationships stated within contract. For such delivery systems to perform optimally, an understanding of these actual relationships between actors and its impact upon the implementation process becomes imperative.

This paper shall seek to propose and validate a model for conceptualising and evaluating these actual relationships. Drawing from the VSM and the ability of systems to maintain viability-that is to maintain independent existence, away from external environmental factors and to successfully deliver on their mandates; this study proposes that implementation processes as epitomised by the TMOs in this case can only achieve the set implementation outcomes if the actual relationships between these actors conforms to the stipulated policy guidelines or contractual arrangements.

The study will commence by highlighting the importance of infrastructure investment in the attainment of growth in emerging economies and the need for skills development. Secondly, policy implementation literature would be reviewed. Thirdly, a review of the VSM will be carried out to highlight its diagnostic and evaluation potentials. Fourthly, the discussion of the methodology adopted ensues. The findings would then be presented. This will be followed by a validation of the proposed conceptual model within an Infrastructure case study and a conclusion.

Developing the Local Suppliers through Infrastructure Delivery in an Emerging Economy-Nigeria

There appears to be considerable evidence which highlights the direct relationship between infrastructure investments and economic growth (Aschauer, 1989, Schubeler, 1996, Kirkpatrick et al., 2006, Estache and Limi, 2008, Snieska and Simkunaite, 2009). Vives et al. (2009), citing a 1994 World Bank report, supported the view that such investments have a significant impact on the growth of any economy. The report, they stated, alluded to the fact that each 1% investment in infrastructure in developing countries possessed the potential of generating a 1% growth in Gross Domestic Product (GDP). Although this relationship between infrastructure investments and economic growth has been challenged by renowned economists Munnell (1992) and Gramlich (1994), the recent global economic imbroglio has seen successive governments around the world channelling their attention towards the use of these investments to resuscitate their economies. Furthermore, the need for improved infrastructure stock in emerging economies cannot be more imperative than at this time when recent reports have indicated that the fact that the rate of economic growth in the emerging economies would outpace the matured economies. See Figure 1 below.

INSERT FIGURE 1 HERE

The emerging economies are shown as the BRIC and the N11 countries whereas the G7 are the matured economies.

The PWC report also maintained that this projected rapid increment in the economic growth rate in the emerging economies has made it a more likely to receiving a substantial share of the future global investment as shown in Figure 2.

INSERT FIGURE 2 HERE

Therefore, the demand for increased infrastructure stock would inadvertently drive the demand for the development of local infrastructure specialist skills within these economies

(PWC, 2013). With an ever rising population-rising at an estimated 27% every decade (World Bank, 2013) and a steady economic growth rate of slightly below 7% per annum, Nigeria remains one of such emerging economies where the substantial investments made in infrastructure structure have not made any significant impact on the national GDP. This is due to the use of overseas expertise for infrastructure delivery. The Government has embarked upon several energy and transportation infrastructure projects over the past decade to boost productivity. Within the oil and gas industry-the mainstay of the Nigerian economy, such investments have brought in its wake, the Nigerian Content Act-a legislation which seeks to transfer the skills and patronage accruing from these infrastructure investments to the local suppliers. With an annual investment of an estimated \$8 Billion in the delivery of new oil and gas infrastructure, the Content Act was seen as a law that would enable the development of local suppliers and in turn bridge the skills gap being experienced in the country. It would also encourage the retention of a substantial part of the infrastructure capital within the local economy hence positively affecting the GDP and the living conditions of the average citizen. Nearly a decade after the adoption of the Nigerian Content Guidelines and three years after its promulgation into law, unemployment in Nigeria still appears to be on the rise, and local suppliers within the oil and gas industry still bemoan loss of work to foreign owned firms and expatriates. According to Balouga (2012), some sort of disjuncture appears to exist between the policy formulation and the implementation levels of policy. He maintained that this disjuncture was apparently caused by the actions and inactions of the participants to the implementation process. Policy disjuncture is not new to the body of implementation research (Nudzor, 2012). Proctor et al. (2011) observed that this disjuncture existed due to the lack of an adequate conceptualisation of the implementation process, showing the actual interactions between the various stakeholders to the implementation process. On the other hand, Nudzor (2012) stated that the failure of the policy makers to understand that policy implementation process as one that is centred upon continuous interaction, dialogue, feedback and modification of objectives, coping with mixed feelings, values and norms as well as pragmatism between actors had engendered this disjuncture.

No doubt a proper conceptualisation of these interactions and the communication structure of the policy implementation process as depicted by the infrastructure delivery system in this study would avail policy makers and other stakeholders with a tool for the diagnosing the process. This would enable them to understand the process better and to know when such disjuncture has occurred or is bound to occur; thus allowing them to resolve it. This is what this study sets out to do.

What is Policy Implementation and why apply models?

Implementation, according to DeLeon (1999:314) was described as “*what happens between policy expectations and (perceived) policy results*”. Mazmanian and Sabatier (1983:20-21) provided a more succinct and elaborate definition in their seminal work on policy implementation. They described implementation as “*the carrying out of a basic policy decision, usually incorporated in a statute but which can also take the form of important executive orders or court decisions. Ideally, that decision identifies the problem to be*

addressed, stipulates the objectives to pursued, and in a variety of ways, structures the implementation process”.

This definition treats implementation as an action which sits along the policy formulation and policy outcome continuum and actually enhances the delivery of credible outcomes if properly managed and organised. It also portrays implementation as a complex multi-party exercise involving several actors/agencies, target groups and implementing bodies.

It must be acknowledged that the use of models within implementation research to enable an understanding of policy implementation procedures pre-dates this study. However, the models in existence have apparently failed to properly conceptualise and evaluate the implementation process in an effective manner; more so as it fails to consider the impact of actual relationships existing between the actors on the attainment of the provisions enshrined in the contractual agreements.

Infrastructure Delivery Systems as TMOs

Espejo (1994:201) in his contribution to the discourse on organizations stated that organizations do not possess the capability to maintain independence existence but rather arise as the components of the interrelated parts maintain interactions with actors within a particular operational domain. In view of this opinion, he defined an organization as “*a complex network of interpersonal interactions with closureemerge when on-going interactions produce recurrent coordination of actions among participants, thus creating order out of chaos*” (Espejo 1994: 205). Bertelsen (2003a; b) acknowledged that organizations evolved from inter- personal and inter-organizational interactions resulting in complexities given the attendant uniqueness of each individual and organization.

Policy implementation processes associated with infrastructure and infrastructure delivery can be viewed through a temporary multi-organisational perspective due to the limited timeframes for delivery. Stringer (1967), observed that the nature of social services provision arrangements, of which infrastructure forms an integral part of, requires a peculiar mode of organisation allowing for the creation of a special structure to cater for inherent management problems.

Accordingly, Stringer (1967) suggested that the delivery process for such services should be viewed as a temporary multi-organisation. TMOs differ from conventional organisations in various ways. Whereas the latter could be ascribed to as possessing the following characteristics, namely: a capability to impose upon itself a set of goals with wide ranging applicability throughout its constituent parts, pursuance of these established goals remains critical to its set up and continued existence, presence of a usually hierarchical internal structure depicting the command structure of authority, and a permanence transcending certain tasks; TMOs remain socio-technical systems wherein existing relationships between players are majorly conditioned by the task (Stringer 1967). TMOs possess the following features: effective communication; dependency of relationships on tasks which are relevant to the attainment of the overall project goal; and actors possess other interests outside the project hence the project remains the only reason for their collaboration; (de Blois and

Lizarralde, 2010). Based upon these features, it would be apt to describe the infrastructure delivery system as a TMO as it consists of several organisations coming together to fulfil some sort of objective within a given time frame.

The Concept of Viability

Although the Oxford Advanced Learner's dictionary defined the term viable as connoting the fact that something "*can be done; that will be successful*", the term as used in this paper is in sync with systems thinking literature (Beer, 1979, Hoverstadt, 2008, Schwaninger, 2006, Espejo, 2003). Therein, the term "*viable*" was used to connote that particular characteristic of a given system to survive in within a particular environment notwithstanding the degree of adversity which the environment exerts on the system (Espejo, 2003).

These systems do not only possess the ability to survive but also to retain within them the capability to respond to any uncertainty resulting from its host environment capable of undermining its performance. To become viable, a system has to achieve requisite variety with the complex environment that it faces. It must be able to respond appropriately to the various threats and opportunities presented by its environment and plan ahead for anticipated changes within its external and internal environments. As its central proposition, this study holds that an infrastructure delivery system (TMO) can only attain and sustain viability if all the parties within it are acting in accordance to the stipulated guidelines for achieving the system's set objectives. Beer (1983) described this as acting in a manner that suggests an attempt to maintain the identity of the System-In-Focus (SIF). Identity here for TMO in line with the Nigerian Content Act would be to the development of local skilled manpower and internationally competitive local supply chains. According to Beer (1979), viability remained a common goal-either long term or, in the case of temporary organisations, considerably long enough to accomplish its intended purposes. The VSM has enjoyed zero degree of falsifiability (Schwaninger, 2006) when applied in diagnosing and/or evaluating organisations.

Although extensive research has been carried out on the use of the VSM to diagnose organisational units and whole organisations, there is no evidence of its application within a TMO. The need for this becomes imminent considering the significant differences between conventional organisations and TMOs. This study seeks to explore the capabilities of the VSM in this regard and to propose a conceptual model based on similar principles as the VSM.

An Overview of VSM Applications in Various Contexts

In recent times, there has been an increase in the application of the VSM in several ways such as: identification of stakeholders' functions in the implementation of a national biotechnology policy(Adham et al., 2012); understanding the firm as a viable system (Golinelli et al., 2011, Polese et al., 2009); diagnosis and redesign of organisations towards attaining viability(Brocklesby and Cummings, 1996, Ríos, 2012); assessment of project management practices(Britton and Parker, 1993); governance issues at a national level(Beer, 1993, Thomas, 2006); development of governance frameworks for communities or associations

(Davies, 2007, Türke, 2008); and for developing effective knowledge management guidelines(Leonard, 2000).

Whereas the studies enumerated above appear to give a picture of the VSM as the most appropriate tool for the conduct of this research, this study understands the immense complexity and contextual differences associated with TMOs and the policy implementation process in emerging economies. Although there have been attempts to use the VSM in identifying functions and inter-relationships of various organisations in the implementation of national policy(Adham et al., 2012), there has not been any study , known to the researcher, which has sought to evaluate the infrastructure delivery process TMO as an integral part of policy implementation in developing countries.

Methodology

The major objective of this study was to develop a model for conceptualising the actual interactions between actors to an implementation activity from an infrastructure project perspective by applying the principles of the VSM. To achieve this objective, it was deemed necessary that the opinion of systems practitioners should be sought and relied upon. Due to this, the researchers sought the most appropriate medium to reach out to these professionals especially within the timeframe available. In line with these constraints, the researchers adopted the use of the Computer-Mediated Communication (CMC) approach. This approach made it possible for the researchers to reach out to a generous sample of systems practice professionals and to elicit a discussion between them. The CMC approach relies heavily on the use of the internet and social networking sites in the collection of data.

This study found the use of asynchronous online discussion forums most apt for the collection of expert opinions. The researchers set up discussion topics in line with the objectives of the study on two systems practice professionals discussion groups on LinkedIn –a social networking group. Purposive sampling was utilised in deciding what groups to be engaged with. The researchers set up discussion boards within these two groups labelled groups A and B. They also moderated the ensuing discussion over a period of four months thus fulfilling the tenets of asynchronous CMCs', wherein the discussants made contributions at their convenience. Due to its closed group nature, the researchers conveyed to the participants the purpose of the data and reassured them of utmost confidentiality. Due to these confidentiality reasons; the names of these groups were anonymised through the use of alphabets.

At the end of the four month period, a total of twenty-five discussants had made contributions within the groups. Although, eighteen of these discussants played prominent roles, seven assumed passive roles contributing only once. The researchers decided to utilise the opinions of the eighteen active discussants. Questions asked within these online discussion forums revolved around the pre-set themes. The following themes were employed: level of knowledge about the viable systems theory, the VSM and its usage; an identification of the attributes of the VSM and identification of any other alternatives to the VSM from a systems viability point of view. The transcripts originating from the online discussion panel

was thematically analysed in line with the pre-set themes. The findings were then compared to relevant literature to seek for areas of divergence or possible new leads. Afterwards, the developed conceptual model was applied to an oil and gas infrastructure project in Nigeria's Niger Delta named project ABC for validation purposes. Face to face structured interviews were conducted after an identification of the various actors after the application of the model to the project; see Figure 3.

Representatives of these actor organisations within Project ABC's TMO were approached through snowballing sampling technique. In line with the tenets of the proposed model, a systems view of the entire process was adopted wherein the views of the main contractor, the implementing agencies, the Joint Venture company as represented by the IOC and the project team at the IOC. See Table 1 for a distribution of the various interviewees.

INSERT TABLE 1 HERE

Prior to the interview sessions, the interviewees were handed down a diagram showing the various identified actor organisations and their linkages as they appeared on the VIDM. They were also handed down a narrative which explained the propositions behind the model to allow for an understanding of the context of the validation. Structured interviews involve the asking of identical questions to different parties at different times (Bernard and Ryan, 2010). Bearing in this in mind, researchers simplified the structured questions to an extent where the aim of the validation activity would be attained. The answers obtained from the interviewees was now analysed using a Likert scale to rank the responses obtained.

Case Description

Project ABC is jointly owned by an International Oil Company (IOC) and is situated in Nigeria's Niger Delta. This IOC operates as a Joint Venture with the Nigerian National Petroleum Corporation (NNPC). This project involved the construction of an integrated gas project to support power generation in Nigeria. Project ABC was of significant importance to the nation. This was due to the fact that the nation was in dire need of such plants in the face of the declining levels of power supply it was experiencing. Also at the time of project commencement, the Nigerian Content guideline had taken effect thus signalling the need to extend patronage to local suppliers and allow for the transfer of skills to the local workforce. The first tranche of the Project ABC became fully operational in 2008 while actual construction work commenced three years earlier in 2005. Upon completion, Project ABC comprised of: a new high voltage switch yard; a gas receiving facility; and six new gas wells. Information in the public domain stated that during the construction phase of the project, a workforce of three thousand persons was actively engaged, with locals constituting 95% of this number thus satisfying the policy guidelines on Nigerian Content involvement. The application of the model to the project enabled a proper conceptualisation of the actual inter-organisational interactions in terms of actor identification, formal and informal communication channels and the position of authority within the delivery system of Project ABC. This would allow for further diagnosis and eventual evaluation in subsequent studies.

Although the use of single case study strategy in research has been described as limiting replication and comparison of contexts (Eisenhardt and Graebner, 2007), this research understands the usefulness of such strategy in studies that are critical, exploratory and/or unique (Yin, 2009). This study satisfies these three requirements being a unique study seeking to conceptualise and explore the actual relationships between actors in a critical context.

Preliminary Findings

The findings from the discussion groups confirmed what was obtained from the reviewed literature. The VSM was deemed most suitable for the diagnosing organisations of any kind-temporary or permanent. The new conceptual model being proposed-the Viable Infrastructure Delivery Model (VIDM) - was based on the positive attributes of the VSM as confirmed by the expert opinions, namely:

- a) Its flexibility and context-specific nature;
- b) Its supremacy in allowing for a holistic understanding of complex organisational structures thus allowing for easy conceptualisation of relationships;
- c) Its evaluative/ diagnostic capabilities;
- d) Its ability to structure an entire system, linking as it were, the strategic levels to the operational levels in a manner that is different from the hierarchical management structure design thus preventing disconnect between various levels of policy implementation relationships and;
- e) Its superiority over other alternatives from a viable systems perspective.

Proposed Conceptual Model

The use of the VSM as an enabling platform for the development of the VIDM is premised on these aforementioned capabilities and provenance of the VSM in the provision of an enhanced platform for a holistic comprehension of organisations. In this study, the VSM serves as an actor interaction model as it provides an opportunity for understanding the interactions between several implementation stakeholders (actors) within the TMO. Bernard and Ryan (2010), added that these actors could range from countries, organisations through to individuals, depending on whether the study was economically inclined or socially inclined. Figure 3 below highlights the VIDM as developed for conceptualising and evaluating the inherent relationships within infrastructure based TMOs.

INSERT FIGURE 3 HERE

The conceptual model seeks to conceptualise the actual relationships between the parties to a TMO mandated to deliver on certain set policy outcomes through the infrastructure delivery system. Such policy outcomes could be in terms of skills transfer and local supplier development as was the case with project ABC alongside other project deliverables such as timely completion, according to budget and to the right specifications. However, whereas the latter three deliverables have always been concentrated upon given the ease with which they are measured, the former two have been difficult to measure in many projects. This study is

centred upon the former two, referred to elsewhere as soft deliverables (Arrowsmith, 2010). Also, the VIDM will evaluate the impact of these relationships upon the attainment of implementation outcomes. Arguably an accurate conceptualisation will lay the foundation for the conduct of a proper diagnosis or evaluation. This would enable policy makers know when such systems are unlikely to attain the implementation outcomes and therefore policy outcomes and for them to understand the reasons why. Rather than what obtains now whereby policy outcomes are

The VIDM allows for easy identification of all the stakeholders and proper definition of their expected roles in consonance with the contractual and statutory stipulations. These stipulations are usually enshrined in the policy guidelines. Often times the actions of these stakeholders have been established to conflict with the guidelines and the VIDM can enable other stakeholders identify such incidences at an early stage and also to curb same. This portrays the role of the proposed conceptual model as a diagnostic/evaluative model.

The VIDM possesses all the components required for the viability of the TMO. It relies on the proposition that; only TMOs with evidence of viable actual relationships within them can achieve the requisite implementation outcomes and proceed to successfully deliver on the intended outputs of the policy.

The model consists of six different subsystems with each of these subsystems possessing similar features with the overall system. This feature of the conceptual model is known as recursivity. This principle of recursivity allows for every subsystem of the overall system to maintain a self-organising stance thus allowing all participating actors to an implementation process to exhibit tendencies at the various levels of the model that are in consonance with their remit as it concerns achieving any identified implementation outcomes. This principle also allows for all the stakeholders to be duly represented within the project environment at all times. This way, any disconnect between these stakeholders as a result of poor communication or obscure lines of command would be easily noticed and corrected.

The implementing agency's interaction with the future and present environment will enable it to forecast the future impacts of the policy or futuristic needs necessary to be planned at the present moment or later into the future. These futuristic needs may include certain infrastructure skills which would be in short supply in the foreseeable future.

The model seeks to achieve an integration of all the various stakeholders and their interests ranging from policy making, the policy implementing agency, the contracting agency responsible for the delivery of the policy and the main contractors' consortium in the case of an infrastructure project. This integration establishes a clear communication channel between these stakeholders thus enabling them to uphold the identity of the TMO which is the attainment of the policy objective through proper implementation.

Systems 2 and 3* in the model represented by coordination and monitoring allows for continued monitoring and control of the processes in line with the overall objectives of the TMO from its client arm.

From the foregoing, it becomes clear that the proposed VIDM can be effectively used to conceptualise and evaluate the implementation process from a TMO's perspective within an infrastructure delivery environment.

Model Validation

From Table 2, it can be observed that a total of nine interviewees participated in the validation of the VIDM within Project ABC. The responses obtained from the interviewees are detailed below.

Q1. Representation of Actor Organisation relationships within the Delivery System: A majority of the interviewees (56%) agreed that the VIDM was excellently representative of the actors involved in the delivery of infrastructure policies and also, the relationships between the actor-organisations. 22% of the interviewees observed that the VIDM's representation of the actors and the inherent relationships could at best be described as good whereas an equal number felt that the VIDM averagely represents the actual relationships. None of them objected to the relationships as conceptualised by the VIDM.

INSERT FIGURE 4 HERE

Q2. Appropriate description of the existing communication channel within the TMO: Pertaining to the model's ability to describe the contractual stipulated communication channel between the parties to the TMO, the actual communication channel and the lines of authority within the TMO, 45% of the interviewees opined that the VIDM did an excellent description. Whereas 33% stated that the VIDM made a good diagrammatic description, 22% felt it performed averagely in that regard.

INSERT FIGURE 5 HERE

Q3. Validity of the VIDM's underlying proposition: The main proposition behind the VIDM states that for any system to attain and maintain '*viability*', all the component sub-systems should be represented at the actual delivery environment and should work collaboratively towards maintaining the sustenance of the identity of the System-in-Focus (SiF). The identity of the SiF-in this case the Project ABC's TMO- being the development of local skills and supplier capability through extended patronage levels during the construction process. It has been observed that within TMOs, parties to such always get to act opportunistically, seeking to achieve the objectives of their respective organisations against the overall objectives of the project upon which they are engaged. This is against the principle of '*viability*'. When the opinion of the interviewees was sought as it concerns the validity of this proposition, 78% concurred that it was an excellently valid proposition whereas 22% believed that it could be referred to as a good proposition.

INSERT FIGURE 6 HERE

Q4: Relevance of VIDM to understanding actual actor interactions within TMO: The main rationale behind the development of the VIDM was to enable a more in-depth and systemic understanding of the infrastructure delivery TMO through a conceptualisation of the actual relationships which exist between the actors to the delivery. It is expected that such a conceptualisation would allow for an understanding of the inherent complexities and enhance a better evaluation of the delivery process from an actor inter-relationship perspective. This would make it easier for the public sector or the implementing agency to identify any occurrence of policy disjuncture within the delivery chain and rectify same rather than waiting for the end of the project to evaluate the service delivery outcomes/policy outcomes.

All the interviewees believed that the VIDM was actually a relevant model which could assist in policy implementation especially within infrastructure delivery TMOs. Whereas a majority (67%) identified it as an excellent tool, 22% stated that it was a good tool. Another 11% observed that it was basically an average tool, stressing that its impact would be dependent upon the expertise of the person using it.

From these observations gathered from the interviewees in Project ABC, the VIDM could be described as a proper model for the conceptualisation of actual actor relationships within an Infrastructure delivery TMO. It also proves helpful in investigating issues of policy disjuncture or implementation gaps arising within such TMOs.

INSERT FIGURE 7 HERE

Summary

This study highlighted the growing desire of emerging economies to improve their infrastructure stock to enable them sustain their increasing economic growth rates. It reviewed the impact of an enhanced infrastructure stock and sustained infrastructure stock on economic growth. However, it was observed that there was actually an acute shortage of infrastructure skills within a majority of these emerging economies thus leading to the low levels of infrastructure capital retention within such countries when compared to the matured economies. This phenomenon was traced to the non-competitive nature of the local suppliers and the lack of local skilled manpower.

Fortunately, many of these emerging economies such as Nigeria have identified this problem and enacted policies such as the National Content Act to resolve it. The Act seeks to ensure that patronage is extended to local suppliers especially during the delivery of major infrastructure within the nation's lucrative oil and gas industry. However, the study observes the mixed reactions which have trailed the Act since its inception about a decade ago by players within the sector. Many observers have blamed policy disjuncture/implementation gap as being responsible for the apparently poor showing of the Act. The absence of a model for conceptualisation of actor relationships within the projects in the sector to depict the implementation process has made it difficult to evaluate the implementation of such policies from an infrastructure project perspective.

The study, whilst relying upon the diagnostic principles of the VSM moved on to develop and validate a model-the VIDM- for conceptualising and evaluating actor-organisation relationships within the TMOs in a bid to evaluating same to establish the points of disjuncture if truly such exists. Using an existing project, the researchers attempt to validate the model. The development and subsequent validation of the VIDM forms part of a larger study which is on-going at the moment; in future, the researchers will attempt to apply the model on several infrastructure delivery TMOs with the aim of enabling an in-depth understanding of these TMOs and ascertaining where policy implementation gaps may have occurred, if any, and its possible causes.

References

- ADHAM, K. A., KASIMIN, H., SAID, M. F. & IGEL, B. 2012. Functions and Inter-Relationships of Operating Agencies in Policy Implementation from a Viable System Perspective. *Systemic Practice and Action Research*, 1-22.
- AKINYOSOYE, M. 2010. Infrastructure Development in Nigeria: Road Map to Sustainable Development. *Greenhill Technical Services*, . Ontario.
- ARROWSMITH, S. 2010. Horizontal policies in public procurement: a taxonomy. *Journal of Public Procurement*, 10, 149-186.
- ASCHAUER, D. A. 1989. Is Public Expenditure Productive ? *Journal of Monetary Economics*, 23, 24.
- AUC & UNECA 2012. Financing of the Programme for Infrastructure Development in Africa (PIDA). Addis Ababa: African Union Commission/ United Nations Economic Commission for Africa.
- AWUZIE, B. O. & MCDERMOTT, P. 2012. Using a Systems Viability Approach to Investigate The Social And Economic Impact Of Energy Infrastructure Investments On Local Construction Supply Chain Development-A Case Of Nigeria's Niger Delta Region. *In: JAVERNICK-WILL, A. & MAHALINGAM, A. (eds.) Engineering Project Organisation Society Conference*. Rheden, Netherlands.
- BALDWIN, J. & DIXON, J. 2009. Infrastructure Capital: What is it? Where is it? How Much of it is There? *Where is it*.
- BALOUGA, J. 2012. Nigerian Local Content: Challenges and Prospects. *International Association for Energy Economics*, 4.
- BEER, S. 1979. *The Heart of Enterprise*, Chichester, Wiley.
- BEER, S. 1993. *Designing freedom*, House Of Anansi.
- BERNARD, H. R. & RYAN, G. W. 2010. *Analyzing qualitative data: Systematic approaches*, California, SAGE Publications, Incorporated.
- BRITTON, G. & PARKER, J. 1993. An explication of the viable system model for project management. *Systems practice*, 6, 21-51.
- BROCKLESBY, J. & CUMMINGS, S. 1996. Designing a Viable Organization Structure. *Long Range Planning*, 29, 9.
- CALDERON, C. & SERVEN, L. 2008. Infrastructure and Economic development in Sub-Saharan Africa. *Policy Research Working Paper*. Washington: World Bank.
- DAVIES, J. 2007. Models of Governance-A Viable Systems Perspective. *Australasian Journal of Information Systems*, 9.
- DE BLOIS, M. & LIZARRALDE, G. A System of Classification of Temporary Multi-Organizations in the Building Sector. *In: BARRET, P., AMARATUNGA, D., HAIGH, R., KERAMINIYAGE, K., PATHIRAGE, C. & eds. W092-Special Track 18th CIB World Building Congress May 2010 Salford, United Kingdom, 10-13 May, 2010 2010 Salford, UK. CIB*, 130.

- DELEON, P. 1999. The stages approach to the policy process: What has it done? Where is it going. *Theories of the policy process*, 1, 19-32.
- DESSY, S. 2007. Client power, citizen participation, institutions and services delivery: Theory and Evidence with special emphasis on Africa. *AERC Project on Institutions and Service Delivery*. http://aercafrica.org/documents/isd_workingpapers/DessyS_ClientPowerCitizenParticipationISD.pdf.
- EISENHARDT, K. M. & GRAEBNER, M. E. 2007. Theory Building from Cases: opportunities and challenges. *Academy of Management Journal*, 50, 8.
- ESPEJO, R. 2003. The Viable System Model : A briefing about organisational structure. Available: <http://www.cybersyn.cl/imagenes/documentos/articulos/INTRODUCCION%20TO%20THE%20VARIABLE%20SYSTEM%20MODEL3.pdf> [Accessed 17th October 2011].
- ESTACHE, A. & LIMI, A. 2008. Procurement Efficiency for Infrastructure Development and Financial Needs Reassessed. *World Bank Policy Research Series*. Washington: World Bank.
- FOSTER, V. & PUSHAK, N. 2011. Nigeria's Infrastructure; A continental perspective. *Policy Research Working Paper*. Washington D.C: World Bank.
- GIDADO, K. PFI Implementation and Evaluation Model For Developing Economies: Example Of Nigeria. Proceedings Of International Conference On Engineering, Project And Production Management, 2010.
- GOLINELLI, G. M., PASTORE, A., GATTI, M., MASSARONI, E. & VAGNANI, G. 2011. The firm as a viable system: managing inter-organisational relationships. *Sinergie rivista di studi e ricerche*.
- GRAMLICH, E. M. 1994. Infrastructure investment: A review essay. *Journal of economic literature*, 32, 1176-1196.
- HOVERSTADT, P. 2008. *The Fractal Organization: Creating sustainable organizations with the viable system model.*, West Sussex , UK John Wiley and Sons Ltd.
- KIRKPATRICK, C., PARKER, D. & ZHANG, Y. 2006. Foreign direct investment in infrastructure in developing countries: does regulation make a difference? *Transnational Corporations*, 15, 143.
- LEONARD, A. 2000. The viable system model and knowledge management. *Kybernetes*, 29, 710-715.
- MAZMANIAN, D. A. & SABATIER, P. A. 1983. *Implementation and public policy*, Scott, Foresman Glenview, IL.
- MUNNELL, A. H. 1992. Policy watch: infrastructure investment and economic growth. *The Journal of Economic Perspectives*, 6, 189-198.
- NUDZOR, H. P. 2012. Exploring the policy implementation paradox: using the Free Compulsory Universal Basic Education (fCUBE) policy in Ghana as an exemplar. *International Journal of Qualitative Studies in Education*, 1-20.
- POLESE, F., GIUSEPPE, R. & CARRUBBO, L. 2009. The contribute of Viable System Approach in directing and managing inter-firm relationships. *Annual Euromed Conference* [Online].
- PROCTOR, E., SILMERE, H., RAGHAVAN, R., HOVMAND, P., AARONS, G., BUNGER, A., GRIFFEY, R. & HENSLEY, M. 2011. Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Services Research*, 38, 65-76.
- PWC 2013. Gridlines- Capital Projects and Infrastructure. In: SAND, W. (ed.) *Emerging Market Series*. United Kingdom: PricewaterhouseCoopers LLP.
- RÍOS, J. P. 2012. *Design and Diagnosis for Sustainable Organizations*, Springer.
- SCHUBELER, P. 1996. *Participation and partnership in urban infrastructure management*, Washington D.C, World Bank.
- SCHWANINGER, M. 2006. Theories of Viability: a Comparison *Systems Research and Behavioural Science* 23, 11.
- SNIESKA, V. & SIMKUNAITE, I. 2009. Socio-economic impact of infrastructure investments. *Inzinerine Ekonomika-Engineering Economics*, 3, 10.
- STRINGER, J. 1967. Operational research for" multi-organizations". *Operational Research*, 105-120.

- THOMAS, R. 2006. Is the Viable System Model of Organization inimical to the concept of human freedom? *Journal of Organisation Transformation & Social Change*, 3, 69-83.
- TÜRKE, R.-E. 2008. *Governance: systemic foundation and framework*, Springer.
- VIVES, A., BENAVIDES, J. & PARIS, A. M. 2009. Selecting infrastructure delivery modalities: No time for ideology or semantics. *Journal of Construction Engineering and Management*, 136, 412-418.
- YIN, R. K. 2009. *Case study research design and methods*, Thousand Oaks, Ca, Sage Publications.