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USING THE ANALYTIC HIERARCHY PROCESS TO ENHANCE PARTICIPATORY DECISION-MAKING IN MULTI-STAKEHOLDER INFRASTRUCTURE PROJECTS: A PIPELINE PROJECT CASE STUDY

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ABSTRACT

There has been a noticeable increase in the incidence of failed and abandoned infrastructure projects in developing countries in recent times. This is despite the introduction of several project management techniques and decision making tools for the management of such projects. This has led the developing countries to suffer from acute infrastructure deficit. In Africa for instance decisions to embark on infrastructure delivery and development are based on political whims and self-interest. Whereas several researchers have maintained the importance of the early stakeholder involvement in the project delivery cycles especially in the decision-making process, they have concentrated their effort on collaborative decision making among the project teams neglecting the external stakeholders, whose immediate environment is being exploited and who don't derive the expected utility from the development exercise. This article adopts an organisational perspective in studying the infrastructure delivery process. It utilizes a case study approach alongside a focus group session to understudy the significance of participatory decision-making and its impact on project delivery success in developing countries. The research findings establish that participatory decision making is pivotal to the attainment of project success. It points to the dearth of a scientific procedure for conducting participatory decision making processes in developing countries. This conceptual paper makes a case for the adoption of the Analytic Hierarchy Process (AHP) as a viable tool for conducting participatory decision making procedures in a credible, structured and transparent manner.

KEYWORDS

Analytic Hierarchy Process, Developing countries, Infrastructure delivery system, Participatory Decision making, Stakeholder management.

INTRODUCTION

There has been a noticeable increase in the incidence of failed and abandoned infrastructure projects in developing countries, despite the introduction of several project management techniques. This has led the developing countries to suffer from acute infrastructure deficit. Decision making has been identified as one of the significant factors inhibiting the delivery of functional infrastructure (Aibinu & Jagboro, 2002; Ogbonna, 2007), especially in Africa where decisions to embark on infrastructure delivery and development are taken based on political whims and self-interest (Dessy, 2007). Whereas several researchers have maintained the importance of the early stakeholder involvement in project delivery cycles especially in the decision-making process, they have concentrated on collaborative decision making among the project teams neglecting the external stakeholders-the wider public- whose immediate environment is being exploited and who don't derive the expected utility from the development exercise. Participatory decision making can be described as an end product of effective stakeholder management process.

In developing countries, the lack of effective procedures for selecting and implementing projects has been variously referred to as one of the salient causes of project failure. Researchers have indicated that most projects fail even at their conception stages as they have just been selected for political purposes and for other reasons not necessarily bordering on viability of the intended project. Other projects have failed as a result of the inherent hostility from its host environment as the inhabitants of the community feel removed from the project and work intensely to undermine the success of such project.

These reasons have been identified as part of the reasons why the developing world is lagging behind their developed counterparts in infrastructure adequacy and economic growth, especially given the direct relationship between them. The inability of public investment projects to attain sustainability upon completion derive from the lack of key stakeholders' buy-in into the project objectives; and attendant conflict over project objectives (Klakegg & Haavaldsen, 2011). They ascertain, through the conduct of a survey, that the following reasons, which occur at the front-end, were instrumental to the apparent non-attainment of relevance in major public investment projects namely: poor knowledge about the users' needs and a misunderstanding of project objectives.

Several literatures exist on collaborative decision making among project teams in the project delivery systems of construction projects. A particular school of thought have actually labelled this phenomenon, concurrent engineering. This article realizes that this existential literature dwells on project teams, otherwise described as internal or primary stakeholders without any reference made to the attendant dearth of literature on how to enhance participation of secondary stakeholders in the decision making process as it concerns infrastructure projects in developing countries. It seeks to fill this gap by evaluating the impact of involving external stakeholders, defined in this context as persons affected by the delivery of an infrastructure project, in the decision making process in the attainment of project success. It also suggests the adoption of the Analytic Hierarchy Process (AHP) as an effective medium for enhancing participatory decision making in multi-stakeholder project delivery systems such as the infrastructure delivery systems in developing countries.

This article commences by describing the infrastructure delivery system from an organisational perspective, buttressing on the inherent complexity of the system. This complexity arises from the multi-stakeholder and multiplicity of processes involved in the delivery process. It proceeds to review the literature on decision making as a project management skill essential for delivering successful projects within the context of developing countries. The article shall adopt the following steps to arrive at its conclusion: an organisational perspective of an infrastructure delivery system; a review of project stakeholder literature; an insight in decision-making and participatory decision-making; the AHP as a multi-criteria decision making tool; a justification of the methodology adopted for the study; the findings emanating from the study; discussion of findings; and the conclusion

INFRASTRUCTURE DELIVERY SYSTEM: AN ORGANISATIONAL PERSPECTIVE

An organization has been described as "a complex network of interpersonal interactions with closureemerge when ongoing interactions produce recurrent coordination of actions among participants, thus creating order out of chaos" (Espejo, 1994: 205). Gallagher, Rose, McClelland, Reynolds, and Tombs (1997) view an organization as a group of people operating within given boundaries, collaborating as it were with the sole aim of achieving a common objective. These definitions acknowledge the authenticity of the argument that organizations arise out of inter- personal and inter-organizational interactions which result in

complexities given the attendant uniqueness of each individual and organization (Burton, Obel, & Desanctis, 2011; Shirazi, Langford, & Rowlinson, 1996; Stinchcombe, 1965). Child (1984) posits that the success of a given project is significantly affected by its relationship with the external environment.

These structures refer to those avenues within a given organization which influences the manner in which it confronts the task of delivering the organizational objectives and goals. The performance of any organization is greatly affected by the degree of the management's understanding of the organization as an integrated and dynamic whole (Hoverstadt, 2008; Miles, Snow, Meyer, & Coleman, 1978). This knowledge would enable them to confront future changes in its external environmental conditions. The design of an organization should ensure that the following attributes are factored into the design: need for a framework to assess inter-personal relationships within the organization; need for the inclusion of performance measurement systems to aid assessments of personal achievements and contributions towards the attainment of collective tasks; and most especially the guidelines for choosing the structures and developing them (Child, 1984; Daft, 2009).

Eisenhardt and Zbaracki (1992) describe organisations as political systems consisting of various collectives of people with at least partially conflicting goals or objectives. Viewing an organisation from a political prism, they posit that a very critical feature of the political model is the fact that choice as established by the organisation is a mere reflection of the preferences of powerful people. These people also engage in politics from time to time. This leads them to arrive at the conclusion that the people with conflicting preferences engage in politics in order to gain a favourable decision. This is the dominant situation in the developing world where the majority are neglected in the decision making process.

According to Lahdenpera and Koppinen (2009) project delivery systems can be described as the organisational framework of a project which defines the control mechanisms and the relationships between the actors and the incentives. In the sphere of infrastructure delivery, project-organizations are prevalent. These project-based organizations have been designed in such a manner that allows their internal structures to confront the attendant complexity within the infrastructure delivery environment.

An Infrastructure Delivery System has been described as pivotal to the success of any infrastructure/project development activity (Lahdenpera & Koppinen, 2009). They stress the significance of effective delivery systems to the client as it improves the chances of attaining her objectives. Infrastructure Delivery Systems are complex projects (Baccarini, 1996; Bertelsen, 2003) comprising of several relationships between the various stakeholders.

Packendorff (1995) and Turner and Muller (2003) argue that projects should not be studied in isolation from issues such as cultural affinities, conceptions, relationship with the immediate environment, but rather as temporary organizations consisting of goal-fulfilling subsystems dependent on a pivotal and tactically situated parent system for their existence.

In delivering infrastructure projects in the developing climes, much consideration has not been accorded to the environment and secondary stakeholders particularly the host communities and end users especially as it concerns the decision making procedures. The decisions are normally handed down authoritatively thus breeding hostile external environments for these project organisations. Arguably this has negated the performance or functionality of these infrastructure projects. Dessy (2007) acknowledges the fact that the performance of African countries in services delivery to the citizenry has continued to dwindle and tether on the edge. He insists that the situation has maintained an unresponsive stance towards the several changes in institutional arrangements, as it continues unabated under centralized and decentralized delivery mechanisms. He highlights the views of several development experts who opine that the main problem with Africa remained the inability of the citizens, especially the poor, to hold the state accountable for its policy making.

MANAGING PROJECT STAKEHOLDERS

There is an absence of any broadly accepted definition of the term "stakeholder" as well as reasons for its evolution in academic discourse (Yang, Shen, & Ho, 2009; Yosie & Herbst, 1998). For instance, Clarkson (1995) acknowledges the disparity between Freeman's (1984) and Preston's (1990) account of the evolution of the term 'stakeholders'. Whereas the former asserts that the term was first used by SRI international in 1963, the latter traces its origin to the period of the great depression when the General Electric used the term stakeholders to describe its shareholders; employees; and customers.

Freeman (1984:46) in his seminal book entitled 'Strategic Management; A Stakeholder Approach' describes the term 'stakeholder' as "any group or individual who can affect or is affected by the achievement of the organization's objectives". In recent literature, he adjusts his position, stating that anyone who was capable of affecting the survival or the success of any given organization was qualified to be classified as a stakeholder (Freeman, 2004). The term 'stakeholder' has been used to describe all persons or groups who lay claims to a certain degree of ownership or rights or interests in a particular organization and the inherent activities of that organization, either in the past, the present or the future (Clarkson, 1995). PMI (2008) defines stakeholders as those persons or organizations (e.g. customers, sponsors, the performing organization, or the public) who are actively involved in the project or whose interests may be positively or negatively affected by the performance of or completion of the project.

This article finds the definition rendered by Walker, Bourne, and Rowlinson (2008) as being most appropriate for the ensuing discourse on the significance of stakeholder involvement in decision making within the context of developing nations. Walker et al. (2008:73) define stakeholder as "individuals or groups who have an interest or some aspect of rights or ownership in the project, and can contribute to, or be impacted by either the work or the outcomes of the project." In developing countries, most infrastructure projects are intended for the public good and are termed as being owned by the public sector on behalf of the citizenry.

Whereas Freeman (1984) and Mitchell, Agle, and Wood (1997) identify the existence of two classes of stakeholders: primary and secondary stakeholders respectively, Cleland (1998) Olander (2007) and PMI (2008) jointly agree with the classification of stakeholders into two distinct groupings: internal and external stakeholders respectively. Walker et al. (2008) adopts a different categorization, classifying stakeholders into four distinct groups.

The primary stakeholders are those stakeholders whose activities constitute the lifeline of the organization and without which the organization would cease to exist (Clarkson, 1995). The secondary stakeholders are those stakeholders whose activities affect or are affected by the operations of the organization even though they are not actively engaged in any direct transaction with the organization, thus not affecting the organization's survival. This group of stakeholders whilst not having a direct effect on the survival ability of the organization can actually affect the organization's image negatively or positively. Walker et al. (2008) identify four stakeholder groups: upstream stakeholders (paying customer or end user), down-stream stakeholders (supply chain); external stakeholders (the host community, independent minded persons who feel that the project will eventually affect them in one way or the other. This typology of stakeholders was deemed fit for the purpose of this research article as the focus of the paper lies within the ambit of the external stakeholders. In furtherance to the adopted typology, Karlsen (2002) maintains that the following could be categorized as stakeholders within a construction project environment: clients, contractors, labour unions, Non-governmental organizations, end users, controlling organizations, public authorities, financial institutions, media, and third parties among others.

Meredith and Mantel (2000) in highlighting the importance of stakeholders maintains that many project managers end up delivering objectives which are outside the scope of stakeholder demands thus resulting in project failure. Poor communication, assignment of inadequate resources to the execution of the project, incessant changes in project scope, unfavourable media attention, and negative community reactions to the project have been identified as the problems caused by project stakeholders which directly increases the degree of uncertainty on projects (Karlsen, 2002). This increase in uncertainty makes the project more susceptible to failure. Regrettably despite the established influence of stakeholders on project outcomes, Karlsen (2002) laments the fact that reactions by the project management team to these influences is typified by causal actions. The absence of any clearly defined strategies for confronting the impact of these influences has led to the development of the stakeholder management theory/concept. Under the concept of stakeholder management, different stakeholder management methods and approaches have evolved.

The theory of stakeholder management is, admittedly, central to the success of any project. Project managers should set about their projects by identifying these stakeholders and determining the degree of influence which they wield either collectively or individually. The stakeholder management process commences with the process of identifying the stakeholders and understanding the kind of influence which these stakeholders wield upon the project organization and designing a means of effectively managing these influences for the attainment of the project's objectives. Stakeholders exert tremendous impact on the project organization. Mitchell et al. (1997) assert that the essential nature of stakeholder management within contemporary management

environment whilst Olander (2007) agrees that the effective management of stakeholder interests in a given project remains a daunting challenge for most project management teams and continually remains crucial for the attainment of project success. The daunting nature of this task lies in the existence of divergent expectations arising from diverse stakeholders. This makes the creation of a platform for enhanced participation of a diverse range of stakeholders in the decision making process desirable.

DECISION MAKING PROCESSES IN INFRASTRUCTURE PROJECTS

There is no broadly acceptable definition of the term “decision” within the plethora of decision making theory literature (Eilon, 1969; Eisenhardt & Zbaracki, 1992; Kiker, Bridges, Varghese, Seager, & Linkov, 2005). Keren (1996) maintains that Edwards’ seminal piece on the theory of decision making in 1954 marked the turning point in the evolution of the behavioural decision making theory. Edwards (1954) established that economists and others, over the years have been developing mathematical theories about how people make choices among desirable alternatives. These theories, he insists, centre on the notion of the subjective value, or utility, of the alternatives among which the decider must choose.

Eilon (1969) rather cites Ofstad (1961) as inferring that an individual could be referred to as having made a decision when he; “has started a series of behavioural reactions in favour of something, or it may mean that he has made up his mind to do a certain action, which he has no doubts that he ought to do, or to make judgement regarding what one ought to do in a certain situation after having deliberated on some alternative courses of action”.

From these words credited to Ofstad (1961), Eilon highlights three cardinal points, namely: that the decision maker has several alternatives; that his choice involves a comparison between these alternatives and the evaluation of their outcomes. He defines the decision process as consisting of a series of steps, starting with information output and analysis and culminating in resolution, namely a selection from a set of available alternatives. The resolution serves as the decision made by the decision maker from a list of likely alternatives.

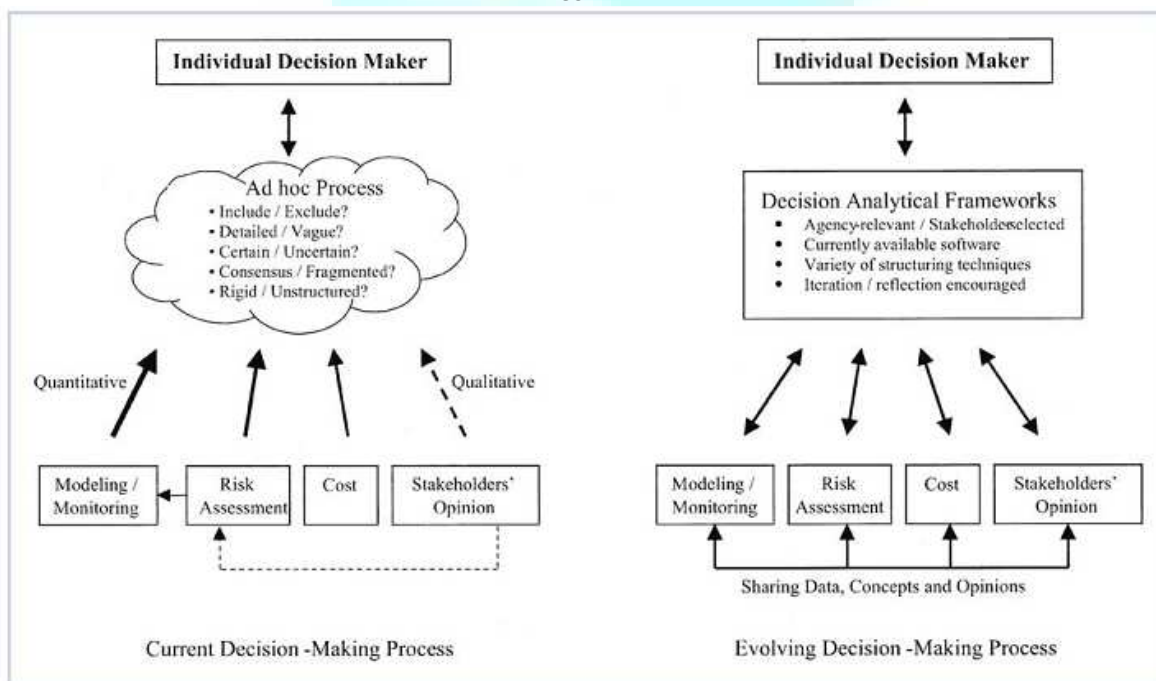
Eisenhardt and Zbaracki (1992) in their bid to highlight the significance of decision making processes within organisations, agree that the manner of strategic decision making processes adopted by an entity is central to its entire strategic process. Decision making process in environmental projects can be complex due to the inherent trade-offs between socio-political, environmental, ecological, and economic factors (Kiker et al., 2005). Mustajoki, Hämäläinen, and Marttunen (2004) further accentuate the inherent difficulty encountered in decision making processes relating environmental projects such as the pipeline project being studied in this article. Environmental decisions are often complex and multi-faceted involving various stakeholders with different priorities or objectives-presenting exactly the same type of problem that behavioural decision research has shown humans as poorly equipped to solve unaided (Kiker et al., 2005).

For projects which have the potential of distorting the attendant environmental harmony in the developing world, decision makers normally depend upon four types of generalized technical input for their decision making: the results of modelling and monitoring studies; risk assessment; cost-benefit analysis; and stakeholder preferences (Kiker et al. 2005). They maintain that the manner in which the decision makers handle these matters, usually in a heuristic and subjective manner leads to a situation where the decision so made cannot be defended due to the unstructured manner in which the decisions might have been made. They maintain that even when a structured approach is employed, it may be seen as lacking the needed flexibility to adapt to localized concerns or faithfully represent minority viewpoints thus undermining the end decision. This is apparently the problem encountered in the decision making process.

Artunes et al (2006) state that the inherent difficulty in multi-stakeholder projects is also noticeable in: the evaluation of the environmental impacts of a specific project, the environmental assessment of a programme, or the development of sustainability pathways. They cite Forester (1999) as identifying the need to consider not only the facts, but also values, asking questions as it concerns what ought to be honoured, protected, sustained, or developed. They maintain that this inquiry which leads to a specific decision requires the active involvement of all relevant stakeholders and at early stages too. Kiker et al (2005) and Antunes et al. (2006) also maintain that the difficult nature of the decision making process in project based organisations concerned with projects with huge socio-economic and technological consequence on the environment and its inhabitants has been seemingly aggravated by the ad-hoc posture adopted by several decision makers in contemporary times. This apparent loss of faith in this ad-hoc procedure for decision making has led to a gradually evolving decision making protocol based on a systematic procedure as depicted in the

Figure 1.

FIGURE 1



Source: Kiker et al. (2005)

Most of the decisions made in developing countries are based on this ad-hoc procedure as shown in the current decision making process in diagram 1. From the diagram, it can be deduced that the opinions of the stakeholders particularly the external stakeholders are considered non-important and not usually heeded by the decision-makers or policy makers. This culminates into the delivery of projects that are not in tandem with the expectations of these stakeholders. The use of the cloud boundary for the current decision-making process, buttresses the lack of firm structure in the decision making process thus making it susceptible to manipulations along tribal, religious and political lines.

The clamour for the use of a structured decision making procedure for major infrastructure projects in the developing world stems from the inability of the structured approach to maintain an objective stand rather than a subjective one. Kiker et al. (2005) makes a rather strong case for the adoption of Multi-Criteria Decision Analysis (MCDA) techniques in the conduct of structured decision making in complex environmental projects including major infrastructure delivery.

They admit that several researches in the area of multi-criteria decision analysis (MCDA) have made available practical methods for applying scientific decision theoretical approaches to complex multi-criteria problems such as the AHP. They posit that for group problems, the process of quantifying stakeholder preferences may be more intensive, often incorporating aspects of group decision making necessary for stakeholder involvement in decision-making for the intended project.

MCDA approaches possess the capability to call attention to similarities or potential areas of conflict between stakeholders with different views, thus resulting in a more complete understanding of the values held by others. Kiker et al. (2005) argue that the purpose of MCDAs' is not to always single out the best decisions, but to help improve understanding in a way that facilitates a decision-making process involving risk, multiple criteria, and conflicting interests. It visualizes trade-offs among multiple conflicting criteria and quantifies the uncertainties necessary for comparison of available remedial and abatement alternatives.

Mustajoki et al. (2004) maintain that MCDA provides a transparent way to structure problems and support the elicitation of preferences in participatory decision making. It is a systematic process where different elements of the problem are identified and modelled, and the stakeholders' preferences elicited within a structured framework. They stress the conflicting interests of these stakeholders and the need for the employment of transparent methods to settle the differences.

INTEGRATING EXTERNAL STAKEHOLDERS INTO DECISION-MAKING: THE ART OF PARTICIPATORY DECISION MAKING

Kiker et al. (2005) admit the increasing significance of stakeholders involvement in the decision making process as an essential element for decision making processes. Yosie and Herbst (1998) posit that the stakeholder involvement in decision making as it concerns the environment by government and industry is inevitable and will continue to expand. They observe that the increased use of stakeholder processes over the past decade was actually representative of societal interest in more interactive forms of decision making. Kiker et al. (2005) assert that the current decision making process actually limits stakeholder participation within the decide and defend paradigm that positions stakeholders as constraints to be tested rather than the source of core values that should drive the decision making process. Arguably, this is the case in most project-based decision-making processes especially in developing countries.

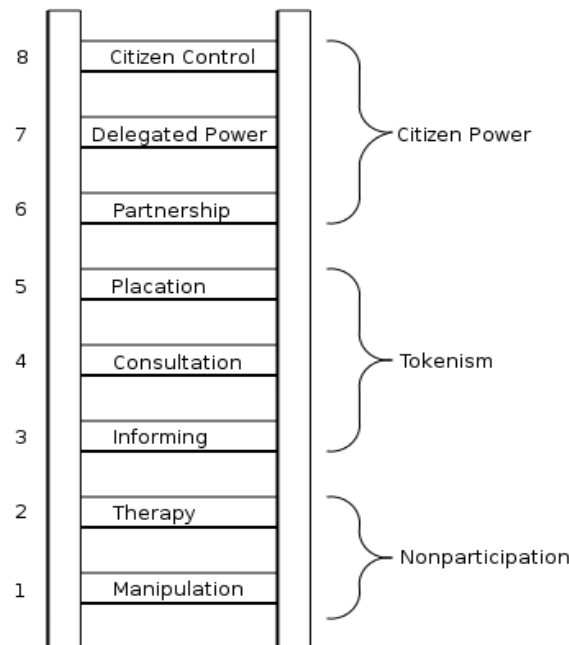
According to Edelenbos and Klijn (2004), reasons for the increased advocacy for participatory decision making involving stakeholders range from an attempt to drastically reduce the veto power of various societal participants by involving them in decision making, the need to improve the quality of decision making by using information and solutions of various actors and bridging the perceived broadening gap between citizens and politicians. This has been the case in developing countries where active early stakeholder involvement in the decision-making processes as it concerns infrastructure delivery activities have been at the lowest ebb thus resulting in the delivery of unwanted assets (Dessy, 2007).

Artunes et al (2006) whilst reviewing the works of Gregory (2000) and Hammond et al., (1999) posited that a structured decision-making strategy for supporting wider participation in the process should be imbued with the requisite attributes to perform the following tasks: Framing the decision; defining the problem to make sure the "right" problem is addressed; defining key objectives and criteria: identifying what values matter most to stakeholders; establishing alternatives and considering the relevant constraints: viewing these alternatives as portfolios of actions rather than individual options, since for most sustainability issues there is no such thing as a single "best action", but rather a "more desirable policy mix"; identifying consequences-the most important impacts that can affect the stated objectives and associated uncertainties; evaluating the desirability of the consequences according to the proposed criteria; clarifying trade-offs: identifying important conflicts across the desired objectives to use this knowledge for decision making and to create new and better alternatives. The ability of the MCDAs to achieve these tasks has led to increased advocacy for its adoption in contemporary participatory decision-making discourse (Mustajoki et al., 2004).

Arnstein (1969) puts forward a typology of eight levels of participation to assist with understanding what actually consists of citizenship participation. This typology can be found in below.

FIGURE 2 below.

FIGURE 2



Source: Arnstein (1969)

Although this typology as developed by Arnstein has been used in various societal spheres such as urban renewal and anti-poverty initiatives, he maintains that the illustration of the typology could easily be described as analogous to what obtains in various situations such as;- churches currently facing demands for power from priests and laymen seeking to bring about change within the organisation; colleges and universities which have assumed the status of literal battle fields over salient issues concerning student power and rights; or public schools, city halls, and police departments. The underlying issues remain fundamentally the same – the 'have-nots' trying to upset the cart and assume the positions of the 'haves' thereby possessing enough power to render the target organisations submissive to their views, aspirations, and needs.

This situation can be described from the developing country context of the typical project-based Infrastructure Delivery System (IDS) and the subsequent interaction with its host communities who represent a majority of its external environment-external stakeholders. Following from the various stages of an

infrastructure project lifecycle as identified by Fewings (2005) especially at the inception and the strategy stage, the citizens are usually overlooked and at best, viewed as being on the lower rungs of the tokenism strata of the participation ladder described above-informing and consulting. This often results in decisions taken to benefit a few power brokers as against the views of the majority of the citizens whose socio-economic and geographical landscape such a project would have a tremendous impact on. This culminates into the delivery of projects which do not agree with the values and norms held as being sacrosanct within that particular locality. This article argues that this is a major cause of project failure as planning is a crucial part of the project delivery process and if it's not dependent on an inclusive decision-making process which is transparent and structured, it would lead to numerous acts of sabotage and apathy by the external stakeholders who ideally should be interested in ensuring accountability, probity and that the project is fit for the intended purpose.

The advocacy for an all-inclusive stakeholder is premised upon the numerous advantages associated with this phenomenon. Edelenbos and Klijn (2006) in making a case for interactive decision making assert that interactive decision making should be viewed as a way of achieving an increment in the degree of citizen involvement in governance thus reducing the gap between government and its citizens. As if to buttress their points, they cite several authors as maintaining that the interactive decisions have been employed in the Netherlands as a new type of horizontal steering for solving problems (Klijn & Koppenjan, 2006)

In their own contribution, Irvin and Stansbury (2004) identify the advantages of citizen involvement in decision making as including: education; political suasion; empowerment; breaking the gridlock; avoiding litigation costs; environmental management. They also highlighted the demerits: the difficulty of diffusing citizen goodwill; complacency; representation; lack of authority; the power of wrong decisions; persistent selfishness.

They maintain that the argument for enhanced citizenship participation often rests on the merits of the process and the belief that an engaged citizenry is better than a passive citizenry as postulated in King, Feltey, and Susel (1998). Vroom and Jago (1988) insist that *"a policy that is well grounded in citizen preferences might be implemented in a smoother, less costly fashion because the public is more cooperative when the policy is implemented."*

Having reviewed the various literatures which have revealed the pros of the participatory decision-making tool and make a case for the adoption of an approach that enhances the integrity of the decision made by the various stakeholders, attention is drawn to the quality of the decisions made through the participatory process by Beierle (2002). He admits the existence of little or inadequate literature on the quality of stakeholder-based decisions. Whereas Edelenbos and Klijn (2006) argue that there is no standard procedure for evaluating the strengths and weakness of different modelling approaches for sustainable development decision-making, Beierle (2002) embarks on an investigation to unravel the quality of these decisions in a systematic manner.

After a thorough analysis of data emanating from a sample size of two hundred and thirty nine cases, he came to the conclusion that the stakeholder-based decision making processes were replete with making sound decisions. This makes it critical that this study is contextualized to developing countries in the continued search for variables likely to positively influence project performance within those climes, especially as it affects infrastructure projects.

ANALYTICAL HIERARCHY PROCESS (AHP) AS AN MCDA

One of the basic problems affecting effective decision making in multi-stakeholder project environments such as the infrastructure delivery project environment has been identified by Saaty (1994). He maintains that the prevalence of several stakeholders within a particular project environment interested in achieving their own objectives without any consideration for other stakeholders in the environment made effective decision making by the project leader a difficult task. Good decisions, he insists, must take cognizance of the complexities of the environment for it to be able to withstand the hazardous nature of the environment.

To be able to survive the environment as mentioned above, a decision making approach should have the following characteristics: simple to construct; be adaptable to both groups and individuals alike; be natural to our intuition and general thinking; encourage compromise and consensus building; and not require inordinate specialization to master and communicate (Saaty & Vargas, 2001). This is in tandem to the characteristics enumerated earlier in this article. The AHP, a decision making tool developed by Saaty in 1980 (Palcic & Lalic, 2009) possesses the aforementioned characteristics thus making it most suitable for decision-making in multi-actor environments. The AHP was designed as a tool for solving technical and managerial problems through the quantification of the relative priorities for a given set of alternatives on a ratio-scale based on the decision-makers judgement, stressing as it were the significance of the intuitive judgements of a decision-maker as well as the consistency of the comparison of alternatives in the decision making process. The AHP contributes to solving complex problems by structuring a hierarchy of criteria, stakeholders, and outcomes and by eliciting judgements to develop priorities. He maintains that systems theorists have pointed out that we can better understand an entire system by examining it from a general, holistic perspective that does not give as much attention to the function of its parts.

The AHP allows researchers and decision makers to *"structure a system and its environment into mutually interacting parts and then to synthesize them by measuring and ranking the impact of these parts on the entire system"* (Saaty & Vargas, 2001). They further posit that the AHP assists leaders with socially responsible decision making by enabling them avoid oversimplification, identify and evaluate costs and benefits, to plan for the future, and to adapt to change.

Steps for the application of the AHP in decision making: - planners have to initially develop a hierarchy of all details and likely outcomes; they then judge the relative importance of these details and accord them numbers to quantify them. The principles of analytic thinking include: - the principles of constructing hierarchies; the principle of establishing priorities, and the principle of logical consistency. He argues that words limit the perspectives of our feelings and justifies the use of numbers for measuring physical experiences. AHP enables decision makers to determine priorities and to make trade-offs. He opines that the AHP has evolved out of the need to incorporate the basic observations on human nature, analytic thinking, and measurement for quantitative approach to problem solving. The AHP is a powerful model for tackling complex political and socioeconomic problems. It furthermore provides a framework for group participation in decision making or problem solving. He argues that to shape unstructured reality requires collective participation, bargaining and compromise.

Saaty (1994) maintains that the AHP can be used to *"stimulate ideas for creative courses of action and to evaluate their effectiveness. It helps leaders determine what information is worth acquiring to evaluate the impact of relevant factors in complex situations. And it tracks the inconsistencies in the participant's judgements and preferences, thereby enabling leaders to assess the quality of their assistants' knowledge and the stability of the solution."*

The AHP understands the limitations posed by the absence of measureable scales for attaching value to the socio-economic characteristics and strives to adopt a quantitative approach to affix numbers to these characteristics to aid measurability.

Complex systems can best be understood by breaking them down into constituent elements, structuring the elements hierarchically, and then composing or synthesizing, judgements on the relative importance of the elements at each level of the hierarchy into a set of overall priorities.

Basic considerations in constructing a hierarchy include: identification of the overall aim; identification of the sub-aims; identification of criteria which must be satisfied to fulfil the sub-aims of the overall aim; identification of the sub-criteria under each criterion; identification of actors involved; identification of the actor's goals; identification of the actors' policies; identification of the options and outcomes; for yes-no decisions, take the most preferred outcome and compare the benefits and costs of making the decision with those of not making it; and then do a benefit/cost analysis using marginal values.

Structuring a hierarchy requires substantial knowledge of the system or problem in question. Saaty (2001) accepts that the modelling of a problem is the most creative part of decision making and is one which has a significant effect upon the outcome of such decisions.

He opines that most of the problems encountered in various systems stem out of our inability to understand the internal dynamics of a system in enough detail so as to be able to identify cause-and-effect relationships. He maintains that if we are able to do so then the, the problem would be reduced to one of social engineering, as we would know at what points in the system intervention is necessary to bring about the desired objective.

Various applications of the AHP include: setting priorities; generating a set of alternatives; choosing the best policy alternatives; determining requirements; allocating resources; predicting outcomes and assessing risks; measuring performance; designing a system; ensuring system stability; optimizing; planning; and resolving conflicts.

RESEARCH METHODOLOGY

Yin (1994:59) defines case study as an *"empirical inquiry that investigates a contemporary phenomenon within its real-life context and addresses a situation in which the boundaries between phenomenon and context are not clearly evident."* He maintains that this approach is of essence when the research has to do with

the examination of contemporary events, in situations where the relevant behaviours cannot be manipulated. This article seeks to understudy the significance of participatory decision making on project delivery success and to make a case for the adoption of the AHP to enhance such decision making processes. It does not seek to unravel and discuss all other variables which might be responsible for project failure in developing countries as there abounds extensive literature on that topical issue. The case study approach relies upon multiple evidences (Yin, 1994) with data needing to converge in a triangulating fashion and as another result. This enables the researcher to utilize multiple methods in the conduct of his investigation as is the case in this particular research. For this particular study, focus groups arranged at workshops involving stakeholders and documentary evidence were employed alongside observation.

This study employs a single case design. Yin attempts to justify this approach by insisting that single case designs are most viable when: the single case represents the critical case in testing a well-formulated theory; when the single case represents an extreme or unique case; and when the single case is a revelatory one. This opinion was supported by Jefferies, Gameson, and Rowlinson (2002) in their study of the Olympics stadium project. This particular study is a revelatory one and thus finds it expedient to use a single case design. Data was collected through multiple sources namely: Interviews were held initially with selected stakeholders in a bid to identify the particular classes which several stakeholders belonged to with regards to project X. Afterwards, a focus group interview was held. During this, participants were selected from a wider sample of stakeholders. They were invited to a stakeholder forum and asked to express their views as it concerns the phenomenon being understudied. The stakeholders were selected on the basis of their influence on the entire project delivery process. Primary and secondary stakeholders alike were asked to share personal experiences about their involvement in various decisions taken at various stages of the project lifecycle. They were also asked to identify what the critical success factors were for project X. Subsequently, they were also asked to rank these critical success factors in terms of priority.

CASE DESCRIPTION

The case study utilized in this study shall be referred to as project X. The case study was carefully selected based on the case study selection criteria enumerated in the preceding section. Project X involves the laying of a 42" diameter pipeline measuring a distance of approximately 50kilometers (Km). Upon completion, project X is expected to transverse twenty (20) major communities situated in four different local government areas of a state in the Niger Delta region of Nigeria. It is also hoped to boost export and domestic gas supply. The contract for the construction of project X was awarded in 2010 by an oil prospecting and development JV (Joint venture) company owned by the Nigerian government and an oil prospecting and exploration multinational. The main contractor for the project was an indigenous contracting concern, in line with the government's drive towards local content development within the oil and gas sector of the economy. The length of the pipeline and the numerous communities it transverses increased its degree of complexity as it brought along with it, various stakeholders each possessing their peculiar expectations and objectives. Project X was deemed appropriate for the investigation into the manner of decision making approaches adopted by the project team and its impact on the progress of the project. Project X has commenced and is currently on-going at the time of this study.

FINDINGS

As had been stated earlier the members of the project team, described as internal stakeholders were initially interviewed with a view to ascertaining their approach to the planning of the project. Members of this group of stakeholders were drawn from the project sponsor, the main contractor and the project manager in charge of the project. After this round of interviews, the investigators shifted their focus to the group of stakeholders critical to the study-the external stakeholders. These stakeholders were invited to a workshop where a focus group was conducted with an experienced moderator mandated to preside over the session.

From these two data collection sources employed for the course of this investigation, the following findings were obtained:

IDENTIFICATION OF STAKEHOLDERS

During the interview sessions, most of the interviewees agreed with classification rendered within the existing literature. They ascribed the external stakeholder status to members host communities through which project X was expected to pass through. They saw themselves as those who were solely responsible for the delivery of the project and understood that the significance of gaining the support of the host communities if they were to succeed in the achieving project success. Focus group participants drawn from the various host communities were also aware of their position as external stakeholders.

IDENTIFICATION OF CRITICAL SUCCESS FACTORS

Critical success factors have been described by Rowlinson (1999) as those fundamental issues inherent in the project which must be maintained for the enhanced team-working to take place in an efficient and effective manner. In an attempt to define CSFs, Freund (1988) traces its origin to John Rockard's definition. John Rockard defines CSFs as "*those things that must be done if a company is to be successful*". Characteristics of CSFs are identified as including; their significance in the attainment of the overall corporate goals and objectives; they should remain measurable and controllable within the context where they are applicable; ideally, they should be relatively few in number; they should also be expressed as activities which must be carried out during the process and not at the end of the process; they should also be applicable to companies operating within a particular sector which possess similar strategies and objectives; they should also be hierarchical in nature (Freund 1988).

In the context of this study as it pertains to the delivery of a pipeline project, the CSFs would ideally be associated with the attainment of the stakeholder expectations. During the inquest, it was discovered that the internal stakeholders agreed that apart from successful delivery of the project according to the key success criteria of the timely completion, under-budget, and to the required condition to perform the tasks required by the project sponsor; the expectations of the external stakeholders was of prime importance. To this effect they maintained that they developed CSFs relative to the attainment of these expectations. External stakeholders maintained, during the focus group sessions, that they were asked to list in order of importance, their various expectations during workshops and town hall meetings. The most important expectations highlighted were the need for adequate compensation for the acquired property along the routes through which the pipelines would run and the need for the engagement of local labour and resources in the delivery process-local content. The project team maintained that they developed CSFs which were geared towards ensuring the attainment of these expectations whereas the external stakeholders insisted that they were being neglected. They admitted that instead of the skill development activities, they were being engaged as surveillance contractors to secure and protect the constructed pipeline and project sites.

THE DECISION MAKING PROCESS AND EXTERNAL STAKEHOLDER INVOLVEMENT

Upon further scrutiny, it was discovered that decision on the CSFs to be adopted and the order in which they were to be adopted were done without the actual involvement of the external stakeholders. The internal project stakeholders adopted a generic view of what should be paid as compensation and also on how to deliver local content development without any input from the host communities. Apparently this negates the principle of citizen power in participatory decision making, especially as ensconced by Armstein in his citizen participation ladder framework but rather depicting manipulation and at best tokenism in arriving at the decision-making.

PERCEPTIONS OF EXTERNAL STAKEHOLDERS ON THE DECISION-MAKING APPROACH EMPLOYED IN ARRIVING AT THE COMPENSATION VALUE

Most of the participants in the focus group representing the project host communities insisted that the workshops were one-sided as their opinions were sought but not adopted by the project team. They insisted that they made no input in the modalities in deciding what constitutes adequate and fair compensation for acquisition of their landed properties and the inherent loss of livelihood. Whereas the project team insisted that they took these wider socio-economic criteria for project success into consideration in the decisions made as it concerns the CSFs in project X, they could not identify any structured approach that would enable the investigators establish that these expectations were considered at all. The World Bank recommends that in assessing compensation, (a) attention should be paid to the adequacy of the legal title, registration and site occupation; (b) the affected people should be notified of the prevailing laws and regulations on valuation and compensation involved; (c) establishment of the requisite criteria for resettlement eligibility of the affected households; and (d) the development of mechanisms for the prevention of illegal encroachers and squatters from participating in the compensation arrangements. There was no evidence that this guideline was adopted as the stakeholders had no knowledge of these and could not demand for their adoption. This belief that that their

contributions were not adopted in the decisions invariably leads to increased hostility within the host communities thus denigrating the eventual success of the project. This is why the AHP becomes imperative. If it had been adopted, the external stakeholders would have no difficulty in assessing the manner in which their contributions were considered due to the transparent and structured approach it brings to the act of decision making.

DISCUSSION

Although this study focuses on the early planning stages, project X has commenced and is in its early construction stages. Pockets of dissenting voices from the host communities are being heard. Considering Mitchell et al. (1997) typology of stakeholder influence on projects based on the kind of attributes they possess and the dynamic nature of this typology, it becomes likely that these pockets of dissent against the project might result in massive protestations against the project if the communities feel that their expectations are not being attained by the project team at any time as a result of their non-participation in the decision-making process. This shows the need for the significance of citizen power and the fact that most persons would take ownership of the project, ensuring its success, if they feel that they have made major inputs into the project. An AHP remains a better way to create such an unbiased atmosphere despite the admittance of Saaty (2001) that the end decision taken might not be the right one and the dependence of the end decision on the judgement of the project team-decision-maker.

CONCLUSION

This conceptual paper set out to make a case for the adoption of a systematic mode of decision-making within infrastructure projects in developing countries. It relies on a synthesis of literature initially to prove the significance of effective stakeholder management and transparent and structured decision making process in the attainment of project success. The failure of many infrastructure projects in developing countries was attributed to several causes chief among which was the non-participatory means of decision making at various stages of the project delivery lifecycle. A more structured approach to participatory decision making was advocated with special emphasis on the AHP. To buttress the impact of unstructured, spontaneous and unilateral decision making approaches adopted by planners in developing countries, this article adopts a single case method to highlight the approach utilized in a particular infrastructure project labelled project X. Project X is a gas pipeline project situated in Nigeria's Niger Delta region. It was discovered that the approaches adopted by the project planners/team was not perceived as allowing for the influence of citizen power in the decision making process by the host communities especially with regards to the expectations on compensation and local engagement. This scenario, which is similar to most projects of similar magnitude within the comity of developing countries, possesses the capability of generating hostility to the project from its host environment and thus undermines the ability to achieve its objectives and goals. Arising from these findings, this article highlights the significance of a structured approach to participatory decision making within infrastructure projects. This is premised upon the belief that such a structured approach such as the AHP would enhance the chances of achieving project success especially in developing countries. It recommends that the future studies attempt applying the AHP to specific projects through means such as longitudinal case studies to establish its ability to resolve the imbrogio associated with participatory decision-making in such countries.

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