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Strategies for enhancing strategic project management in public research projects: case Nigeria

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Abstract: The study examined barriers and key criteria for enhancing strategic project management application in the execution of research and development (R and D) projects in Nigerian public research organisations. Given the economic and social challenge in R and D projects, a multi-methodology consisting of quantitative and qualitative analysis was employed. A total of 213 questionnaires were used and twenty senior practitioners interviewed. The findings revealed that organisational culture such as employee's behaviour, civil service procedures, operational routines and lack of knowledge in strategic project management (SPM), organisations routines were the significant barriers to the application of SPM. Strategies for addressing the barriers and enhancing SPM application were identified to include: proper definition of projects, use of project team approach, stakeholder's involvement enhanced, using the problem-driven-approach to select projects and employees motivation.

Keywords: strategic project management; SPM; project management; organisational culture; research and development projects; public research organisation; Nigeria.

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Edward Ochieng is currently a Senior Lecturer in Programme and Project Management at Cranfield University, United Kingdom. He has a PhD from Loughborough University. He has presented at national and international conferences, such as Association of Researchers in Construction Management (ARCOM), Australian Universities Building Educators Association (AUBEA), CIB World Congress, American Society for Engineering Education (ASEE) and International World of Construction Project Management where he shared his knowledge on project complexity, performance, capital effectiveness, operational effectiveness and team integration. He has published three books, 28 book chapters and over 75 refereed papers in high-ranking journals and conferences. He has supervised nine PhD students to successful completion and over 150 MSc/MBA industrial projects by research. He has also acted as an internal and external examiner of more than ten PhD students in different UK universities. In recognition of his expertise and contribution to curriculum development, Edward has been invited by Loughborough University, University of Wales, Open University and University College of Estate Management to act a programme reviewer. Edward collaborated with academics, industrialists and the Infrastructure Project Authority (IPA) to examine frameworks that could be used to identify and estimate benefits and value (including capital effectiveness) at the front end of public sector projects. In addition, Edward collaborated with academics and industrialists to investigate the promising new technology cryogenic energy storage (CES) to solve the problem of how to store excess renewable energy – the research team was awarded €7 million. Edward has secured an estimated £643,815 from a range of funders for several projects and consultancy in project management.

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This paper is a revised and expanded version of a paper entitled [title] presented at [name, location and date of conference].

1 Introduction

Currently, the dramatic rise in the use of project management techniques in managing projects has challenged organisations to focus more on the benefits of projects and its comparative advantage to the organisation. According to Babatunde and Adebisi (2008), organisations have now adopted project management techniques to ensure that their goals are achieved. The public research organisations, are known to execute basic and applied research projects that can lead to innovative projects and products. Thus there is the need to enhance the successes of those projects to ensure the organisation achieves a sustainable competitive advantage and also contribute to the economic growth of the country.

Many research organisations fail to realise the desired benefits from its organisational strategy due to their inability to actively deploy the principles and standards of strategic project management (SPM) in either the formulation or execution of their projects. While some other organisations choose to implement project management, as a standardised set of project management practices. These organisations expect that such an approach will carry significant potential improvement on their project performance. However, the use of traditional project management focuses only on meeting the project time, cost and performance. Considering the social and economic challenges coupled with the fierce global competition, the need to find new ways that will enhance performance and aid organisations achieve competitive advantage in the marketplace cannot be over emphasised. Hence, the need to include the strategic perspective in the management of projects.

Project management has been identified as a means of avoiding the pitfalls inherent in the management of projects. These difficulties are in most cases the reasons for the

failure or abandonment of projects (Nwachukwu et al., 2010). According to Brown (2007), SPM is a project management tool used to manage and measure project outcomes and ensure optimal value for an organisation. Furthermore, projects undertaken by an organisation must meet a set of criteria determined by the organisation's leadership to ensure alignment with the organisation's strategic vision. SPM also bridges the gap between the lofty ambitions of strategists and staff that do the work. Strategy without projects is just another document collecting dust, while projects without strategic importance quickly loses their appeal. Roger L. Martin and A.G. Lafley in their book *Playing To Win* explained that strategy is about making explicit choices and building a business around those choices. Precisely, that strategy is choice. More specifically, that strategy is an integrated series of choices that uniquely positions the firm in its industry so as to create sustainable advantage and superior value relative to the competition. The application of SPM in PROs would therefore enhance the planning and execution of R and D projects. It would also address the holistic method of applying the soft skill-set of the project management body of knowledge (leadership, team management, complexity and ambiguity management) (Quadri, 2010). This will develop the capacity, competence and tacit knowledge necessary to ensure successful prioritisation, management, implementation and procedural closeout of R and D projects in PROs.

PMI's annual report also indicated that its worldwide membership has grown in the last decade from 50,000 to over 350,000, which is indicative of the widespread use of project management practices by organisations (PMI Annual report, 2008). During the same time frame, however, there was a commensurate improvement in organisations' ability to generate superior results in strategy execution (PMI Annual report, 2008). This could be as a result of implementing a new strategic initiative, which is successfully managing changes that occur as new initiative are deployed on project. Although the strategy challenge is not new, leading strategic initiatives effectively and efficiently has continued to plague organisations. The recent economic crisis has made the situation even worse. As economies start work towards recovery, executives of institutions are under close watch to deliver key strategies. They are expected to excel amid ongoing social, economic and environmental challenges. Research have noted that organisations fail to implement up to 70% of their strategic initiatives (Beer and Nohria, 2000; Miller, 2002) due to deficiency in the management of change, while Cândido and Santos (2015) reported that It is often claimed that 50%–90% of strategic initiatives fail. Although these claims have had a significant impact on management theory and practice, they are controversial. The change in advancements of technology and innovation has made it impossible for research organisations to maintain the status quo in achieving a competitive advantage.

Innovation is the key to the development of skills, generating ideas through research and turning them into commercial successes. It is not only vital for high-technology industries, but also essential to the future of many of our traditional sectors such as agriculture, manufacturing and mining (Hall and Williams, 2008; Haward, 2000). Public research organisations are known to support innovations through well-articulated R and D projects due to their main contribution to sustainable social and economic growth in highly industrialised economies. However, this is undisputed among economists and especially in the context of the modern knowledge-based economies. This means that government support for R and D activities are widely accepted, in contrast to public support in the area of investment, production or commercial production (Garcia-Quevedo, 2004; Giebe et al., 2006). Despite the unique environment in the

research organisations, R and D projects could be of more benefits from the application of SPM techniques. In a rapidly changing environment with diverse issues impacting on projects, SPM can support the achievement of projects as well as the organisational goals. This study therefore, discusses and explores the SPM concept, barriers affecting its application and suggests strategies that will enhance the application of SPM in the execution of R and D projects in Nigerian public research organisations through the following specific objectives:

- To analyse and discuss the practical application of project management practices in public research organisations.
- To identify barriers affecting project execution that has caused failure and abandonment of R and D projects.
- To suggest workable strategies that will enhance R and D projects success through the application of SPM concept.

2 SPM application in research and development projects

Most projects today are conceived with a business perspective in mind; their goals are focused on future improved business and organisational performance, with enhanced profits, growth, and market position (Shenhar et al., 2005). Yet, ironically, when project managers and teams are engaged in day-to-day project execution, they are not focused on the business aspects. Their focus and attention, rather, is operational, and their mind-set is on 'getting the job done'. While this mind-set may focus on doing the job efficiently, it may lead to disappointing business results and even failure (Shenhar et al., 2005). Strategically managed projects are focused on achieving business results, while operationally managed projects are focused on getting the job done.

Management teams in strategically managed projects focus attention on activities and decisions that will improve business results in the long run, and are concerned with customer needs, competitive advantage, and future market success. Rather than sticking to the initial product definition and project plan, they continuously make adjustments that will create better business outcomes (Shenhar et al., 2005). While the operational approach may be justified in some cases, the long-term (strategic) perspective is rather more acceptable. What is needed therefore is a new mind-set and framework that will focus project management in the new millennium on strategic issues to improve business performance (Shenhar et al., 2002). In view of the above, PROs will not only enhance the execution of R and D projects but will also achieve a project strategy that will address the needs of the populace in Nigeria.

This study is considered important because of the need to eliminate or reduce R and D failure rate and significantly increase the success rate of research projects that will lead to innovations, which will in turn contribute to the economic growth of Nigeria and other developing Countries. The rates of project failure have been reported even in the developed countries and have been an issue of concern. For example: KPMG survey of Project Management practices in New Zealand, in 2010 carried out a survey on 100 businesses across a broad cross section of industries and found that 70% of organisations have suffered at least one project failure in the prior twelve months and also that 50% of respondents indicated that their project failed to consistently achieve what

they set out to achieve (International Project Leadership Academy, 2016). Also IBM in 2008 carried out a Survey of 1,500 change management executives on the success/failure rates of 'change' projects and found out that only 40% of projects met schedule, budget and quality goals. The biggest barriers to success listed as people factors were changing mindsets and attitudes – 58%, corporate culture – 49%, lack of senior management support – 32% and underestimation of complexity listed as a factor in 35% of projects (International Project Leadership Academy, 2016). Furthermore, an article 'not fit for purpose' by the Guardian Newspaper (UK) (5th January 2008) reported of an investigation into government waste on projects in the UK since year 2000. The report revealed that for government projects, $4billion was wasted as a result of failed projects and only 30% of our projects and programs are successful (Joe Harley, Programme and Systems Delivery Officer at the Department for Work and Pensions) (International Project Leadership Academy, 2016). These reports is not encouraging and require finding new ways to reduce or eliminate the factors that contribute to project failure, hence the need for strategic approach.

One of the goals of strategy is to determine why some organisations are more successful than others, and to understand the mechanisms that can help organisations achieve and sustain a competitive advantage (Grant, 2010; Rumelt et al., 1994). Competitive advantage is the ability of an organisation to create more value than its rivals, and therefore achieve a superior return on investment (Barney and Hesterley, 2006). Sustained competitive advantage requires capabilities that provide enduring benefits and are not easily copied by competitors or rendered obsolete (Barney and Clark, 2007; Kwak and Anbari, 2009).

The application of SPM crystallises the concept of project differentiation and integration management. It is the fusion of the W5-H3 embodiments of a typical development project (what, when, where, who, why, how, how much and how well) and their application, relevance and dynamism to the whole lifecycle of developing projects – initiation, planning, execution, monitoring and closing (Quadri, 2010). This process would help in the establishment of an easy process of project evaluation, and the identification of the root causes of project failures in PROs. Therefore, SPM as a project management tool will be used to select and manage projects that will address the mission, vision and strategic objectives, leveraging on the tacit knowledge of creation and innovation enthusiasm in the organisations. This comprehensive but streamlined unique approach with emphasis on R and D projects simplifies the justification for reengineering the management and execution of R and D projects in such a way as to incorporate the SPM techniques and minimise the incidence of project failures in PROs (Ugonna et al., 2015).

3 Method

The research approach used was an empirical study that combined qualitative and quantitative research methods. The study employed a case study approach to examine SPM application and the barriers that affected its implementation in the execution of R and D by conducting an exploratory investigation in four project based research organisations in Nigeria. The use of case study was due to its long and distinguished history of many disciplines, and today accounts for a large proportion of books and articles in social sciences (Creswell, 2014). Furthermore, according to

Eisenhardt (1989), the case study research is necessary 'at times when little is known about a phenomenon, current perspectives seem inadequate because there is little empirical substantiation'.

The methods used in the collection of data and other relevant information was through review of literature, semi-structured interview and questionnaire administered to the project management practitioners in public research organisations in Nigeria. The first phase of this research was the distribution of the questionnaire. This involved investigating the project management practices by the participating public research organisations in executing R and D projects, the factors that hindered effective application of SPM in the execution of R and D projects. Respondents were required to grade the factors associated with the application of SPM in implementing R and D projects in the order of importance. The rating of the factors associated with the application of SPM was in the order of 'strongly important', 'very important', and 'fairly important', 'important' and 'not important'. However, for ease of analysis, the response rates have been merged to 'very important', 'important' and 'not important'. The second phase was the semi-structured interviews with 20 project practitioners from the selected public research organisations. The interview sought to confirm the organisational structure in place in each organisation, the routine processes in place for project execution, how many projects were executed in a year, how the projects were selected and the success rate of the projects selected for execution. Furthermore, the application of SPM in the execution of R and D projects, strategic project framework in place and the challenges faced in applying the principles of project management during project execution were investigated. The final stage, was the validity and reliability of the research findings, which involved assessing the plausibility and credibility of the findings and any evidence provided in support of them. These were carried out using a focused group and the purpose was to verify and also add richness to the research findings.

The organisations used for this research have been renamed as organisation A, B, C, D and are involved in research and development (R and D) activities in Nigeria. There were a total of 300 questionnaires distributed to project management practitioners holding both top and medium positions. However, 213 completed questionnaires were retrieved and used for the analyses. The data analyses were carried out using IBM SPSS for Windows 21 and NVIvo, which enabled the researcher to analyse data very quickly and in many different ways (Bryman and Cromer, 2011). The findings of this study are discussed in the next section.

4 Findings

4.1 Project management practices

On the practical implementation of project management practices, Table 1 shows an overview of the respondents' responses on the activities that are carried out during project execution. The respondents were asked to state if the SPM processes following the project life cycle were applied in the execution of R and D projects, and if yes, to rate the level of implementation in the organisation. The result for the level of implementation is a summary of the rating for the most implemented process in the organisation. This

was to enable the researcher to interpret the findings with regard to how well these activities were carried out in the execution of R and D projects.

Table 1 Survey of project management practices

Summary of Project management practices	*Yes (%)*	*No (%)*	*Level of implementation*				
			Excellent (%)	*Above average (%)*	*Average (%)*	*Below average (%)*	*Un-satisfactory (%)*
Appointment of project team at project initiation	95.8	4.2	22.1	32.8	33.8	8.8	2.5
Preparation of project charter	91.0	9.0	13.5	42.2	28.1	12.0	4.2
Preparation of feasibility study	88.3	11.7	7.9	38.9	36.3	12.6	4.2
Environmental impact assessment	61.6	38.4	9.2	28.5	39.2	16.2	6.9
Preparation of project sustainability	87.3	12.7	10.9	34.2	35.9	13.6	4.9
Risk assessment	73.7	26.3	13.7	34.6	26.1	19.6	5.9
Job description for project team	77.5	22.5	13.6	41.4	31.4	11.5	2.1
Setting up of project office	80.7	19.3	10.4	36.1	36.8	12.5	4.2
Preparation of a detailed project plan	95.3	4.7	12.4	42.1	31.2	11.4	3.0
How well financial plan is prepared	95.3	4.7	15.3	38.6	33.2	7.4	5.4
Development of quality plan	88.3	11.7	9.5	39.2	34.4	15.3	1.6
Development of risk plan	56.5	43.5	8.3	25.6	34.7	20.7	10.7
The level organisations preparing procurement plan	92.0	8.0	13.4	31.4	38.1	13.9	3.1
The level of communication plan development	85.4	14.6	7.6	31.9	37.3	19.5	3.8
Organisation's ability to monitor and control project activities	95.3	4.7	11.2	38.5	28.3	18.0	3.9
Organisations managing communication with stakeholders	93.0	7.0	10.2	36.2	33.7	16.3	3.6
How well funds are managed	91.0	9.0	12.2	29.1	32.3	18.5	7.9

Table 1 Survey of project management practices (continued)

Summary of Project management practices	*Yes (%)*	*No (%)*	*Level of implementation*				
			Excellent (%)	*Above average (%)*	*Average (%)*	*Below average (%)*	*Un-satisfactory (%)*
Management of project risk	81.5	18.5	8.2	30.4	40.4	17.0	4.1
Management of time during project execution	77.6	22.4	11.7	29.4	35.0	18.4	5.5
Pass through due process for project procurement	94.8	5.2	18.6	38.7	29.6	9.0	4.0
Set standards for delivery of project output	89.0	11.0	15.8	36.1	38.8	7.1	2.2
Management of changes during implementation	92.4	7.6	11.7	20.9	45.4	15.8	6.1
Organisation's carrying out project evaluation at closure	89.2	10.8	9.7	36.0	33.9	14.0	6.5
Organisations disseminating lessons learned from projects	84.0	16.0	9.5	32.4	33.0	16.8	8.4
Organisations documenting and archiving all project documents	95.3	4.7	17.2	31.0	31.0	14.8	5.9

The survey findings showed that project management standards were practised in PROs, however regarding the level of implementation, not all the processes were implemented as required. The survey findings revealed that although 95.8% of the participants agreed that project teams were appointed at the beginning of projects, 33.8%, 8.8% and 2.5% of this 95.8% stated that the level of implementation was average, below average and unsatisfactory respectively, indicating that the process was not adequately implemented.

The preparation of a project plan, financial plan and the organisation's ability to monitor and control project activities each had 95.3% of the respondents agreeing that these processes were carried out in their organisation. But then the level of implementation differed, with the majority of the respondents indicating that the level of implementation was average, below average and unsatisfactory. However, regarding project plans, although a small majority of the respondents stated that the level of implementation was above average and excellent, there were still a significant number of respondents who reported that the level of implementation was low.

It was deduced therefore that project plans were inadequately prepared which affected its implementation. The formulation of a strategic plan for the execution of projects in the organisation has no effect on the organisation's performance without proper implementation. According to Jooste and Fourie (2009), the best strategy formulation without implementation is just like a well-documented activity only, but strategy implementation is the key to better organisational performance. Furthermore, Dobni and

Luffman (2003) also stated that for a strategic plan to be of benefit to an organisation, its implementation is key, yet it is one aspect that has been relatively neglected. This showed that strategic plan is an important variable that can enhance organisational performance only when implemented. According to Noble (1999), well-formulated strategies only produce superior performance for the firm when they are successfully implemented.

With regard to practices that were not carried out, the development of project risk and its assessment scored the highest, and even when they were carried out, the participants still rated the implementation low, meaning that the project risks were neglected. The development of project risk is a critical step towards project execution and needs to be discovered and managed before it develops into a loss (Ochieng et al., 2013). As shown in Table 1 only 56.5% of the respondents reported that risk plan were developed, while 43.5% said that they were not developed, which is a significant number. The level of implementation was also low, with the majority agreeing that it was below average or unsatisfactory. One of the causes of success or failure in the management of projects is the approach to risk (Morris, 2009), and this was observed to be neglected in PROs in Nigeria.

Concerning the management of time during project execution, 22.4% of the respondents' reported that time was not managed, while 77.6% on the contrary agreed that project time was managed. However, regarding the level of implementation, the response varied with 35.0% of respondents rating the level of implementation average, while 18.4 and 5.5% of the respondents rated the process below average and unsatisfactory respectively. This showed that most of the respondents rated the process low, while only 29.4 and 11.7% of the respondents rated the process to be above average and excellent. With this result it was evident that time was not adequately managed. Indicating that there was the need to adopt a strategy that will enhance the execution of R and D projects in public research organisations in Nigeria.

4.2 Factors that affect SPM application

On the factors that affected the effective application of SPM in the execution of R and D projects, the findings from the study as shown in Table 2 revealed that appointment of project team had 76.7% of the respondents acknowledging that the appointment of project team was a very important factor. While the project funding had 73.3% of the respondents stating that funds were very important and was required for project execution. Meaning that for an effective application of SPM, the appointment of the project team and project funding were very important and could hinder the effective execution of R and D projects in public research organisations in Nigeria. For any projects to be executed, funds are important and required, indicating that while people are the driving force in the execution of projects, project funding was required for project execution. However, computing and software programs for managing projects had 29.7% of the respondents indicating that the variable was not important which was quite significant.

The use of organisations routines had 26.8% of the participants reporting that this was not important. Although participants gave a negative report, experience has shown that an organisations routine is one of the factors that can delays project success if not controlled. However, from the research findings, it was found not to be necessary in the application of SPM. The understanding of the project management principles and clear project management methodology had an average response with only 50.7% and 54.8% of the

participants respectively reporting that they were very important. The lack or inadequate knowledge of project management standards will affect the application of SPM in the execution of R and D projects. This is because the concept of SPM involves the combination of organisation's strategy and the project management techniques (Grundy and Brown, 2002) for effective execution of projects.

Table 2 Factors associated with SPM

SPM factors	*Very important (percentage)*	*Important (percentage)*	*Not important (percentage)*
Appointment of project team from the beginning	76.7	16.2	7.1
Experiences and competences of the project team to the nature of the project	65.1	23.9	11.0
Understanding the principles of project management	50.7	34.8	14.4
Adoption of well-defined project management framework	47.1	37.3	15.7
Computing and software programs to manage projects effectively	35.4	34.9	29.7
Communication between project team and the management	61.8	28.5	8.7
Planning of the project	64.1	25.2	10.6
Feedback from previous projects	36.5	46.6	16.8
Standards and specifications for the elements of the project	56.5	34.4	9.1
Stimulation and motivation of employees	56.9	25.4	17.7
Organisations routines procedures	29.1	44.0	26.8
Clear project management methodology	54.8	29.3	15.9
Team working between all team members of the project	63.2	24.6	12.0
The project funding	73.3	14.3	12.4

From the qualitative findings, variables found to affect the practical application of SPM was the employee's attitude towards the implementation of SPM. This hindered some of the organisations that have developed a strategic plan from implementation. Furthermore, the lack of knowledge in SPM concept and generally in project management principles alongside the public research organisations culture contributed to inadequate or non-application of SPM in the execution of R and D projects. According to McDermott and O'Dell (2001), organisational culture is not homogeneous. There are always sub-cultures, sometimes merely different from the organisation as a whole, and sometimes in opposition to it. In this study, even organisations that acknowledged that strategic plan were developed for the execution of R and D projects, were found to experience a set back due to the employee's attitude and research organisational culture. To address these, the following strategies have been identified to help project

management practitioners minimise the barriers and enhance the execution of R and D project using SPM concept.

5 Strategies for overcoming SPM barriers

There are numerous barriers that inhibit the application of SPM on the execution of R and D projects in public research organisations, both at the strategic, operational and project level. These include:

- lack of project team development
- project funding
- knowledge on SPM
- project management techniques
- research organisation's culture
- employee's attitude.

The barriers that tend to inhibit the adoption and implementation of SPM techniques typically relates to the competitive nature of the organisation. However, the notion of achieving strategic fit in an organisation are concentrated on the successful realisation of strategies by ensuring that there is an alignment between the strategy and organisation (Gupta and Govindarajan, 1984; Miles and Snow, 1984, John and Dennis, 1993). According to Institute of Project Management Ireland, history have shown that one of the main reasons of projects failure in public organisations is the inability of project management practitioners in the public organisations not thinking through an implementation strategy fully. Meanwhile until implementation occurs, a project remains an investment of resources. It achieves its full value only when deployed successfully (PMI Ireland, 2013).

Furthermore, studies by several other authors (Miller, 1997; Okumus, 2001; Salem, 1998; Scholz, 1987) identified implementation variables, which they believe would contribute to successful implementation of strategies if well managed. These include strategy formulation, organisation's environment, organisational culture, organisational structure, project planning, communication, project funding and the people. This confirms the factors identified in this study that can affect the effective application of SPM in the execution of R and D projects in research organisations. The importance of people or the project team in the application of SPM is also evident in different implementation frameworks, (Candido and Morris, 2001) which included people as an important factor that is crucial to ensuring successful implementation. Although literature available did not offer ways to overcome barriers in the implementation of strategy, they have provided useful theoretical background to this study.

From the research findings, the following strategies have been identified to improve the effective application of SPM in public research organisations in Nigeria. The strategies have been listed as follows:

- Project plan that defines the projects: the strategy of developing a plan that defines the project for everyone in the team involved in the execution of the project to understand will help all the stakeholders to clearly understand the aim of executing

the project. For example, when the aim and objectives of an R and D project to be executed is explained to the team, there will be an enhanced knowledge and reduced time in achieving the project aim and objective.

- Management involvement: the top management involvement and support is an important factor for effective execution of projects in an organisation. Projects with management support receive all the attention required and continuous feedbacks are received. Thus enhances project implementation.
- Project team approach: the use of project team approach in the implementation of SPM in the execution of R and D projects, involves developing a project team that will execute the specific project. According to Medinschi and Colta (2009), the first major step to be taken in planning for a project was the formation of a project team that will execute the project. Formulation of a project team helps in employing the required skills for effective execution of the project.
- Strategic project leadership: involving a strategic leader with strong understanding of project management techniques is an important approach that will employ the knowledge of the strategy as it relates to the projects, the process of executing projects and the leadership skills of inspiring and motivating the project team in order to achieve success.
- Employee's motivation: from the research findings the project team or the people were the most important variable in the application of SPM in the execution of projects. Indicating that people are crucial for the execution of any project, as the project do not execute themselves, but rather the people. The motivation of the employee's involved in the execution of projects thus is an important approach. This will enhance their productivity and also enhance organisation's performance. The application of SPM therefore would be enhanced when the employees are motivated.
- The use of problem-driven-approach in the selection of projects: a problem-driven approach in a research organisation will involve focusing on a particular challenge or opportunity and use it to select the project that will address the problem or achieve a success. These will involve the following.
  a identifying the problem or the opportunity why the research project is being executed
  b outlining the organisational and governance measures required to address the problem
  c ensuring that the political economy drivers are involved in both to identify obstacles to progressive change and to understand where a 'drive' for positive change could emerge (Fritz, et al., 2009).

The approach if employed will enable the research organisations enhance the execution of R and D projects and also achieve a competitive advantage.

6 Conclusions

This study identified barriers that affected the application of SPM in public research organisations in Nigeria. These include lack of project team development, project

funding, and knowledge on SPM, project management techniques, research organisation's culture and employee's attitude. To enhance the application of SPM, the public research organisations need to define projects for everyone to understand, ensure that top management are involved, formulate project team for the project, motivate employees because people are essential to project implementation, engage a strategic project leader and also use a problem-driven-approach in selecting R and D projects. The concept of SPM is concerned with the management of complex projects by combining organisation's strategy and project management techniques. As a result, for useful application of SPM in public research organisations, the adoption of the strategies will enhance its use and also aid the project management practitioners in public research organisations in Nigeria execute R and D projects efficiently and achieve competitive advantage.

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