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# **Methodology for developing capability maturity levels for PPP stakeholder organisations using critical success factors**

## **Abstract**

**Purpose-** The success of any public-private partnership (PPP) project is largely dependent on the country's maturity on critical success factors (CSFs) that made PPP projects successful. Thus, the identification of metrics and standards for measuring the maturity of stakeholder organisations on CSFs for PPP projects implementation remain a challenge. Therefore, the purpose of this study is to use CSFs to develop a process maturity and determine the current maturity levels of stakeholder organisations in PPP projects implementation in Nigeria.

**Design/methodology/approach-** The study adopted literature review and six PPP project case studies including interviews in each case study and expert forum. The outcome of a comprehensive literature review provides a total list of fourteen CSFs that made PPP projects successful in Nigeria. These CSFs were employed for capability maturity levels definition ranging from level 1(Ad hoc) to level 5(Optimizing) in line with Capability Maturity Model (CMM) concept. Quantitative assessment was considered as a support tool for making an overall assessment of both the public and private organisations current capability maturity levels and for comparison approach.

**Findings-** A capability enhancement framework for stakeholder organisations in PPP project was developed. This framework was employed in assessing the current capability maturity levels of stakeholder organisations involved in PPP projects in Nigeria. Using this framework, it was found that public sector organisations were positioned between maturity level 1 and maturity level 2 (out of 5 maturity levels) on CSFs applicable to them. While most private sector organisations were placed in maturity level 2 on CSFs associated with them.

**Practical implication:** The results emanated from this study provided both the theoretical and practical implications. The theoretical implication provides new insights into the usefulness of CSFs in PPP projects and indicates that merely identifying possible CSFs for PPP projects are not sufficient. The practical implication shows that the framework developed in this study had provided the benchmark for the identification of methodical approach, and standard to process improvement in PPP infrastructure projects, which can be replicated in both the developed and developing countries. Thus, the framework could be used to benchmark future studies.

**Originality/value-** The framework would provide a useful guide and roadmaps for improvement by indicating 'what' needs to be done by stakeholder organisations involved in PPP projects in achieving higher capability maturity levels on identified CSFs for PPP projects in Nigeria and developing countries at large.

**Keywords:** Critical success factors, capability maturity model, PPP projects, organisations, stakeholders, Nigeria.

Paper type **Research paper**

## **Introduction**

Governments in many countries ranging from mature economies to emerging market economies have found partnerships with the private sector as an attractive alternative to increasing and improve the supply of public infrastructure facilities. In line with global

trends, both the federal and state governments of Nigeria are ameliorating the key infrastructure challenges through the involvement of the private sector in infrastructure development via PPPs. This has led to over 51 infrastructure projects undertaken through PPPs between 1990 and 2009 (Vetiva, 2011). In 2013 and 2014, about 66 PPP infrastructure projects were in the pipeline (Infrastructure Concession Regulatory Commission, 2014). At present, the number of PPP infrastructure projects undertaken in Nigeria are of increase ranging from airport, seaports, roads, rails, power and energy, markets complex development, university hostel development, housing, commercial offices among others. Therefore, in a globalizing world there is a considerable interest in identifying critical success factors (CSFs) that made PPP projects successful (see Qiao *et al.*, 2001; Jefferies *et al.*, 2002; Zhang, 2005; Li *et al.*, 2005; Cheung *et al.*, 2012; Babatunde *et al.*, 2012; Dada and Oladokun, 2012; Famakin *et al.*, 2012; Babatunde *et al.*, 2015) among others.

Bullen and Rockart (1981) argued that the potential application and usefulness of the CSFs concept generated considerable interest in industry, as CSFs seemed to be an aid to management to strategize, plan, manage, monitor and achieve organisational goals. This is affirmed by many researchers. For instance, Ram and Corkindale (2014) asserted that the births of CSFs have introduced a new organisational approach for helping to achieve performance goals and competitiveness. The CSFs concept promised a systematic way of identifying the key areas that require the constant and careful attention of management to achieve performance goals. Fortune and White (2006) asserted that CSFs are the best-known approach for tackling the human and organisational aspects of projects. Niazi *et al.* (2003) argued that CSFs are used to establish a baseline to formulate a means for the maturity of the process. Yeo and Ren (2009) claimed that process maturity is mainly dependent on key capability areas extracted from CSFs. Ali and Kidd (2013) stated that the identification of CSFs help practitioners to work on areas responsible for the success of a process. Niazi *et al.* (2003) emphasised on the identification of CSFs is the measure to provide guidelines for improvements.

World Economic Forum (WEF) (2013) reported that the success of any PPP project is largely dependent on the country's maturity on each CSF that made PPP projects successful. Thus, approaches to using CSFs to develop PPP process maturity received scarce attention. For instance, there is a paucity of studies conducted to investigate the maturity of stakeholder organisations on CSFs for PPP projects, especially in Nigeria and developing countries at large. Few studies that investigated PPPs maturity (see Deloitte, 2007) failed to discuss the phenomenon from primary stakeholder organisations' perspectives. This study aims to fill this gap. It is in pursuance of this that primary stakeholder organisations in both the public and private sectors already involved in PPP projects implementation to include public sector authorities, concessionaires, local lenders/banks, consultants, and contractors are assessed to know their current capability maturity levels in respect to CSFs for PPP projects in Nigeria.

### **Capability maturity model (CMM) concept**

Capability maturity concept has its origin in quality process improvements and traces back to Crosby (1979) studies in the late 1970's. Paulk *et al.* (1993) stated that Capability Maturity Model (CMM) was first developed in the software industry by the Carnegie Mellon University as a framework to inspect capability maturity of software providers. Fraser *et al.* (2002) affirmed that the modern day capability maturity concept gained its popularity based on the software CMM, initiated in the early 1990's in the USA. Eadie *et al.* (2011) asserted that since 1991, many CMMs have been developed and recognised internationally. The concept of CMM is increasingly applied in many disciplines. For example, software

















(2) The case studies assessment on suitability and applicability of the framework showed a consensus among the stakeholders that the framework is suitable for use and has practical relevance in PPP projects implementation particularly in Nigeria. Several of the stakeholder responses are as follows:

- A project consultant in case study 3 has this to say:  
*“The framework is first of its kind in implementing PPP projects in Nigeria. It offers a useful guide”.*
- A stakeholder from Lagos State Development and Property Corporation (LSDPC) that involved in case study 5 said:  
*“The framework is logical, clear and very useful. But if it can be assessed electronically, it would facilitate the usage”.*
- A stakeholder from Lagos State Public Private Partnership (PPP) Office that involved in case study 1 said:  
*“This is a thorough framework for measuring the maturity of different stakeholder organisations on critical success factors. The framework captured all critical success factors that always present in successful PPP projects in Nigeria. Moreover, the framework can be used as an assessment tool for prequalification of bidders in future PPP projects in Nigeria”.*

(3) Based on these selected responses and other meaningful recommendations made by the selected stakeholders in the six case studies, it is evident that the framework is relevant and very useful in PPP projects implementation in Nigeria and the stakeholders are happy to use the framework.

To further prove the reliability and validity of the framework developed in this study, external validation was conducted (see Figure 2). This validation process involved the PPP experts in the public and private sector organisations, and academia. This is supported by earlier researchers. For instance, Liyanage and Egbu (2008) refined and validated the performance management framework (PMF) using the views of practitioners and academia, and the academia were mainly university lecturers and professors. Cheung (2009) validated a best practice framework for implementing PPPs in Hong Kong using nine respondents comprised PPP experts and academia among others. Therefore, the validation and evaluation of the framework was based on six assessment criteria identified by Yeung (2007), Cheung (2009), and Awodele (2012). The six assessment criteria include comprehensiveness; objectivity; practicality; replicability; reliability; and overall suitability of the framework for use in Nigeria. In this regard, the six aforementioned assessment criteria were used to develop a questionnaire survey for validation and evaluation of the framework. The questionnaire survey was based on a similar validation process undertaken by previous researchers. For instance, Yeung (2007) adopted questionnaire survey to validate the partnering performance index model. Cheung (2009) conducted questionnaire survey to validate the best practice framework for implementing PPP projects in Hong Kong. Awodele (2012) employed questionnaire survey to validate the framework for managing risk in the privately financed project in Nigeria among others. Thus, the following criteria were set-up to select the respondents for validation exercise:

- Having extensive working experience in PPP projects in Nigeria.
- Involving directly, recently, or currently in PPP projects in Nigeria.
- Having reached the managerial level in the public sector or managing director in the private sector or active researcher in academia.



process improvement in PPP infrastructure projects implementation received scarce attention. Thus, there is a need for a methodical approach and standard to process improvement in PPP projects. Against this backdrop, this study adopted the concept of CMM with respect to critical success factors (CSFs) to develop a capability enhancement framework for stakeholder organisations in PPP projects. The application of the framework in assessing the current capability maturity levels of primary stakeholder organisations involved in PPP infrastructure projects in Nigeria revealed that public sector organisations were between maturity level 1 and maturity level 2 (out of 5 maturity levels) on each CSF applicable to them. While private sector organisations were mostly in maturity level 2 on each CSF associated with them. It is established in this study that Nigeria's maturity is between maturity level 1 and maturity level 2 (out of 5 maturity levels) on CSFs that made PPP projects successful. These findings are similar to previous studies that found low maturity level, which is between level 1 and level 2 in all project management knowledge areas for public sector organisations involved in both large infrastructure projects development and in PPP infrastructure projects in South Africa and Botswana among others. This study is not without limitations. First, the identification of CSFs adopted to develop the framework based on a literature review, having other methods together such as questionnaire survey, which allows a rigorous statistical analysis may enrich the findings. Second, currently no such framework developed in this study exists for process improvement in PPP projects. Thus, the accuracy needs improvement in future work. Third, the framework is currently designed for stakeholder organisations in PPP projects, hence limiting the use of the framework to PPP projects only. Despite its limitations, the framework developed in this study would be a useful guide and providing roadmaps for improvement by indicating 'what' needs to be done in achieving higher capability maturity levels on each CSF applicable to both the public and private sector organisations in PPP projects in Nigeria. Also, the framework had provided the benchmark for the identification of methodical approach and standard to process improvement in PPP projects, which can be replicated in the developed and developing countries. Therefore, the framework is expected to enhance the success rate of PPP projects implementation, most especially in Nigeria and developing countries as a whole. The study findings would further enhance the conceptual and practical utility of the CSFs concept in the construction industry at large. Based on the findings of this study, the following policy recommendations are proposed:

- It is recommended that the public and private sector organisations in PPP projects, most especially in Nigeria and other developing countries are encouraged to apply the framework, as the framework provided feasible improvement roadmaps in achieving higher capability maturity levels.
- Since both the public and private sector organisations are in low capability maturity levels, it is therefore required of the stakeholder organisations in PPP projects implementation to undertake broad improvement programmes in achieving higher capability maturity levels. Consequently, once the improvement programmes are implemented; they need to be assessed to see whether they are effective.

It is evident that this study has not only made contributions to knowledge in relation to the use of CSFs to develop PPP process maturity framework for stakeholder organisations in PPP projects, but also contributes to the wider body of knowledge of process improvement in the construction industry. Therefore, further study should be conducted to widening the understanding of CSFs to develop PPP project process maturity in other countries, using a comparative approach.

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