Risk Assessment for Public-Private Partnership in Radio-diagnostic facilities in Nigeria

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Abstract

Background: Public-private partnerships (PPP) have emerged as a solution to funding of the radio-diagnostic services in the Nigerian health sector and earlier studies had shown that an objective risk assessment model could guarantee the success of the PPP projects. Empirical studies in this research domain are limited.

Objective: To estimate the significant level of risk factors associated with PPP projects involving radio-diagnostic services in Nigerian hospitals.

Methodology: A total of 122 questionnaires aimed at examining the relative importance of different risk factors were sent out but 82 (67.21%) were returned for data analysis. The target respondents were Radiographers, Radiologist, investors from the private sector involved in radiology PPP projects, hospital administrators in charge of Radio-diagnostic PPP and academics who have gained in-depth knowledge of the PPP model through research. SPSS version 17 was used to analyze the data.

Results: The empirical findings show that the leading most important risk factors in PPP involving radio-diagnostic facilities in Nigeria are (1) Government corruption; (2)foreign exchange rate fluctuation; and (3) inflation.

Conclusion: The obstacles to the success of PPP in radio-diagnostic facilities in Nigerian may come from Government corruption, foreign exchange rate fluctuation and inflation. This study will guide the risk managers to deal with the vital few high risks first before the trivial ones.

Keywords: Public-private partnerships (PPP), Radio-diagnostics, Risk assessment, Nigeria.

Introduction

Nigerian government funds public radiodiagnostic services through different mechanisms for public health care financing. These include budgetary allocation, the user-pay system by the clients, insurance coverage and donor funding [1]. Underfunding of the radiodiagnostic department results in a limited capacity to maintain the machines or replace the obsolete ones in order to catch up with the modern technology [2]. Recruitment and retaining of the best hands are also hampered. Public-private partnerships (PPP) financing has been seen as innovative tools for financing major infrastructure projects [3].

Public-Private Partnership has been commonly adopted in sectors that offer the most potential for commercial opportunities such as health care and hospital [3]. Nigerian government in recent years has received and widely adopted PPP. This is evident in the demands of heads of federal government owned tertiary hospitals seeking the use of PPP as a measure of sustainable health care financing in Nigeria [4]. A Public-Private Partnership is a project that is funded and operated through a partnership of government and the private sector. This is based on the assumption that the private sector is stronger and their participation has a way of delivering public services faster and contributes to significant cost saving [5]. These projects are delivered in a timely, efficient and cost-effective manner; encouraging participation of small and medium sized enterprises and enhancing the health safety and wellbeing of the public [6789].

Risk in radiology related PPP projects arise from many sources including politics, policies, market conditions and operation/economic environment. Therefore despite the perceived advantages of PPP, these risks often lead to the failure of the projects. Risk assessment is a crucial component of project risks management [3]. It is an objective evaluation of assumptions and uncertainties by clear consideration and presentation. A risk Assessment

model provides a list of risk ordered from the most significant down to the least significant.

The two quantities which risk assessment is concerned with are probability of occurrence and impact, also known as potential loss [10]. In theory, both are equal but in practice risk with a high impact and a low probability of occurrence are often handled differently from the one with a low impact and high likelihood of occurrence [14]. In this case risk(R) is expressed as a product of probability (P) and impact (I) [3]. Expressed mathematically: R= PI

Objective analyses that rely on historical information and experiences of professionals and researchers have been used to assess the impact of risk and uncertainty, since the early 1990's [11,3]. The approach has always been identification and classification of risk factors, assessment of their effects on the project and selection of ways to control them [3,8,9]. From reviewed literature, twenty-four risk factors for PPP, in general, were identified in addition to eleven project specific risk factors linked to radio-diagnostic services. The risk factors associated with PPP projects ranged from government corruption, government intervention, interest rate fluctuation, foreign exchange rate fluctuation, inflation, political/public opposition, change in market demand to environmental risk while the radiation risk factors relating to radio-diagnostic services ranged from poor knowledge of radiation protection, lack of workplace monitoring to lack of immobilization devices. Risk classification reflects the purpose of risk management [9]. Based on the literature review, five categories of risks were summarized as thus: political, economic, legal, natural and radiation/operation risk group [3,8,9].

While the risk factors of PPP in other sectors like road construction and water sector have been investigated extensively, comparable knowledge in radio-diagnostic services is still scarce. This may lead to poor management and eventual failure of the projects. This study investigated the risk factors and also established risks assessment model for PPP in Radio-diagnostic facilities in Nigerian hospitals.

Previous Research Studies on Risk Assessment in PPP Projects

Attempt to estimate risks associated with PPP by researchers commenced in the late 1990's. However, after 2010, there has been an increase in the number of publications on risks assessment. The Chan et al., empirical study of risk assessment and allocation in PPP aimed at identifying and assessing the principal risks for the delivery of PPP in China. They used questionnaire survey from 105 respondents with long-term experience in PPP projects to calculate the mean rating of each risk factor of PPP projects in China based on the product of risk probability and risk impact (Risk significance = Risk Probability x Risk Impact). The study revealed that government intervention, government corruption and poor public decision-making processes are the three most important risk factors. The study also attributed this to inefficient legislative and supervisory systems [3]. On the contrary, an earlier study titled 'Risk management framework for construction projects in developing countries" by Wang et al., conducted among professionals using questionnaire survey showed that top critical risks in Chinese PPP were entity reliability, change in law and force majeure. Government corruption ranked sixth [12]. This is an indication that risk factors do undergo changes over time.

Materials and Method

This study was a cross-sectional survey. It was carried out in four selected radiology departments in Nigerian hospitals involved in PPP projects within a period of twelve months from January 2017 to December 2017. Risk identification is the first step in risk assessment and a total of 35 risk factors for PPP in Radio-diagnostic projects were identified after conducting a literature review. The identified risk factors were classified into 5 groups according to their nature. The target survey respondents belonged to four categories: (i) investors from the private sector involved in radiology PPP projects. (ii) Hospital administrators involved in radiology PPP projects (iii) radiologists and radiographers involved in PPP projects (iv) academics who have gained in-depth knowledge of the PPP model through research. The reason for the inclusion of academics is because their views are widely believed to be objective [3]. A total of 122 questionnaires were sent out but 82 were returned for data analysis. This made it a response rate of 67.21%. Five-point Likert format was used as a measurement scale and each respondent scored each of the 35 risk factors with it. The assessment of the different risks in PPP projects is based on their probability and impact. With respect to the probability of occurrence and impact, the five-

point Likert scale represented; 1=very low, 2=low, 3= average, 4=high and 5=very high. Statistical Package for Social Sciences (SPSS) version 17 was used for the analysis.

Results

Table 1. Background information of the Respondents

Variables	Frequency	Percentage
Working experience of survey respondents		
Under 1year	2	3
1-5 years	19	23
6-10years	17	21
11-15years	20	24
16-20years	18	22
Above 20years	6	7
PPP experience of survey respondents		
Under 1year	2	3
1-5 years	36	44
6-10years	42	50
11-15years	2	3
16-20years	-	-

Table 2. Risk Ranking of PPP in Radiodiagnostic Facilities in Nigeria for Political and Economic risk groups

Risk group	Risk factor	Probability	Impact	Significant	Overall Ranking
Political	Government corruption	3.88	3.96	16.23	1ST
	Government intervention	3.21	3.16	11.18	20th
	Public credit	3.09	3.23	10.84	22
	Naturalization/exploration	2.94	2.91	9.40	28th
	A poor public decision-making process	2.90	3.00	9.41	29th
	Political/public opposition	3.28	3.29	11.69	16th
	Political interference	2.92	2.91	8.49	32
Economic	Foreign exchange rate fluctuation	3.88	3.87	16.07	2nd
	Inflation	3.72	3.80	14.62	3rd
	Interest rate fluctuation	3.81	3.35	13.33	9th
	Financial risk	3.56	3.74	13.88	5th
	Debt servicing risk	3.22	3.41	11.67	17th
	Price change	3.59	3.56	13.98	4th
	Expense payment risk	2.63	3.17	8.75	31st
	Projects/operation changes	3.04	3.12	9.92	27th
	Market competition	3.34	3.06	11.05	21st
	Change in market demand	3.20	2.94	10.33	24th

Table 3. Risk Ranking of PPP in Radiodiagnostic Facilities in Nigeria for legal and natural risk groups

Risk group	Risk factor	Probability	Impact	Significant	Overall Ranking
Legal	Legislation change	3.25	3.46	12.38	12th
	Imperfect law and supervision system	3.13	3.06	10.73	23rd
	Change in tax regulation	3.15	3.22	11.23	18th
Natural	Industrial strike	3.03	2.98	9.93	26th
	Terrorism (Force majeure)	2.82	2.88	9.08	30th
	Unforeseen we ather/geotechnical conditions	2.52	2.52	7.12	33rd
	Environmental risk	2.52	2.47	6.86	35th

Source: Research data

Table 4. Risk Ranking of PPP in Radio-diagnostic Facilities in Nigeria for Radiation/operation risk group

Risk group	Risk factor	Probability	Impact	Significant	Overall Ranking
Radiation/operation	Poor knowledge of radiation protection	2.67	3.38	10.04	25th
	Lack of periodic quality assurance checks on the x-ray machines.	3.42	3.42	11.82	15th
	Unavailability of person nel protective devices e.g. Lead rubber shield.	3.32	3.43	11.88	14th
	Lack of workplace monitoring.	3.04	3.91	12.73	11th
	Unavailability of personnel monitoring.	3.05	3.61	13.67	7th
	Lack of portable radiation surveying instrument e.g. Survey meters.	3.53	3.54	13.85	6th
	Unavailability of installed protection instrument e.g. Area radiation monitors, airborne contamination monitors.	3.22	3.63	13.25	10th
	Lack of periodic integrity check on the personnel protective devices e.g. Lead rubber aprons.	3.34	3.72	13.53	8th
	Lack of re-training.	3.33	3.26	12.05	13th
	Poor workplace supervision.	3.15	3.16	11.22	19th
	Lack of immobilization devices.	2.55	2.58	6.98	34th

Source: Research data

Table1 shows that very few of the respondents (n=2; 3%) have industrial experience of less than one year and the highest count (n=20; 24%) worked up to fifteen years.

Table 1 shows that though twenty-two (29%) of the respondents have worked for more than sixteen years but only two (3%) were exposed to PPP setting for a period up to 15 years.

Table 2 shows that the most significant risk factor is government corruption with the mean risk significant value of 16.23. The second risk factor is foreign exchange rate fluctuation with the value of mean rating of 16.07 and the third is inflation with the value of 14.62. The risk factor with the highest probability of occurrence was foreign exchange rate fluctuation with the value of 3.88 while the risk factor with the lowest probability of occurrence in this group is Expense payment risk with the value of 2.52. Severity was highest at foreign exchange rate fluctuation with the value of 3.87 and lowest at Naturalization/exploration and Political interference with the value of 2.91.
Table 3 shows that the most significant legal risk factor is Legislation change with the mean risk significant value of 12.38. The most significant natural risk factor is Industrial strike with the value of mean rating of 9.93. The risk factors with the lowest probability of occurrence in the study were Unforeseen weather/geotechnical conditions and Environmental risk each had a value of 2.52.

Table 4 shows that the most significant Radiation/operation risk is Lack of portable radiation surveying instrument with the mean risk significant value of 13.85. The least significant is Lack of immobilization devices with a mean value of 6.98. The risk factor with the highest probability of occurrence in the group is Lack of portable radiation surveying instrument with the value of 3.53. Severity was highest at Unavailability of installed protection instrument with the value of 3.63 and lowest at Lack of immobilization devices with the value of 2.58

Discussion

The survey result presented in a table shows that Government corruption, foreign exchange rate fluctuation and inflation are the most significant risk factors in this study. Two of the risk factors fall within the economic risk group. The major obstacles to the success of PPP in radio-diagnostic facilities in Nigerian do not come from the very intrinsic part of the project which is radiation-related risks. This implies that Government corruption and foreign exchange rate fluctuation will be the possible reasons for the failure of the PPP project in Radio-diagnostic in Nigerian. Government corruption as the leading risk factor reported in this study is in agreement with the study by Chan et al., in which the top 3 risk factors were government intervention, government corruption and poor public decision-making processes [3]. This places government corruption as the leading threat to the success PPP globally.

In this study, Foreign exchange rate fluctuation ranked 2nd, Inflation 3rd, Price change 4th and Financial risk 5th. The aforementioned risk factors come under the economic risk group. This could be attributed to the prevailing instability in foreign exchange rates and the high inflation rate in Nigeria and their effects on various economic variables [13]. Almost all radiological equipment used in Nigeria is imported from foreign countries. Their installations, as well as maintenance, most often require the services of expatriate and all these transactions are done with foreign exchange. Probability and severity of economic risk were particularly high in foreign exchange rate fluctuation. Inferentially, in an event of foreign exchange instability in Nigeria, its negative impact on Radio-diagnostic PPP projects would be high.

The highest ranking radiation risk in this study is Lack of portable radiation surveying instrument with position number six in the overall ranking whereas Foreign exchange rate fluctuation from economic risk group ranked number two. It shows that radiation risks have a lower ranking than economic risks in this study. This could be because the operators of the project are more concerned with the economics of the PPP projects than their safety and that of the environment. This finding is in agreement with reports of the previous studies by Wang et al., and Chan et al., were the operational and construction risks which are the core characteristics of the PPP projections were ranked far below the economics and political risk groups [3, 12].

This study ranked legislation change from the legal group number twelve. This does not agree with the result of the study by Ke et al., which placed "change in law" at number one [14]. This is probably because the practitioners who participated in the Ke et al., study was more conversant with the PPP laws which give priority to a process of developing and reviewing PPP projects. Public-private partnership laws can also be used to close gaps in the laws of a country to allow for the success of PPP projects. These modifications may be embodied in sector-specific law, in this case, Radio-diagnostics. A major cause of other risks may be inefficient legislative and

supervisory systems for PPP projects [3]. There appears to be no sound legal backing and institutional framework for PPP projects involving radio-diagnostic facilities in Nigeria at the moment.

This study revealed that Industrial strike risk tops the list of the natural risks group above terrorism and environmental risks. Probably the incessant industrial actions in the health sector in Nigeria have become one of the biggest threats to the success of PPP in the radio-diagnostic facilities. More than eight industrial strikes from different trade unions and professionals associations in the health sector had crippled the activities in the public hospitals in the past five years [15]. Considering the hospital as a multi disciplinary setting, conflicts of interest usually result in strike action. These strikes would negatively impact on the investment potentials of the healthcare system. Contrary to the findings in the previous study by Chan et al., industrial strike was ranked below terrorism, unforeseen weather/ geotechnical conditions and environmental risk [3]. This is probably because countries like the People Republic of China have a stringent labour law that discourages industrial strikes [16]. The right to strike might be a fundamental human right and has been recognized in principles in most countries but the penalties to which those who organize or participate in strikes are liable to vary between countries.

Among the Radiation/operational risks group, unavailability of personnel monitoring and lack of periodic integrity check on the personnel protective devices were the leading risks which show that failure to provide the personnel radiation safety devices could lead to the failure PPP projects despite the presence of the state of the art equipment. Despite the perceived importance of unavailability of personnel monitoring, it occupied the 14th position in the overall ranking. This is in agreement with the study of Chan et al., where Project/operation changes from the operation group were the number 13th in the overall ranking [3]. The possible reason for the relatively low ranking of the risk factors from the operation group could be because the practitioners have mastered and modified the techniques to avoid the potential loss emanating from the risk factor. However, in the radiodiagnostics, the impact of radiation-related risks if they occur may exceed the monetary loss. Some incidents or accidents arising from the radiation may be considered 'too small' to be reported.

Whereas fifty-three percent of the respondents have working experience greater than ten years, only three percent of them have worked in a PPP setting for those number of years. This might attest to the lateness of Nigerian hospital administrators to embrace PPP as an alternative means of funding radio-diagnostic services.

Conclusion: An effective risk assessment model could help in the success of the implementation of PPP in Radio-diagnostic facilities in Nigeria. The research findings showed that the leading most important risk factors in PPP involving Radio-diagnostic facilities in Nigeria are Government corruption, foreign exchange rate fluctuation and inflation. These may cause obstacles to the success of the projects.

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