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Financial Risk and Adoption of Public-Private Partnerships in Kenyan Public Universities

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Authors' contributions

This work was carried out in collaboration among all authors. Author FMA designed the study, performed the statistical analysis, wrote the protocol, and developed the first draft of the manuscript. Authors GSN and MS managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Employment of public-private partnerships as a way of delivery of public utilities has been on the rise in the recent past. This has been driven by a number of factors, key among them being the ability of the public entity to transfer financial risk to private sector players who are better placed to mitigate such risks. The study purposed to assess the effect of financial risk on adoption of public-private partnerships in Kenyan public universities. The specific study objectives were to evaluate the influence of interest rate variability, revenue streams variability and exchange rate variability on adoption of public-private partnerships. The study employed a descriptive research design while targeting a population of 223 comprising of purposively selected employees from nine public universities. A sample size of 143 was used from whom data was collected using structured questionnaire. Data analysis employed use of both descriptive and inferential statistics. The results obtained show that interest rate variability, revenue stream variability and exchange rate variability have a statistically significant influence on adoption of public-private partnerships. On the basis of the study findings it was concluded that financial risk transfer had a significant positive influence on adoption of public-private partnerships in Kenyan public universities. It is therefore recommended that Kenyan public universities should thoroughly evaluate financial risk involved in any project before entering into public-private partnership arrangement in order to enhance value for money.

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Keywords: Public-private partnerships; adoption; financial risk; interest rate; revenue streams; exchange rate.

1. INTRODUCTION

1.1 Background of the Study

Previously the role of providing infrastructure solely rested with the government However over the years governments all over the world have sought to engage entities from the private sector in provision of public goods and other utilities. This has been realized through public-private partnerships (PPP) Carnis and Yuliawati [1]. PPP is an arrangement where the public sector entity engages a private sector party to provide certain public utilities that would have otherwise been provided by the public entity Mohammed, Abdulkadir and Usman [2]. In the recent past there has been an upsurge in employment of public-private partnerships in delivering a number of public amenities in various countries Mouraviev and Kakabadse [3]. This has been attributed to a number of factors including ability of public-private partnerships to alleviate financial burden as well as transfer of financial risk inherent in given infrastructure projects. Reallocation to the private entity is one of the basic features of a public-private partnership [4]. In a public-private partnership arrangement the public entity passes the financial risks inherent in a project to the private sector players who in most cases are better placed to mitigate the effects of such risks [5]. This enhances the success of the project hence occasioning greater value for money to the public entity.

1.2 Objectives of the Study

The overall study objective was to assess the influence of financial risk on adoption of public-private partnerships in Kenyan public universities. In specific the study aimed to:

i) To examine the influence of interest rate variability on adoption of public-private partnerships in Kenyan public universities.
ii) To evaluate the effect of revenue stream variability on adoption of public-private partnerships in Kenyan public universities.
iii) To determine the influence of exchange rate variability on adoption of public-private partnerships in Kenyan public universities.

2. LITERATURE REVIEW

Given the multiplicity of stakeholders involved in public-private partnership projects and considering the lengthy periods for such projects, it is important to prudently evaluate all risks that may have an effect on project. Depending on the nature of the project, risks could arise either at project level, market level or at country level Wang, Xiong, Wu and Dajian [6]. The success of PPP projects therefore heavily depends on prudent allocation of financial risk. A number of past studies conducted suggest that in general, it is prudent to allocate risks to that party with best ability to mitigate the effects of that risk when it occurs Nkambule [5]. Similarly Uddin and Zack [7] argue that risk should be transferred to private sector parties owing to their ability to manage risks when they occur. Hwang, Zhao and Gay [8] found out in their study that transferring financial risk to private sector parties is a welcome idea since they are better suited to manage such risks. The setup of public-private partnership arrangements is therefore hinged on the premise that risks are to be allocated to the private sector entities given their ability to mitigate the effects of those risks Chou and Pramudawardhani [9]. However, such transfer should be done with a view to enhancing the public entity's value for money from the utilities delivered Sakure, Sawant and Jagtap [10]. This is achieved by ensuring that the private sector entities attain the set contractual obligations fully and efficiently. It is imperative know that the level of risk allocated should be matched with proportionate reward for acceptance of that risk Hovy [11].

Financial risk arises due to the variability in the financial indicators that affect a PPP project Karim [12]. In specific, financial risk can be related to volatility in rates of interest, variability in exchange rates, revenue streams and such other factors that may have an effect on financing costs Zaharioaie [13]. Due to the complexity of PPP projects and considering the lengthy period of concession inherent in PPP, it becomes difficult to accurately analyse and control the risks involved Fernandes [4]. It therefore becomes important to transfer each risk to an entity best suited to mitigate its effects. It has been found that complex projects and those that employ high level of technology are more susceptible to resource risks Shishodia, Dixit and Verma, [14]. Similarly Fernandes [4] contend that a projects financial viability is highly dependent on the financial risks involved in the project. The implication is that high financial risk may result to higher cost of realizing the project thereby

decreasing the value for money expected by the public entity.

The major financial risks that impact on the public-private partnership include the exchange rate risk, the interest rate variability and revenue risk Zaharioaie [13]. Such variability in interest rates, revenue streams and exchange rates have an enormous influence on the eventual viability of PPP projects. Interest rate volatility is a significant risk factor in public-private partnership arrangements since it affects the cost of borrowing. It occurs when the local cost of funds significantly varies due to fragile local economic and banking system Karim [12]. In his study he contends that interest rate variability is a significant risk factor whose prudent allocation is required to ensure the PPPs viability.

It is generally agreed that PPP arrangement passes the risk of interest rate variation to the private sector entity which is best suited to mitigate such risk Chou and Pramudawardhani [9]. The essence of transferring these risks is for the public entity to attain value for money from the amenities rendered within the set contractual terms. Ke, Wang and Chan [15] posit that interest rate volatility is a crucial risk factor that may impact on the overall viability of a public-private partnership project. They agreed that this risk should be properly allocated to enhance performance and ensure that the public entity gets value for money.

The rate of exchange relates to the value of one unit of local currency to a unit of foreign currency. In most cases public-private partnership projects are financed by international lenders. Such lenders avail funds denominated in foreign currency. Under PPP arrangement it is widely considered prudent to allocate financial risks to private entities Uddin and Zack [7]. The fluctuation in the rates of exchange has an adverse effect on overall cost of borrowing. In addition, a weak local currency implies that more money will be needed to offset the foreign denominated loan. Variation in exchange rates is caused by a number of factors such as economic conditions and political conditions. The economic conditions can be home based or international. Generally a PPP project should be designed in a manner that allocates exchange rate variability to the party that is most suited to mitigate the risk when it occurs.

The variability in revenue streams arises when the cash flows vary significantly from what was anticipated. Projects should be managed in such a manner as to minimize the variation in revenue streams. This can be realized through purchase agreements and other related contracts that guarantee predictability. In general it is advisable to allocate financial risks to the private entities due to their ability to mitigate such risks. PwC [16], in a study conducted in healthcare sector, indicated that the level of development of the PPP market is irrelevant when it comes to managing financial risks. Thus private investors in both developed and developing PPP markets should be actively involved in management of financial risks in a public-private partnership. Generally the readiness of the private sector to undertake more risks in a PPP project is dependent upon the maturity of the PPP market in the respective country.

3. METHODOLOGY

Descriptive research design was used. The target population was 223 comprising of university employees from public universities in Kenya with a record of involvement in public-private partnerships. The study was conducted in 2019. Seven public universities were involved in the study. Purposive sampling was used to select respondents. A sample size of 143 was used, representing 64% of the target population. A questionnaire was employed in data collection. A response rate of 86% was attained. The data collected was subjected to both descriptive and inferential analysis.

4. FINDINGS AND DISCUSSIONS

The main study objective was to ascertain the effect of financial risk on adoption of public-private partnerships in Kenyan public universities. The indicators of financial risk were interest rate variability, revenue streams variability and exchange rate variability. The objective was evaluated based on the responses obtained from the questionnaire in which the respondents indicated their degree of agreement with the statements therein. The findings of the study are with reference to the Kenyan scenario.

4.1 Descriptive Statistics for Financial Risk on adoption of PPP

From the responses obtained from the questionnaire descriptive statistics for financial risk transfer and its influence on adoption of public-private partnerships in Kenyan public

universities were generated. The output of the analysis appears in Table 1. The output is on a Likert Scale of 1 to 5 (1-1.80 = Strongly Disagree while 4.20 – 5.00 = Strongly Agree)

The findings indicate that variability in interest rates has an influence on the overall cost of the project. This shows the need for public sector entities to put into consideration the effect of interest rate variability whenever they want to engage in public-private partnerships. This is represented by a mean of 4.21 which corresponds to strongly agree. Further the results showed that anticipated variability in revenue streams has an effect on the adoption level of public-private partnerships. In order to cover themselves from such variability public sector entities opt for public-private partnerships. This is indicated by a mean of 3.79 coinciding with "agree" on the given scales. In addition, the results of the study indicate that variation in rates of exchange ultimately influences the overall cost of the PPP project. This is premised on the fact that many lenders in PPP are foreign-based implying that payments have to be effected in foreign currency. Whenever there is an adverse fluctuation in the exchange rates the cost of debt would increase. Such anticipated variation in exchange rates would therefore drive public sector entities to adopt public-private partnerships so as to transfer the attendant risk to private sector entities. This is indicated by a mean of 3.96 coinciding with "agree" on the formed scales.

4.2 Testing Adequacy of Sample for Factor Analysis on Financial Risk

In order to determine whether the data collected on financial risk was adequate for purposes of factor analysis, Kaiser-Meyer-Olkin (K.M.O) value was computed. In addition, the Bartlett's Test of Sphericity was also calculated. The results of the two tests were used to determine whether or not to conduct factor analysis. The results as indicated in Table 2 show that KMO was 0.660 which is above the minimum recommended of 0.5. Similarly the Bartlett's Test of Sphericity based on 5% level of significance was found to be significant by p = 0.000. From the results it was concluded that factor analysis could be conducted.

4.3 Factor Analysis for Financial Risk Transfer

In order to explain the variability among the observations, factor analysis was performed. Factor analysis was also necessary in ascertaining the existence of any correlated variables with the aim of eliminating data that was deemed redundant. Ten (10) items comprising measures of financial risk as indicated by interest rate variability, revenue stream variability and exchange rate variability were subjected to a variance test. It was observed that all the ten (10) items of the measure of financial risk were found to be valid. This was based on the fact that all of them had factor loadings above 0.5, which is considered to be the minimum required. It was therefore necessary to reserve all the ten items for further analysis. Table 3 indicates the factor analysis results. From the findings it can be seen that there were three major factors that had greatest influence on financial risk, cumulatively explaining 48.4 percent of the total variation. This means that, 48.4 percent of the common variance shared by the ten constructs could be explained by just three factors. The first component accounted for 19.9 percent; the second item accounted for 14.7 percent while the third item explained 13.8 percent of the overall variance. All the three major factors (component 1-3) had Eigen values higher than 1.

In order to help in interpretation of the three components it was necessary to obtain a rotation component matrix. The results were indicated in Table 4. From the rotation matrix coefficients, it was seen that the major loadings in component 1 related to change in interest rate legislation and variability in interest rates. This component was renamed as change in interest rate legislation. Changes in interest rate legislation may have an adverse effect on the cost of borrowing leading to increase in financial risk. The main loadings in component 2 related to items on variation in fees/price charged and the need to transfer revenue stream variability. This component was renamed as prices/fees changes. The fees charged for the product provided by the PPP has an effect on the level of financial risk. The change in such fees leads to variation in expected revenue from the project thereby increasing the financial risk. In component 3, the major loading consisted of the need to transfer exchange rate variability. This component was therefore renamed as exchange rate variability. The ability to transfer exchange rate variability to the private entities influences the level of public-private partnership adoption.

Table 1. Descriptive statistics for financial risk

Statement	N	Min	Max	Mean	SD
1. Variability in interest rates affects the overall cost of public-private partnerships.	123	1	5	4.21	0.824
2. Changes in interest rate legislation affect the overall cost of PP projects	123	1	5	3.84	0.918
3. Need to transfer interest rate Variability risk leads to increase in the number of PPP projects initiated.	122	1	5	3.64	0.951
4. Variation in demand of product/service leads to variation in revenue streams of PPP projects	123	2	5	3.68	0.899
5. Expected variation in price/fees charged leads to variation in revenue streams of PPP	122	1	5	3.71	0.88
6. Variability in project revenue streams variability affects the variability of PPP projects	123	1	5	3.80	0.836
7. Need to transfer revenue streams variability risk leads to increase in the number of PPP projects initiated.	123	1	5	3.79	0.738
8. Variability in exchange rate has an effect on overall cost of PPPs	121	1	5	3.87	0.849
9. Variability in exchange rate leads to increase in the number of PPP projects initiated.	123	1	5	3.91	0.678
10. Need to transfer exchange rates affect the variability	123	1	5	3.96	0.863

Key: N= Sample size, Ranking scale for the mean: 1.00-1.80 (Strongly Disagree), 1.80-2.60 (Disagree), 2.60-3.40 (Neutral), 3.40-4.20 (Agree), 4.20-5.00 (Strongly Agree), Min = Minimum, Max = Maximum, SD = Standard Deviation

Table 2. Kaiser-Meyer-Olkin and Bartlett's test on financial risk

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.669
Bartlett's Test of Sphericity	Approx. Chi-Square	59.823
	Df	45
	Sig.	.000

Table 3. Total variance explained for financial risk transfer

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.369	23.687	23.687	1.992	19.915	19.915
2	1.366	13.659	37.347	1.470	14.699	34.615
3	1.108	11.077	48.424	1.381	13.809	48.424
4	.993	9.935	58.358			
5	.949	9.491	67.849			
6	.822	8.217	76.066			
7	.689	6.895	82.961			
8	.622	6.223	89.184			
9	.577	5.768	94.952			
10	.505	5.048	100.000			

Extraction Method: Principal component analysis

Further analysis of the extracted factors of financial risk as indicated by interest rate variability, price changes and exchange rate variability as identified in the rotation matrix was performed. The analysis presents the mean, standard deviation and the Cronbach's alpha for three factors. The results as indicated in Table 5 show that interest rate variability which is indicated by change in interest rate legislation attained a Cronbach's alpha of 0.896, variation in revenue streams as measured by changes in prices/fees achieved a Cronbach's alpha of 0.811 while variation in exchange rates showed a Cronbach's alpha of 0.827. Since the minimum recommended alpha is 0.7, the findings of the study were deemed to be reliable.

Table 4. Rotated component matrix for financial risk transfer

Statements	Component		
	Change in interest Rate Legislation	Price Changes	Exchange Rate Variability
1. Variability in interest rates affects the overall cost of public-private partnerships.	.648	.127	.000
2. Changes in interest rate legislation affect the overall cost of PP projects	.703	.058	.029
3. Need to transfer interest rate Variability risk leads to increase in the number of PPP projects initiated.	.542	.034	.007
4. Variation in demand of product/service leads to variation in revenue streams of PPP projects	.321	.526	.092
5. Expected variation in price/fees charged leads to variation in revenue streams of PPP	.028	.771	.359
6. Variability in project revenue streams affects the viability of PPP projects	.320	.507	.010
7. Need to transfer revenue streams variability risk leads to increase in the number of PPP projects initiated.	.061	.572	.071
8. Variability in exchange rate affects the overall cost of PPPs	.010	.071	.678
9. Variability in exchange rate affects the viability of the project.	.173	.228	.532
10. Need to transfer exchange rate variability leads to increase in PPP projects initiated	.235	.295	.766

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 5 iterations

Table 5. Analysis of mean and reliability of financial risk factors

Component	Mean	Standard deviation	Cronbach's Alpha
Change in interest rate legislation	4.284	0.696	.896
Change in prices/fees	3.667	0.806	.811
Exchange rate variability	4.283	0.641	.827

Key: 1.00-1.80=Strongly Disagree, 1.80-2.60=Disagree, 2.60-3.40=Neutral 3.40-4.20=Agree, 4.20-5.00 =Strongly Agree

Based on the constructed scales for the three factors, it was observed that the level of adoption of PPP was greatly influenced by need to transfer interest rate risk to the private sector entities as indicated by a mean of 4.284. According to the ranking scale, this corresponds to strongly agree. The interest rate risk was represented by the changes in interest rate legislation. Adverse change in interest rate legislation would lead to severe negative effects on the overall cost of capital, thereby negatively impacting on the viability of the project undertaken. This result is in concurrence with the outcome in PwC [16] who indicated that interest rate volatility is a significant risk factor that has the ability to affect the overall cost of a public-private partnership project. In order to transfer the probable risk of high cost of capital as a result of adverse change in interest rate, a public entity would opt to engage in a PPP arrangement. In such a case there is transfer of the projects attendant risks to a private sector entity. Further the respondents agreed that changes in prices for the product or service have an effect on the anticipated revenue streams. This was shown by a mean of 3.67 which coincides with "agree" on the given scales. This outcome implies that an expected future variation

in the price of a service or product has an impact on the anticipated revenue to be generated from the project. If there is significant reduction in prices then revenue streams can significantly shrink causing the project to be deemed unviable. The outcome is in agreement with that of Sakure, Sawant and Jagtap [10] who indicated that the viability of a project is greatly hinged on the ability to predict its revenue. That can be attained through effective financial risk transfer. Finally variability in exchange rate was found to have a mean of 4.283 which corresponds to strongly agree on the provided rankings. This implies that the respondents contended that changes in exchange rate will have a significant effect on the level of a PPP undertaking, thereby influencing the adoption level of PPP. The finding agrees with that of Uddin and Zack [7] who found that due to participation of foreign investors, a project may be exposed to foreign exchange risk since repayment of the loaned capital as well as the interest is normally denominated in foreign currency.

4.4 Regression Analysis between Financial Risk and Adoption of PPP in Kenyan Public Universities

For purposes of determining the influence of financial risk transfer on adoption of public-private partnerships in Kenyan public universities, a regression analysis was performed. The findings as shown in Table 6 indicate that the coefficient of correlation (R) for financial risk transfer and adoption of Public-private partnership was positive 0.5667. Further an R2 result of 0.321or 32.1% was obtained. This implies that the independent variable, Financial Risk as measured by price changes, interest rate legislation and exchange rate variability, explained up to 32.1% of the entire variance in the dependent variable, adoption of PPP in Kenyan Public Universities. This means that 67.9% of variability in adoption level of public-private partnerships witnessed in Kenyan public universities can be attributed to other factors not in the model.

4.5 ANOVA for Financial Risk and Adoption of PPP in Kenyan Public Universities

Analysis of Variance was performed and the result obtained was indicated in Table 7. The findings show that, the model fitted on the data was statistically significant as supported by F value of (3.919, 3,119) and p-value of 0.000, a figure that is less than the level of significance 0.05. The study had hypothesized that financial risk has no statistically significant influence on adoption of PPP in Kenyan public universities. However from the findings of the study, it can be concluded that this null hypothesis is rejected since the p-value obtained of 0.000 is lower than 0.05 threshold necessary to accept it. Hence the alternative hypothesis that Financial Risk has a statistically significant influence on adoption of public-private partnerships in Kenyan Public Universities is accepted.

To support the ANOVA findings on Financial Risk and Adoption of PPP in Kenyan Public Universities, regression coefficients were obtained. The results presented in Table 8 show that financial risk as measured by price changes, changes in interest rate legislation and exchange rate variability were positively related to adoption of PPP. The relationship between price changes and adoption of PPP in Kenyan public universities was found to be significantly positive (β= 0.543; t=12.612; p=0.002). This implies that the possibility of price level changes during project life drives public entities to enter into PPP projects in order to transfer such risk. Engagement of a private sector entity by the public entity shields the public entity from the financial shocks that come with unexpected price changes which ultimately cause adverse effects on the revenue projections. This result is in concurrence with that of Sakure, Sawant and Jagtap [10] who posited that a project's viability is determined by the ability to accurately predict its revenue. This can be effectively attained if there is sound transfer of financial risk. In addition, a significant positive relationship between change in interest rate legislation and adoption of PPP in Kenyan public universities (β=0.104; t=2.873; p=0.001). The finding implies that possible alterations in future interest rates would motivate the public entity to enter into PPP arrangements so that in event of such adverse changes happening, the resultant increase in cost of capital would be borne by the private entity. This finding concurs with that in PwC [16] who indicated that interest rate volatility is a significant risk with great potential to influence the overall cost of a public-private partnership project. Engagement of a private entity therefore helps a public entity to transfer the possible risk of high cost of capital that may be occasioned by adverse change in interest rates.

Table 6. Model summary of financial risk and adoption of ppp in Kenyan Public Universities

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.5667[a]	.321	.3111	1.6427

a. Predictors: (Constant), Price changes, Interest rate legislation and exchange rate variability

Table 7. ANOVA for financial risk and adoption of PPP in Kenyan Public Universities

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	30.324	3	10.108	3.919	.000
	Residual	306.944	119	2.579		
	Total	337.268	122			

Table 8. Coefficients of financial risk and adoption of PPP in Kenyan Public Universities

	Unstandardized coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	β		
Constant	1.056	0.049	-	21.542	.000
Price Change	0.567	0.045	0.543	12.612	.002
Interest Rate Legislation Changes	0.112	0.039	0.104	2.873	.001
Exchange Rate Variability	0.251	0.048	0.218	5.228	.000

Further the results show a presence of a significantly positive relationship between exchange rate variability and the adoption of public-private partnership in Kenyan public universities (β=0.218; t=5.228; p=0.000). This outcome means that expected variability in exchange rates may push a public entity to engage in a public-private partnership in order not to be subjected to the adverse effects that may be occasioned by such variation. In most cases, foreign lenders play a critical role in funding of PPP projects. The repayment of the capital invested by such lenders is done in foreign currency. There is therefore need for the public entity to transfer the risk in variation of exchange rates to a private party. This finding is congruent to that of Uddin and Zack [7] who indicated that as a result of participation of foreign investors, a project may be exposed to foreign exchange risk.

Based on the summary shown in Table 8, a regression model of the nature, $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e$ can be fitted as follows:

$$Y= 1.056+ 0.543X_1 + 0.104X_2 + 0.218X_3 + e$$

Where

Y – Adoption of PPP
X_1 - Price changes
X_2 - Interest rate legislation changes
X_3 – Exchange rate variability
e – Error term.

This means that when other factors are held constant, an increase in price level variability by one unit leads to 54.3 percent increase in adoption of PPP in Kenyan public universities. Further, when other factors are held constant, a unit increase in adverse interest rate legislation would lead to 10.4 percent increase in adoption of PPP in Kenyan public universities while an increase in exchange rate variability by one unit would result in 21.8 percent change in the level of PPP adoption. From the results it can be seen that of the three indicators of financial risk, change in price level is the most influential factor followed by exchange rate variability. The factor that has the least influence on adoption level of PPP in Kenyan public universities is change in interest rate legislation.

5. CONCLUSIONS

The study purposed to evaluate the influence of interest rate variability, revenue stream variability and exchange rate variability on adoption of public-private partnerships in Kenyan public universities. From the findings it was seen that all

the independent variables had a positive influence on adoption of PPP in Kenyan public universities. This was evidenced by the positive coefficients of determination which indicated that the variations in adoption of PPP were explained by the variables under study. At 5% significance level, the influence of interest rate variability, revenue stream variability and exchange rate variability on adoption of PPP was found to be statistically significant. The null hypotheses were rejected; hence the alternate hypotheses were accepted. Thus interest rate variability, revenue stream variability and exchange rate variability had a statistically significant positive influence on adoption of public-private partnership in Kenyan public universities. This implies that the change in the levels of adoption of PPP as a result of change in the study variables was not by chance.

6. RECOMMENDATIONS

The study recommends that public universities should undertake a thorough financial risk assessment before engaging in a public-private partnership. This will ensure that financial risk is transferred to those parties which are best suited to handle it. In so doing the public universities will be able to realize value for money hence greater realization of their objectives. Secondly it is recommended that public universities should establish PPP nodes in their universities. This will consist of individuals who will be tasked with evaluating potential projects to be undertaken under PPP arrangement. Such a move will enhance the quality of evaluation of projects thereby ensuring that only viable projects are undertaken.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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