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Determinants of Public-Private Partnership Success in The Health Sector in Zambia: Key Success Variables Analysis

Lt. Col. Richard Mbaka, (MBA)
Doctor of Business Administration (DBA) Candidate
ZCAS University, School of Business
PO Box 50497 RW, Lusaka Zambia
E-mail: richambaka@gmail.com

Austin Mwange, PhD/DBA
Lecturer – Economics and Finance
The University of Zambia, Graduate School of Business
P.O. Box 32379, Lusaka, Zambia
E-mail: austin.mwange@unza.zm; austinmwange1@gmail.com; lecturer.researcher@gmail.com

Abstract

The aim of this study is to investigate the determinants of success factors of Public Private Partnerships in the health sector in Zambia. This study was descriptive. A questionnaire survey was used as the main research instrument to obtain relevant data from participants who have played key roles in the implementation of PPP projects from public and private sectors. This was preceded by a rigorous literature review to investigate the current status of the implementation of PPP procurement system in the health sector in Zambia. The questionnaire was divided into two major parts. Part A was on the information about the respondent and part B is on the overall success variables for PPP projects in Zambia and health sector in particular. The respondents were requested to rate the PPP success variables using a five-point Likert scale in part B. The rating systems for the importance of each variable in the questionnaire using the 1 to 5 scale were adopted. Score 1 represents not important, score 2 represents fairly important, score 3 represents important, score 4 represents very important, and score 5 represents highly important. A total of 255 questionnaires were distributed by hand delivery and a total of 184 completed questionnaires were completed and returned. This survey achieved a response rate of 72 per cent and this high response rate was achieved because the researcher was making necessary follow up which motivated the respondents to complete the questionnaires and return them in time. . Variable analysis was used as a statistical data analysis method for the identification and grouping of relatively small numbers of variables that have some things in common. It is a multivariate method that shows the relationships among correlated variables difficult to interpret This is a method that can be used to try to identify patterns in fairly large sets of data with substantial numbers of variables as the case was with this study. This procedure gives opportunity for making meaningful deductions from the large set of variables in the process of interpreting the outcomes of the questionnaire survey during data analysis and interpretations. Bartlett's Test of Sphericity was used which tests whether the correlation coefficients are all 0. The test computes the probability that the correlation matrix has significant correlations among at least some of the variables in a dataset, a prerequisite for factor analysis to work. Further, Kaiser-Meyer-Olkin Measure (KMO), and Measures of Sampling Adequacy (MSA) and variable extraction were also applied in the analysis.

The results of variable analysis identified seven critical success variables as follows: projects feedback, leadership focus, risk allocation and economic policy, good governance and political support, short construction period, favourable socio-economic variables, and delivering publicly needed service. This study shows that more developmental projects could be delivered through PPP if the government could focus on these main variables in the implementation process. The result will influence policy development towards PPP and guide the partners in the development of PPP projects.

Keywords: Developing countries, Zambia, Procurement, Public Private Partnerships, PPPs critical success variables, CSF, Measures of Sampling Adequacy, MSA, Kaiser-Meyer-Olkin Measure, KMO Bartlett's Test of Sphericity

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Introduction

The governments are increasingly using public private partnership (PPP) procurement arrangement to deliver works and services in both developed and developing countries (Ng, Wong and Wong, 2012**;** Li et al., 2005). Where the private actor is being used to providing public facilities through partnerships in order to address the infrastructural deficit without the financial commitment to the government (Syuhaida & Aminah, 2009). This method is adopted so that the limited available resources can be directed to other need areas. (Udechukwu, 2012). However, despite these pronounced benefits, the use of PPP as a procurement method in government and institution in particular still remains comparatively low in percentage to the total public investments in infrastructure (RICS, 2011). Whilst the governments are looking towards best approaches in order to satisfy and meet the demand of the citizens despite the challenges of deficit budget, the citizens are demanding for improved public services (Hartmann, Davies & Frederiksen, 2010). This demand is very high in Zambia as a result of the growth in population of about 20 million and needs to be supported by adequate public infrastructures.

According to Africa Infrastructure country diagnostic(AICD,2010) Zambia would need to spend an average of $1,6 billion a year over decade 2006 -2015 to develop the infrastructure found in the in the rest of the developing world. However, this was never achieved and the report showed that the government's investments in the provision of public infrastructures and other services in the country contributed very little to the development of the public facilities, and the implementation of PPP infrastructure projects has recorded very low performance. This study sets out to examine the PPP projects implementation in Zambia and to identify the most critical variables that determine the success of such projects. The findings of this study could help the industry practitioners to understand the important variables for PPP projects while providing valuable information for organizations that intend to participate in PPP projects in Zambia. This study applies an industry-wide survey with large respondent numbers, to explore the key ingredients for successful delivery of PPP projects and to examine the perceptions of public and private sector participants. The findings of this study are valuable and useful for the successful application of PPP in the Zambian construction industry.

Literature Review

The critical success variables (CSFs) are those limited areas in the organization's activities that could result in the organization's success and performance (Kwak, Chih & Ibbs, 2009). It could also be defined as "few key areas of activity in which favourable results are absolutely necessary for a particular manager to reach his goals" (Bullen & Rockart, 1981, p3). The concept of critical success variables could be traced to Ronald Daniel, who initiated and used the word 'success variables' in the 1960s (Chien, 2014). This was later made popular by John F. Rockart of MIT Sloan School of Management in the 1970s where he introduced 'critical success variables' in the article published in Harvard Business Review (Bullen & Rockart, 1981; Chien, 2014).

Since then, many authors have applied the idea to various fields. However, this is a concept being adopted in the construction industry (Sanvido et al., 1992; Chua, Cog and Loh, 1999). The concept of critical success variables has been investigated by many authors on PPP projects (Jefferies, Gameson & Rowlinson, 2002; Li et al., 2005; Cartligde, 2006; Jacobson & Choi, 2008; Cheung, 2009; Agrawal, 2010; Minnie, 2011; Chou et al., 2012; Ng, Wong and Wong, 2012; Cheung, Chan & Kajewski, 2012; Tang et al., 2013; Ismail, 2013; Wibowo & Alfen, 2014; and Ameyan & Chan, 2015). A comprehensive literature review was conducted to identify CSFs of PPP in the construction industry. Relevant published documents like textbooks, journal articles, conference papers, research reports and other materials were reviewed. Table 1 presents the summary of the literature review on the key PPP success variables identified by authors from different countries. The table listed fifteen (15) different studies by several authors that cut across various regions. The review identified twenty-eight (28) key success variables for PPP projects implementation. These success variables were later included in the questionnaire survey for this study.

The variables that were identified for the private sector participants in the implementation of PPP projects are strong private consortium (Jefferies, Gameson & Rowlinson, 2002; Li et al., 2005; Zhang, 2005; Cheung, 2009; Ng, Wong and Wong, 2012; and Ameyan & Chan, 2015), appropriate risk allocation and sharing (Li et al., 2005, Zhang, 2005; Cheung, 2009; Wibowo & Alfen, 2014), available financial market (Li et al., 2005; Cheung, Chan & Kajewski, 2012; Ismail, 2013; Ameyan & Chan, 2015), thorough and realistic cost/benefit assessment (Li et al., 2005 & Chou et al., 2012), economy viability (Zhang, 2005 and Ng, Wong & Wong, 2012), nature of

contractual agreement (Zhang, 2005; Agrawal, 2010; and Wibowo & Alfen, 2014), favourable legal framework (Cheung, 2009; Cheung, Chan & Kajewski, 2012; Ismail, 2013, Wibowo & Alfen, 2014; and Ameyan & Chan, 2015), delivery publicly needed service (Minnie, 2001; Ng, Wong & Wong, 2012; and Ismail, 2013), sound economy policy (Cheung, 2009; & Ismail, 2013), and stable micro-economic conditions (Cheung, 2009; & Cheung et al, 2012). Two variables that were identified as key variables for the delivery of PPP projects by the public sector were the alignment with government's strategic objectives (Ng, Wong & Wong, 2012; and Tang et al., 2013) and strong political support (Wibowo & Alfen, 2014; and Ameyan & Chan, 2015). However, the commitment and responsibility of public/private sectors (Li et al., 2005; Cartlidge, 2006; Jacobson and Choi, 2008; Cheung 2009; Chou et al, 2012; Ismail, 2013; and Ameyan and Chan, 2015), true partnership (Cartlidge, 2006; Jacobson & Choi, 2008), and open communication (Cartlidge, 2006; Jacobson and Choi, 2008) are the variables that are common to both public and private sectors' participants in the projects' implementation.

Jefferies, Gameson and Rowlinson (2002) identified three key variables for Australia; solid consortium with a wealth of expertise, considerable experience, high profile and a good reputation; an efficient approval process that assists the stakeholders in a very tight timeframe; and innovation in the financing methods of the consortium. Tang et al. (2013) identified five key success variables as the identification of client/owner requirements; clear and precise briefing documents; feedback from completed projects; and thorough understanding of client/owner requirements. Thus, the wealth of expertise, experience, and reputation are expected to help in the successful delivery of projects under PPP arrangement. The expertise is expected to be in both public and private sectors of the industry. They both have great roles to play in the system. Li et al. (2005) also identified five key PPP success variables as: strong private consortium; appropriate risk allocation and risk sharing; available financial market; commitment/responsibility of public/private sectors; and thorough and realistic cost/benefit assessment. Additionally, the commitment and shared vision, open communication and trust, and collaboration are the three key PPP success variables identified in the United States of America by Jacobson and Choi (2008), whereas, in China, the key success variables for PPP projects are a stable macro-economic condition; favourable legal framework; sound economic policy; available financial market; and multi-benefit objectives (Cheung, Chan & Kajewski, 2012). A stable macro-economic condition is seen as an important variable in the delivery of PPP project successfully in the country, although, China is still being recognized as a developing country, despite the large size of her economy (Mwange, 2017; Mwange, A., Kasongola, & Meyiwa, 2022). If the economic condition is stable, the investors would be willing to invest their money, since they hope to recoup their investment in a favourable economic environment (Mwange, 2022). These variables are those identified in the countries that are regarded as developed nations. These variables are tending towards the private sector's wealth of experiences and the utilization of such experiences.

Agrawal (2010) identified concession agreement, short construction period, and repayment of the debt as the PPP success variables in India, while Minnie (2011) identified delivering a publicly needed service and achieving the objectives of the partnership for South Africa. Ameyan and Chan (2015) identified government (political) commitment, adequate financing, public acceptance/support, strong and competent private partner, and effective regulatory and legal structures. In Malaysia, Ismail (2013) identified five key success variables for the delivery of PPP projects; good governance; commitment/responsibility of public/private sectors; favourable legal framework; sound economic policy; and available financial market. While in Indonesia, the identified key success variables for PPP projects are sound legal basis; an irrevocable contract; sensible and manageable risk-sharing arrangements; clearly defined coordination mechanisms; and strong political support (Wibowo& Alfen, 2014). These identified success variables in Malaysia and Indonesia are similar to those variables identified in other countries mentioned earlier. But in Indonesia, an irrevocable contract as a success variable is distinct from other countries reported. This may be due to the situation of contract administration within the country. These variables are identified in the developing countries and show that the public sector needs to make more contributions to the development of the PPP projects (Mwange, 2022).

Table 1: PPP Success Variables From Literature Review

	Jefferies, Gameson and Rowlinson, 2002	Li et al., 2005	Zhang, 2005	Cartlidge, 2006	Jacobson and Choi, 2008	Cheung, 2009	Agrawal, 2010	Minnie, 2001	Chou et al., 2012	Ng, Wong and Wong, 2012	Cheung, Chan and Kajewski, 2012	Tang et al., 2013	Ismail, 2013	Wibowo and Alfen, 2014	Ameyan and Chan, 2015
Strong private consortium	**Y**	**Y**	**Y**			**Y**				**Y**					**Y**
An efficient approval process	**Y**														
Innovation in the financial methods of consortium	**Y**														
Appropriate risk allocation and sharing		**Y**	**Y**			**Y**								**Y**	
Available financial market		**Y**									**Y**		**Y**		**Y**
Commitment/responsibility of public/private sectors		**Y**		**Y**	**Y**	**Y**			**Y**				**Y**		**Y**
Thorough and realistic cost/benefit assessment		**Y**							**Y**						
Economic viability of the project			**Y**							**Y**					
Nature of contractual agreement			**Y**				**Y**							**Y**	
Sound financial package			**Y**												
Favourable investment environment			**Y**												
True partnership				**Y**	**Y**										

Table 1: PPP Success Variables From Literature Review

	Jefferies, Gameson and Rowlinson, 2002	Li et al., 2005	Zhang, 2005	Cartlidge, 2006	Jacobson and Choi, 2008	Cheung, 2009	Agrawal, 2010	Minnie, 2001	Chou et al., 2012	Ng, Wong and Wong, 2012	Cheung, Chan and Kajewski, 2012	Tang et al., 2013	Ismail, 2013	Wibowo and Alfen, 2014	Ameyan and Chan, 2015
Open communication				**Y**	**Y**										
Favourable legal framework						**Y**					**Y**		**Y**	**Y**	**Y**
Short construction period							**Y**								
Repayment of the debt							**Y**								
Delivering publicly needed service								**Y**		**Y**					
Achieving the objectives of the partnership								**Y**							
Sound economic policy											**Y**		**Y**		
Stable macro-economic conditions						**Y**					**Y**				
Alignment with government's strategic objectives										**Y**		**Y**			
Multi-benefit objectives											**Y**				
Identification and understanding of client/owner requirement												**Y**			
Clear and precise briefing documents												**Y**			
Feedback from completed projects												**Y**			

Table 1: PPP Success Variables From Literature Review

	Jefferies, Gameson and Rowlinson, 2002	Li et al., 2005	Zhang, 2005	Cartlidge, 2006	Jacobson and Choi, 2008	Cheung, 2009	Agrawal, 2010	Minnie, 2001	Chou et al., 2012	Ng, Wong and Wong, 2012	Cheung, Chan and Kajewski, 2012	Tang et al., 2013	Ismail, 2013	Wibowo and Alfen, 2014	Ameyan and Chan, 2015
Clear defined coordination mechanisms														**Y**	
Strong political support														**Y**	**Y**
Good governance													**Y**		

Methodology

For the purpose of this study, a questionnaire survey was used as the main research instrument to obtain relevant data from participants who have played key roles in the implementation of PPP projects from public and private sectors. This was preceded by a rigorous literature review to investigate the current status of the implementation of PPP procurement system in the health sector in Zambia. Three interviews were later conducted with PPP experts on projects I health sector in Zambia in order to seek their opinions on the compiled list of PPP CSFs and the suitability of those variables to the Zambian practice in health sector. This served as a pilot interview and the interviewees confirmed the relevance of those variables. The profiles of the participants in the pilot interview are shown in Table 2 and their opinions added value to this study. The questionnaire survey was later conducted. This is an effective method of obtaining necessary information and data from a large sample size of the population for quantitative data analysis (Cheung, 2009). A pilot survey was undertaken with twenty (20) respondents before distributing the questionnaires. This stage involved a large number of participants in the PPP procurement system higher than case studies or interview approaches. The questionnaire is divided into two major parts. Part A was on the information about the respondent and part B is on the overall success variables for PPP projects in Zambia and health sector in particular. The respondents were requested to rate the PPP success variables using a five-point Likert scale in part B. The rating systems for the importance of each variable in the questionnaire using the 1 to 5 scale were adopted. Score 1 represents not important, score 2 represents fairly important, score 3 represents important, score 4 represents very important, and score 5 represents highly important.

Non-probability convenience sampling method was used for the survey since the actual number of participants could not be ascertained due to lack of data base that describes the population of participants in the PPP procurement arrangement in Zambia and particular the health sector. Snowball sampling was also used to complement the process where identified participants were persuaded to recommend other key participants to serve as respondents in the data collection process. The respondents included Architects, Quantity Surveyors, Builders, Engineers, Project Managers and other related professionals from the public and private sector. The questionnaires were administered in Lusaka (capital city of Zambia). A total of 255 questionnaires were distributed by hand delivery and a total of 184 completed questionnaires were completed and returned. This survey achieved a response rate of 72 per cent and this high response rate was achieved because the researcher was making necessary follow up which motivated the respondents to complete the questionnaires and return them in time. Another variable was that the time to answer the questions was very short and this facilitated their quick responses. It takes an average of 15 minutes to complete the questionnaire and a maximum of 20 minutes for each respondent. The following steps were taken to avoid non-response from the potentials respondents: the questions concerning the personal information about the respondents were not included in the questionnaire; hardcopies of the questionnaire and personal deliveries were used to increase the rates of return, and opportunities were given to the respondents that needed more days to answer the questionnaires.

A reliability coefficient test was carried out to determine the degree of reliability of the questionnaire template before it was administered to the respondents. This assesses the internal consistency of items in a questionnaire (Howitt & Cramer, 2008). The critical level for reliability when using Chronbach's alpha is 0.7 and any coefficient below that indicates that the variables are not sufficiently inter-correlated to combine to yield a single latent construct (Fellows & Liu, 2008). In order to achieve reliable results, the attributes that were less than 0.7 were not included in the analysis. Then, an exploratory variable analysis was carried out. Variable analysis is a statistical method used for the identification and grouping of relatively small numbers of variables that have some things in common. It is a multivariate method that shows the relationships among correlated variables difficult to interpret (Fellows & Liu, 2008). Also, it is a method that can be used to try to identify patterns in fairly large sets of data with substantial numbers of variables (Howitt & Cramer, 2008). This procedure gives opportunity for making meaningful deductions from the large set of variables in the process of interpreting the outcomes of the questionnaire survey during data analysis and interpretations. Other important measures that are considered in the variable analysis process are Bartlett's test of sphericity, Kaiser-Meyer-Olkin Measure (KMO), Measures of Sampling Adequacy (MSA) and variable extraction (Li, 2003). This data analysis technique was used in order to determine representative variables that could indicate other variables to serve as the most important variables that are useful for policy makers and administrators. These variables would help in the decision-making process while the political leaders and private investors could focus on these areas in the PPP project development to serve as a guide.

Results and Discussion

The information on the respondents that participated in the survey is presented in Table 3, Figures 1a and 1b. This includes the respondents from public and private sectors. The result shows that 136 respondents were from the public sector and 48 respondents from the private sector representing 74% and 26% of the respondents respectively. The indication is that the respondents from the public sector participated more in the survey than the private sector. The observation is that it is much easier to approach the public sector participants than their counterparts in the private organizations. Often, the private sector participants were reluctant to provide information concerning their organizations without due authorization from the management. The ratio of private sector respondents to the variables being measured is considered low for variable analysis and this shows a limitation in this study.

Table 2: Profiles of interviewees for pilot study

Interviewee	Position	Organization	Sector
1	Officer	Public procurement Authority	Public
2	Officer	Ministry of Finance(PPP Unit)	Public
3	Chief executive	Special Purpose Vehicle Company	Private

Table 3: Number of respondents on survey

	Frequency	Percentage
Public Sector	136	73.9
Private Sector	48	26.1
Total	**184**	**100.0**

Table 4: Result of data reliability (public sector)

Cronbach's Alpha	No. of Items
0.812	13

Table 5: Result of data reliability (private sector)

Cronbach's Alpha	No. of Items
0.781	15

Figure 1a, shows that 29% of the respondents had between 11 years and 15 years working experience on PPP projects while 32% of the respondents had between 6 years and 10 years working experience. However, with about 39% of the respondents having less than 5 years working experiences on PPP projects, the result still shows that a majority of the respondents had good working experience (61%). The result also shows that the majority of respondents were involved in the Infrastructure and Housing sectors with 65% and 34% respectively (Figure 1b). These two sectors represent a total of 99% of the PPP projects by sector while other sectors make up of 1%. A reliability test was then carried out using SPSS before proceeding with the analysis of the survey data.

Figure 1: (a) Participants' experiences on PPP projects; (b) PPP project category

Tables 4 and 5 show the results of the Cronbach's alpha reliability for the PPP success variables. The results show that the data collected are reliable at 0.812 and 0.781 for the public and private sectors respectively (Fellows & Liu, 2008). The use of variable analysis for the success variables of PPP projects was for the purpose of exploring to detect underlying relationships among the variables. This was later described in fewer, more comprehensive variables. This analysis was necessary to determine the few variables that the stakeholders and participants in the implementation process could concentrate upon in order to achieve the objectives of using this procurement method.

Table 6: KMO and Bartlett's test (public sector)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**0.74**
Bartlett's Test of Sphericity	Approx. Chi-Square	611.055
	df	78
	Sig.	0.000

Table 7: KMO and Bartlett's test (private sector)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**0.767**
Bartlett's Test of Sphericity	Approx. Chi-Square	599.812
	df	105
	Sig.	0.000

The results of variable analysis of variables that enhance the success of PPP project implementation are listed in Tables 6, 7, 8 and 9. The total variables for both public and private sectors were twenty-eight (28) in number and there were thirteen (13) variables for the public sector and fifteen (15) variables for the private sector. The values of the test statistic for sphericity (Bartlett test of sphericity = 611.055) and (Bartlett test of sphericity = 599.812) for public and private sectors respectively are considered very large. The associated significance levels are small (p = 0.000), suggesting that the population correlation matrix is not an identity matrix. This could be interpreted as the correlation matrix showing all with a significant correlation at the 5% level. These results show that the principal component analysis could proceed without eliminating any of the variables. The values of KMO statistic are 0.74 and 0.767 for public and private sectors respectively and these are considered satisvariabley for the variable analysis. The principal component analysis produced a three-variable solution for the public sector and a four-variable solution for the private sector with eigenvalues greater than 1.000.

Table 8: Rotated variable matrix (loading) of CSFs for public sector

	Component		
	1	2	3
Multi-benefit objectives	0.675		
True partnership	0.636		
Alignment with government's strategic objectives	0.629		
Clear and precise briefing documents	0.598		
Clear defined coordination mechanisms	0.574		
Open communication	0.565		
An efficient approval process	0.553		
Nature of contractual agreement	0.521		
Thorough and realistic cost/benefit assessment	0.521		
Appropriate risk allocation and sharing		0.567	
Sound economic policy		0.527	
Achieving the objectives of the partnership		0.490	
Feedback from completed projects			0.599

Table 8 shows the three component variables for the public sector which accounted for 60% of the total variance from the thirteen variables. This is the variable grouping based on varimax rotation and the loading on each variable exceeds 0.40. Each variable is weighted heavily on only one of the variables. The three principal variables are hereby interpreted as follows:

Variable 1 – Leadership Focus

This principal variable accounts for 30.44% of the total variance of PPP success variables. This variable is composed of nine sub-variables; multi-benefit objectives, true partnership, alignment with government's strategic objectives, clear and precise briefing documents, clear defined coordination mechanisms, open communication, an efficient approval process, nature of the contractual agreement, and thorough and realistic cost/benefit assessment. This result shows that the public sector must be able to provide the needed leadership role in the implementation of PPP projects.

They should focus while considering the objectives of utilizing PPP procurement, on making the partnership work and aligning the implementation process with the government's objectives. These three components have high loadings (significance 0.675, 0.636 and 0.629 respectively). Also, the public sector must assemble the team that would produce clear and precise briefing documents (significance 0.598) in order to give a good direction to the private sector participants. In an attempt to give good direction, the public sector should identify clear defined coordination mechanisms (significance 0.574) and provide open communication (significance 0.565) with the private sector and the general public. An efficient approval process (significance 0.553), nature of contractual agreement (significance 0.521), and thorough and realistic cost/benefit assessment (significance 0.521) are the last three variables that are also considered important for the public sector in the implementation of PPP projects. These variables are considered very important for the successful implementation of public projects using PPP procurement method.

Variable 2 – Risk Allocation and Economic Policy

This principal variable accounts for 12.60% of the total variance of PPP success variables. This variable is composed of three sub-variables; appropriate risk allocation and sharing (significance 0.567), sound economic policy (significance 0.527) and achieving the objectives of the partnership (significance 0.490). The management of the risk associated with PPP projects is very important to the success of the project. This is confirmed by earlier studies ((Li et al., 2005, Zhang, 2005; Cheung, 2009; Wibowo & Alfen, 2014). Therefore, the public sector should ensure that the appropriate risk is allocated to the party best suited to manage such risk. Another important variable for the success of PPP projects is the availability of sound economic policy by the political leaders. This variable gives direction to the development of the economy and provides an environment conducive to the implementation of PPP projects in the health sector in Zambia. Thus, if such an environment is available, then, the objectives of the partnership could be achieved. These objectives could be regarded as effective developments of infrastructure for the public sector and health sector in particular while enabling the maximization of profit for the private sector partners.

Variable 3 – Projects Feedback

This principal variable accounts for 16.68% of the total variance of PPP success variables. This variable is composed of one sub-variable as feedback from completed projects. The value of its significance is 0.599. This result shows that the process of reviewing and getting feedback from completed PPP projects would provide adequate information for future implementation of such projects. The identified challenges could then be avoided while success variables could be noted and incorporated into future projects by the public sector participants.

Table 9 shows the four component variables of the private sector which accounted for 54% of the total variance from the fifteen variables. This is the variable grouping based on varimax rotation and the loading on each variable exceeds 0.40. Each variable is weighted heavily on only one of the variables. The four principal variables are interpreted below.

Variable 1 – Favorable Socio-Economic Variables

This principal variable accounts for 26.54% of the total variance of PPP success variables. This variable is composed of eleven sub-variables; stable macro-economic conditions (significance 0.662), favourable investment environment (significance 0.651), commitment and responsibility of public/private sectors (significance 0.650), innovation in the financial methods of consortium (significance 0.618), available financial market (significance 0.580), economic viability of the project (significance 0.551), strong private consortium (significance 0.548), favourable legal framework (significance 0.544), repayment of the debt (significance 0.484), identification and understanding of client/owner requirement (significance 0.481) and sound financial package (significance 0.473). This result shows that the implementation of PPP projects in health sector in Zambia would only be successful in a favourable investment environment. This favourable environment needs to be complimented with the commitment of the public and private sectors' participants. However, the review of PPP projects implementation in other countries, showed that the successful deliveries of PPP projects in countries like United Kingdom, Australia, Singapore, Hong Kong, Malaysia and South Africa (Li et al., 2005; Tang et al., 2013; Hwang, Zhao & Gay, 2013; Ng, Wong & Wong, 2012; Ismail, 2013; and Minnie, 2011 respectively) were due to the conducive investment environments. The international and local investors were attracted to those countries mentioned above because they knew that their rights were going to be protected under the law and that they could easily get justice from the courts of law in cases where their rights are denied. This is seriously lacking in Zambia where some PPP projects like the Zambia railways and Mpulungu

harbor concession were abruptly cancelled after the change of government though the new government Patrotic Front by then cited non performance as the reason for cancellation. .

Table 9: Rotated variable matrix (loading) of CSFs for private sector

	Component			
	1	2	3	4
Stable macro-economic conditions	0.662			
Favourable investment environment	0.651			
Commitment and responsibility of public/private sectors	0.650			
Innovation in the financial methods of consortium	0.618			
Available financial market	0.580			
Economic viability of the project	0.551			
Strong private consortium	0.548			
Favourable legal framework	0.544			
Repayment of the debt	0.484			
Identification and understanding of client/owner requirement	0.481			
Sound financial package	0.473			
Good governance		0.511		
Strong political support		0.463		
Short construction period			0.831	
Delivering publicly needed service				0.528

Variable 2 – Good Governance and Political Support

This principal variable accounts for 10.55% of the total variance of PPP success variables in health sector in Zambia. This variable is composed of two sub-variables; good governance, and strong political support with significance values of 0.511 and 0.463. This result shows the importance of the political leaders in creating policies to drive the development of infrastructure and public services through the utilization of PPP procurement method. In addition, an earlier study showed the very importance of political support, and this is found to be the top critical success variable in the implementation of PPP projects in the United Arab Emirates (UAE) (Dulaimi et al., 2010). The study also concluded that this is relevant to most Middle East countries where governments' influences are strong. In the implementation of PPP as procurement systems, the support of political leaders and citizens, are vital to the success of the arrangement, while lack of political support could affect the commitments from the public sector to the projects and public opinion against PPP could affect the development of those projects. Moreover, social support should assist the process and allow smooth management of the facilities in terms of payment of tolls and other commitments from the public. Therefore, the political leaders are expected to do a thorough assessment of the cost and associated benefits of the projects, to determine the outcome of the process.

Variable 3 – Short Construction Period

This principal variable accounts for 8.78% of the total variance of PPP success variables in the health sector in Zambia. This variable is composed of one sub-variable; short construction period with significance value 0.831. The variable has the highest loading of the success variables for public and private sectors. This shows that this variable is very important to the success of the private investors in PPP projects implementation in the health sector. This variable is one of the three most important PPP success variables in India (Agrawal, 2010). India and Zambia are both developing countries. The results of the two researches show common outcomes while the social and environmental variables are identical. Hence, this result is relevant to the developing countries and this variable is important for a successful business project. It is necessary that this variable is achievable in the implementation of PPP projects in the health sector in Zambia.. If the project is delivered on time, the project cost associated with project management is reduced and the investors could recoup the funds invested in the project.

Variable 4 – Delivering Publicly Needed Service

This principal variable accounts for 7.92% of the total variance of PPP success variables in the health sector in Zambia. This variable is composed of one sub-variable, which is delivering publicly needed service with a significance value of 0.528. This result shows that the provision of public services that could meet the expectations of direct users of such facilities is very important for public acceptability in the health sector in Zambia. If the project is accepted by the public, the users would be willing to pay for the use of the facilities and the investors would be able to maximize their profits. This situation will provide a win-win result which is an important objective of PPP procurement system.

Success variables model for PPP project implementation

The result of the variable analysis was able to identify the principal variables that are critical to the delivery of PPP project within the study area. The principal success variables identified for the public sector participants were leadership focus, risk allocation and economic policy, and projects feedback, whereas the four principal variables identified for the private investors in the implementation of PPP projects are favourable socio-economic variables, good governance and political support, short construction period, and delivering publicly needed service. These variables are considered the most important and, if utilized, would improve the implementation of PPP procurement method in the health sector in Zambia while acting as a catalyst for the development of infrastructure in the country. These principal variables summarized the success variables required for the implementation of PPP projects in the health sector in Zambia and in this study. The public sector serves as the client or owner of the projects under PPP arrangement, so, the likelihood of success would be enhanced when the public sector participants take up the leadership role to ensure that all issues relating the projects are resolved as quick as possible. As the leader and owner of the project, the public sector should create avenues for parties to benefit from the arrangement.

Figure 2 shows the public and private sectors' success variables model that incorporates the seven main variables considered the most important to the successful delivery of PPP project in the health sector in Zambia. These three principal variables such as projects feedback, leadership focus, and risk allocation and economic policy are those that contribute to the PPP project success in the health sector in Zambia with the participation of the public sector. These variables provide a good foundation for project development during the project planning and procurement stages. If these principal variables are included in the implementation of PPP projects in the health sector in Zambia, the success of the project is assured. However, the other four principal variables such as good governance and political support, short construction period, favourable socio-economic variables, and delivering publicly needed service are those that ensure the success of project development through private sector participation. These four main variables must be available during the project construction and operation stages of the PPP project in health sector in Zambia. The success variables model in Figure 3 explains that the PPP project implementation process must be supported by the identified main variables in order to produce an efficient and successful public project in the health sector in Zambia. This result shows that the seven identified variables are critical to the process of delivering PPP projects in Zambia's health sector.

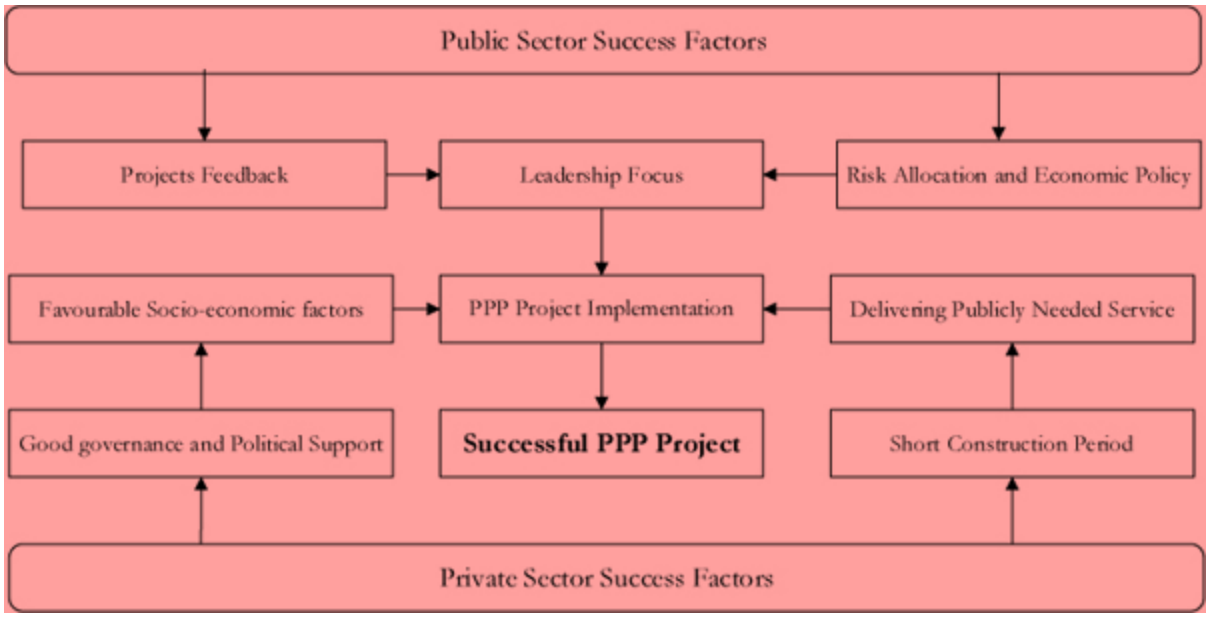

Figure 2: Public and private sectors' success variables model for PPP projects in the health sector in Zambia

The first success variable for public sector is the 'projects feedback'. This variable is expected to assist the public sector participants in understanding the challenges and be able to address them in order to improve future projects. 'Risk allocation' is another variable considered important at the planning stage of the project and this helps in allocating the risks to the party in the better position to manage them. Also, a sound 'economic policy' of the government gives direction to the public sector participants while the 'leadership focus' of the public sector helps the whole process in achieving the objectives of the PPP project implementation. On the other hand, the private sector participants need 'good governance and political support' to succeed in the implementation of PPP projects in health sector while 'favourable socio-economic variables' provide enabling environment for the investors. Furthermore, the short construction period' and the 'delivering publicly needed service' are variables that help the private investors to achieve their objectives of participating and investing in PPP projects. Profit maximization and organization's reputation are some of the objectives of the private sectors' participation in the project. Thus, if the private sectors could achieve their aims of participating, the whole PPP project implementation process should succeed. This creates avenues for a win-win situation for the PPP procurement system.

Conclusions

The successful implementation of PPP projects is crucial to the development of social and economic infrastructures in general and the health sector in Zambia in particular . The result of the variable analysis was able to identify the seven most important variables that are critical to a successful PPP project in the health sector in Zambai. These variables form the cardinal areas that governments should focus on for the improvement and development of the system to use PPP procurement method in the health sector in Zambia. This helps to achieve benefits for the adoption of private financing for the delivery of public projects. Moreover, the availability of a matured political environment would encourage participants in the implementation process, while a favourable socio-economic environment provides an enabling setting for growth and development. Despite the benefits, one of the limitations of this study is that the outcome of this process could only be applicable in Zambia. Furthermore, nearly forty percent of the respondents of this study had limited experience working on PPP projects. Therefore, any future study is expected to consider additional respondents with work experience of more than five years and the proportion of total variance should be for at least 75% for the variable analysis. Its result should be compared with the outcome of this study. Subsequently, the test-retest reliability and alternate form reliability methods for an external consistency reliability assessment of survey that were not utilized could be considered in the future study. Nevertheless, the results would assist foreign participants, especially those from developed countries, to understand the variables that promote

investments in the system. The participants could be better informed on the variables that are likely to help in the delivery and implementation of PPP projects in the health sector in Zambia.

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