

# Attractive Factors of Public Private Partnership (PPP) for Road Projects in Ethiopia

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**Abstract:** The private sector has long been involved in delivering public sector projects in Ethiopia but its role limited as consultant and contractor for the government. Over recent years, the interest in adopting Public Private Partnership (PPP) has increased internationally. Many research outcomes have presented positive reasons for the governments and the private sector to welcome this form of long term contract arrangement, rather than continue involving in the traditional procurement methods. This paper aims to explore the attractive factors for PPP implementation in the Ethiopian road sector. A questionnaire survey was conducted in Ethiopia and survey respondents were invited to rate their perceptions on the importance of seventeen different attractive factors identified. The results show that the five important attractive factors for pursuing PPP in the Ethiopian road sector are: 'solve the problem of public sector budget restraint', 'facilitate creative and innovative approaches', 'save time in delivering the project', 'improve maintainability' and 'enhance government integrated solution capacity'. The research outputs contribute to the limited knowledge on PPP practices in Ethiopia by providing empirical evidence on the conditions that are attractive to the introduction of PPP in the road sector.

**Keywords:** Ethiopia, Procurement, Public Sector, Private Sector, Partnerships, Road Infrastructure, Attractive Factors

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## 1. Introduction

The current Ethiopian government made the road sector one of its priority areas and implemented four Road Sector Development Programs (RSDPs) during the period 1997-2015. The fifth RSDPs are under implementation until 2020. The total budget expended from the public treasury for the road sector in the last nineteen years is estimated to be ETB 266.2 billion (USD 17.4 billion) [28]. However, many of the projects planned under the RSDPs were not being completed within the prescribed time and budget and did not meet the quality standards. Consequently, the gap between plan and implementation is hindering the efforts for economic development of the country and together with the growing demand for better road infrastructure [27]. The funding gap in infrastructure is not only due to lack of revenue, but also a consequence of inefficiencies in public spending resulting from poor governance, poor investment planning, and under-investment in maintenance and high operating costs [39].

The government has also maintained its role in financing the road sector through the conventional methods of

procurement. Private sector participation in financing road infrastructure is evidently absent where the lack of a liberalized regulatory framework and competitive market structure hampered the involvement of potential investors [6]. The growing global demand for public infrastructure and services has necessitated numerous governments to leverage the private sector's capital and expertise through PPP procurement method [14]. PPP is a long term contractual arrangement between the public and the private sector for the delivery of a certain services whereby the private partner assumes substantial risks equivalent to the payment agreed in the contract [40].

However, over the past years, most of the developing countries including Ethiopia have failed to attract significant private investments in infrastructure as realized in the developed countries. Research findings also suggest that the unique characteristics of PPP in each country influence its attractiveness in the country [32].

To utilize the advantages of PPP implementation, the Ethiopian government needs to have thorough understanding of the drivers of PPP implementation, and to cognize the

applicability of international experience to Ethiopia. Thus the objective of this research was to investigate the attractive factors of adopting PPP for road infrastructure development in Ethiopia.

## 2. Background to PPP in Ethiopia

Concessional arrangement for infrastructure development in Ethiopia dates back to the nineteenth century when Emperor Menelik granted to his Swiss adviser, Alfred IIG, to establish a company to build and operate a railway from Djibouti through Harar and Entoto to the White Nile on March 9, 1894 [36]. After passing many challenges from regional colonial powers, design changes and financial constraints, the railway construction reached Addis Ababa in 1917. The completion of the railway was an event of considerable socio-economic significance for Ethiopia opening the country to international markets [41].

Ethiopia had also formulated a legal instrument to use the private sector investment through concession since 1960 under its administrative law, though the practice in infrastructure development has been hindered due to different political and economic reasons [23]. Nonetheless, in recent development, the power sector has attracted Independent Power Producers (IPP). Among these IPP, Corbetti Geothermal plc and the Ethiopian government signed an implementation agreement (IA) and a power purchase agreement (PPA) to develop geothermal power in December 2017. This agreement marked a major step in the development of privately financed power generation in Ethiopia. According to the agreement between the parties, the special purpose vehicle company, Corbetti Geothermal Plc, will construct 1,000 MW geothermal power plants with an estimated cost of USD 4 Billion. The electric power generated will be sold to the Ethiopian government national grid with an agreed rate [24].

Encouraged with these recent developments, the Ethiopian government understood the need for mobilizing resources from different sources other than the traditional government financing of infrastructure in order to meet the growing demand for public services. To address this issue, in late August 2017 the government established a PPP framework and PPP Unit within the Ministry of Finance.

## 3. Literature Review

Literature review was used to identify relevant attractive factors of PPP implementation, which were then incorporated into the design of a questionnaire. Previous studies on driving forces for adopting PPPs are of two types [32]. The first type refers to literature that discussed the reasons or motivations for adopting PPP without carrying out specific analysis on the reasons. The second type is research that empirically examined the driving factors for PPP implementation. In this study, literature based on theoretical and empirical studies were used to identify the attractive factors that affect PPP implementation. This information was used to design a

questionnaire that was sent to potential road sector respondents to gather primary data in the Ethiopian road sector.

A study conducted in UK to examine the factors attracting PPP implementation identified 15 attractive factors [9]. These factors were: solves the problem of public sector budget restraint, enhances government integrated solution capacity, reduces public money tied up in capital investment, caps the final service costs, reduces the total project cost, saves time in delivering the project, reduces public sector administration costs, benefit to local economic development, non-recourse or limited recourse public funding, transfer of risk to the private partner, improves maintainability, facilitates creative and innovative approaches, improves buildability, accelerates project development and technology transfer to local enterprise. Furthermore, the study concluded that it was essential that at an early stage in preparing a business case for PPPs, a clear understanding of the positive factors surrounding the procurement will provide a more informed basis for decision-making [9]. Governments opt to PPPs for various reasons. The drivers for adoption of PPPs include acceleration of infrastructure provision, better risk allocation, whole of life cost savings, improved quality of services, access additional revenue sources, benefits for local economic and social development, and improved project scrutiny [11].

Attractive factors of PPPs implementation have been studied by many researchers in different administrative regions. Among these, a study in main land China and the Hong Kong Special Administrative Region through a questionnaire survey explored and compared the key drivers for adopting PPP and the respondents were invited to rate their perceptions on the importance of fifteen different driving factors [2]. The findings indicated that respondents from China rated economy-related drivers higher which were: solve the problem of public sector budget restraint; provide an integrated solution for public infrastructure/services; reduce public money tied up in capital investment; cap the final service costs; reduce the total project cost; save time in delivering the project; reduce public sector administration costs; benefit to local economic development; and nonrecourse or limited recourse to public funding.

However, Hong Kong based respondents tended to rate efficiency-related drivers higher including: facilitate creative and innovative approaches; transfer risk to the private partner; improve buildability; improve maintainability; technology transfer to local enterprise; and accelerate project development. Hence, this finding implies that the unique characteristics of PPPs in each country influence the PPP attractiveness in the country [32]. In a related study, conducted through a questionnaire survey of respondents originated from Hong Kong, Australia and the UK to investigate the reasons for implementing PPPs; revealed various reasons [4]. The top three reasons for implementing PPPs in Hong Kong were private initiative, economic development pressure demanding more facilities and high

quality of services required. In Australia, the three key reasons were high quality of services required, economic development pressure demanding more facilities and inefficiency because of public monopoly and lack of competition. Whereas, the main motivations for implementing PPP in the UK were shortage of government funding, economic development pressure demanding more facilities and avoid public investment restriction.

As countries show economic progress, infrastructure demand to accelerate the economic growth becomes significant. In this regard, governments opt to stretch their capacity to facilitate the required infrastructure from the public budget until deficiency of resources hold them back. In a study conducted in Malaysia through a questionnaire survey of 122 respondents confirmed three top driving forces for PPPs implementation [32]. These were economic development pressure of demanding more facilities, private incentive, and shortage of government funding.

In order to identify the attractive factors of PPPs implementation in developing countries, a study was conducted through a questionnaire survey of international PPP experts from the academic and industrial sectors [14]. The result indicated that the three most critical factors that attract PPP investment were political support and acceptability for PPPs, government positive attitude towards private sector investments and political stability.

One of the driving forces tempt governments around the world to adopt PPPs implementation is the involvement of the private sector expertise to project development to deliver innovate services than the public sector using the traditional procurement method. In this respect, a study attempted to draw the attractive factors of PPP through a questionnaire survey of selected participants from the UAE and the UK [19]. The respondents ranked highest four factors, and these were private sector's skills and experience, private sector's funds, value for money, and risk transfer to the private party.

Government agencies usually prefer to pursue PPPs implementation considering different pressing strategic, political, technical, and economic motivations. A study conducted in UK examined the motivations of Birmingham City Council to implement PPPs and the authors claimed that the main factors for adopting PPPs were strategic and organizational, political, technical and economic aspects [7].

Maintenance and handling of infrastructure in developing countries is one of the challenges that affect the provision of proper services to citizens. A study conducted in Zambia using a questionnaire survey identified the benefits of implementing PPPs in construction projects [12]. The study established that a reduction in the risk of handling, improvement in the levels of services, provision of economic benefits, savings in construction related costs and increase in infrastructure provision were the most significant benefits of implementing PPPs. In a similar study in Ghana, identified five major reasons for the adoption of PPPs for construction projects which were: reduces public sector administration cost, allows for shared risk, reduces the problem of public sector budget constraint, private sector possess better

mobility and private sector has ability to raise funds for project [37].

Identification of attractive factors of PPPs implementation can also be used for decision support of government agencies. Through a case study by comparing the attractive and negative factors of implementing the Hong Kong Zhuhai Macau Bridge using PPPs, the authors, showed that negative factors outweighed attractive factors of the project [4]. Therefore, the use of PPPs to deliver that project could not be justified and the decision of the government coincided with the research outcome.

Based on the foregoing discussion of empirically examined papers, the positive features that influence the attractiveness of PPP in the delivery of public infrastructures are summarized in Table 1.

*Table 1. Summary of Attractive Factors for Adopting PPP Projects.*

No.	Attractive Factors	Source
1	Solve the problem of public sector budget restraint	[37, 9, 4, 32]
2	Enhance government integrated solution capacity	[9, 11, 4, 12]
3	Reduce public money tied up in capital investment	[9, 4]
4	Facilitate creative and innovative approaches	[9, 4, 19, 7]
5	Reduce the total project cost	[9, 11, 4, 19]
6	Save time in delivering the project	[9, 4]
7	Transfer risk to the private sector	[37, 11, 4, 32]
8	Reduce public sector administration costs	[37, 4]
9	Benefit local economic development	[9, 11, 4, 12]
10	Improve buildability	[9, 4]
11	Improve maintainability	[9, 7, 12]
12	Non-recourse or limited recourse to public funding	[9, 4]
13	Accelerate project development	[9, 11, 4, 32, 12]
14	Private sector possess better mobility	[37]
15	Private sector has the ability to raise funds for project	[37, 11, 19]
16	Cap final service costs	[9, 4]
17	Technology transfer to local enterprises	[9, 4, 19]

## 4. Methodology

### 4.1. Introduction

The research started with a systematic literature review to identify the attractive factors of public private partnership (PPP) implementation. By addressing the factors through the literature review, the research investigated the presence of the identified factors in Ethiopia through a structured questionnaire survey. Questionnaire survey is considered to be an effective, convenient, and economical analytical tool for collecting data and sampling the opinions of individuals [17]. Prior to its use, a peer review of the questionnaire was conducted in the University of Birmingham by way of a trial run for checking the wording, identifying ambiguous questions and testing the technique that may be used to collect the data [34]. Finally, the analysis results contributed to the development of conclusion and recommendations for the development of PPP road projects in Ethiopia.

## 4.2. Data Collection

The survey was conducted amongst relevant government organizations, ministries, development partners and private practitioners (contractors and consultants) who were selected based on expert sampling method from the target population of the public, private and development partners working in the Ethiopian road sector. The advantage of this approach is that since experts tend to be more familiar with the subject matter their opinions are more reliable than a sample that includes both experts and non-experts [1].

The respondents were identified based on three main criteria; (i) they must possess adequate knowledge in the area of the Ethiopian government policies and regulations of infrastructure development; (ii) they have involved very closely in the procurement of large infrastructure projects; or (iii) they have served as senior experts or managerial position in their respective area of specialization. The aim was to ensure that the sample for the study was representative of the public sector, private sector and the development partners' perspective. As such, the target experts consisted of respondents drawn from various groups as listed below.

- a. The World Bank Ethiopian Country Office,
- b. African Development Bank Ethiopian Office,
- c. PPP Unit - Ministry of Finance,
- d. Federal Integrated Infrastructure Development and Coordinating Agency,
- e. National Planning Commission of Ethiopia,
- f. Ethiopian Roads Authority Senior Officials,
- g. Addis Ababa City Roads Authority,
- h. International Contractors and Consultants working in Ethiopia, and
- i. Local Contractors and Consultants

## 4.3. Data Analysis Techniques

Quantitative and qualitative research methods are the two major types of research strategies for data analysis. The research area and the availability of data mainly dictate the type of research method to follow [34]. Quantitative research measures a problem in numbers based on a theory composed of variables objectively [34]. But, qualitative research underlines meanings, experiences and descriptions to subjectively evaluate the opinion, view or perception of respondents towards a particular issue. In this study, both qualitative and quantitative research methods were employed for data analysis.

### 4.3.1. Qualitative Data Analysis

Qualitative data analysis of research is concerned with subjective assessment of attitudes, opinions and behaviour [33]. The literature review was analysed by using systematic literature review and content analysis to identify relevant studies to meet the research objectives. Following a qualitative approach, the result of the literature review used to develop the questionnaire to collect the participants' perception on the importance of the attractive factors in the Ethiopian road sector.

### 4.3.2. Quantitative Data Analysis

Quantitative data analysis produces quantified outcomes and conclusions derived from evaluation of results from the literature and collected data [5]. The descriptive method of data analysis including the measure of central tendency (mean score) were employed to investigate the distributions of the data given by the respondents [34]. Furthermore, the inferential method of data analysis was also used to measure the relationship between variables.

The data collected was analysed using the Statistical Package for Social Science [29]. Therefore, the techniques that were used in this research study, in respect of data analysis include the Mean Score Ranking Technique, *t*-Test, Reliability Test, Relative Agreement Index (RAI) and Kendall's Concordance Analysis as explained below.

#### i) Mean Score Ranking Technique

The mean score ranking technique has been adopted by many researchers to establish the relative importance of attractive factors as suggested by group of respondents [3, 4, 7, 32, 37]. In this study, the data collected from the questionnaire survey was also analysed using the same technique.

The mean score (MS) for each factor was computed using equation 1:

$$MS = \frac{\sum(fxs)}{N} \quad (1 < MS < 5) \quad (1)$$

Where *s* = score set to each factor by the respondents (ranging from 1 to 5), *f* = frequency of each rating for each factor, and *N* = total number of responses concerning that factor. Higher ranking was assigned to the factor/issue with lower standard deviation when two factors score the same mean value [8].

#### ii) One-Sample *t*-test of the Mean Score

A one sample *t*-test of the mean scores was carried out to measure the significance of the attractive factors in influencing the implementation of PPP road projects in Ethiopia. The rationale in conducting the *t*-test was that instead of taking mean values above the average (3.0) as significant (on the 5-point scale), it was proper to show the significance of the factor statistically above the average [13, 10, 8]. The limit for a 5-point scale was fixed at '3.5' (*m* = 3.5) and the analysis for the one-sample *t*-test was conducted. With this assumption, the null hypothesis "the identified factors are not significant and less important" was rejected if the mean score was significantly greater than 3.5 at a significance level of less than 0.05. Equation 2 was used for the *t*-test [35]:

$$t(df) = \frac{(M1-M2)}{SMD} \quad (2)$$

Where:

M1 = mean of the group one population,

M2 = mean of the group two population, and

SMD = the standard error of the difference between the two means.

#### iii) Relative Agreement Index (RAI)

The relative agreement index (RAI) method was used to

determine the relative importance of attractive factors as ranked by respondents and the method has been utilized by many researchers [18, 22, 30, 8]. The RAI was used to set the level of importance of the factors in the Ethiopian road sector. The RAI was determined using equation 3 [18].

$$RAI = \frac{\sum W}{A \times N} = (0.2 \leq RAI \leq 1) \quad (3)$$

Where:

W = the sum of scoring given to each factor by the respondents (ranging from 1 to 5),

A = the highest score (i. e. 5 in this case), and

N = number of respondents assigning the same scoring for the factor/issue.

Moreover, the RAI computed was also used to categorize the ranked factors into three grouping of low, medium and high as shown in Table 2.

**Table 2.** Scoring the Levels of the Importance of Factors [22].

Average Score	RAI	Importance level
4.0 to 5.0	0.8 to 1.0	High (H)
3.0 to < 4.0	0.6 to < 0.8	Medium (M)
1.0 to < 3.0	0.2 to < 0.6	Low (L)

iv) Kendall's Coefficient of Concordance

Kendall's coefficient of concordance,  $W$ , is an essential non-parametric measure of relationship [38]. It is utilized to determine the degree of agreement among several respondents on a given sets of ranking of factors/issues [33]. Equation 4 was used to calculate Kendall's coefficient of concordance ( $W$ ) [38].

$$W = \frac{\sum (R_j - \bar{R}_j)^2}{N^2 (N - 1)/12} \quad (4)$$

Where,

$N$  = number of factors ranked,

$R_j$  = average of the ranks assigned to the  $j^{\text{th}}$  factor, and

$\bar{R}_j$  = average of the ranks assigned across all factors.

When the numbers of factors to be ranked are greater than seven, the chi-square is suggested to be employed as a near approximation [38, 21, 3]. The following relationship (equation 5) holds between coefficient of concordance ( $W$ ) and chi-square with ( $N - 1$ ) degree of freedom [35, 21]:

$$X^2 = k (N - 1) W \quad (5)$$

**Table 3.** Response Rate.

Type of Survey	Target number of respondents	Actual number of respondents	Responserate (%)
Questionnaire	85	52	61%
Total	85	52	61%

As illustrated in Table 4, majority of the respondents, 33 (64 per cent), engaged in the private sector including consultants and contractors, 11 (21 per cent) engaged in the public sector, and 8 (15 per cent) are from development partners (the World Bank and the African Development Bank). 14 (27 per cent) of respondents were foreign citizens working in the Ethiopian road sector in various areas of

Where,

$k$  = number of respondents ranking the factors, and  
 $N$  = number of factors being ranked.

The chi-square distribution table can be used to find the critical chi-square value by referring from Siegel and Castellan (1988). When the actual calculated chi-square value equals or surpasses the critical value derived from the table for a certain level of significance, in this case 0.05, and a certain value of degrees of freedom ( $N - 1$ ), then the null hypothesis "the set of rankings of factors by respondents was different or unrelated to each other" can be rejected [38], [21].

v) Reliability Test

Cronbach's alpha was used to determine if the multiple Likert scale questions in the questionnaire were reliable. The Cronbach's alpha was computed using equation 6 [1]:

$$\alpha = \frac{k\bar{r}}{(1+(k-1)\bar{r})} \quad (6)$$

Where,

$K$  = the number of items, and

$\bar{r}$  = the average inter-item correlation.

If the computed value of alpha is greater than 0.70, it indicates a higher level of reliability of the adopted measurement scales [16].

## 5. Results and Discussions

### 5.1. Demographic Information

A total of 85 questionnaires were distributed to selected participants involved in the Ethiopian road sector in various field of assignment from December 2017 to March 2018. Each potential respondent received a cover letter and a copy of the questionnaire. Out of the total target population of 85 experts, the survey was able to collect data from 53 respondents. However, one respondent was excluded from the analysis as it was considered to show insufficient understanding of the questions. Hence, there were a total of 52 usable questionnaires representing a response rate of 61 per cent as shown in Table 3. Considering there are no PPP road projects and there are limited number of potential PPP experts in Ethiopia, 52 responses were considered acceptable for this analysis.

expertise. Majority of the respondents were experts from the private sector comprising contractors and consultants (64 per cent). This result was expected since many professionals are employed in the private sector in the Ethiopian road sector where the research study was concentrated.

**Table 4.** Distribution of Respondents.

By Sector	Frequency of response		Percentage (%)
	Target	Actual	
Public sector	20	11	21%
Private sector	50	33	64%
Development partners	15	8	15%
Total	85	52	100%

Table 5 shows widespread specialisation of the questionnaire respondents that can enable to collect valuable

**Table 5.** Specialization of Respondents.

Primary Role	Frequency	Percentage
PPP expert	3	6
Procurement Specialist	5	10
Director	5	10
Road Contractor	12	22
Transport Economist	2	4
Financial Advisor	1	2
Road Consultant	18	34
Project Manger	1	2
Transport Engineer	2	4
Macroeconomic Research and Modelling Expert	1	2
Development Plan Implementation Research and Evaluation Expert	1	2
Macro Plan Preparation, Monitoring and Evaluation Team Leader	1	2

## 5.2. Ranking of Attractive Factors of PPP Road Projects in Ethiopia

The target survey respondents of the questionnaire included all industrial practitioners from the public, private and development partners. These respondents were requested to rate their degree of agreement against each of the identified seventeen attractive factors of PPP implementation in the Ethiopian road sector according to a five-point Likert scale (1 = Unimportant and 5 = Most Important). The rankings of the respondents are listed in Table 6.

The findings presented in Table 6 show the attractive factors in descending order ranked by all respondents. The most attractive top five factors were: (1) Solve the problem of public sector budget restraint (mean=4.21,  $t$  - value positive,  $p < 0.05$  and RAI=H); (2) Facilitate creative and innovative approaches (mean=4.08,  $t$  - value positive,  $p < 0.05$  and RAI=H); (3) Save time in delivering the project (mean=4.06,  $t$  - value positive,  $p < 0.05$  and RAI=H); (4) Improve maintainability (mean=4.04,  $t$  - value positive,

opinions to answer the research objective. Among the total respondents, the majority of the respondents were road consultants and contractors with 34% and 22% respectively. Procurement Specialist and Directors comprised each 10% of the experts respectively. Though the other experts have experience in other methods of infrastructure procurement, only 6% of the respondents were PPP experts. This result demonstrates the lack of PPP experts in the Ethiopian road sector.

$p < 0.05$  and RAI=H) and (5) Enhance government integrated solution capacity (mean=3.98,  $t$  - value positive,  $p < 0.05$  and RAI=H).

Out of the seventeen attractive factors, seven of them ranked with mean value ranging from 3.92 to 3.73 with medium relative importance indices namely (6) Improve buildability (mean=3.92,  $t$  - value positive,  $p < 0.05$  and RAI=M), (7) Benefit local economic development (mean=3.81,  $t$  - value positive,  $p < 0.05$  and RAI=M), (8) Technology transfer to local enterprises (mean=3.79,  $t$  - value positive,  $p < 0.05$  and RAI=M), (9) Transfer risk to the private sector (mean=3.77,  $t$  - value positive,  $p < 0.05$  and RAI=M), (10) Reduce public money tied up in capital investment (mean=3.77,  $t$  - value positive,  $p < 0.05$  and RAI=M), (11) Accelerate project development (mean=3.75,  $t$  - value positive,  $p < 0.05$  and RAI=M), and (12) Private sector possess better mobility (mean=3.73,  $t$  - value positive,  $p < 0.05$  and RAI=M).

**Table 6.** Attractive Factors of PPP Road Projects in Ethiopia.

Attractive factors	Mean	$t$ -Test (m = 3,5)	Sig. (one-tailed)	Std. Deviation	RAI	Rank	Level of Attractiveness
Solve the problem of public sector budget restraint	4.21	5.049	0.000	1.016	0.84	1	H
Facilitate creative and innovative approaches	4.08	5.646	0.000	737	0.82	2	H
Save time in delivering the project	4.06	5.173	0.000	777	0.81	3	H
Improve maintainability	4.04	6.212	0.000	625	0.81	4	H
Enhance government integrated solution capacity	3.98	4.186	0.000	828	0.80	5	H
Improve buildability	3.92	4.298	0.000	710	0.78	6	M
Benefit local economic development	3.81	2.387	0.011	930	0.76	7	M
Technology transfer to local enterprises	3.79	2.087	0.021	997	0.76	8	M
Transfer risk to the private sector	3.77	1.976	0.027	983	0.75	9	M
Reduce public money tied up in capital investment	3.77	2.109	0.020	921	0.75	10	M
Accelerate project development	3.75	2.216	0.016	813	0.75	11	M
Private sector possess better mobility	3.73	2.320	0.012	717	0.75	12	M
Reduce public sector administration costs	3.69	1.509	0.069	919	0.74	13	M

Attractive factors	Mean	t-Test (m = 3.5)	Sig. (one-tailed)	Std. Deviation	RAI	Rank	Level of Attractiveness
Private sector has the ability to raise funds for project	3.62	960	0.171	867	0.72	14	M
Non-recourse or limited recourse to public funding	3.58	715	0.239	776	0.72	15	M
Reduce the total project cost	3.40	-647	0.260	1.071	0.68	16	M
Cap final service costs	3.35	-1.698	0.048	.653	0.67	17	M

Note: Results are significant at 95% level ( $P < 0.05$ ); degree of freedom (df) = 51

Mean score based on total respondents, N = 52

RAI = Relative Agreement Index

Four attractive factors were least ranked which were not considered statistically significant ( $p > 0.05$ ) namely, (13) Reduce public sector administration costs, (14) Private sector has the ability to raise funds for project, (15) Non-recourse or limited recourse to public funding, (16) Reduce the total project cost, and (17) Cap final service costs. Among the least ranked attractive factors two of them scored negative  $t$ -value indicating that they are below the test value of 3.5 ((16) Reduce the total project cost ( $t$ -value = -0.647) and (17) Cap final service costs ( $t$ -value = -1.698)).

In the following section, the top five highly ranked attractive factors of PPP implementation in the Ethiopian road sector are discussed in detail.

“Solve the problem of public sector budget restraint” was the most important attractive factor as perceived by overall respondents. This finding indicates that PPP type arrangement suits more to those countries where governments have resource constraints and a considerable infrastructure gap exists [15]. Given limited public resources, the formulation of PPP legal framework in Ethiopia provides an opportunity to improve public sector efficiency and private sector development, while attracting foreign resources to support budget constraints [31]. Hence, the financing of public sector projects by the private sector has been recognized as one of the key initial driving forces for implementing PPP schemes [2].

The second most attractive factor for PPP road projects implementation in Ethiopia as ranked by all respondents was “Facilitate creative and innovative approaches”. There has been evidence that by using PPP, the public at large can enjoy better quality services because PPP encourages the private sectors to be innovative and creative in delivering projects [32]. This is a reflection that in the Ethiopian road sector, there is a limitation of capacity in design and project management which is tremendously affecting the public sector budget due to time and cost overrun [25].

The third attractive factor ranked by overall respondents was “Save time in delivering the project”. One of the most attractive features of PPP procurement method is that it offers both the public sector and the private contractor more freedom to select innovative methods in the provision of assets and services. This in turn leads to time saving by accelerating project development and by avoiding delays in project delivery [9]. Public financed project delay in the Ethiopian road sector is a common phenomenon which has been affecting the country’s economic prospect in many ways [25].

The fourth ranked attractive factor as rated by all

respondents was “Improve maintainability”. Under a PPP contract, since the private sector is responsible for design, construction, operation and maintenance, it has the opportunities to consider design suitability and convenience for future maintainability of the project. In the traditional method of procurement, maintenance of road projects is a critical problem in Ethiopia due to quality problem at construction stage and lack of sufficient budget at the asset management stage.

The fifth most attractive factor rated by all respondents was “Enhance government integrated solution capacity”. This finding indicates that with PPP procurement, the project scope is capable of expansion to reflect a broader context integrating several components of projects. This might permit the development of an integrated solution, such as binding several activities (design, construction, financing, maintenance, etc.) formerly dealt with under different departments into a single project, thus achieving economies of scale [9].

In summary, out of the total seventeen attractive factors ranked by all respondents, the mean score values of four attractive factors were above 4.0 with high level of attractiveness. The mean score values of eleven attractive factors were above 3.5 and less than 4.0 with medium level of attractiveness. These findings revealed that these fifteen factors were perceived to be important attractive factors for the development of PPP road projects in Ethiopia. Only the mean score values of two attractive factors namely; “reduce the total project cost” (mean score=3.40) and “cap final service costs” (mean score=3.35) were less than 3.5 with medium level of attractiveness.

### 5.2.1. Agreement of the Survey Respondents

The Kendall’s coefficient of concordance (W) for the rankings of attractive factors was 0.103. The computed W was significant with  $p = 0.000$ . As the number of factors considered (17) were above seven, the Chi-square value would be referred to rather than the W value. According to the degree of freedom, the critical value of Chi-square was 26.296 for the overall respondents and the computed Chi-square value (86.031) was above the critical value of Chi-square (26.296). Therefore, this result indicated that there was a high consensus among the 52 respondents about ranking of which factors are attractive for implementation of PPP road projects in Ethiopia.

### 5.2.2. Reliability Test

Cronbach’s alpha coefficient was calculated to verify the internal consistency of the measurement instrument used in

the questionnaire. The result of Cronbach's coefficient alpha in this survey was calculated to be 0.838. Therefore, this finding provides evidence that all the factors have a high internal consistency and reliability.

## 6. Conclusion

The objective of the study was to identify attractive factors of PPP road projects implementation in Ethiopia based on a literature review and the opinion of purposively sampled experts. The mean score analysis conducted determined the relative importance of each factor. The following conclusions are drawn.

1. The five most important attractive factors for adopting PPP road projects in Ethiopia in descending order were:
  - a. Solve the problem of public sector budget restraint
  - b. Facilitate creative and innovative approaches;
  - c. Save time in delivering the project;
  - d. Improve maintainability; and
  - e. Enhance government integrated solution capacity
2. The results of the top attractive factors for PPP road projects adoption in Ethiopia are mainly significant to the government. The government will be beneficiary due to the fact that debt sustainability is a critical issue in the Ethiopian financial system as result of excessive commercial borrowing for infrastructure.
3. In particular, the result showed that an attractive feature of PPP procurement method is that it offers both the public sector and the private sector more freedom to select innovative methods in the provision of assets and services. The presence of factors such as maintainability in the top attractive factors for PPP suggests that this factor may be aligned with innovation in terms of the risk and practicality elements. The opportunity for the private sector to inject its technical expertise much earlier in the project development process is clearly regarded as an attractive feature of PPP by both parties.
4. Moreover, PPP is also considered attractive because it is believed to accelerate project development. To ensure fast road project delivery through PPP in Ethiopia, strong coordination between relevant government authorities envisaged to involve in PPP approval need to be organised so that there will be no long delay in any process before the PPP project is awarded to a private company. The achievement of economies of scale, by developing an integrated solution capacity of the government is perceived as an important attractive factor in development of PPP road projects in Ethiopia.
5. The attractiveness of the remaining ten factors is also need crucial attention by the public and the private sector as their mean score values were more than 3.5. These ten attractive factors in order of significance were: Improve buildability; Benefit local economic development; Technology transfer to local enterprises; Transfer risk to the private sector; Reduce public money tied up in capital investment; Accelerate project development; Private sector

possess better mobility; Reduce public sector administration costs; Private sector has the ability to raise funds for project and; Non-recourse or limited recourse to public funding.

## 7. Recommendation

The under listed recommendations are forwarded to be considered by the government of Ethiopia.

1. The government of Ethiopia needs to engage the private sector investors through PPP arrangement who have the capabilities of raising substantial funds for road infrastructure development in the country to fill the huge investment gap which cannot be provided by the government alone form the national budget. In this regard, a clear policy and strategy for the private sector participation in financing PPP road projects need to be drafted and communicated to local and international stakeholders through appropriate means.
2. In order to ensure that PPP is an attractive and successful procurement tool in the Ethiopian road sector, the government should support innovation by giving more authority to the private sector partner in deciding the design, construction, financing, and operation of PPP road projects when developing the PPP contract.
3. It is worth noting that efficiency for PPP road projects come from the capability of the private party in managing the full life cycle of the project under one integrated development system coupled by its technical and financial facilities available for the project.
4. In a PPP road project, the private partner is responsible for maintaining the public infrastructure over the concession period. Therefore, it is recommendable to the government of Ethiopia to intensify the process of implementing PPP for new road projects so that the government will be able to focus on the maintenance backlog of already constructed road projects in the country through conventional procurement methods.

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