# PPP ROAD PROJECTS IN BANGLADESH: IDENTIFICATION AND PRIORITISATION OF RISKS

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Bangladesh needs to develop its road sector with greater importance, which requires high volume of capital investment. The government of Bangladesh through its different agencies is taking initiatives to develop and maintain the road sector under PPP arrangement very recently with a view to relieving the pressure from use of public fund. However, a number of pressure groups, such as media, intellectuals, bureaucrats and even some political leaders are trying to oppose government's initiative to involve the private sectors in developing the road sector of Bangladesh. There are number of evidences of time and cost overruns and even complete failure of road projects in Bangladesh. Moreover, owing to complex nature such as large volume of capital investment, long- term concession agreement and multi-party involvement, PPP models have been adjudged to be full of risks. Thus, it is very important for all the stakeholders to understand the various risks associated with PPP road projects. Identification of risk factors and their significance on project implementation is one of the key elements for the success of any project. The objectives of this paper were set as: to explore level of importance of need and the reasons for adopting the PPP road projects in Bangladesh and; to identify and prioritise of risk factors associated with PPP road projects in the context of Bangladesh. 36 risk factors were identified through extensive review of literatures on PPP road projects and then a questionnaire survey was conducted among three groups of respondents in Bangladesh: public clients, contractors and consultants. A total of 120 questionnaires were distributed among the respondents, in which 82 were returned. Majority of the respondents agreed that PPP road projects are very important, which can reduce the pressure on public fund for developing the road sector. 'Availability of land' is the most significant risk factor affecting the success of PPP road projects in Bangladesh was ranked first by the respondents. Improper planning for PPPs, risk in financing, corruption in government sector and delay in land acquisition, are the other top ranked factors, which can significantly affect the success of PPP road projects in Bangladesh. There is a strong agreement of the rankings between the contractor and consultant groups. However, there is little disagreement of opinions between the clients and contractors and clients and consultants as well.

***Keywords: Bangladesh, identification of risks, prioritisation of risks, public private partnerships (PPPs), road project***

## INTRODUCTION

Bangladesh is one of the most densely populated countries in the world with an average of about 1084 inhabitants per square kilometre having a per capita income of only US$ 645 (Bangladesh Economic Review, 2010). The principal modes of transport in Bangladesh are roadways, railways, inland waterways, two sea ports, maritime shipping and civil aviation, amongst which roadway is the dominating mode for transporting passengers and freights (Bangladesh Bridge Authority, 2011). Being a developing country, to accelerate the GDP growth rate along with easement of traffic congestions in most of the major cities, the country needs to emphasise the development of the road sector with a greater importance. However, requirement of high volume of capital investment in road sector is one of the major impediments for the government to develop this sector. From this viewpoint, project implementation through Public-Private-Partnerships (PPPs) seems to be one of the best alternatives for the government to ease the pressure on public sector fund. The government of Bangladesh through its different agencies is taking initiatives to develop and maintain the road sector under PPP arrangement very recently with a view to relieving the pressure from use of public fund. However, a number of pressure groups, such as media, intellectuals, bureaucrats and even some political leaders are not appreciating the government's initiative to involve the private sectors in developing the road sector of Bangladesh.

In PPP procurement methods, the private partners can be engaged in delivering public services (Akintoye and Chinyio, 2005). It is widely used worldwide because of having some other features such as proper allocation of project risks and efficiency in project implementation with innovative design and construction, which encourage the public clients to initiate PPP-based infrastructure projects worldwide (Li and Akintoye, 2003). However, generally project implementation process comes across a number of risks in

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different forms such as political, cultural, technological, social, legal, environmental, financial, macroeconomic, project default risks etc. (Han *et al.,* 2005). In addition, owing to complex nature, large volume of capital investment, long- term concession period and involvement of diversified parties, project implementation through PPP models has been adjudged to be full of risks (Li and Zou, 2011). Moreover, in PPP road project, traffic revenue or demand risk, toll pricing and collection risks are other important factors that can create uncertainty in getting back the cost of capital and profit to the private entity by the end users throughout the long range concession period (Singh and Kalidindi, 2006).

Impact of risks in completing a PPP project is usually significant. Failure to manage the risks has the direct or indirect impact on goals and objectives of the organisation. Thus, all the parties involved in PPP procurement need to know the nature and complexity of project risks. The public sector clients need to address the project risks for assessing financial and economic viability before embarking on any project (Singh and Kalidindi, 2006), preparing a successful concession agreement and transferring the major risks to the private sectors as they are best able to manage them (Ibrahim *et al.,* 2006). On the other hand, the private parties need to know the nature of risks for taking investment decision in PPP projects, setting the risk premium while taking part into the bidding competition and preparing risk mitigation plan before going to implement the project (Hardcastle and Boothroyd, 2003). Thus, it is essential to have a clear understanding to all the parties involved about the risks associated with PPP projects in the investing country. This paper aims at exploring the importance of need and reasons for adopting PPP road projects in Bangladesh, identification of the significant risk factors in PPP road projects and prioritisation of those factors in the context of Bangladesh.

## RESEARCH METHODOLOGY

The methodology of the research contains comprehensive review of literatures to identify the risk factors associated with PPP road projects. The risk factors were listed in tabular form in accordance with their number of citations. Then, primary data were collected through questionnaire survey to explore the need and the reasons for adopting PPP road projects in Bangladesh and to rank the risk factors in accordance with their degree of importance in the context of Bangladesh. The questionnaire was divided into two parts. In the first part, the respondents were asked to opine the importance of need for PPP road projects and the reasons for adopting PPP road projects in Bangladesh. In the second part, 5-point Likert scale (5=very important, 4=important, 3=moderately important, 2=less important, 1=unimportant) was used to rate degree of importance of the risk factors in PPP road projects in the context of Bangladesh. The respondents were chosen from three different groups, public clients; private contractors; and consultants, who were directly involved in road sector development or public procurement in Bangladesh.

## METHOD OF DATA ANALYSIS

### MEAN SCORING RANKING

Mean Score (MS) ranking technique is used to rank the risk factors based on the surveyed data. It is widely used in construction management researches to determine the relative ranking of the factors in descending order (Xu, *et. al.,* 2010; Ibrahim *et al.,* 2006). The mean score (MS) for 5-point Likert scale can be calculated by the following equation (Chan and Kumaraswamy, 1996):

$$MS = \frac{\sum_1^5 (f.s)}{N}$$

Where, f = frequency of each rating for each risk factor;
s = score given to each risk factor by the respondents, and
N= total number of responses concerning a particular risk factor.

**Concordance analysis for agreement/disagreement between different groups of respondents**

In order to test for any agreement/disagreement in rankings of the individual factors between various groups of respondents, Spearman correlation analysis for any two groups is used. The Spearman rank correlation coefficient is a commonly used tool to measure correlation between two sets of rankings viewed by two different groups of respondents (Chan and Kumaraswamy, 1996). The rank correlation coefficient ($r_s$) ranges from - 1 to + 1. A correlation coefficient of + 1 suggests a perfect linear correlation while a value of - 1 means negative correlation implying that high ranking on one is associated with low ranking on the other. In the case of zero value, no linear association exists (Chan and Kumaraswamy, 1996). The Spearman rank correlation coefficient ($r_s$) for any two sets of rankings is calculated by:

$$r_s = \mathbf{1} - \frac{\mathbf{6}\sum \mathbf{d_i^2}}{\mathbf{n(n^2-1)}} \quad \text{and,} \quad \boldsymbol{t} = \mathbf{r_s}\sqrt{\left[\frac{\boldsymbol{n-2}}{\mathbf{1}-\boldsymbol{r_s^2}}\right]}$$

Where, $d_i$ is the difference between the ranks given by two groups of respondents; and n is the number of pairs of values in the data set. To test the rank correlation coefficient, a t-test at a 95% confidence interval of the null hypothesis ($H_0$) is used. $H_1$ is the alternative hypothesis. The decision rule depends on whether the calculated values of t are greater than or less than the critical values of t for (n - 2) degrees of freedom.

For top 10 ranked risk factors (n=10),
$H_o$: two groups of respondents do not agree on the ranking of importance of risk factors;
$H_1$: otherwise.
Reject $H_o$ if t > 1.860 or t < - 1.860, at a level of significance of 5 %

## IDENTIFICATION OF RISKS IN PPP ROAD PROJECTS

Every PPP project, like any other projects, is adjudged to be full of risks. Much of the risks in PPP projects emerges from the complexity of contract agreement in terms of documentation, financing, technical details and sub-agreements along with the generic risks in construction projects (Grimsey and Lewis, 2002). In case of a concession based PPP project, absence of stable and long-term revenue stream significantly affects the core business objectives of the equity investors and debt providers (Ng *et al.,* 2010).

Several studies (Xu *et al.*, 2010; Chung et al., 2010; Singh and Kalidindi, 2006; Thomas, 2003) were carried out to identify the significant risk factors in PPP road projects, their impacts and development of risk management tools for different countries. A total of nine available research papers on risk in PPP road projects were found. Through the content analysis of these nine papers, a total of 36 risk factors were identified and listed in a tabular form along with the number of citations by the authors.

***Table 1: Identification of risks in PPP road projects***

| RISK FACTORS | Wang *et al.* (2000) | Thomas (2003) | Wibowo and Kochendorfer (2005) | Singh and Kalidindi (2006) | Ogunlana and Abednego (2009) | Chung *et al.* (2010) | Xu *et al.* (2010) | Rajan *et al.* (2010) | Li and Zou (2011) | Total number of citations |
|---|---|---|---|---|---|---|---|---|---|---|
| Fluctuating traffic /demand risk | x | x | x | x | x | x | x | x | x | 9 |
| Delay in construction | x | x | x | x | x | x | x | | x | 8 |
| Delay in land acquisition | x | x | x | x | x | | | x | x | 7 |
| Change in policy /laws | x | x | x | x | x | x | | | x | 7 |
| Fluctuation of interest rate | x | | x | x | x | | x | x | x | 7 |
| Operation risks | x | | | x | x | x | x | x | x | 7 |
| Cost overruns | x | x | x | x | | | x | x | x | 6 |
| Pricing/fixing of toll rates | x | x | x | | x | x | | x | | 6 |
| Delay in approval | x | | | x | | | x | x | x | 5 |
| Inflation | x | | x | | x | | x | | x | 5 |
| Project financial closure risk | | x | | x | x | | x | x | | 5 |
| Risk in contract management | x | | | | x | | x | x | | 4 |
| Design risk | | | | | x | x | | x | x | 4 |
| Force majuere risk | x | | | x | x | x | | | | 4 |
| Risk in quality control | | | | x | x | | x | | | 3 |
| Competing/alternative routes | x | | | | x | x | | | | 3 |
| Risk in collection of toll | | x | | | | | | x | x | 3 |
| Debt servicing risk | | x | | | | x | | x | | 3 |
| Fluctuation of exchange rate | x | | | | x | | x | | | 3 |
| Environmental risk | x | | | | | | | x | x | 3 |
| Government intervention | | | | | x | | x | | | 2 |
| Corruption in government | x | | | | | | x | | | 2 |
| Lack of government support | | x | | | x | | | | | 2 |
| Lack of competition in bidding | | | | | | x | | | x | 2 |
| High bidding cost | x | | | | | | | | x | 2 |
| Planning/pre-investment risk | | | | x | | | | | x | 2 |
| Commissioning risks | x | | | | | | | | x | 2 |
| Acceptance of toll road | | x | | | | x | | | | 2 |
| Change of project scope | | | | x | | | x | | | 2 |
| Health and safety risk | x | | | | | | | | x | 2 |
| Availability of land | | | | x | | | | | | 1 |
| Resettlement risk | | | | x | | | | | | 1 |
| Residual value risks | | | | | | | | | x | 1 |
| Delay in annuity payment | | | | x | | | | | | 1 |
| Unstable law and order | | | | | | | x | | | 1 |
| Bid Evaluation risk | | | | | | | x | | | 1 |

Table 1 shows that fluctuating traffic or demand risk is the mostly cited risk factors associated with PPP road projects in most of the countries. The commercial success of PPP road projects is usually depends on the toll collected from the traffic for the use of the assets if otherwise not compensated by the clients to the investors (Singh and Kalidindi, 2006). Delay in construction is another important factor discussed by my most of the authors. Construction delay is a general factor for any type of project which may be the result of insufficient experience of the contractors, use of inappropriate construction methods, inaccurate time and cost estimating, improper project planning and scheduling, incompetent project team, unreliable subcontractor, obsolete technology etc. (Long *et al.*, 2004). Delay in land acquisition, frequent change in laws/policies and risk in operation and maintenance are the other most cited risk factors associated with PPP road projects. All these 36 factors were then considered for further questionnaire survey.

# CHARACTERISTICS OF THE RESPONDENTS

The questionnaires were distributed among 120 respondents, 40 in each of three groups of respondents (*public clients*, *private contractors* and *consultants*). Out of 120, a total of 85 questionnaires were returned in which 3 were left blank or partially filled up, which were screened out for analysis. Finally, a total of 82 completely filled-up questionnaires is considered for further analysis. The overall response rate is 68.33%, which is quite satisfactory compared to the similar studies done earlier. For example, Ibrahim *et. al.* (2006) had a response rate of 24%, Li *et. al.* (2005) had 11% response rate, Soetanto *et. al.* (2001) received a response rate of 18.9% and Chan and Kumaraswami (1996) got a response rate of 40% in similar type of questionnaire survey. Figure 1 shows the response rate for each group of respondents.

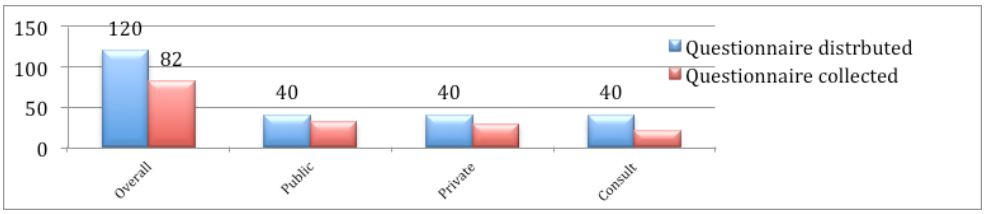


***Figure 1: Survey response by different groups of the respondents***

## LEVEL OF EXPERIENCE OF THE RESPONDENTS

The respondents were asked to mention their level of experiences in construction of road projects in Bangladesh and/or experience in public procurement of Bangladesh. Table 2 represents the experience of the respondents, which shows that more than 60% of them have the experience of more than 10 years in the field of road construction and/or public procurement in Bangladesh. As majority of the respondents are the senior level construction professionals, their opinions ensure the acceptability of the results.

***Table 2: Experience level of the respondents in road projects***

| YEARS OF EXPERIENCE | OVERALL | | PUBLIC CLIENTS | | PRIVATE CONTRACTORS | | CONSULTANTS | |
|---|---|---|---|---|---|---|---|---|
| | No. | (%) | No. | (%) | No. | (%) | No. | (%) |
| Less or equal to 5 years | 9 | 11% | 8 | 25% | 1 | 3% | 0 | 0% |
| 5+ to 10 years | 23 | 28% | 12 | 37.5% | 9 | 31% | 2 | 10% |
| 10+ to 20 years | 38 | 46% | 8 | 25% | 13 | 45% | 17 | 80% |
| More than 20 years | 12 | 15% | 4 | 12.5% | 6 | 21% | 2 | 10% |
| Total = | 82 | 100% | 32 | 100% | 29 | 100% | 21 | 100% |

# FINDINGS OF THE SURVEY RESULTS

## IMPORTANCE OF PPP ROAD PROJECTS IN BANGLADESH

The respondents were asked on 5-point Likert scale (0= unimportant, 1= less important, 2= moderately important, 3= important, 4= very important) to rate 'to what extent PPP road projects is important' to develop the road sector in Bangladesh. The survey result shows that majority of respondents (52%) mentioned the procurement method as *very important*, 44% as *important* and only 3 respondents (4%) as *moderately important* to develop the road sector of Bangladesh. No one mentioned it as less important or unimportant.

## REASONS FOR ADOPTING PPP ROAD PROJECTS IN BANGLADESH

The respondents were also asked to mention the reasons for adopting PPP road projects in Bangladesh. A total of 11 factors were identified. Figure 2 shows that 56 respondents (68.3%) mentioned 'lack of public fund' as the main reasons for adopting PPP procurement methods for development of road sector in Bangladesh. The other important reasons mentioned by the respondents are ease of pressure from the conditional foreign loans (26.83%), providing uninterrupted roadway communications (25.6%), timely completion of projects (24.4%) and ensuring quality of project works (23.2%).

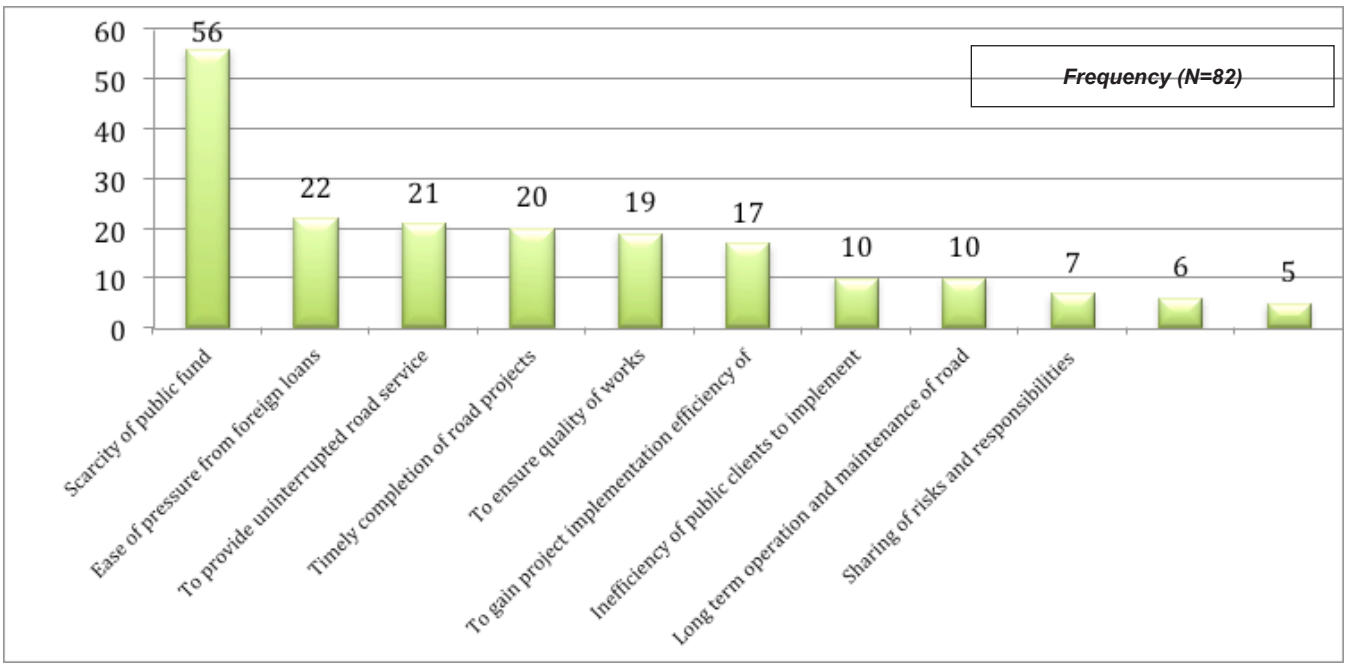


***Figure 2: Reasons for adopting PPP road projects in Bangladesh***

## RANKING OF RISK FACTORS IN PPP ROAD PROJECTS IN BANGLADESH

The mean score (MS) for each factor from the surveyed data is used to get the relative ranking. The factors are ranked based on the mean scores from each of the view points of clients, contractors and consultants groups. Finally, the overall ranking of the risk factors is calculated combining the data given by all respondents. In case of same score for two or more factors, prioritisation has been made based on smaller standard deviation. The top five significant risk factors from clients' view points are: delay in acquisition of land for the projects (MS=4.50), initiating PPP projects without proper planning by the client organisations (MS=4.41), availability of sufficient land for construction of road projects in Bangladesh (MS=4.38), lack of qualified bidders to invest in large scale road projects (MS=4.13), risk of financing in PPP road projects in Bangladesh to get back the money (MS=4.06). From the view point of contractors, the highest ranked five significant risk factors are: risk in availability of land (MS=4.55), risk of financing in PPP road projects (MS=4.48), corruption in government sectors (MS=4.41), improper planning for PPP road projects (MS=4.34) and government intervention in large scale project procurement (MS=4.28).

*Table 3: Rankings of risks in PPP road projects in Bangladesh from different perspectives*

| RISK FACTORS | WEIGHTED AVERAGE | | | CLIENTS | | CONTRACTORS | | CONSULTANTS | |
|---|---|---|---|---|---|---|---|---|---|
| | R | MS | SD | R | MS | R | MS | R | MS |
| Risk of availability of land | 1 | 4.43 | 0.817 | 3 | 4.38 | 1 | 4.55 | 1 | 4.33 |
| Improper planning for PPP | 2 | 4.33 | 0.771 | 2 | 4.41 | 4 | 4.34 | 3 | 4.19 |
| Risk of financing | 3 | 4.27 | 0.847 | 5 | 4.06 | 2 | 4.48 | 2 | 4.29 |
| Delay in land acquisition | 4 | 4.24 | 0.639 | 1 | 4.50 | 6 | 4.14 | 6 | 4.00 |
| Corruption in government | 5 | 4.09 | 0.820 | 11 | 3.81 | 3 | 4.41 | 5 | 4.05 |
| Risk in acceptance of toll road | 6 | 4.02 | 0.801 | 10 | 3.88 | 7 | 4.10 | 4 | 4.14 |
| Government intervention | 7 | 3.98 | 0.875 | 13 | 3.75 | 5 | 4.28 | 7 | 3.90 |
| Lack of qualified bidders | 8 | 3.94 | 0.880 | 4 | 4.13 | 9 | 3.86 | 9 | 3.76 |
| Unstable law and order | 9 | 3.90 | 0.730 | 9 | 3.97 | 10 | 3.86 | 8 | 3.86 |
| Delay in getting approval | 10 | 3.80 | 0.761 | 8 | 4.00 | 11 | 3.76 | 11 | 3.57 |
| Frequent change in laws | 11 | 3.79 | 0.698 | 7 | 4.00 | 12 | 3.72 | 12 | 3.57 |
| Delay in construction | 12 | 3.59 | 0.816 | 12 | 3.81 | 14 | 3.31 | 10 | 3.62 |
| Risk in collection of toll | 13 | 3.55 | 0.996 | 18 | 3.25 | 8 | 3.90 | 13 | 3.52 |
| Risk in resettlement | 14 | 3.52 | 0.959 | 6 | 4.03 | 17 | 3.00 | 14 | 3.48 |
| Inflation | 15 | 3.29 | 0.839 | 20 | 3.13 | 13 | 3.38 | 15 | 3.43 |
| Risk in contract management | 16 | 3.29 | 0.853 | 16 | 3.41 | 15 | 3.21 | 17 | 3.24 |
| Increase in project cost | 17 | 3.28 | 0.879 | 14 | 3.47 | 18 | 3.00 | 16 | 3.38 |
| Operation and maintenance risks | 18 | 3.06 | 0.791 | 21 | 3.09 | 19 | 2.97 | 20 | 3.14 |
| High tendering cost | 19 | 3.04 | 0.909 | 31 | 2.81 | 16 | 3.14 | 18 | 3.24 |
| Fluctuation of interest rate | 20 | 3.00 | 0.770 | 24 | 2.97 | 20 | 2.93 | 19 | 3.14 |
| Fluctuating exchange rate | 21 | 2.98 | 0.769 | 27 | 2.94 | 22 | 2.93 | 21 | 3.10 |
| Subjective tender evaluation method of PPP | 22 | 2.94 | 0.998 | 19 | 3.22 | 23 | 2.55 | 23 | 3.05 |
| Maintaining quality of works | 23 | 2.91 | 0.973 | 15 | 3.44 | 29 | 2.24 | 22 | 3.05 |
| Unwillingness of the government for PPPs | 24 | 2.88 | 1.011 | 17 | 3.28 | 25 | 2.41 | 24 | 2.90 |
| Fluctuating traffic volume | 25 | 2.80 | 1.048 | 26 | 2.94 | 21 | 2.93 | 31 | 2.43 |
| Force majeure risks | 26 | 2.77 | 0.907 | 25 | 2.97 | 24 | 2.48 | 25 | 2.86 |
| Existing/alternative routes | 27 | 2.67 | 0.969 | 28 | 2.94 | 26 | 2.31 | 26 | 2.76 |
| Fixing the toll rates | 28 | 2.57 | 1.089 | 22 | 3.09 | 31 | 2.10 | 32 | 2.43 |
| Variation in scope of works | 29 | 2.55 | 0.918 | 33 | 2.75 | 28 | 2.28 | 28 | 2.62 |
| Environmental risk | 30 | 2.54 | 0.971 | 30 | 2.84 | 32 | 2.10 | 27 | 2.67 |
| Delay of annuity payment | 31 | 2.52 | 1.009 | 32 | 2.81 | 27 | 2.31 | 35 | 2.43 |
| Changes in design of work | 32 | 2.51 | 0.878 | 29 | 2.84 | 30 | 2.17 | 29 | 2.48 |
| Payment of debt | 33 | 2.51 | 1.009 | 23 | 3.00 | 33 | 2.00 | 30 | 2.48 |
| Health and safety risk | 34 | 2.34 | 0.864 | 34 | 2.72 | 35 | 1.86 | 33 | 2.43 |
| Commissioning risk | 35 | 2.23 | 1.010 | 36 | 2.63 | 34 | 1.90 | 36 | 2.10 |
| Risk in residual value | 36 | 2.13 | 1.167 | 35 | 2.69 | 36 | 1.34 | 34 | 2.38 |

*R = Ranking, MS = Mean score, SD = Standard deviation

The consultant group ranked the top five significant risk factors associated with PPP road projects in Bangladesh as risk of availability of land for road project (MS=4.33), risk of financing in PPP road projects (MS=4.29), improper planning for PPP road projects (MS=4.19), risk in acceptance of toll road by the users (MS=4.14), corruption in government sector (MS=4.05) and delay in land acquisition (MS=4.00). The overall mean scores of all the factors ranges from 4.43 to 2.13. Availability of land (MS = 4.43), improper planning for PPP project procurement (MS = 4.33), risk of financing in PPP road projects (MS = 4.27), delay in land acquisition (MS = 4.24) corruption in government sector (MS = 4.09), risk in acceptance of toll roads (MS = 4.02) are some of the top ranked risk factors rated by the respondents.

*Concordance analysis:* To test the agreement or disagreement on rankings of the top ten important risk factors between two groups of respondents, concordance analysis was done. The values of $r_s$ and t-values are shown in Table-4. The hypotheses are tested at 95% confidence level.

***Table 4: Test for agreement on the overall ranking of the 10 most important risk factors as perceived by different group of respondents***

| Groups of respondents | $r_s$ | t | Reject $H_0$? | p-value |
|---|---|---|---|---|
| Clients and Contractors | -0.297 | -0.880 | No | Not significant |
| Clients and Consultants | -0.103 | -0.293 | No | Not significant |
| Contractors and Consultants | 0.867 | 4.914 | Yes | Significant, <0.05 |

**$r_s$ = Spearman's rank correlation coefficient; t = t-statistics; $H_o$ = null hypothesis; p = probability that rejects the null hypothesis wrongly.*

Table 4 tabulates the results of calculation of Spearman's rank correlation coefficients ($r_s$), the t-values, and the decision rule of rejection of null hypothesis for the 10 most significant risk factors ranked by the different groups of respondents. It can be said that there is general agreement between the consultants and contractors in respect of the ranking of the top ten risk factors, whereas there are significant disagreements between clients and contractors, as well as clients and consultants. This test reinforces the concordance of perception between the contractors and consultants.

# DISCUSSION OF THE RESULTS

## REASONS FOR ADOPTING PPP ROAD PROJECTS IN BANGLADESH

From this study it is explored that PPP could be one of the best alternatives for the government of Bangladesh to meet the fund requirement along with easement of pressure from foreign loans for developing the road sector of Bangladesh. Avoiding time overruns is another important reason for choosing PPP road project in Bangladesh, which can be ensured through PPP arrangement. Ensuring quality of physical works is one of the major problems in most of the projects in Bangladesh, which can be significantly improved by incorporating the private parties. Besides these, the government can go for PPP road projects to learn the technology know-how from the private sector, which will increase the project implementation efficiencies of the public clients.

## RISKS ASSOCIATED PPP ROAD PROJECTS IN BANGLADESH

The prioritisation of risks in PPP road projects based on literatures for different countries is quite different from that of Bangladesh. For example, availability of land was discussed in only one available literature, whereas, it was ranked 1st critical factor in Bangladesh. On the other hand, fluctuating traffic revenue was cited in all the available papers; however, this factor was ranked as a least important factor in Bangladesh. Some of the top ranked factors are discussed in the perspectives of Bangladesh based on this study.

## RISK IN AVAILABILITY OF LAND FOR PPP ROAD PROJECTS

The factor 'availability of land' for PPP road projects was ranked 1st overall. Though the factor was ranked 3rd by the clients, the contractors and the consultants groups ranked it as 1st. Availability of land is a very common problem for road projects in Bangladesh as it has a small area with high density of population. Construction of road projects needs considerable land. There also needs to be demolished high-rise buildings, markets and other structures which are located adjacent to the existing roads. Moreover, cost of the land in major cities in Bangladesh is extremely high as compared with the cost of projects. There are number of evidences of failure of road projects in Bangladesh due to scarcity of land.

## IMPROPER PLANNING FOR PPP PROCUREMENT

Though 'improper planning for PPP procurement' was identified as one of the least cited factors in the available literatures, this factor was ranked 2nd in this research. The public clients ranked the factor as 2nd, while both contractors and consultants ranked it as 3rd. This is one of the critical risk factors in Bangladesh as most of the road projects in Bangladesh are taken into consideration on the basis of political choices. The financial and economic viability are often ignored while initiating the road projects in Bangladesh, which often extend the scope of projects in terms of time and cost overruns.

## RISK IN FINANCING OF PPP ROAD PROJECTS

The respondents rated 'risk of financing in PPP road projects in Bangladesh as the 3rd most significant risk factor. The clients group ranked the factor as 5th, while both the contractors and consultants groups ranked it as 2nd. The risk is important to both contractors

and lenders as it may affect the project revenue and cash flow regime, which has a direct impact on payment for the services provided by the asset and consequently the recovery of capital invested by the lender.

### DELAY IN LAND ACQUISITION

Delay in land acquisition was ranked fourth overall, while the clients group of respondents rated it as first. Both the contractors and consultants have ranked the factor as sixth. As most of the road project construction professionals in the public clients in Bangladesh have the bitter experience with land acquisition process in construction works. In Bangladesh, acquisition process requires number of steps to get the approval with lot of complexities, which causes for considerable time and cost overruns.

### CORRUPTION IN GOVERNMENT SECTOR

Overall, the factor, corruption in government sector was ranked fifth. The contractors ranked it as third and the consultant group ranked as fifth, while the clients group ranked the factor as eleventh. Corruption exists in most of the public sectors in Bangladesh, which often cause for significant delay in project implementation. The contractors often make an excuse for causing delay due to corruption. The activities related to tendering process, getting approval for necessary documents, receiving the interim payments etc., involve some forms of corruption by the clients, which discourages the private investors to invest in PPP road projects.

## CONCLUSIONS

The government is now considering initiating PPP procurement methods for development of the road sector of Bangladesh. However, some pressure groups including the public sector clients are trying to convince the policy makers not incorporating the private sector in developing the road sector of Bangladesh right now. The research shows that PPP road projects are very important to develop and maintain the road sector as the government is now not capable of providing large amount of public money to this sector. PPP procurement method can also improve the present project implementation inefficiencies including time overruns, inferior quality of physical works etc. However, PPP procurement method is adjudged of full of risks because of long-term concession agreement, multi-party involvement and large capital investment in addition to general project related risks. The private parties are not showing much interest in investing in Bangladesh as they are less informed about these risks associated with PPP road projects. 36 risk factors were identified through extensive review of literatures on risks in PPP road projects, which were used for ranking of these factors in the context of Bangladesh thorough questionnaire survey. The survey result shows that availability of land, improper planning for PPP procurement by the government, risk in financing in PPP road projects, corruption in public sector, government intervention and risk in acceptance of toll roads are some of the top ranked risk factors that might affect the success of PPP road projects in Bangladesh. To encourage the private sectors the government should emphasise minimising the impact of the above mentioned risk factors. Necessary land for road projects should be made available duly to the investors to make the projects successful. The policy makers should also motivate the pressure groups and the stakeholders including the mass people towards the requirement of PPP road projects in Bangladesh. Another important thing is creating the sound business environment for the local and foreign investors not intervening their activities by the top level of the government, which can ensure the return on investment for the investors.

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