

APPLICABILITY OF BOT IN INFRASTRUCTURE DEVELOPMENT

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Abstract

One of the main problem that developing countries face is the restricted treasury, with burdens of education, health care, agriculture etc. on the treasury: the construction sector usually compromises. If the development of construction sector is slow, then all other sectors suffer because of lack of infrastructure and transportation. This scenario was seen in many developing countries. A solution to this vicious circle is to outsource the construction projects to the private sector. This helps in building the project in accordance with the guidelines of the government (the client), uplifting the burden on the treasury as the financial support to the construction is by the contractor. In return the benefits are to the public whereas the cost of project is recovered through the tolls in favor of the contractor. This paper discusses the applicability of BOT through a systematic procedure, stages of BOT and the risks that have to be kept in mind before undertaking the BOT project. The awareness towards the procedure of BOT and risks in BOT reduces the uncertainties that organizations face while selecting Build Operate and Transfer. It is a brilliant alternative approach to construction.

Key words: *BOT; client; infrastructure; private sector; restricted treasury*

1. Introduction

As construction industry is the world's second largest industry after agriculture and is vital facet for economic growth, where construction is promoted by building discrete type of structures. The main obstacle for safety and comfortable environment of life is access to standard and suitable infrastructures. Here after in many countries, providing infrastructures may face some accurate obstacles such as paucity of public fund to invest for

infrastructure development, minor capability of practitioners, and high risk of failure. In order to mitigate and eradicate these obstacles, the BOT model was emerged and improved, as private sector undertakes the project financing, designing and building. Basically in BOT model a sponsor or private sector will build the project on behalf of predefined fund and after execution of construction the facility is operated by the private sector till

concession period. This concession period is given to sponsor to revenue the cost incurred during the construction. The project ownership is then submitted to the host government after termination of concession period. Commonly, BOT is implemented for infrastructure development for a period of 30 years and host government persists to attract the private sector fund, maintaining enough efficiency as well as expanding the investment area. According to the World Bank report, the assembled investment for

infrastructure development with entirety of private sector all over world was about US\$1,475 billion. In which the investment involved approximately 4100 projects in between 1990- 2007. In this report BOT proved to be effective, preferable, and most adopted among entire private participation. The investment in infrastructure by participation of private sector from 1990 till 2007 is shown as below on behalf of World Bank report [1].

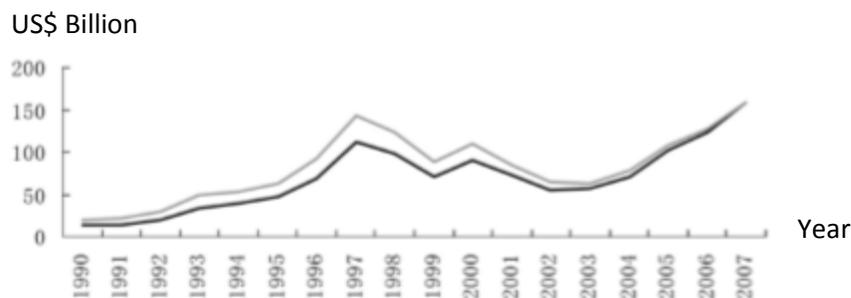


Fig 1. The private sector investment in infrastructure development graph.

It is noteworthy that, an inconsistency has been observed between the government and its impotence to fulfill the requirements of infrastructure development, affected due to population growth. No remedy could be used except, access and adoption of privatization which made satisfactory outcomes in many developed as well as developing countries in infrastructure development. BOT gained popularity as well as facilitated the drop of monopoly associated to public sector. The fundamental facets that will fortify the private sector in construction are: the mobilization of resources, provision for technical and managerial expertise; an improved operating efficiency; potential for large-scale injection of

capital; greater efficiency in using the capital; utilization of rationalization/cost-base tariffs for services and a better understanding of customer needs. The BOT project is complex by its nature due to a large number of parties involved in concrete contract, and each party is dependent on its counterpart's performance.[2].

Beyond this, each infrastructure project consumes a huge amount of budget for initial investment, prolix interval of construction time, low interest income, gradual payback rate and numerous levels of risk. Therefore, allowing BOT to grant concession period to sponsors as defined range to finance the facility. BOT attained familiarity when

British government focused to sought more public projects in early 1990's. In Hong Kong, BOT was adopted in most of infrastructure development projects which absorbed more investment form foreign countries. Even the underground rail and highway works proved as successful BOT projects in China and had enough potential for implementation of BOT [3].

Even though, developed countries have fulfilled the high level of infrastructure demand, but in developing countries still the demand of infrastructure development is controversial as beyond US\$1 trillion is required to fulfill the demand of Asia's infrastructures for the coming decade according to Asian Development Bank report. The development of infrastructure will propel the country's economy and development of country in high rank. The accomplishment of infrastructural development projects also facilitates employment for the residents [4].

The first formal adoption of BOT is associated to Prime minister of Turkey: Turgut Özal in early 1980's, where the project consisted the Akkuyu nuclear power project construction in 1984. Turkey had two fundamental reasons for reaching this approach as:

- a. The execution of project responsibilities should be associated to sole unit of organization who undertakes all the responsibilities. As well as achieving high efficiency.

- b. Facilitating the criteria for foreign investment in Turkey, in order to absorb the foreign investment.

Similar projects were executed but due to slow promotion, these projects were terminated. It is notable that, government is committed to initiate the procurement process, which is commenced by operation of practitioners and consultants in engineering, financial, legal and environmental to adopt a feasibility study. This feasibility study is to find whether project is convenient for BOT implementation or not? Then suitable project for BOT practice will consist project brief as attached to tender documents as follow: [5]

1. Demands of host government and as well as concession period related to the project.
2. Instruction in order to provide the tender documents, and describing the tender.
3. Lining up the construction, commission and maintenance of host government with respect to its requirements.

In order to adopt a successful BOT project, the economic and political environment of host government is required to be stable. Only then BOT plays an important role in development of infrastructure.

The purpose behind this paper is to introduce the vital facet of infrastructures development as well as its importance through BOT implementation, stages of BOT project, the risk associated with BOT and procedure for implementation, in order to fortify the

infrastructures to meet the demands and outwit the economic level.

2. Background of BOT

As infrastructure plays a vital role in economic development, as well as incorporates a large number of employees, financial resources, the host government is responsible for funding and construction of these infrastructures. But due to paucity of budget and expertise, the private sector emerges to fulfill the lack of fund and is capable enough of expertise. The construction of Panama Canal and Suez Canal can be mentioned as two fairly adopted BOT instances and gained popularity in 1950. 111 completed BOT projects and known projects over 31 countries are listed by Smith and Walker since early 1995. Beyond this, BOT nomenclature is fairly new, but adoption of BOT is related to several centuries back. Even Europeans were practicing BOT as Concession, which was the term allocated to BOT, also the host government had to take many responsibilities in that time. Nowadays, the host government is not included and doesn't undertake responsibilities in planning, construction, and financing and its involvement is restricted as compared to the past. Generally, the host government's responsibility is to facilitate loans, make guarantees, offer subsidies, control prices in market, and to corporate in license renewal. Several projects executed through adoption of BOT in the past centuries can be highlighted as; the first BOT practice in Hong Kong is associated to the Hong Kong Cross Harbour Tunnel, which was initiated in 1972. Beyond this, in Canada, BOT was practiced in

construction of Terminal 3 of Pearson International Airport in Toronto, which was completed in 1991 with cost of US\$433 million. Another example can be highlighted; Channel Tunnel, which was executed by share undertaking of British and France governments. Even in United States, the first adoption of BOT in highway development is the Dulles Toll Road Extension which was initiated in 1988 with total cost of US\$250 million.

As well as it is noteworthy, that BOT generally differs from privatization and nationalization. Basically comparing to privatization, usually an entity is owned by government and then sells it to the private sector, but is quietly different in BOT, the financial budget is provided by private sector in order to build the project and owns it for determined period of time, then transfers its ownership to the host government without requesting any costs. The revenue incurred during construction is collected by operating the facility in ownership period. [6]

As well as many Asian countries practiced privatization of infrastructures in the mid of 1980s, in order to mitigate and eradicate the problems associated to economic growth. As its practice was adopted to transport, power, water, sewage, and telecommunications projects to gain and maintain infrastructures more swiftly and accurately as compared to traditional project delivery. In order to increase the economic growth and to promote development, BOT has locked the Asian region countries as a vital facet and alternative, as well as a remedy for fulfilling the demands to build required

infrastructures. Beyond its benefits, reaching successful BOT project is complicated as it is complex by its nature and is difficult to achieve the predefined goals. As the practice of BOT in countries like; Thailand, Malaysia, Indonesia, China, and South Asia has proven to be challenging. The World Bank report stated that, BOT practice has achieved less attention to adopt, beside of much talk to develop the infrastructures, as neither government nor private sector have proven to be acceptable and satisfied till date. Basically, the high level of complexity in different stages such as construction, finance and management have proven to be as barriers, also the large number of participants involved in the project may lead to conflicts. [7]

Many countries in Asian region have not gained and conceived the concept and complexities of BOT, as adoption of BOT projects in Asia have proven. During 1985 to 1996 period, the BOT projects did not gain the predefined goals of privatization, due to unstable political environment and controversial matters going on in country, legal battles, squeamish policies and regulations, and conflicts between the participants which even made some projects fail to reach in physical development stage. [4]

3. Nature of Infrastructure Projects

Urban development has received attention in recent days in order to provide developed infrastructure. Therefore, initiatives were required in infrastructure development to overcome the social and economic problems caused by antiquated

buildings and degraded infrastructure. Although, the common infrastructure projects such as power, water sewerage, telecommunications and transport facilities possess a distinct number of features such as; the of lack portability, are rarely convertible to other uses and it can be difficult to reverse any investment made in them. As the majority of infrastructures execution requires large amount of capital, as well as, they also have long periods of payback. However, they do provide important services, which would usually fall to the public sector and they generally operate as monopolies. The public opinion and political pressure makes the infrastructure nature to be responsive. Contrary to other types of foreign direct investment, most infrastructure projects only generate local currency, but the dividends and loan repayments are paid in foreign currency. The process of infrastructure development or execution in its nature always possess a high level of risk to be completed. [9]

4. BOT Project Structure

The practice of BOT has been extremely spreading out and adopting in infrastructures development. In which private sector or sponsors funds in construction of infrastructures and receives a concession range which varies from 10 to 30 years, from host government, the cost of build and design of project is incurred by the private sector, after completion of facility, it is operated by sponsors to revenue it is cost incurred during discreet stages, and after expiration of defined concession period facility ownership is transferred to the host government in order to maintain and operate the facility. [8]

Simple BOT model is more desirable in developing countries, in which the concession period is varying from 10 to 30 years and associated with nature of project and risk related to the commission and accomplishment of project, as well as BOT paves the ground to reallocate the deficit resources from

infrastructure to other priorities like; development of rural regions, reduction of poverty, outwit education and health, the simple model of BOT is shown in the figure2. [4]

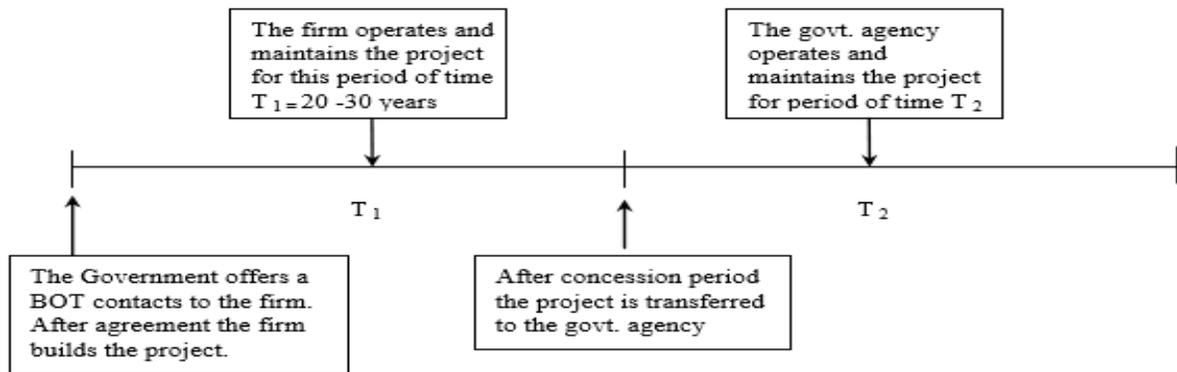


Fig 2. Simple BOT model

Even many for Partnership exist in many countries among which BOT has proven to be more efficient. Some forms of PPP are listed as bellow: [4]

- BLT(build-lease-transfer)
- BOO(build-own-operate)
- BOOM(build-own-operate-maintain)
- BOOT(build-own-operate-transfer)
- BOOST(build-own-operate-subsidies-transfer)
- BRT (build-rent-transfer)
- BOOTT(build-own-operate-train-transfer)
- BTO(build-transfer-operate)
- DBFO(design-build-finance-operate)
- DBO(design-build-operate)
- DBOM(design-build-operate-maintain)
- DOT(design-operate-transfer)
- DOT (develop-operate-transfer)
- FBOOT(finance-build-own-operate-transfer)

own-operate)
ROT(rehabilitate-operate-transfer)

5. Parties Involved in BOT Project

The BOT structure consist a number of parties involved to undertake the project, in order to accomplish the project suitable and timely completion it is required, that each party must be liable and perform their responsibilities without any deficits and to prohibit any conflicts.

The parties involved in BOT project are as follow: [8]

5.1 The Host government

Basically the host government must highlight the infrastructure demand for establishment, and suitability of project for financing must be done through host government appraising. The political

and economic environment of country will affect the choice of infrastructure, and sometimes it is desirable to change the law of country in order to achieve feasible extent and absorb the foreign investment easily. Like enacting the legislation exclusively to the project, refining the laws associated to recognition and enforcement of contractual obligations or security rights, or laws associated to nationalization and expropriation in order to facilitate regulatory framework within which project can function. Even, sometimes the host government will provide the exemption of custom duties and concessionary taxes and tax exemption on project profits to absorb the foreign investment.

As well as the host government is committed to pave the ground to support the project in some occasions such as provision of land, fuel or energy and granting the license to the concessionaire.

5.2 Private Sector or Sponsors

The private sector is committed to capitalization in the project and receives a concession period from host government. In some occasions the private sector will form an entity in agreed proportion, in which the responsibilities of each shareholder is defined and undertake the project share.

If the responsibilities and relationship of sponsors are not clearly defined, then it will propel to conflicts and disputes which results in the termination of project. The agreement between the sponsors must be clarified as; how project is financed, how project is administrated and whether sponsors are allowed to transfer the shareholdings.

5.3 Lending banks

It is noteworthy that, commercial debt has provided fund for most of BOT project till now by a great extent. As the estimated percentage of lending for investment of infrastructure development in BOT project provided by banks varies, it depends upon size, sector of the project, source of repay and appraising the risks located to the project. The lend is directly provided to sponsors by banks, even the banks expect to make financial support in a project based on 'non-recourse' or 'limited-recourse'.

In other words, the commercial banks will expect to repay their debt by non-recourse asset such as buildings, lands and machinery. Then, the best option on agreeing to repay the debt is limited recourse, which allows the sponsors to repay the debt by the income received from operating the facility. Therefore, the source of repaying the income is vital in the bank assessment of risk that project is allocated.

5.4 Other Lenders

If the initial investment for project fund is not capable enough to execute the project, the project sponsors more over can borrow from other sources, particularly regional and national development banks, bilateral agencies that consist of export credit agencies and development finance institutions.

5.5 Construction Contractor

The construction contractor is liable to undertake the construction work and take the risk allocated to the project. In order to execute the project timely and within stipulated budget and defined specifications,

construction contractor may be one of the sponsors. Even the lenders, expect that construction contractor is capable enough to control the risk and complete the project on time, in order to repay its debt on time and get benefits.

5.6 Operation and Maintenance Contractor

As long term contract is being signed with the sponsors and the operator, in order to provide safe operation and timely maintenance of the completed facility, the operator also tries the best to make more benefits from operating facility efficiently.

5.7 Other Parties

The equipment suppliers, fuel suppliers, insurers, and engineering and design consultants are called as other parties. Lawyer as well as financial advisers of other parties are also involved in other parties.

6. Stages of BOT Project

Adoption of BOT project consist a series of discrete stages as follow: [8]

6.1 Project Formulation

Firstly, the required and desired infrastructure or facility is identified, in which determination of required infrastructure is associated with host government. In spite of this, the particular infrastructure is occasionally determined by developer which is exclusively an international agency. Then the host government will provide the proposal of financing of desirable infrastructure, and the conditions of its suitability for adoption through

BOT basis. As well as, feasibility study is undertaken by host government on its own consideration.

6.2 Invitation to Tender

As the desired infrastructure or facility is selected by host government to adopt BOT structure, then the procedure of undertaking is decidable. That decides which procurement has to be selected, in order to achieve successful BOT project.

In spite of this, it is common to implement the procurement law. Host government incepts the competitive bidding and is liable to provide a proposal with complete details and should contain the accurate requirements of infrastructure, as well as the concession period length.

6.3 Submission of Bids

The sponsors, which are interested to undertake the project, will do a feasibility study about the project and offer their bids submitted to the host government, based on the invitation received from the host government.

6.4 Selection of Winning Bid

The winner of the bid will be declared by host government, based on the appraising done by government and concession will be awarded to the winner.

6.5 Negotiation and execution of documentation

As most of times, the sponsors or host government will start the negotiation between each other. The sponsors will provide the required documents for the project, as the main document is

associated to the concession agreement. Thereafter the rights and responsibilities of each party is set out through the concession agreement and form the basis of contract.

6.6 Construction

The project will be undertaken to execute by a contractor, which is usually a sponsor and the project cost is paid through the debts. As the facility is accomplished, it will be subjected to tests for passing. This is previously defined in contract documents, after positive response from the test, the constructed facility is accepted by sponsors and host government.

6.7 Operation

The constructed facility is operated and maintained by the sponsor on behalf of the concession period granted to the sponsor. In order, the sponsor will revenue the cost incurred during the construction of facility and repay the debt and make the benefit of investment.

6.8 Transfer

The final phase of BOT project is associated to the transfer of facility to the host government, after the expiration of concession period. As it is noteworthy that, concession period is usually sufficient long enough that allow sponsor to repay the debts and gain a reasonable rate of return.

7. Risk Identification in BOT project

In adoption of each project, risk is associated without any argumentation and it is unquestionable. The different types of risks are related to the size and nature of each project. Beyond this, the risk

associated in BOT is completely different from other projects and solitary, but the risks are the same in the initiation, execution, and operational phases. Therefore, one of the vital facets in any BOT financing project is allocation of different types of risks, which are associated between the public sector and private sector. After public and private sectors, the risk is related to the individual parties. As well as the project progress is corresponding to the occurrence of risks. The overall cost of project, duration and quality of final product or service delivered, are the norms to measure a project whether it is successful or not. Beyond this these parameters are affected by risk. Generally, risk is categorized in four major groups as; financial, political and technical and miscellaneous risk [10]

- a. Financial risks: currency risks, interest rate risk, equity risks, foreign exchange risk, commercial risk, liquidity risk,
- b. Political risks: sovereign risks and country risks
- c. Technical risks: construction risk and operation and maintenance risk
- d. Miscellaneous risks: market risk, inadequacy of concession contract, shareholders' risk and risks associated with changes among key management personnel.

7.1 Financial risk

Financial risks can be defined as the impact on the performance of an entity propel to risk. As the sponsors and investors will face risks and have enough knowledge of facing it. In order to make benefits it is required to manage risks. The higher risk is associated with higher benefit. As many

developing countries in East Asia region are facing paucity of source for investment and financial risk, the financial risk is limited to the following risks:

7.1.1 Currency risk:

In any BOT project, the sponsors are aware of the existence of currency risk which appears due to funding of international banks and foreign companies. It creates the difference in exchange rate. The curious problem in international transaction is related to the fluctuation in currency. The solution to reduce the currency risk in to minimum level is; firstly, the foreign firms can hedge currency fluctuation in international market. Secondly, the agreement between the foreign firm and host government on behalf of determination of payment which is required to be paid for employment can be tailored to mitigate currency risk. Even the best way of reducing the currency risk is, to make investment in local currency. It can be seen in the Shandong power project when enormous amount of Renminbi tranche (equivalent to US\$822 million) was funded by China Construction, Shandong International Trust and Investment Corporation and was first time twinned with a large US dollar tranche. Beyond this, in negotiation stage between the concessionaries and host government, suitable agreement on mitigation of currency risk should be achieved, as well as the currency inconformity should be guaranteed by host government, in order to avoid any defect in project execution and operation.

7.1.2 Interest risk:

The borrowing and debts payment are affected by the interest rate in contrast to currency rate. The appearance of fluctuation in interest rate

will impact the lenders, the suitable rate of interest should be determined upon agreement of project. In case of failure to reach the determined rate of interest or if it is far too high, the lenders are required to pay extra cost. The guaranteed rate of interest by host government to private sector, will facilitate to attract the foreign investors in BOT projects, as seen in execution of Indonesian BOT toll road whereby the government had guaranteed on maximum interest rate, minimum revenue guarantee, debt guarantee, tariff guarantee and minimum tariff guarantee.

7.1.3 Equity risk

In order to form concessionaries, sharing of fund is vital to implement the BOT project. As well as the share price of company is standard measure for performance of company which is associated by the equity risk. The higher share price will allow the higher benefit, but the lesser one will affect the concessionaire credit. Even the higher equity of sponsors will raise the capital to invest in BOT project.

7.1.4 foreign exchange rate:

Another vital risk is associated with foreign exchange currency rate which will affect the BOT project during execution and operation. The foreign firms who are interested to invest in other countries must be aware of threats associated with international exchange rate. It has been observed that Malaysian government has managed to reduce the foreign exchange risk by providing guarantees. They made guarantees to attract the shortfall when; the adverse exchange rate movements exceeded 15 percent on its offshore debt or adverse interest rate movements exceeded 20 percent on its floating rate offshore debt.

7.1.5 Commercial risk:

The risk which jeopardizes the financial performance in a project is summarized to commercial risk. Commercial risk in contrast to other project is observed in three stages as; during completion, operation and the final output / input in BOT project. Even the agreement between the supplier and government for supply and off-take is important in reducing the risk. That will allow the parties to agree on required amount of input, for instance; coal supply as input to power plant project with the output as generation of electricity. This allows the supplier to stock material at lower cost and the promoter to create required output.

7.1.6 Liquidity Risk:

as in BOT adoption, the revenue is generated through the commission of facility, in order to determine the success of BOT project, the facility must be capable enough to create sufficient amount of revenue to repay the debt with in stipulated time.

7.2 Political Risk

In order to accomplish the BOT project, the environment of the host government is required to be stable and no changes in government should occur to destabilize the conditions and create fear of political risk considered in BOT project adoption. Political risk is associated to the following risks:

7.2.1 Sovereign risk:

The risk which is associated to the provision of loans to the foreign governments and it is adopted commonly in banking world is known as sovereign risk. This risk is administrated by the political environment, where the investment is done,

exclusively the location where BOT is initiated. The risk will take place when the political environment of country is unstable and affects the sponsors. It was observed that BOT project faced the deficits during instability of political changes of government in Thailand, as well as the countries such as Libya and Saudi Arabia which are governed by different ideologies are facing the sovereign risk, the guarantees of host government will allow to avoid the occurrence of this risk.

7.2.2 Country risk:

the overall investment climate in a host government is associated to country risk which is totally different from the sovereign risk. The threats which influence the country risks are; socio-economic situation, the internal and external conflicts, ethnic tensions, corruptions, policy and legal aspects. Before implementation of BOT project, the private sector or sponsor should study the profile risk of host government and highlight the risks, then it is determined if the project is affordable or not. This study can be done through cooperation from the World Bank or Asian Development Bank studies, which are done through the countries conditions and stability.

7.3 Technical Risk

The construction risk, operation and maintenance risk are classified under technical risk, therefore it should be understood in well manner. In order to reduce this risk, the sponsors are responsible to conduct assessments to recognize the risks in details and ensure that project will be constructed in accordance to the specification, design and requirement of host government provided.

7.3.1 Construction risk:

the issues such as unknown land situation, delay in procurement of construction materials, increase of cost associated to the raw material for construction such as price of steel, copper and aluminum are the barriers which facilitate the construction risk, as well as poor design report, prolong of construction schedule and alters in changing production factor are also recognized as construction risk.

It was observed that the project cost was increased in North-South Highway project in Malaysia due to problems occurred during construction stage such as problem in acquisition of land, poor road design which allowed the increment from initial cost US\$1.2 billion to US\$1.8 billion. Therefore, provision of suitable report design which is accepted by the host government and sponsors is curious. As well as involvement of third party to act as audit and comment the design and construction methodology will help to reduce the construction risk.

7.3.2 Operational and maintenance risk:

After the completion of facility, several risks are related to this stage, as when the performance of facility is not suitable to the level which was required due to technical problem. The poor performance is the result of inefficient equipment and machineries during construction phase and poor workmanship during installation. The specialized skilled team is required to operate and maintain the facility in well manner, whereas inefficient team will result high cost of operating and lesser revenue cost.

7.4 Miscellaneous risks

Beside the previous risks, other risks are also associated with BOT project, such as market risk which is dependent upon demand of completion of facility. The sponsor should conduct a feasible study of market to recognize the demand. Also significant problems reveal when there is imbalance in concession contract, which take place in tendering stage as sponsors take the tender without complete understanding of conditions and terms of tenders. In order to avoid these risks, it is compulsory to adopt standard terms in construction contract, also in operating and maintenance contract.

8. Conclusion

From the paper it can be concluded that the application of BOT in developing countries can result in faster construction of public works, with less burden on national treasury and higher simultaneous development in services. It cannot be ignored that there are issues in BOT projects but with proper documentation, the thefts and errors and contingencies can be avoided. By including competent parties, the climatic and other risks can be tackled. It was also seen that the countries who followed proper procedures for the Projects accompanied with financial and political support achieved outstanding results for the project completion and success. It was also observed that the change in political parties and reforms can lead to drastic delays in project and in cases, termination. For the betterment of country or state, the development should be given priority instead of political party needs. Applicability of BOT depends upon the will of the country to develop, it can either

be developed country as well as developing countries, the problems faced in both types of projects varies because of the financial status, political status and ideology of the clients. However, the evidence suggests that BOT should be followed for Fast, reliable, Quality construction where the projects gets delivered first and paybacks are generated at very generous rates.

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