Chapter 3
Risk Management and Public Private Partnerships for Infrastructure

3.1 Introduction

Few issues in modern finance have inspired the interest of both practitioners and theoreticians more than the subject of risk evaluation and management.  The ability to understand, measure, and weigh risk is," according to Peter Bernstein, "at the heart of modern life. Virtually every investment and financing decision involving inter-temporal allocation of resources under uncertain conditions is associated with some risk, which is in effect, either assumed in the expectation of a higher return, or is transferred to others through hedging and/or contracting arrangements.

Yet, increased exposure to risk has been an inevitable consequence of recent economic, technological, and financial changes, which have come to represent the defining themes of the 1990s. These include the globalization of economic activity, the mobility of capital flows across national boundaries, widespread privatization of public sector enterprises, intensified competition, and high volatility in international financial and currency markets. In the face of such paradigmatic developments, the viability of long-term capital investments, particularly in the core infrastructure sectors of power, transport and telecommunications, hinges critically on how risks associated with such investments are evaluated and managed. While it is very difficult to represent all risk related issues in a generic sense, as it is different in each sphere or domain, Figure 3.1 captures a highly generic way of conceptualizing Enterprise-wide risk by a global consulting giant.

It’s important to emphasize that no matter how difficult the conceptualisation be, the process of risk management is quite often given to logic and iteration in any area / domain. And any proactive risk management process follows the step-by-step approach of identifying,

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1 Not surprisingly, risk management has grown in recent years into a mature discipline with a wealth of literature, specialized skills, and sophisticated computer-based systems that can be applied to investment project appraisal, pension plans, portfolio asset allocation, credit derivatives, regulatory capital adequacy for the banking sector, and derivative trading.


3 Two inherently different approaches to risk management exist. One is reactive and the other is proactive. Reactive risk management means the project team reacts to the consequences of risks (actual problems) as they occur. Proactive risk management means that the project team has a visible process for managing risks that is measurable and repeatable. Preventing risk is the transition point between reactive and proactive approaches and is the one used in infrastructure financing.
analysing/assessing or measuring/quantifying, evaluating, monitoring and controlling the
inter-play of risk variables in that domain. An effective project team assesses risks
continuously and uses the information for decision-making in all phases of the project. On
many projects, risks are assessed only once during initial project planning. Major risks are
identified and mitigated, but then are never explicitly reviewed again. This is not an example
of good risk management. Prevention occurs in the planning stages of a project, when the
team can take action to preclude risks from occurring. It is important to point out that
prevention is still essentially a reactive strategy for managing risks; it is not a cure for the
cause of risk, only a means to avoid its symptoms. To reach the higher levels of proactive
risk management, the team must be willing to take risks. This means not fearing risk but
rather viewing it as a means to create the right type of opportunity. When the project team
uses proactive risk management, they assess risks continuously and use them for decision-
making in all phases of the project. They carry the risks forward and deal with them until
they are resolved or until they turn into problems and are handled as such. To do so, the
team must be able to unemotionally evaluate the risks (and opportunities) and then take
actions that will address the causes of these risks, not just their symptoms. The team’s
ability to manage risk and opportunity will be the determining success factor.

3.2 Risk Management Defined

Risk management sets forth a discipline and environment of proactive decisions and actions
to assess continuously what can go wrong, determine what risks are important to deal with,
and implement strategies to deal with those risks.

3.3 Risk Management Process

Figure 3.2 attempts to visualize the proactive risk management process that we are
discussing.

3.3.1 Step 1: Risk Identification

Risk identification is the first step in the proactive risk management process. Risks must be
identified before they can be managed. Risk identification provides the project team with the
opportunities, cues, and information that allow them to surface major risks before they
adversely affect the project. The process that occurs between team members and
stakeholders is very important. It is a powerful way to expose assumptions and differing
viewpoints. It is unlikely that a team will agree on the ranking of all risk factors. Depending on experience, different team members will see the project differently. If after discussion no agreement can be reached, the best approach is a voting technique wherein the majority wins. If the votes are tied, the worst case should be used for the risk assessment.

**Figure 3.1**

Integrated enterprise risk management: Optimizing enterprise returns under uncertainty

**Figure 3.2**

Proactive Risk Management Process

Identify and manage risks throughout all phases of the project
The development in social sciences research helps the risk managers to use various tools and techniques for Risk identification. Project team members and key project stakeholders use Risk factor charts, Risk matrix, Risk Maps etc, through a series of open discussions, or workshops to identify and rank risks for the project. When they discover a risk as a result of working through the tools, they should develop a risk statement and enter it on the master list of risks. Figure 3.3 and Fig 3.4 below would give an idea how a Risk Factor Chart and Risk Matrix would look respectively. Risk factors are grouped by focus area and risk factor category. The tools like Risk Matrix help in delineating the risks by category or groups (a sample of the matrix used for the data collection of this study which identifies the Risks and the stakeholder who manages it can be seen in Figure 3.4).

**Figure 3.3 Risk Factor Charts**

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Low-risk cue</th>
<th>Medium-risk cue</th>
<th>High-risk cue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project fit</td>
<td>Directly supports customer's mission and goals</td>
<td>Indirectly impacts one or more goals</td>
<td>Does not support or relate to customer's mission or goals</td>
</tr>
<tr>
<td>Customer perception</td>
<td>Expects team to provide this product</td>
<td>Believes team is not working on the expected product</td>
<td>Believes the desired product is a mismatch with prior</td>
</tr>
<tr>
<td>Work flow</td>
<td>Causes little or no change to work flow</td>
<td>Changes some aspect or has small affect on work flow</td>
<td>Significantly changes work flow or method of organization</td>
</tr>
</tbody>
</table>

**Figure 3.4 Risk Matrix**

<table>
<thead>
<tr>
<th>Risks</th>
<th>WHO TAKES?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Revenue Structure</td>
<td>DEV</td>
</tr>
<tr>
<td>2. Technology Performance</td>
<td></td>
</tr>
<tr>
<td>3. Construction</td>
<td></td>
</tr>
<tr>
<td>4. Operations</td>
<td></td>
</tr>
<tr>
<td>5. Site Conditions</td>
<td></td>
</tr>
<tr>
<td>6. Feedstock (Waste supply)</td>
<td></td>
</tr>
<tr>
<td>7. Permit &amp; Development</td>
<td></td>
</tr>
<tr>
<td>8. Comparative Eco. &amp; Price</td>
<td></td>
</tr>
<tr>
<td>9. Inflation</td>
<td></td>
</tr>
<tr>
<td>10. Change-in-law</td>
<td></td>
</tr>
<tr>
<td>11. UCC (Force majeure)*</td>
<td></td>
</tr>
</tbody>
</table>

*UCC- Un-Controllable Circumstances ;CIL- Change In Law
More often Risk maps are also used in identifying risk characteristics and assessing the degree of the risk variable or attribute as can be seen from Figure 3.5. Each risk factor has one or more characteristic that describes whether the risk should be considered a high, medium, or low risk.

**Figure 3.5  Risk Map**

While the above are some of the tools in identifying the risk variables, once it is identified, it must be expressed clearly. This is referred to as 'Risk Statement'. When stating a risk, the team must consider not only a symptom, but also a result. Hence, the statement of risk should include what is causing the situation to arise (that is, the condition) and the expected result (that is, the consequence).

### 3.3.2  Step 2: Risk Analysis/ Quantification

Risk analysis is the second step in the proactive risk management process. The purpose of this step is to determine the magnitude of the individual risks and to rank them with respect to *Cost, Schedule and Performance*. To this aim it is necessary to determine the probability of occurrence and the consequence severity of the events identified in the previous step as *Risk Variables/ Items*. In order to standardise this evaluation and to reduce possible subjectivity during the assessment, a set of reference tables (both for probability and for consequence) shall be prepared and used throughout the project.
Risk analysis is the conversion of risk data into risk decision-making information. Thorough analysis ensures that the team is working on the right risks. Risk is composed of two factors: risk probability and risk impact. Risk probability is the likelihood that an event will actually occur. Using a numerical value for risk probability is desirable for ranking risks. Risk probability must be greater than zero, or the risk does not pose a threat to the project. Likewise, the probability must be less than 100 percent or the risk is a certainty—in other words, it is a known problem. Risk impact measures the severity of adverse effects, or the magnitude of a loss, if the risk comes to pass. Deciding how to measure sustained losses is not a trivial matter. If the risk has a financial impact, a dollar value is the preferred way to quantify the magnitude of loss. The financial impact may be long-term costs in operations and support, loss of market share, short-term costs in additional work, or lost opportunity cost. Other risks can have a level of impact where a subjective scale from 1 to 5 is more appropriate. These essentially rate the viability of project success. High values indicate serious loss to the project. Medium values show loss to portions of the project or loss of effectiveness.

To evaluate a list of risks, the overall threat of each risk needs to be clearly understood. Sometimes a high-probability risk has low impact and can be safely ignored; sometimes a high-impact risk has low probability and can be safely ignored as well. The risks that have high exposure (high probability and high impact) are the ones worth managing. This can be done by reducing either the risk probability or the risk impact and is termed as 'risk exposure'. When estimating probability and impact, we should be aware of what we know and what we don't know. If we think a risk could result in a million dollar loss, but our level of confidence is 50 percent, the people who are reviewing the risk analysis need to understand these factors. The risk impact has to be classified as to whether the impact of the risk is, for example, financial, strategic, technical, or legal. The magnitude of impact should the risk actually occur is referred to as 'Risk Impact'. This number could be the dollar value of the loss or simply a number between 1 and 10 that indicates relative magnitude. The result of multiplying risk impact by risk probability is often used to rank risks.

There could be whole lot of tools, techniques (nowadays to read as 'softwares'), methodologies, approaches that are possible in 'Risk Analysis'. It could range from a simple statistical measure to very advanced stochastic measures or even inter-disciplinary modelling which can bring say methodologies from rocketry science to stock market (or say methodologies in stock market behaviour to Anthropology). Such is the breadth of knowledge and ideas that can be used for analysing risks, it would be inappropriate to list a few. Thus it could only be said that risk analysis weighs the threat of each risk to help decide
which risks merit taking action. Managing risk takes time and effort away from other parts of the project, so it is important for the team to do only what is absolutely necessary to manage them. The key is to identify a limited number of major risks that must be managed (usually 10 or less). We shall note that to rank risk exposure, all of the risk impact values must be in the same units of measurement, either dollars or levels of impact. After ranking the risk exposure, the team should focus on a risk management strategy and how to incorporate the risk action plans into the overall project plan. Experienced Risk Managers surveyed for the study are of the opinion that simple but effective technique for monitoring risk is to list the top 10 risk major risk items in the project. The top 10 risk list is externally visible to all project stakeholders and can be included in the vision/scope document and the project plan.

3.3.3. Step 3 : Risk Evaluation

Risk Evaluation or Risk Action Planning is the third step in the risk management process. It turns risk information into decisions and actions. Planning involves developing actions to address individual risks, prioritising risk actions, and creating an integrated risk management plan or framework.

The four key areas the team should address during risk evaluation are:

- **Research**: Do we know enough about this risk? Do we need to study the risk further to acquire more information and better determine the characteristics of the risk before we can decide what action to take?

- **Accept**: Can we live with the consequences if the risk were actually to occur? Can we accept the risk and take no further action?

- **Manage**: Can the team do anything to mitigate the impact of the risk should the risk occur?

- **Avoid**: Can we avoid the risk by changing the scope?

The moot questions raised above need to be addressed in the light of the overall Risk Management Goals of the project/enterprise. The three main risk management goals for any project are to:

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(i) Reduce the probability of occurrence.
(ii) Reduce the magnitude of loss.
(iii) Change the consequences of the risk.

**Risk Management Strategies:**

Risk Management strategies are also evolved at this stage and a number of strategies are possible to reduce risk:

- For those risks the project team can control, apply the resources needed to reduce the risk.
- For those risks outside the control of the project team, find work-arounds.

It may be possible for the project team to transfer the risk by:

- Moving to different hardware.
- Moving a software feature of the project to another part of the system that is better able to handle it.
- Sub-contracting the work to a more experienced player who can assume the risk.

A metrics can be thought of by the team which will use it to determine whether the planned risk management actions are working.

**The Risk Contingency Strategy:**

The idea behind a contingency strategy is to have a fallback plan in place that can be activated in case all efforts to manage the risk fail. The team would execute the risk contingency strategy if the risk contingency strategy trigger were reached.

### 3.3.4. Step 4: Risk Monitoring

Risk monitoring or tracking is the fourth step in the risk management process. In it, the team monitors the status of risks and the actions it has taken to mitigate them. Risk tracking is essential for effective action plan implementation. This means devising the risk metrics and
triggering events needed to ensure that the planned risk actions are working. Tracking is the watch dog function of the risk action plan. It is a good idea to include a risk review during regular project reviews and debriefs. This should include assessing the progress of resolving the project’s top 10 risks. A ‘Risk Status Reporting’ is a useful form of management at this stage. For project reviews, the team should show the major risks for the project and the status of risk management actions. If project reviews are regularly scheduled (monthly or at major milestones), showing the previous ranking of risks is useful, as is the number of times a risk was in the top 10 risk list.

Risk status reporting can identify four possible risk management situations:

- A risk is resolved, completing the risk action plan.
- Risk actions are tracking the risk management plan, in which case the risk actions can continue as planned.
- Some risk actions are not tracking the risk management plan, in which case corrective measures should be determined and implemented.
- The situation has changed significantly with respect to one or more risks and will usually involve reassessing the risks or re-planning an activity.

As the project team takes actions to manage risks, the total risk exposure for the project should begin to approach acceptable levels.

### 3.3.5 Step 5: Risk Control

Risk control is the last step in the proactive risk management process. After the team has chosen the risk metrics and the triggering events, there is nothing unique about risk management. Rather, risk management melts into project management processes to control the risk action plans, correct for variations from the plans, respond to triggering events, and improve the risk management process.

Risk management relies on project management processes to:

- Control risk action plans.
- Correct for variations from plans.
- Respond to triggering events.
Thus the above steps form part of a generic way of understanding the Risk Management processes for any enterprise or project. There isn't much of a difference when we apply these processes in a specific way, say to infrastructure projects. These are dealt in detail in the paragraphs below.

3.4 Risk Management in Infrastructure Projects

The basic principle governing risk management in an infrastructure project finance deal is intuitive and well articulated: allocate project-specific risks to parties best able to bear them (taking into account each party’s appetite for and aversion to risk), control performance risk through incentives, and use market hedging instruments (derivatives) for covering market-wide risks arising from fluctuations in, for instance, interest and exchange rates. In practice, however, difficulties arise due to market imperfections, i.e., derivative markets (swaps, forwards) for currency and interest rate risk hedging that are either non-existent or not sufficiently developed in most emerging countries, limited contracting possibilities (due to enforceability and credibility problems), and differing methodologies for risk measurement and evaluation. As a result, governments have been asked to provide guarantees for various kinds to projects, often at no charge.

3.4.1 Project Risk Evaluation

There are two important aspects of infrastructure project finance risks that distinguish it from corporate and traditional limited recourse project finance:

(a) a high concentration of project risks in the early phase of project life cycle, i.e. the pre-completion phase; and

(b) a risk profile that undergoes important changes as the project comes to fruition, with a relatively stable stream of cash flows that is subject to market and regulatory risks once the project is completed. Figure 3.6 below describes the main risks that arise in the development and operational phases.

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4 The argument for risk management in project finance is stronger than in corporate finance. In the case of corporate finance, the argument for risk management or hedging rests on the notion that hedging adds value to the extent that it helps ensure that a company has sufficient internal funds available to take advantage of attractive investment opportunities. See Froot, Scharfstein, and Stein (1993). In a project finance deal, risk management bears directly on the success or failure of the project.
In this context it is pertinent to understand the financing structures that are used in Project finance as it has a bearing on how the risks are allocated between the stakeholders and managed.

3.4.2 Risks in Project Financing

The term Project Financing refers to a wide range of financing structures where the provision of funds is not primarily dependent upon the credit support of the sponsors or the value of the project’s physical assets but on the project’s capacity to serve the debt and provide an equity return to the sponsors through its cash flows. Project finance involves the setting up of an “ad hoc” project company (called a Special Purpose Vehicle - SPV) to carry out the venture. The SPV is capitalised through equity and debt funding which is used to cover project capital expenditures and pre-operational costs; once the project is completed, the SPV can start its commercial activities thus generating the necessary cash flows to repay the financing. Thus the SPV is a separately capitalised, stand-alone entity that is legally separate from its parent company – in which they remain the principal shareholders. Funding for the project is acquired through this vehicle, which may have a different credit rating from its sponsors or the country in which the project is located. The assets associated with the project in question will also be owned by the vehicle. It will be allotted only the minimum amount of capital required to meet the financial needs of the project, and, in most cases, the vehicle does not consolidate with the sponsors’ balance sheets. Figure 3.7 dissects and illustrates the Structure of a Project Finance deal.
Project Finance Defined

Standard & Poor's one of the better known rating agencies (which rates infrastructure projects as well) defines a project company as a group of agreements and contracts between lenders, project sponsors, and other interested parties that creates a form of business organization that will issue a finite amount of debt on inception; will operate in a focused line of business; and will ask that lenders look only to a specific asset to generate cash flow as the sole source of principal and interest payments and collateral.

Figure 3.7

It can be seen that the structure of project finance deals involves many parties, all of which bear some portion of the risks of the scheme. The investment phase comprises all the activities associated with the construction of project assets, (some times under a turn-key contract). The capital expenditures relating to the infrastructure are incurred here. The investment phase starts with the so called “Financial closing” (i.e. when the financing contracts are finalised and the SPV is entitled to draw down the funds) and ends when project's assets are completed and the SPV starts commercial operations (i.e. generate revenues). The financial exposure of the SPV increases throughout the investment phase and reaches its peek when all debt and equity funds have been drawn down. Once the
Both those who lend to the venture and those who invest in it rely on the project's expected revenue stream for returns. As a result, these parties share with the sponsor some of the risks associated with the project. Such risks include technical, financial, operational, commercial and political risks. Those lending money to the project – usually international banks – have to decide which of these risks are acceptable for them to hold on their books and which should be covered through sponsor support, governmental guarantees, insurance and other contractual arrangements, including derivative products. This is true of projects floated by the Government as sponsors or projects under the Public Private Partnerships (PPPs) also. A layering (or de-layering) of the various risks and allocating it among the stakeholders is what is attempted by way of a structure which can be visualised as seen in Figure 3.8

Figure 3.8

The sponsor's objectives in using project financing are usually threefold. First, the sponsor aims to minimise its exposure to risk, thereby helping to preserve its own credit standing and its future access to capital markets. It also is attempting to minimise the cost of financing the
If the structure can make the debt attractive to prospective lenders and investors in some way, it can reduce the cost of funding the project overall. And, lastly, by achieving these things it will maximise the return on its equity investment. Forming a comprehensive list of the risks facing both sponsors and lenders in project financing would be almost impossible, and would be, to some extent, project-specific. But all project finance deals share certain common risks, including: resource or reserves risk; completion risk; operational risk; technical risk; legal risk; market risk; and country or political risk. In project finance these risk must be carefully assessed and mitigated. Some risks like the Market Risk would turn out to be lethal for the project, if it were not to be properly assessed and addressed. Market risk is the risk that the target market will not materialize and it shocks the financial health of the project brought about by a sudden shift in economic conditions outside the sponsor’s control, through sudden and dramatic moves in foreign exchange rates, commodity prices, energy prices, inflation rates and interest rates etc. The most usual way protecting from these risks is represented by the signing of “off-take agreements” between the SPV and its customers. An off-take agreement is a contractual obligation by a customer to effect a series of payments to the SPV, over a certain period of time, in exchange for using the products/services provided by the vehicle company (SPV). Figure 3.9 captures how not only the nature but also the level of project risks varies over the life cycle of a project.

**Figure 3.9**

3.4.3 **Generic Risks identified**

Very detailed analysis of more than hundred infrastructure projects were carried out as part of this study. Many tools including Risk Matrix and focus group interviews have been
conducted to identify and elicit risks involved in infrastructure projects. The researcher could also attend more than ten workshops, conferences/seminars on crucial infrastructure areas in the span of four years and could examine many model concession agreements (including many generated through international bids) by visiting many development banks. From these analyses though generalizations of risks issues would be fraught with mistakes, specifying generic risks in infrastructure that can be identified in the various phases of a project was possible, and are as follows:

Construction Period Risks

1. Land Expropriation
2. Cost Overruns
3. Increase in Financing Cost
4. Time & Quality Risk
5. Contractor Default
6. Default by Concession Company
7. Time, Cost & Scope of Identified but Related Work and Variations
8. Environmental Damage – Subsisting/On-going

Operation Period Risks

2. Concession company default
3. Termination of concession by concession company
5. Labour Risk
6. Technology Risk.

Market & Revenue Risk

1. Insufficient Income from User Levies
2. Insufficient Demand for Facility
Finance Risk
1. Inflation risk
2. Interest rate risk
3. Current risk

Legal Risk
1. Changes in law.
2. Title/Lease
4. Security
5. Structure.
6. Insolvency of concession company

Miscellaneous Risks
1. Indirect Political Force Majeure.
2. Natural Force Majeure.
4. Exclusivity.
5. Development Approvals.
7. Increase in Taxes.
8. Termination of Concession by Government.
9. Payment Failure by Government
3.4.4 Risk Allocation

Optimal risk allocation aims to minimise both the chances of project risks materialising and the consequences if they do, by allocating risks to the party best able to control them at the least cost. It has two elements:

1. Optimal risk management and impetus to achieve it; and

2. Value for money.

The first of these is based on the view that the party best able to control a risk should be allocated that risk. The second element – value for money – is related to the first, in that the party best able to manage a risk should also be able to manage it at least cost.

Although many risks are in the control of each party, to some degree certain risks are completely outside the control of both parties. If neither party is in a position of full control, the risk allocation should reflect how the private party ‘prices’ the risk and whether it is reasonable for government to pay that price, taking into account the likelihood of the risk eventuating, the cost to government if it retained that risk and government’s ability to mitigate any consequences if the risk materialises. Alternatively, the parties may share the risk through various risk sharing mechanisms.

Basically, in risk allocation, nothing is free. In bidding for a project, the private party estimates the project risks and their potential impacts on project revenues, and in effect sets premiums to insulate itself from the financial results of materialised risks. The premiums are averaged across the project or all projects in which the private party is involved and are weighted according to the probability and consequences of various kinds of events. In reality, the risk premium set is a form of self-insurance. Nevertheless, the financial consequences of some risk, either in full or in part, may be transferred explicitly to others, including insurance brokers. Private parties accept most risks, provided the premium paid is sufficiently large. The question for government is whether the risk premium is good value for money or whether it is more cost-effective for government to take on the risk itself, taking into account the likelihood of a particular risk occurring and how government may be able to mitigate the impacts. For this purpose, a risk management plan is needed for determining the risk take-back by government which involves the following elements:

- Identify all the project risks.: These include the general risks which feature in the risk matrix and discussed above and the project specific risks (for example, the risk to public health in a water project);
determine the core services which are to be provided by government and for which
the risk cannot be transferred to the private party;

Examine each risk and identify those which government is best placed to manage as
a result of the level of control it exercises and those which it may otherwise not be
optimal to leave with the private party. These should in each instance be taken back
by government;

Ascertain whether any of the remaining risks should be shared in accordance with
risk sharing mechanisms as a result of market convention or specific factors relating
to the project; and

Adjust the risk allocation inherent in the basic PPP adjustment structure and use the
contract to reflect that adjustment and allow for any power imbalance between the
parties arising from special government powers.

On practical grounds, the government must identify the risks it will take back before it puts
the project to the market, as part of the process of determining government's risk allocation
position. These risks are identified on a project by project basis. However, generally
speaking, the risks assumed by government are likely to include items such as the risk of
legislation or of a policy change discriminating against the project, the risk of government
wishing to change (eg increase) the service standards or volumes, some elements of native
title risk and some elements of pre-existing latent defect and contamination risk.

Partnerships represent the second generation of policies to bring competitive forces and
market disciplines to bear on government provision of goods and services. Unlike the first
generation of outright privatization (which in any case is not easily workable in multi-party
democracies), PPPs involve a sharing of both responsibility and risk in a collaborative
framework. They seek to draw upon the best available skills, knowledge and resources,
whether they are in the public or the private sector, and deliver value for money in the
provision of infrastructure. Though the discussion on PPPs has been carried in-depth in
subsequent paragraphs of this chapter and report, mention has to be made here as we
discuss allocation of risks (more so in the PPP format). The Table below constructed from
the data and analysis made as part of this study summarises the risk allocation in
infrastructure projects as it is dealt between the various stake-holders.
## Risk Matrix for Public Sector/Private Sector Infrastructure Investments

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Source of risk</th>
<th>Risk taken by</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site risks:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site conditions</td>
<td>Ground conditions, supporting structures</td>
<td>Construction contractor</td>
</tr>
<tr>
<td>Site preparation</td>
<td>Site redemption, tenure, pollution/discharge, obtaining permits, community liaison</td>
<td>Operating company / project company</td>
</tr>
<tr>
<td>Land use</td>
<td>Native title, cultural heritage</td>
<td>Government</td>
</tr>
<tr>
<td><strong>Technical risk:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault in tender specifications</td>
<td></td>
<td>Government</td>
</tr>
<tr>
<td>Contractor design fault</td>
<td></td>
<td>Design contractor</td>
</tr>
<tr>
<td><strong>Construction risk:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost overrun</td>
<td>Inefficient work practices and wastage of materials</td>
<td>Construction contractor</td>
</tr>
<tr>
<td></td>
<td>Changes in law, delays in approval, etc</td>
<td>Project company / investors</td>
</tr>
<tr>
<td>Delay in completion</td>
<td>Lack of coordination of contractors, failure to obtain standard planning approvals</td>
<td>Construction contractor</td>
</tr>
<tr>
<td></td>
<td>Insured force majeure events</td>
<td>Insurer</td>
</tr>
<tr>
<td>Failure to meet performance criteria</td>
<td>Quality shortfall/defects in construction/commissioning tests</td>
<td>Construction</td>
</tr>
<tr>
<td></td>
<td>failure</td>
<td>Contractor / project company</td>
</tr>
<tr>
<td><strong>Operating risk</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating cost overrun</td>
<td>Project company request for change in practice</td>
<td>Project company / investors</td>
</tr>
<tr>
<td></td>
<td>Industrial relations, repairs, occupational health and safety, maintenance, other costs</td>
<td>Operator</td>
</tr>
<tr>
<td></td>
<td>Government change to output specifications</td>
<td>Government</td>
</tr>
<tr>
<td>Delays or interruption in operation</td>
<td>Operator fault</td>
<td>Operator</td>
</tr>
<tr>
<td></td>
<td>Government delays in granting or renewing approvals, providing contracted inputs</td>
<td>Government</td>
</tr>
<tr>
<td>Shortfall in service quality</td>
<td>Operator fault</td>
<td>Operator</td>
</tr>
<tr>
<td></td>
<td>Project company fault</td>
<td>Project company / investors</td>
</tr>
<tr>
<td>Revenue risk</td>
<td>Financial risks</td>
<td>Regulatory/Political risks</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Increase in input prices</td>
<td>Change in taxes, tariffs</td>
<td>Change in law</td>
</tr>
<tr>
<td>Contractual violations by</td>
<td>Demand for output</td>
<td>Political interference</td>
</tr>
<tr>
<td>government-owned support</td>
<td>Fall in revenue</td>
<td>Breach/cancellation of licen</td>
</tr>
<tr>
<td>network</td>
<td>Decreased demand</td>
<td>Expropriation</td>
</tr>
<tr>
<td>Contractual violations by</td>
<td>Fluctuations with insufficient hedging</td>
<td>Failure to renew approvals,</td>
</tr>
<tr>
<td>private supplier</td>
<td></td>
<td>discriminatory taxes, import</td>
</tr>
<tr>
<td>Other</td>
<td>Payments eroded by inflation</td>
<td>restrictions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project default risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project company default</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sponsor suitability risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technical obsolescence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Termination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Residual transfer value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Asset Risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Revenue risk**

- Increase in input prices
- Change in taxes, tariffs
- Demand for output

**Financial risks**

- Interest rates
- Inflation
- Force majeure risk

**Regulatory/Political risks**

- Changes in law
- Political interference
- Project default risk

---

**Government**

- Private supplier
- Project company/investors
- Project company/investors
- Project company/Government
- Project company/Government
- Shared
- Construction contractor
- Project company, with government compensation as per contract
- Government
- Insurer, project company/investor
- Government
- Equity investors followed by banks, bondholders and institutional lenders
- Government
- Project company
- Project company/operator
- Government, with compensation for maintenance obligations
The risk management and the value for money proposition discussed above is achieved in the PPPs by:

- **Focus on services:** The emphasis is on services received by government, not government procurement of infrastructure. Government pays for services provided by the private party, which are delivered through privately owned infrastructure as part of the service package;

- **Whole-of-life costing:** With a PPP there is the opportunity for full integration — under the responsibility of one party — of up-front design and construction costs with ongoing service delivery, operational, maintenance and refurbishment costs;

- **Innovation:** A PPP approach focuses on output specifications, providing wider opportunity and incentive for bidders to develop innovative solutions in meeting these requirements;

- **Asset utilization:** Infrastructure developed by government is rarely used to generate third-party revenue, given the absence of commercial motivation. Private sector providers are motivated to develop opportunities for revenue beyond the government payment stream and this is used in part to reduce the cost of services to government; and

- **Risk transfer:** Risk retained by government in owning and operating infrastructure typically carries substantial, and often unvalued, cost. Transferring some of the risk to a private party which can better manage it at least cost can substantially reduce the overall cost to government.

While all of these elements play a role, none is more important than the last. A PPP is at heart a risk-sharing relationship between the public and private sector, which exists to bring about a desired public policy outcome in a cost effective manner. Achievement of 'value for money' relies on obtaining an optimal transfer of risk because the entity in the best position to manage a particular risk should be able to do so at the lowest price.

### 3.5 The Guiding Principles of PPPs

The Guiding Principles of PPPs have to be framed keeping in mind the Government's objectives and concerns of users, developers, investors and other stakeholders as seen in Figure 3.10. The need for infrastructure-particularly in capital-starved former socialist...
countries and developing countries, has outstripped the supply of conventional public funds. Increasingly, therefore, we see private groups financing, designing, building, operating, and even owning infrastructure via innovative public-private partnerships. Transportation facilities (roads, bridges, tunnels, rail systems, ports, and airports), water-supply system and wastewater treatment plants telecommunications systems, electricity generation and distribution systems, public buildings, and solid-waste and hazardous-waste disposal facilities are being built, expanded, rehabilitated, operated, and maintained around the world through privatised arrangements, relying more on the private sector and less and less on government to satisfy people's needs.

The distinguishing characteristic of such facilities is that, being toll goods, they lend themselves to user charges, because end users or government intermediaries can pay directly according to usage. Therefore market forces can come into play: private capital can be raised, thereby reducing or obviating the need for government borrowing, and operating costs can be paid for by users, which is more equitable than tax subsidized services and generally less expensive than government production of the services.

**Figure 3.10**
3.6 Reasons for Partnerships in Infrastructure provisioning

As part of the survey conducted with lenders and infrastructure providers (totalling 20 institutions) to understand the empirical reasons for public-private partnerships in infrastructure (which included FIs/Banks like IDFC, ICICI, ILFS, IDBI, IFCI, HUDCO, SBI, BOB and Infrastructure Providers like Maharashtra State Road Development Corporation (MSRDC), BSES, L & T, Simplex, UPSRDC, Gammon, GMR, Ideal Roads etc.), the officials responded as shown in the table 3.1, which summarizes the responses for different kinds of facilities. Lack of expertise and savings in capital costs are the most frequently cited reasons for privatising infrastructure facilities, while savings in operating costs ranks third. Similar results were obtained in a survey of a random sample of 200 users of these facilities conducted in Maharashtra and Kerala. Other reasons cited in the two studies are speedier implementation, providing services otherwise unavailable, solving political and labour problems, and sharing risks. The researcher on closer analysis find that the reasons are very similar even in developed countries like US and UK wherein it has been established in similar studies.

3.7 THE NATIONALIZATION-PRIVATIZATION CYCLE

Many experts on Privatization are of the opinion that nationalisation-privatization is a cycle in the economic sense, and they swear that it is more so when it comes to providing services to the masses. The situation with respect to many existing infrastructure facilities is conceptualised and depicted in Figure 3.11, which illustrates a dismaying but common cycle of events in rail, roads, aviation, port services, telephone systems, electric power systems etc.

---

5 T. Irwin David, Privatization in America (Washington, D.C.: Touche Ross, 1987), fig.11
Table 3.1
Reasons for Public Private Partnerships in Infrastructure

<table>
<thead>
<tr>
<th>Type of facility</th>
<th>Capital savings</th>
<th>Lack of expertise</th>
<th>Need for facilities</th>
<th>Operating savings</th>
<th>Means of financing</th>
<th>Better service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airports</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Technology Parks/Facilities</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Power</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Hospitals/Health</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Mass transit</td>
<td>1</td>
<td>3</td>
<td></td>
<td>2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Municipal Services</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Port facilities</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads and bridges</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Solid-waste facilities</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools/Education</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Urban Infrastructure</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Wastewater systems</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water systems</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Note: "1" denotes the most frequently cited reason for public-private partnership for that type of facility.

The cycle can be explained as follows: To start with in the entrepreneurial stage, many small firms start up and provide service. As the new industry grows, mergers and consolidation take place, followed inexorably by government regulation of fees and franchises in response to complaints about fares and in an effort to control perceived “chaotic” competition. Thereafter, costs gradually rise because of inflation and the need for increased maintenance
as the facilities age, but, in the name of "protecting the public", politicians refuse to authorize rate increases or service adjustments. As a result, revenues are insufficient and firms start losing money. This in turn leads to reduced expenditures on maintenance and repair, no further investment in new equipment, increasingly erratic and interrupted service, calls for government action, government takeover, public subsidies for what is now a government-run system, and declining efficiency under public operation. At length the point is reached beyond which subsidies cannot be sustained, and therefore either service must be cut back or user charges or taxes must be raised. Ultimately, the wheel comes full circle as privatisation is called upon to cure the problem. Most literature on privatisation methods are replete with the 'cycle theory' and cases, which seem to prove that it follows the pattern faithfully in the same way, irrespective of whether it is bus service in New York City or reaching water to people in sub-saharan Africa. Furthermore, if the cycle theory were to be true, there isn't a better structure than the PPPs to explain it, as the models in PPPs like BOT structures etc., authorises transfer back to the public sector / government after the set period (say 25 years or so) in the design of the deal itself.

**FIGURE 3.11 – THE NATIONALIZATION-PRIVATIZATION CYCLE**

![Diagram showing the nationalization-privatization cycle](image)


### 3.8. ADVANTAGES OF PPPs

Public-private partnerships for infrastructure satisfy the needs: (1) to upgrade systems to accommodate population growth, to satisfy tightened regulatory requirements (e.g., for
cleaner water), or to attract investment and development; (2) to minimize the cost of new infrastructure and consequent "rate shock" among citizens; and (3) to raise capital for other desired projects by receiving an up-front payment for the infrastructure concession.

The PPPs can help governments address infrastructure needs in several ways:

1. It helps identify and develop new, innovatively designed, user-financed, profit-marking facilities or existing facilities in need of rehabilitation, renovation, or expansion. Private, profit oriented businesses have a direct financial incentive to seek and carry out new projects that will satisfy public needs at prices the public can pay, projects that would otherwise have to wait until government funds became available. Government-sponsored projects, in contrast, are often uneconomical, and most times end up as grandiose monuments that satisfy personal needs.

2. By involving private sponsors and experienced commercial lenders, it assures in-depth review of the technical and financial feasibility of the project.

3. It can accesses private capital markets to supplement or substitute for hard-to-get government resources. New capital comes from a large and previously untapped pool of investors interested in higher-risk, higher-return investments than traditional municipal bonds; this can leverage limited public funds and may improve the government's credit rating.

4. It builds more quickly and more cost effectively than government usually can, and therefore satisfies public needs more quickly at lower cost. Construction is generally more rapid because private developers are more flexible and do not have to observe government procurements rules and bureaucratic constraints that delay planning and construction schedules.

5. It operates facilities more efficiently than government usually can, while complying with regulatory standards, such as those for water quality.

6. Taxpaying private firms provide a new source of tax revenue. Privately developed projects are estimated to pay over two dollars in new tax and franchise revenue for every dollar in project cost; if the new infrastructure generates ancillary real-estate development or opportunities for concessions, for instance, even greater revenues will be realized.
7. It accepts risks that would otherwise have to be borne by the public sector.

8. It transfers technology and trains government personnel during the course of a project.

9. It establishes a private benchmark against which to measure the efficiency of similar projects and enhances public management of future projects.

Government’s vital role is to identify and plan to satisfy the fundamental need for particular infrastructure projects; investigate project feasibility; execute the myriad tasks involved in contract letting (see later discussion); assign monopoly rights (by the act of choosing the private partner); regulate prices in the public interest (in as much as the facility is usually a classical toll good, subject to monopoly); establish and monitor performance standards; and (usually) contribute to the financing.

3.9 The Spectrum of PPPs in Infrastructure

Public-private partnerships for infrastructure take many forms. Figure 3.12 shows the spectrum of principal models, ranging from fully public to fully private. In the terminology of the public-private forms are contracts, franchises, and divestments. The rankings of the models in the right half of the figure, that is, their relative degree of “privateness,” should not be interpreted too rigidly, as the differences are subtle and depend on individual cases.

![Figure 3.12: The Spectrum of Public-Private Partnerships](image-url)
3.9.1 Government Department

The traditional method of providing infrastructure-based services is directly through government departments. The government, which owns the facility, is responsible for designing, financing, building, and operating it. A common example is say Public Works Department (PWD), municipal water supplies etc.

3.9.2 Public Authority

In both developed and developing countries public authorities are common for power, water, transportation, and telecommunications services. These are being reformed by commercialisation (managerial are financial autonomy and separate budgets based on user charges) and corporatization (legal company status with separation of ownership and management). The intentions of such changes are to achieve efficiency and accountability and to have the entity act like a business rather than a political body. Institutions like TRAI (Tariff Regulatory Authority of India), CEA (Central Electricity Authority) are examples of this. Regional authorities like IA (Infrastructure Authority) created under the Maharashtra Infrastructure Development And Support Act (also referred to as MIDAS Act) and many such Authorities that are being created at the State level in India exemplify this form. They try to do the regulator’s function.

3.9.3 Service Contract

Specific services associated with infrastructure may be contracted out to private firms. Examples here are ticketing, cleaning, and food catering for railroads; meter reading, billing and collection for water; and cleaning/removal of solid waste from public highways etc. The public agency retains overall responsibility for operation and maintenance of the system except for the particular contracted services, and it bears all of the commercial risk. It must finance fixed assets and provide working capital. Compensation to the contractor may be on the basis of time, lump-sum, fixed fee, or cost-plus, or on the basis of a physical parameter (number of water bills sent out, meter reading of electricity bills etc). Service contracts are generally for periods of less than five years.

3.9.4 Operations and maintenance contract or Lease

A private partner operates and maintains a publicly owned facility under a management contract with the sponsoring government, which owns the facility. This arrangement is
similar to a service contract, but in this case the private partner has overall responsibility for operating and maintaining the system (commonly called an O&M Contract) and makes the day-to-day decisions; it does not assume any of the capital risks. The objective is greater efficiency and effectiveness of service. This arrangement is used for maintenance of toll roads, supply of water, Airport maintenance etc. The facility could be leased to the private firm, which pays a lease fee and collects user charges; the French term *aftermage* is commonly used for this arrangement.

3.9.5. Co-operative

A non-profit, voluntary, cooperative association assumes responsibility for the service. Rural cooperatives in countries as diverse as the United States, Canada, and Finland successfully expanded local telephone systems. Kenya, India, and China are among the many developing countries where irrigation management transfer is taking place, whereby water user associations take over and operate local irrigation works. Using their own labour and monetary contributions, these associations often succeed in maintaining the network of canals and ditches, and even dams, used in local distribution systems where centralized operation by the government water authority was failing. Examples are also found in other services.

3.9.6 Lease-Build-Operate (LBO)

A private firm is given a long-term lease to develop (with its own funds) and operate an expanded facility. It recovers its investment plus a reasonable return over the term of the lease and pays a rental fee. Because the facility remains publicly owned, this arrangement avoids possible legal problems associated with private ownership of a facility that was publicly financed originally. The largest public-private airport partnership in the United States is that for Stewart airport, a huge but underdeveloped facility located eighty-five miles north of New York City; it is being leased by the state for ninety-nine years to a British company. UK has experimented this form very successfully in many of its sectors. It is getting popular in India as well.

3.9.7 Build-Transfer-Operate (BTO)

A private developer finances and builds a facility and, upon completion, transfers legal ownership to the sponsoring government agency. The agency then leases the facility back to the developer under a long-term lease, during which the developer operates the facility.
and has the opportunity to recover his investment and earn a reasonable return from user charges and commercial activities.

### 3.9.8 Build-Operate-Transfer (BOT)

A contractual arrangement whereby the Developer undertakes the construction, including financing, of a given infrastructure facility, and the operation and maintenance thereof. The Developer operates the facility over a fixed term during which he is allowed to charge facility users appropriate tolls, fees, rentals, and charges not exceeding those proposed in the bid or as negotiated and incorporated in the Contract to enable the recovery of investment in the project. The Developer transfers the facility to the Government Department concerned at the end of the fixed term that shall be specified in the Concession Agreement. This shall include a supply-and-operate situation which is a contractual arrangement whereby the supplier of equipment and machinery for a given infrastructure facility, if the interest of the Government so requires, operates the facility providing in the process technology transfer and training to Government nominated individuals.

A private developer is sometimes awarded a franchise (concession) to finance, build, own, and operate a facility and then transfer it to the public sector, then this is sometimes referred to as BOOT-build, own, operate, and transfer. This arrangement is similar to BTO but may encounter legal, regulatory, and liability issues arising during the long period of private ownership before the transfer. Nevertheless, this is perhaps the most common form of public-private partnership for building new infrastructure. In contrast to a sale or permanent concession, government retains strategic control over the project—which is often a political plus.

### 3.9.9 Wraparound addition

A private developer finances and constructs an addition to an existing public facility, and then operates the combined facility either for a fixed period or until he recovers costs plus a reasonable return on his invested capital. He may own the addition. The objective of this arrangement is to expand the facility despite the government’s lack of resources or expertise to do so entirely with its own funds. Eg. Adding another terminal, to an Airport complex, providing an additional warehouse in a Warehousing corporation etc.
3.9.10 Buy-Build-Operate (BBO)

An existing public facility is sold to a private partner who renovates or expands it and operates it in perpetuity under a franchise. This is equivalent to divesting a company, which then operates under a franchise. As in other franchise models, during the negotiations prior to the sale, the public owner can use the franchise agreement to exercise public control over pricing, access, noise, safety, quality, and future capacity expansion. For example. The first sale in recent history of a wastewater treatment plant in the United States was carried out in Franklin, Ohio, using this arrangement. In Japan and Germany government-owned telephone systems were sold in order to make them more modern, efficient, and internationally competitive through the infusion of private investment. In Argentina and Peru they were sold in order to expand and improve service. (it is hard to believe, but before privatisation one had to wait an average of seventeen years to have a phone installed in Argentina!). In India the majority stakes in the government owned telephone company VSNL (which is the international carrier) was sold to the Tatas with an intention of modernising and improving service.

3.9.11. Build-Own-Operate (BOO)

A Contractual arrangement whereby a Developer is authorised to finance, construct, own, operate and maintain an infrastructure or development facility in perpetuity under a franchise, subject to regulatory constraints on pricing and operations. The Developer is allowed to recover his total investment by collecting user levies from facility users. Under this project, the Developer owns the assets of the facility and may choose assign its operation and maintenance to a facility operator. The Transfer of the facility to the Government is not envisaged in this structure. The long-term property rights provide a significant financial incentive for capital investment in the facility. Examples of this model are private toll roads in Virginia and California, the toll road in china connecting Hong Kong and Macao with Guangzhou, the new terminal at New York’s JFK Airport, and the “chunnel” under the English channel. Numerous power projects in the Philippines and Indonesia, as well as ports in the region, are also public-private partnerships. The U.S. department of energy departed from its conventional approach of government-owned, contractor-operated facilities (M&O contracts) and changed to BOO Structure for remediating 54 million gallons of highly radioactive waste at its plutonium plant in Hanford, Washington.
3.9.12. Build-Own-Operate-Transfer (BOOT)

A Contractual arrangement whereby the Developer is authorised to finance, construct, maintain and operate a project and whereby such project is to vest in the Developer for a specified period. During the operation period, the Developer will be permitted to charge user levies specified in the Concession Agreement, to recover the Investment made in the project. The Developer is liable to transfer the project to the Government Department, after the expiry of the period of operation.

3.9.13 Develop-Operate-and-Transfer (DOT)

A Contractual arrangement whereby favourable conditions external to a new infrastructure project which is to be built by a Developer are integrated into the BOT arrangement by giving that entity the right to develop adjoining property, and thus, enjoy some of the benefits the investment creates such as higher property or rent values.

Functionally the various arrangement discussed above shall be grouped and presented as shown in Table 3.2.

### TABLE 3.2

**INFRASTRUCTURE DEVELOPMENT FUNCTIONS BY SERVICE ARRANGEMENT**

<table>
<thead>
<tr>
<th>Functions</th>
<th>Government</th>
<th>Public Authority</th>
<th>Service Contracting</th>
<th>Management contracting</th>
<th>Leasing</th>
<th>Concession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership of Capital financing</td>
<td>State</td>
<td>State</td>
<td>State or mixed</td>
<td>State or mixed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(fixed assets)</td>
<td>Government</td>
<td>public authority</td>
<td>Public agency</td>
<td>Public partner</td>
<td>Public</td>
<td>Private firm</td>
</tr>
<tr>
<td>Current financing</td>
<td>Government</td>
<td>Market based</td>
<td>Public agency</td>
<td>Private partner</td>
<td>Private</td>
<td>Private firm</td>
</tr>
<tr>
<td>(working capital)</td>
<td>Government</td>
<td>Public authority</td>
<td>Private firm for</td>
<td>Public partner</td>
<td>Public</td>
<td>Private firm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>specific items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Making additional Capital investments</td>
<td>Government</td>
<td>Public authority</td>
<td>Public partner</td>
<td>Public partner</td>
<td>Public</td>
<td>Private firm</td>
</tr>
<tr>
<td>Operation and maintenance</td>
<td>Government</td>
<td>public authority</td>
<td>Private firm for</td>
<td>Private firm</td>
<td>Private</td>
<td>Private firm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>specific items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managerial Authority</td>
<td>Government</td>
<td>Public authority</td>
<td>Public partner</td>
<td>Mainly public Partner</td>
<td>Private</td>
<td>Private firm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearer of Commercial risk</td>
<td>Government</td>
<td>Public authority</td>
<td>Public partner</td>
<td>Based on results, net of contractor payment for Use of existing assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basis of private Party compensation</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>For services rendered</td>
<td>For services and results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical duration Of arrangement</td>
<td>No limit</td>
<td>No limit</td>
<td>Less than 5 years</td>
<td>5 to 10 years</td>
<td>10 to 30</td>
<td>years</td>
</tr>
</tbody>
</table>

54
3.9.14 Rehabilitate-Operate-and-Transfer (ROT)

A Contractual arrangement whereby an existing facility is turned over to the private sector to refurbish, operate (collect user levies in operation period) and maintain for a franchise period, at the expiry of which the legal title to the facility is turned over to the Government. The term is also used to describe the purchase of an existing facility from abroad, importing, refurbishing, erecting and consuming it within the host country.

3.10. Models of Public-Private Partnerships

From the above discussions the various models for PPPs that can be thought of can be summarised and modelled as depicted in Table 3.3.

**TABLE 3.3 - MODELS OF PPPs in INFRASTRUCTURE**

<table>
<thead>
<tr>
<th>Type of facility</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Facility</td>
<td>Sale</td>
<td>Private firm buys facility, operates it under a franchise, and collects user fees.</td>
</tr>
<tr>
<td></td>
<td>Lease</td>
<td>Government leases facility to a private firm, which operates it under a franchise and collects user fees.</td>
</tr>
<tr>
<td></td>
<td>Operations and Maintenance (O&amp;M) Contract</td>
<td>Private firm maintains and operates a government-owned facility; government pays private firm a fee.</td>
</tr>
<tr>
<td>Existing facility Requiring Capital investment for expansion or rehabilitation</td>
<td>Lease-Build-Operate (LBO)</td>
<td>Private firm leases or buys facility from government and operates it under a concession, and expands or rehabilitates it, collecting user fees and paying a franchise fee.</td>
</tr>
<tr>
<td></td>
<td>Buy-Build-Operate (BBO)</td>
<td>Private firm expands a government owned facility, Owns only the expansion, but operates the whole facility, collecting fees.</td>
</tr>
</tbody>
</table>

Contd...in Page 56
New facility to be Built

Build-Transfer-Operate (BTO) Private firm finances and builds new facility, transfers it to Public Ownership, then operates it for 20 to 40 years, collecting user fees.

Build-Own-Operate-Transfer (BOOT), also called Build-operate-Transfer (BOT) same as BTO, but facility is transferred to public ownership after 20 to 40 years

Build-Own-Operate (BOO) Private firm finances, builds, owns and operates facility and collects fees under perpetual franchise.

3.11 Methods of PPPs

Having discussed the forms and models that can be thought of in PPPs, it is pertinent to analyse the methods used generally and the advantages/disadvantages which have been captured in Table 3.4.

**TABLE 3.4**

**ADVANTAGES AND DISADVANTAGES OF PPP METHODS USED**

<table>
<thead>
<tr>
<th>Method</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract</td>
<td>Increases productivity; saves money. Is transparent</td>
<td>Probable worker opposition</td>
</tr>
<tr>
<td>Franchise by Concession</td>
<td>Brings expertise, technology, investment; cuts costs</td>
<td>Probable worker opposition</td>
</tr>
<tr>
<td>Franchise by Lease</td>
<td>Bring expertise, technology; cuts costs</td>
<td>Probable worker opposition</td>
</tr>
<tr>
<td>Grant</td>
<td>Less costly than direct government provision</td>
<td>Continued cost to government; not very transparent</td>
</tr>
<tr>
<td>Voucher</td>
<td>Gives recipients choice; saves Money; corruption free</td>
<td>Continued cost to government</td>
</tr>
<tr>
<td>Mandate</td>
<td>Imposes full cost on private Sector</td>
<td>Imposes full cost on private sector; masks government role</td>
</tr>
<tr>
<td>Sale to joint venture</td>
<td>Brings expertise, technology, Investment; raises some cash; Government retains part Ownership</td>
<td>Not very transparent</td>
</tr>
</tbody>
</table>

Contd…
<table>
<thead>
<tr>
<th>Option</th>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale to private buyer</td>
<td>Brings expertise, technology, investment; raises cash</td>
<td>Possible worker opposition; may not attract buyers; not very transparent</td>
</tr>
<tr>
<td>Sale to the public</td>
<td>Popular; transparent; raises cash</td>
<td>Suitable only for low-risk situations; no new investment in the enterprise</td>
</tr>
<tr>
<td>Sale to managers and employees</td>
<td>Retains operating experience; popular with employees</td>
<td>No new investment, expertise, or technology brought into the enterprise</td>
</tr>
<tr>
<td>Sale to users or cooperative</td>
<td>Popular; gets rid of problem; eliminates drain on funds; raises cash; transparent</td>
<td></td>
</tr>
<tr>
<td>Free transfer to</td>
<td>Brings expertise, technology, investment; government retain part ownership</td>
<td>Raises no revenue</td>
</tr>
<tr>
<td>Joint venture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free transfer to</td>
<td>Popular with the public</td>
<td>Retains management; no revenue; no new investment or expertise</td>
</tr>
<tr>
<td>The public</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free transfer to employees</td>
<td>Popular with employees</td>
<td>No revenue; no new investment or expertise; unfair to public</td>
</tr>
<tr>
<td>Free transfer to</td>
<td>Popular; eliminates problem and money drain; transparent</td>
<td>Raises no revenue</td>
</tr>
<tr>
<td>Users or customer cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free transfer to</td>
<td>Fair</td>
<td>Raises no revenue; unpopular?</td>
</tr>
<tr>
<td>Original owner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquidation</td>
<td>Gets rid of problem; raises some cash</td>
<td>Worker opposition</td>
</tr>
<tr>
<td>Default withdrawal</td>
<td>Subtle solution can do gradually</td>
<td>Temporary public complaints</td>
</tr>
<tr>
<td>Deregulation</td>
<td>Good policy</td>
<td>Complex; opposition from vested interests</td>
</tr>
</tbody>
</table>

### 3.12 Options for PPPs in Infrastructure provisioning

Having discussed the possible routes to private sector participation in infrastructure, table 3.5 elucidates the options for PPPs in infrastructure provisioning.
Table 3.5
Options for Private Sector Participation in Infrastructure and Public Service Provision

<table>
<thead>
<tr>
<th>Private Sector Participation Option</th>
<th>Service Contracts</th>
<th>Management Contracts</th>
<th>Lease Arrangements</th>
<th>Concessions</th>
<th>Build-Own-Operate-Transfer (BOOT)</th>
<th>Reverse BOOT</th>
<th>Joint Ownership (mixed companies)</th>
<th>Outright Sale or Divestiture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financing of investments</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
</tr>
<tr>
<td>Financing of w.capital</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
</tr>
<tr>
<td>Contra. relation with users</td>
<td>Public sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
</tr>
<tr>
<td>Duration (Yrs)</td>
<td>1-2</td>
<td>3-5</td>
<td>5-10</td>
<td>20-30</td>
<td>Time needed to retire debt</td>
<td>Time needed to retire debt</td>
<td>Indefinite or fixed</td>
<td>Indefinite</td>
</tr>
<tr>
<td>Method of payment</td>
<td>Work done/ Unit price</td>
<td>Cost-plus and productivity</td>
<td>Rates price</td>
<td>Rates</td>
<td>Rates</td>
<td>Rates</td>
<td>Rates</td>
<td>Rates</td>
</tr>
<tr>
<td>Method of recovering public expenditure</td>
<td>Rates</td>
<td>Rates</td>
<td>User overcharge</td>
<td>Not applicable</td>
<td>Annual fees by private firm</td>
<td>Rates</td>
<td>Rates</td>
<td>Rates</td>
</tr>
<tr>
<td>Main objective of PSP</td>
<td>Improve efficiency</td>
<td>Improve efficiency</td>
<td>Improve efficiency</td>
<td>Mobilize capital and efficiency</td>
<td>Efficiency improvement</td>
<td>Mobilize capital and efficiency</td>
<td>Mobilize capital and efficiency</td>
<td>Private sector</td>
</tr>
<tr>
<td>Ownership</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Private sector</td>
<td>Public then Private then Public sector</td>
<td>Private and Public</td>
<td>Private sector</td>
<td>Private sector</td>
</tr>
<tr>
<td>Financing</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Private sector</td>
<td>Public sector</td>
<td>Public sector</td>
<td>Private and Public</td>
<td>Private sector</td>
</tr>
<tr>
<td>Management</td>
<td>Public sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private sector</td>
<td>Private and Public</td>
<td>Private sector</td>
</tr>
<tr>
<td>Risk</td>
<td>Public sector</td>
<td>Public and private</td>
<td>Private sector</td>
<td>Private Sector</td>
<td>Public and Private</td>
<td>Private and Public</td>
<td>Private sector</td>
<td>Private sector</td>
</tr>
</tbody>
</table>

3.13. Strategies for increasing PPPs in Infrastructure

Table 3.6 below summarises the strategies governments can take to enhance infrastructure provisioning through the PPP route by addressing the relevant risk issues concerned. The above paragraphs have analysed and illustrated some of the issues of risk analysis and mitigation using the concept of project finance as a model for private financing of infrastructure. As emphasized at the onset, this is not meant to be a model with universal applicability for infrastructure. The risks vary and with them vary the nature of contracts. The nature and sources of finance vary too. What the analyses hopes to achieve in this section is not an elucidation of the specifics, but a hint at the broader generalities. Some specifics do find mention, wherever it has been felt relevant. A typical structure of a PPP project can be figuratively constructed as shown in Figure 3.13.
### Table 3.6

Government Strategies for Encouraging Private Infrastructure

<table>
<thead>
<tr>
<th>Overall</th>
<th>Encourage Initial Private Entry</th>
<th>Some Private Participation</th>
<th>Extensive Private Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prudent macroeconomic management, including currency convertibility, is a priority. An institutional/legal framework is necessary to ensure contracts can be implemented.</td>
<td>Prudently remove subsidies, allow entry to cellular telephones, power generation, ports etc. Use concessions and BOOs as appropriate to sector and political acceptability.</td>
<td>Extensive private sector participation and contestability to sectors where regulatory issues may be more difficult.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sectoral</th>
<th>Broaden the scope of private entry and competition initiate overhaul of regulatory framework.</th>
<th>Demonopolize niche sectors, allowing entry to cellular telephones, power generation, ports etc. Use concessions and BOOs as appropriate to sector and political acceptability.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Medium – sized projects should be financeable.</td>
<td>Project size should not be a constraint.</td>
<td></td>
</tr>
<tr>
<td>Sectoral and regulatory issues</td>
<td>Start process of removing subsidies, preferably by announcing (and adhering to) a phased program. Allow tariffs to be automatically adjusted to reflect changes in costs.</td>
<td>Assess regulatory options. Increase competition within and for markets, regulate natural monopolies.</td>
<td>Review regulatory experience. Convert BOTs to concessions by announcing that they will be re-bid.</td>
</tr>
<tr>
<td>Privatization of SOEs</td>
<td>Consider (Partial, if appropriate) privatization of most financially viable SOEs (eg. Telecoms).</td>
<td>Privatize a broader range of SOEs.</td>
<td>Complete privatization process. Make tariffs fully commercial.</td>
</tr>
<tr>
<td>Foreign Participation</td>
<td>Remove or minimize barriers to foreign capital and expertise.</td>
<td>Encourage foreign participation in privatization.</td>
<td>Remove remaining constraints to foreign participation.</td>
</tr>
<tr>
<td>Sponsors</td>
<td>Ensure strong sponsors, technically and financially. Ensure that they make significant equity contributions.</td>
<td>Scope for greater participation by technically and financially sound local sponsors, and demonstration effects.</td>
<td></td>
</tr>
<tr>
<td>Financial Issues</td>
<td>Adjust regulations to allow foreigners to repatriate dividends. Allow use of escrow accounts if that gives extra comfort to foreign investors.</td>
<td>Access international capital markets. Strengthen local capital markets; public share issues, investments by local pension and insurance funds.</td>
<td>Improve access to international capital through better country risk rating. Encourage private rating agencies, re-insurance industry, full use of foreign and local capital markets.</td>
</tr>
<tr>
<td>Government and risk</td>
<td>Where really necessary, guarantee SOE contractual obligations, and build in buyout provisions for private sponsors. Do not subsidize finance to private or public enterprises.</td>
<td>Assume less risk as private participation increases; adapt regulatory framework on the basis of experience.</td>
<td>Limit commercial presence of government. Focus government involvement on providing enabling environment.</td>
</tr>
</tbody>
</table>
It is pertinent to analyse the financing of infrastructure sector where innovative financing techniques and instruments in increasingly sophisticated capital and insurance markets are allowing for more efficient means of risk allocation and management. Accompanied with the globalisation of financial markets, sponsors of infrastructure projects now find on offer an array of financing options to match debt-servicing obligations with revenue-generating prospects of the projects. The world bank estimates that of the amount spent each year in developing countries on infrastructure, only seven percent comes from private sources – the rest is provided by government and multilateral agencies; by the end of this decade, the share of the private sector is expected to double. Project finance has co-existed with traditional financing for the last 30 years. However, as a means of financing infrastructure projects, it took off only during the last 10 years, the impetus coming from the process of "deregulation" and increasing policy emphasis on private investment in the late 1970s and 1980s, both in the USA under the Reagan administration and in the UK under Margaret Thatcher. The influence of it spread to South East Asia in the 90s, wherein currently majority of the projects are underway.

3.14. BOT Approach to Project Finance

While the subject matter of financing infrastructure projects is referred to as ‘Project Finance’ in the financial lexicon (under whichever models, be it PPPs or otherwise), the build-operate-transfer (BOT) is an approach in Project Finance (could also be under PPPs) that has in recent years played a growing role in the implementation of industrial and
infrastructure projects such as oil and gas fields, power plants, toll roads and water supply and treatment facilities in both industrialized and developing countries. Owing to the strategic importance of BOT projects for developing countries, organizations like United Nations Industrial Development Organization (UNIDO) and other multi-lateral organizations are increasingly being asked by member countries to provide information, advise and guidance on the elaboration of these projects. In response to this need, these organizations have taken the initiative of preparing detailed guidelines for infrastructure development through build-operate-transfer (BOT) projects and these guidelines apart from providing both the general overview of the conceptual, legal and financial issues associated with BOT projects have become practical guides in these spheres.

The structure and content of the guidelines follow the usual path of BOT Projects, from identification of Project opportunities through feasibility studies, formation of a consortium, bidding procedures, contractual and financial packages, to the operation, maintenance and transfer of ownership. It also highlights the ways in which BOT projects can promote technology transfer and capacity building. They help developing countries to take advantage of the potential benefits of using a BOT strategy to implement infrastructure projects and make well reasoned decisions based on the particular objectives and requirements, and elucidate how projects can be made to attract financing from the private sector.

There is no perfect BOT model for all infrastructure projects, and the host countries themselves have to shape the approach to suit the national requirements. Those countries that have had the most success in implementing BOT projects generally attribute it to creating a win-win situation: The BOT approach allows them to pursue their national interests while at the same time it encourages private sector investment. The guidelines should not be regarded as rigid and unchangeable. Infrastructure development is a dynamic process, and the BOT approach has evolved to suit the needs of projects/programmes in individual countries. They would perhaps, serve as a comprehensive reference work, based on experience worldwide, for officials, managers and practitioners dealing with BOT issues.

While our discussions hitherto have been on generic issues of Infrastructure and PPPs there is a need to come to the specifics – the BOT Structures wherein our subsequent analysis in the study would focus on. The focus of this research is also in this area.

3.14.1. What is BOT?

BOT is the terminology for a model or structure that uses private investment to undertake the infrastructure development that has historically been the preserve of the public sector.
"Project finance" is the cornerstone of the BOT approach. It means essentially that lenders took to the project's assets and revenue stream for repayment rather than to other sources of security such as government guarantees or the assets of the project sponsors. In a BOT project, a private company is given the concession to build and operate a facility that would normally be built and operated by the government. The facility might be a power plant, airport, toll road, tunnel or water treatment plant. The private company is also responsible for financing and designing the project. At the end of the concession period, the private company returns ownership of the project to the government, although this need not always be the case, and would depend on the variant used which are discussed below. The concession period is determined primarily by the length of time needed for the facility's revenue stream to pay off the company's debt and provide a reasonable rate of return for its effort and risk. Figure 3.14 briefly summarises the States involved in a BOT procurement procedure.
3.14.2 Types / Variants to BOT

The acronym BOT stands for "build, operate and transfer" or "build, own and transfer" (the terms are used interchangeably). The variants have been explained above under PPPs itself and could include forms like: BOO (build, own and operate, i.e., without any obligation to transfer); BOR (build, operate and renewal of concession); BOOT (build, own, operate and transfer); BLT or BRT (build, rent or lease and transfer); BT (build and transfer immediately); BTO (build, transfer and operate); possibly subject to instalment payments of the purchase price; DBFO (design, build, finance and operate); DCMF (design, construct, manage and finance); MOT (modernise, own/operate and transfer); ROO. (rehabilitate, own and operate); ROT (rehabilitate, own and transfer). For the purpose of this analyses the acronym BOT will include all these variations.

Some commentators have written that the BOT concept has its historical roots in the concession systems of the nineteenth and twentieth centuries. Others believe that BOT projects differ so significantly from the old concession approach that their roots are much more recent. The old concessions normally entitled the private sector to virtually free use of the project -some authors have called it "exploitation"- of the project, with very little participation and control by the host governments. In contrast, in a properly structured BOT project today, the host government decides on the need for the project and its scope, requires that the design, performance and maintenance of the project be tailored to the objectives of the country and selects the private sponsors by means of an appropriate bidding and evaluation process in order to arrive at a price that is fair to both the host government and the sponsors.

Unlike the old concessions, modern BOT arrangements are designed and implemented as public/private partnerships, with private sector finance and efficiency truly serving the public interest. BOT projects offer significant potential for technology transfer and local capability building and for helping to develop national capital markets, as well as a variety of other benefits, all of which will be covered in this analyses. A properly negotiated and drafted BOT project agreement limits the private sponsors to reasonable rate of return and ensures that the project serves the host country's national interests, economic and otherwise. Most BOT projects are first identified by the host government. Through a published request for proposals the host government asks for bids to have a particular project delivered on a BOT basis. It is also possible, however, for a project opportunity to first be identified by a private
entrepreneur, who will propose it to the host government. A number of successful BOT projects have been realized in this fashion.

Many developing countries have begun to promote infrastructure projects on a BOT basis. Such projects are financed on a limited recourse basis and built and operated as a private venture under a project agreement with the host government or one of its agencies. At the end of the operation period, the project is transferred to the host government, usually at no cost or only nominal cost. A number of BOT projects have now been successfully completed and put into operation, and many others are on the way. Thus this contract-based route to financing projects, especially in infrastructure sector has come to stay.

3.14.3. Characteristics of BOT Structuring

The exact nature of the contract used- BOO, BOT, BOLT and their many variations vary across sectors and countries. A number of considerations come into play. One such is that the longevity of the assets created differ. Thus while the life span of a power plant is about 25-30 years (with regular maintenance, and may be extended further by 10-15 years following a refurbishment), a road/highway may last a 100 years or more. This obviously creates a difference in the possible tariff, cash flow and rent characteristics of the project. Typically, a build-own-operate (BOO) contract, where the private operator owns all the assets, can be used for independent power plants (IPPs) and cellular networks while the build-operate-transfer (BOT) arrangement is widely used for longer-lived assets like roads and highways, airports, bridges and so on. Under a BOT arrangement, the private investor, also referred to as the concessionaire, builds and operates the asset for a specified period—referred as the concession period – and earns a return on his/her investment and thereafter transfers the asset to the government. Such a structure works well for projects that can charge users and leaves the government with the option of imposing a tariff or not after the transfer has been made. Thus an erstwhile toll road can be converted to a freeway once the private operator transfers the ownership of the road/highway to the government.

International Finance Corporation (IFC’s) experience shows, that though typically Latin American countries do use a BOO structure for IPPs, Power Purchase Agreement (PPAs) contracts in Asian countries are structured like a BOT. In the case of Enron, for instance, the PPA is a 20 year contract with the possibility of either a transfer of the project to the state or the extension of the contract thereafter. Schedule 11 in the PPA lays out the procedure for valuation and transfer of assets after the concession period. The concession period for Cogentrix (another power project) is 30 years. If one takes the project life into
account, such concession periods extending to 20–30 years in effect is equivalent to a BOO arrangement. IFC analyses this structuring as a consequence of concern for "sovereignty" – a BOT structure provides the security that the assets ultimately belong home. It gives some room for political economy reasons not to undermine the project's need and viability.

The build-operate-lease –transfer (BOLT) arrangement is just a financing technique without changing the modus operandi. This arrangement is presently being widely used for railways where the asset is created by the private sector and then leased out to the public sector for operation. The lease payments to the private sector are structured to amortize the debt and provide a fixed rate of return on equity. At the end of the lease, the assets are transferred to the government.

The main differences between these modes are tabulated below:

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Ownership Of assets</th>
<th>Operating the facility during concession period</th>
<th>Transfer of assets at the end of concession period</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOO</td>
<td>Private</td>
<td>Private</td>
<td>No</td>
</tr>
<tr>
<td>BOT</td>
<td>Government</td>
<td>Private</td>
<td>Yes(to government)</td>
</tr>
<tr>
<td>BOLT</td>
<td>Private</td>
<td>Private/government</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.14.4. THE BOT Mechanism

During the operation period the project company will charge prices. Tolls, fees, etc., sufficient to pay back the project debt and to provide dividends to the shareholders of the project company. The financing is raised by the project company from commercial banks, sometimes backed by export credit agencies and by multilateral and bilateral lenders. The financing of BOT projects are normally on "a project financing "or "non-recourse" basis. The lenders are supposed to look at the cash flows and earnings of the project company as the only source of funds from which the loans will be repaid (and to the assets of the project company as collateral for the loans). Relatively very few BOT projects, however are so completely self-supporting that they can be financed without any guarantees and safeguard undertakings by the interested parties, including the host government. Normally the governments will not provide sovereign guarantees or borrow any money on behalf of the
sponsors, but support from host governments may include assurance of minimum revenues, sharing of project risks, use of right-of-way, guarantees of the performance of government agencies involved in the project, etc.

3.14.4.1 Government preparation for bidding

The next step for the government is to decide the procurement procedure. Alternatives include competitive bidding, sole source procurement or some limited tender system. Most governments will want to pre-qualify potential investors, whether they adopt purely competitive bidding or some other process. A large number of bidders may not be the government's first priority. Rather, the need to attract serious and quality investors should drive the design of the procurement process. If, as will usually be the case, competitive bidding is used, three, four or five serious competitors may be enough to achieve the host government's objectives.

The request for proposals provides the detailed definition of the project. It normally sets forth criteria that must be met, including size, timing, performance and the nature and the range of project revenues. It is also advisable to include the project agreement in the invitation to tender documents. This phase is extremely important from the host government's point of view. If the initial project definition is impractical, or if the governments criteria for award are unrealistic or unclear, interested investors will have great difficulty in responding with realistic proposals. A quality bid package and a transparent, well-defined bid evaluation process are of critical importance for successful BOT project. Experienced bidders consider the bid package and evaluation process as an important indicator of the project's feasibility and of the host government's commitment to make it a success. The terms of the competition must be clear and consistently applied, or serious competitors will be discouraged from pursuing the process. All the issues involved in competitive bidding for BOT projects have to be adhered. From the host government's view point, it is the bidding and evaluation process that defines the terms of reference of the project and is largely responsible for the quality of the competition and investors. Experience suggests that choosing the most suitable project consortium is usually the single greatest determinant of the success or failure of BOT projects.
### 3.14.4.2. Sponsors preparation of a bid

In response to the request for proposals, the group of interested investors or sponsors normally from a consortium put together a responsive bid. The consortium members reach a preliminary agreement at this stage on cost sharing, the role each expects to play in the project and the potential project structure. If confidential or proprietary information have to be shared among project participants, which is often the case. The preliminary consortium agreement includes appropriate confidentiality agreement, or the participants will separately enter into such agreements. The consortium carries out its own more detailed feasibility studies for the project, which are critical factor in its decision to proceed and in its ability to attract financing. It then seeks tentative loan commitments and preliminary contract prices from potential lenders, equity investors, contractors and suppliers in order to structure its proposal or bid.

The consortium then prepares and submits its bid. The request for proposals should require that the bid containing credible financing plan, although not necessarily definitive financing commitments. In some instances, the bid should be allowed to suggest amendments or alternative solutions to one or more aspects of the project in order to better achieve the project’s overall goal. For instance, the feasibility studies undertaken for the consortium or the consortium’s expertise in project design and development may suggest an alternative to some feature of the project as originally outlined in the request for proposals.

### 3.14.4.3 Bid Selection

In the next phase, the government will evaluate the various bids submitted in response to the request for proposals and select the winner. It is critical that highly qualified technical, financial and legal advisers are available to the government entity evaluating the bids. Bids for any complicated project are never identical and are often very difficult to measure one against another no matter how clear their valuation criteria may be. The evaluation of bids for BOT projects will not ordinarily be based on price alone. It is, rather based on factors such as price, the reliability, experience and the degree to which the project as conceived and proposed will lead to other benefits for the host country, such as savings in foreign exchange, promoting technology transfer and providing employment and training to local employees and contractors. Having evaluated the submitted bids, the government invites the selected bidder to execute and sign definitive contractual documents.
3.14.4.4 Project development

With the government’s acceptance and signing of the project agreement, the winning consortium is in a position to make definite commitments among themselves to form or structure the project company if it is not already been formed. The equity contributions required for a project realisation will have to be made. Similarly, the sponsors will now be in a position to approach or go back to potential lenders, as well as to the contractors and suppliers, to obtain more definite commitments or terms and prices. When all these agreements have been negotiated by the sponsors and signed, the project will proceed to financial closing. Financial closing is the date on which the lenders and equity investors advance, or begin to advance, the funds for detailed design, construction, purchase of equipment and other steps necessary to conclude the project.

These final steps after the award of the project and the signing of the project agreement are crucial in the development process of any BOT project. Although most of the onus is on the winning consortium, this final phase of project development may require some support from the host government and flexibility on its part.

3.14.4.5 Project implementation

Once the project reaches financial closing, the implementation phase will begin in earnest. Any particular project, of course, may not fall neatly into these distinct phase. Some site assembly or development and even some preliminary construction may take place before financial closing but the main construction work and the delivery of important pieces of equipment for the project normally take place only afterwards, when the project loan funds become available for disbursement. The construction agreement and processes follow. The implementation phase ends when the project has passed the specified completion tests and is finally accepted by the project company and in principle by the host government.

3.14.4.6 Project Operation

Next, the project enters the operation phase, which will continue for the period of the concession. During this phase, the project company, either directly or through an operator,
operates the project and maintains the facility in conformity with the criteria set forth in the project agreement and as required by the terms of the various loan agreements and agreement with the investors. The revenue or fees received during the operation of the facility allow the project company to recover the investments, serve that debt and make profits. To be sure that operation and maintenance (O&M) are being carried out as required, the lenders, investors and host government have extensive rights to receive reports and carry out inspection of the facilities. The issues associated with O&M has to be addressed some times innovatively and fully. In both the implementation and operation phases, the host government should seek to derive as much benefits as possible from local capability building and the transfer of technology from the project company and contracts into the local economy.

3.14.4.7 Transfer to Host Government

The final phase of a BOT project is the transfer of the project to the host government at the end of the concession period. As a rule, the project will have been designed to enable the BOT sponsors to pay off their project debt and to earn the expected return during the concession period so that the transfer to the host government will be for no consideration or only a nominal one. The interest of the host government at the transfer date will be to make sure that the project has been properly maintained and that enough training and technology transfer have taken place for the government to be able to continue to operate the project.

Depending on the type of project and the degree to which it has decided to promote privatization of its infrastructure, the host government may find it advantageous to have the project company or the operator continue to operate and maintain the project and a negotiated extension of the concession or a new operating contract. This result might make sense if, for instance, the government believed operation of the project by private sector entity provided better and more cost-efficient service than its operation by the government itself. The host government may therefore wish to preserve this option in defining the terms of the project agreement. An alternative could be a new tendering process for a new concession period. The various options and considerations involving project transfer have to be explored.
3.14.4.8 Financing techniques and instruments

A BOT project involves a private sector borrower who seeks financing on either a limited-recourse basis or a non-recourse basis. In theory, the lender in a non-recourse financing arrangement will look only to the project's assets and revenue stream for repayment, not to additional sources of security, such as the total assets or balance sheet of the project sponsors. In practice, as will be discussed elsewhere in this analysis, almost all BOT projects are financed on a limited recourse basis, as opposed to a purely non-recourse basis.

Project finance techniques were applied in the United States of America to the development of commercial real estate and were further developed in the 1970s in the North Sea in connection with oil and gas projects. They are being used for numerous private infrastructure projects involving power plants, roads, railways, bridges, telecommunication facilities and water treatment plants. Infrastructure financing is different, of course, from financing an aircraft to that of a shopping centre. In equipment or real estate financing, the lender's primary security is the capital value of the asset. Toll roads or power plants, on the other hand, have uncertain capital value and a very limited potential for resale. The lender's primary security, therefore, is the contracts supporting the project and, most importantly, the certainty of the revenue stream set forth in the project agreement.

Different types of infrastructure have different risk profiles. The revenue from a power plant project is relatively secure and predictable (bankrupt SEBs as in India to be excluded). The host government or public utility may enter a well-defined agreement with the project company to purchase the power output of the plant. Compare, however, the source of revenue from a power plant to that from a toll road: since the revenue from a toll road depends on the individual travelling decisions of tens of thousands of potential users, the terms of a project agreement for a toll road are based primarily on travel forecast by experts. Such forecasts are obviously less certain and the agreement less secure than a well-drafted, long-term power purchase agreement with the creditworthy utility. Notwithstanding that different projects involve different risks, it should be mentioned that financial markets have become increasingly sophisticated in devising packages to finance almost any type of reasonably predictable revenue stream.
3.15 Contractual Structure of a BOT project

BOT projects involve a number of elements, all of which must come together for a successful project. Figure 3.15 adapted from UNIDO’s BOT Guidelines illustrates a typical BOT project structure and the inter-relationships between the various parties. It gives an overview of the structure of BOT projects and more detailed aspects are discussed elsewhere at relevant places.

**Figure 3.15**

The Contractual Structure of a typical BOT

The structure of a typical BOT project can be described through the building blocks of the BOT contract package as shown above. The primary contract is the project agreement (Implementation Agreement- Concession Agreement). This is the contract between the host
government and the project company. In entitles the project company to build and operate
the project facility and imposes a number of conditions as to design, construction, operation,
maintenance, etc. of the project. It fixes the operation period, the payment for the usage of
the facility, the way in which payment should be effected and so on. In short: the project
agreement is the key contract of a BOT project, and the contractual basis from which the
other contracts are developed.

The subscription of the share capital and the contractual arrangements between the
shareholders are contained in a shareholders agreement. The majority shareholders of the
project company are normally the private project sponsors who in turn might be private
construction companies, equipment suppliers, international trading companies and the
lenders. The participation of the host government as shareholder (equity investor) is not
unusual in some countries and in some fields such as the petroleum industry. The
construction contract is normally a fixed price turnkey construction contract covering all the
work. If the BOT infrastructure project involves large construction work and the supply of
heavy machinery and equipment, the project company will negotiate the construction
contract with a consortium of experienced building companies and equipment suppliers to
assure the timely and proper completion of the project facilities. Effectiveness of the turnkey
arrangement might be a condition precedent to lenders.

In case the host government or a government agency is the only customer of the
infrastructure project, the project company will negotiate a separate purchase agreement
with the government. The agreement provides the company with an assurance of a
minimum purchase by the government and arranges the price structure – often on a take or
pay basis. That means that as long as the government pays the fees, the project company
is assured of sufficient funds to service its debt, cover its projected costs and make a profit.

The fifth major contract of a BOT project is the credit. Agreement between the project
company and the lenders. There is an almost infinite number of conditions, type of loans
and instruments used in BOT financing. The risk of non-repayment of the loans is usually
covered in two ways. First, by standard types of safeguards, such as fixed price turnkey
contracts, providing for performance bond and liquidated damages, real estate mortgage,
default clauses, assignment of insurance contracts, etc. Secondly, by safeguards specific to
BOT projects such as guarantees by governments for the performance of government
agencies on contingency loan for a limited period, escrow agreements and shareholders
and sponsors support agreements. The loan security structure will be included in the credit
agreement.
Normally the project company will enter into an operating/management contract with a professional operating company. The operating/management contract spells out operation specifications, maintenance standards, operating costs, incentives, etc. for the operation period. An adequate insurance programme (insurance policies) must be arranged both during the construction and operation of the project. The project company usually has little to fall back on in the event of a casualty loss except for insurance proceeds.

The contractual framework of a BOT project as outlined here, is of course not exhaustive. Escrow agreements, service agreements, energy supply agreements, supplementary loan agreements, etc., can also be part of the legal framework governing a BOT infrastructure project.

### 3.16 Challenges in the BOT approach

A critical challenge for developing countries is to identify the factors that make projects financeable in the private sector. An exercise to that end should aim at helping governments to identify those factors, specifically as they relate to infrastructure projects. Since BOT entails the financing of infrastructure projects by the private sector, there is a common misconception that the "public" nature of the project can be largely ignored, and the host government often assumes that it has minimal involvement in BOT projects. It will be seen why this assumption is not well-founded and why governments must lead as well as provide support in most projects.

Fortunately, the experience of the last decade makes clear the basic structure needed to make a BOT project viable. Standard solutions are being worked out for the problems that earlier seemed to present inseparable difficulties. Even if a government agency knows little about BOT, the knowledge exists and is available from private advisers as well as organizations such as UNIDO, IBRD, IFC, ADB at the International level and IDFC, IDBI, ICICI etc., at the national level that have built expertise and experience. Institutions like ADB have come out with **Best Practices** that can be followed by the stakeholders. The advantages and challenges of BOT projects have been discussed in more depth throughout this report.
3.17 FIELDS OF APPLICATION-RECENT DEVELOPMENTS

The BOT concept is not a new financial mechanism. Variations on the BOT approach, often known as "concessions", have been in use for a long time in European industrial and mining sectors, especially France, Germany and the Scandinavian countries. More recently various models of project financing with BOT characteristics have been applied to infrastructure projects as different as the large EURO channel tunnel and great belt tunnel projects in Europe, Power plants in the United Kingdom, United States of America and Greenland, as well as projects in the petroleum industry. The capital intensive and high risk North sea projects of the Norwegian sector have all been successfully financed built and operated by private sponsors and are now in the process of being gradually transferred to a government agency. During the BOT process, national technology and skill has been developed to a fairly high and competitive level.

From the early 1980s the BOT concept has been introduced in a number of developing countries as an alternative way to finance infrastructure projects. Such projects include road projects, power plants, port facilities, telecommunications, industrial estates, water supply and treatment systems, airports, metro railway systems etc. A pressing need for infrastructure facilities as a condition for driving economic growth in many developing countries, the third world debt crisis and the present trend to involve the private sector participation would only mean that the interest in the BOT concept in many developing countries is bound to go up.