Chapter 2
Research Design

2.1 Research Objectives

Having discussed the basics and the broader framework of infrastructure financing in Chapter 1, this research study explores the topic with the following major objectives from the lenders perspective:

1. To understand and analyze the use of private capital as a means to finance infrastructure projects and to empirically compare the financial characteristics, geographic and industrial distribution of Project Finance and Non-Project Finance Loans. It would also examine the Pricing of loans (spreads) for project finance and non-project finance loans to know its influence.

2. To analyze the various Risks involved in Infrastructure financing by identifying, estimating, evaluating and managing risk exposures to Infrastructure Projects by adopting Best Practices in Financing of Infrastructure.

3. As an extension of the study an attempt has also been made to construct an Infrastructure Financing Index by estimating and comparing the current status of Infrastructure Financing in India with respect to the Global Best Practices benchmarks.

2.2 Hypothesis of the Study

The study will examine the following hypothesis:

1. The use of Private Capital to finance public infrastructure projects has come to stay in Project Finance.
2.3 Review of Literature

2.3.1 Review of Literature in the Print Medium

An evaluation of the Review of Literature on ‘Infrastructure financing’ brings forth the body of knowledge as it exists now, leading to the establishment of the need for this study.

For instance, in the global context, ‘World Development Report 1994: Infrastructure for Development’ published by the World Bank, is an important publication, which discusses a number of wide-ranging issues on the subject. This report explores the ways in which developing countries can improve the provision and quality of infrastructure services. The report carries a separate chapter on financing issues of private infrastructure projects. Besides, its bibliography itself is a good guide for further research on the subject. Further, the World Bank has published a number of reports, discussion papers, viewpoints, etc., on various sector specific, project specific and country specific issues. Similarly, International Finance Corporation (IFC), the World Bank affiliate, drawing upon their full range of operational experience in infrastructure finance in the private sector, has brought out two publications (a) ‘Financing private Infrastructure’, and (b) ‘Project finance in Developing Countries’ under their Lessons of Experience series. These two publications, though concise, provide a focused picture on the issues involved in financing infrastructure projects.

In the Asian Context, the Asian Development Bank (ADB) has done considerable work in infrastructure financing by drawing on its Asian experiences as a lender in the sector for long. Recently, the research team of ADB has also propounded sectoral ‘Best Practices’ for attracting private investments in infrastructure by covering various sectors like Roads, Power, Water, Airport, Ports and Urban Infrastructure. These are fast becoming as ‘benchmarks’ to be followed by lenders in the Asian context. Thus it could be said that the maximum literature and the knowledge base on the subject is there only with these multi-lateral lending agencies who are present in this spectrum for long. Further, there are several useful publications by private leading international publishers like Euromoney, John Wiely, etc. these publications are also of immense help for the practitioners, academicians, and researchers.
In the Indian context, clearly, there has been lack of serious literature, case studies dealing in infrastructure related issues. And, it is only in the past few years some action has been initiated. However, it should be mentioned that ‘The India Infrastructure Report’ brought out by the Expert Group on the Commercialisation of Infrastructure Projects (Chairman: Shri Rakesh Mohan), is a very useful study. The Report, (consisting of three volumes and running to around 450 pages), submitted to government in June 1996, is truly a seminal work of very high standard.

The Report, apart from plotting the experiences in the global context and helping to reduce the knowledge gap, has made a detailed study of the contemporary issues to be addressed by various authorities in short, medium and long term. There is no doubt that this Report is in itself an important milestone in the Indian Infrastructure sector. After the submission of this Report, based on its recommendations, several policy initiatives have been taken by the Government and other authorities. Surely, the Report is an approach document for the decision makers, a practical workbook for all the players in the market and a source of comprehensive information for the academicians and researchers. Mention should also be made to another bold initiative taken by the new institution, Infrastructure Development and Finance Company (IDFC), which was started in the year 1998, in creating 3iNetwork, which is a network of 3 institutions viz., Indian Institute of Management Ahmedabad (IIMA), Indian Institute of Technology Kanpur (IITK) and IDFC with the aim of harnessing local knowledge and research interests to expand intellectual envelope in the filed. It has thirty professors contributing to the process on an ongoing basis and their efforts have also been institutionalised in the recent years through publication of an annual India Infrastructure Report published by Oxford University Press on thematic concerns in the field. The first such report was published in 2001 titled “Issues in Regulation and Market Structure”; the 2002 report was based on “Governance Issues for Commercialisation” and the 2003 report covered the issue of “Public Expenditure Allocation and Accountability”. Coming to a rigorous academic study, a work by Devapriya K.A.K.; (2003) on the topic “ A Study of Project Finance in Asia with Emphasis on Private Infrastructure Project Finance”; PhD thesis; University of Hong Kong comes closest to the work done in the topic area.
Outside the domain of the above, barring some articles in financial journals and newspapers addressing issues in bits and pieces, and certain Study Reports by some of the consulting companies like PriceWaterhouse Coopers Ltd., McKinsey etc., not much work has been done in the Indian Context. The reason for the poor level of research and documentation may not really be difficult to explain, as infrastructure market being in its formative years, lack of initiatives to take up research studies by the Government and Quasi-Government bodies connected with the sector, lack of financial resources to sponsor studies, lack of transparency in decision making process, hesitation by players, including government, to share the positive and negative experiences could be considered as some of the reasons. However, there is considerable change happening in the recent past, as lot of interest is being created in the sphere (thanks to the government’s hardsell approach of highlighting infrastructure development as the area with highest priority and highlighting their achievements in road development, telecom growth etc., by placing full page advertisement in prominent dailies with obvious intentions) and there are many coming forward to contribute to the field. The launch of an exclusive monthly magazine called ‘Indian Infrastructure’ a few years back would explain the interest and potential for literature in the field. In this context, it has to be mentioned that many such efforts are required for harnessing and expanding the body of knowledge from various perspectives which will go a long way in contributing to the field of ‘infrastructure’ which is the backbone of a vibrant economy.

This study is one such analytical effort in the topic looking at the issues from the lenders perspective to find possible solutions.

2.3.2. Review of Literature in Internet Resources

Internet is perhaps the most important medium that has changed the way researchers go about their job. As in the case of ‘brick and mortar’ entities becoming ‘brick and click’ entities, print literature is fast giving way to digitised literature. Today, no serious research study can ignore the resources available on the internet – be it books published or papers or treatises available world over on the respective subject. Recognising this fact, internet resources have been amply exploited for this study. A list of websites containing literature on the subject is given in the end (Pages 207-208).
As in the case of print literature, it was clearly noticed that the world Bank website (www.worldbank.org) leads the group in harnessing the full potential of the internet. True to its stature, the world bank website provides a global view on the infrastructure sector. Thousands of pages of research output — on infrastructure alone have been made available on their website. Similarly, other world Bank group members — IFC, MIGA, and world Bank Institute have published a large number of papers, reports etc., on the internet. Several other multilateral institutions including ADB have also done a tremendous amount of work in amassing and disseminating knowledge on this field. It is not as if only high profile institutions such as World Bank and IFC utilize the internet route for disseminating knowledge. Many individuals, small organisations, Municipalities, Panchayats and non-governmental organizations, citizens groups, various interest groups have also used the internet effectively for disseminating their views and the output of their studies/efforts. There are several discussion Groups on the internet where serious discussions relating to various aspects of infrastructure development and financing takes place. The frank and free discussions, which take place under this banner, were found to be quite useful and enlightening in understanding the different view points and experiences from people across the globe. Even the local site of 3iNetwork referred earlier offers a discussion board service which allows researchers put posers and get answers from the professors contributing their service. This researcher, taking advantage of this, was able to tap the medium to develop contacts with quite a few professionals located in different countries and India, who were associated with the infrastructure sector. Furthermore, with a view to capturing the best practices prevailing across the globe and to bring in cross-country experiences, the researcher could establish contact with scholars of several institutions located in Washington D.C., New York, London and Amsterdam like the World Bank Institute, Columbia University, Amsterdam Institute of Finance, Bauhaus-Universitat Weimer, Germany, rating agencies like Standard and Poor.

2.4. Theoretical Perspectives

The theoretical perspectives for this research is inspired by works on Theories of Risks & Economic Behaviour, Economics of Uncertainty, Economic Decisions under Uncertainty, Portfolio theory etc., most of which are by the authors of the highest calibre and Nobel laureates like Arrow, Von Neumann and Morgenstern, Harry M. Markowitz,
Karl Henrick Borch, Jacques Dreze etc. Analysing and understanding their work in abstract areas have greatly contributed to the understanding and application of Risk Management strategies and methodologies discussed in this study.

2.5. METHODOLOGY

Methodology is at the heart of any research and the researcher knowing full well the importance of it (as the researcher himself was an academic faculty in the sphere of Management Consulting, Research and training during earlier part of his career) had given utmost importance to it. Be it collection of data or application of tools and techniques, a consistent discipline has been maintained in the study. The new vistas in modern day research methods like the use of internet, tele-conferencing, accessing global databases, use of computers and softwares in analysis have all been highly exploited.

2.5.1 Collection of data

The subject matter being a very emerging area, the researcher was interested in collecting 'PRIMARY DATA / SECONDARY DATA' from the field. Mathematical model is data sensitive and have to be statistically acceptable. Knowing this fact the quantitative research design has been designed after initial framing of the model in most cases. As one of the main objective is to understand and analyse the use of private capital as a means to finance infrastructure projects and to empirically compare the financial characteristics, geographic and industrial distribution of Project Finance and Non-Project Finance Loans an attempt has been made to access the Global Databases in the relevant area.

Though getting access to global databases is a very difficult and a costly proposition, it is one of the best ways of collecting data, be it primary or secondary in the modern day methods of collection of data (especially through digital sources). Authenticated and credible databases in the chosen research area could be scanned and internet sources have also been used optimally both in collecting secondary and primary data. This has been dealt in-depth in Chapter 4 and 5.
Further, the dissertation uses both primary data (collected through structured questionnaire / interview schedules) and secondary data (collected from reports, monographs, research papers and global databases) throughout this study. Particular mention has to be made of the survey on infrastructure projects specific to India (which are detailed in Chapter 6) wherein more than 200 projects covering all important infrastructure sectors has been done. This is one of the largest baseline surveys in terms of coverage in the evolving subject of Risk management in Infrastructure Financing and is close to ground realities as it involved eliciting information by people and institutions who have first hand knowledge of it.

2.5.2. Tools and Techniques for Analysis of Data

The study has used both qualitative and quantitative tools in its analysis. It has also captured qualitative data and had tried to quantify it by using modern day tools and methods. Whole lot of tools and techniques which are of mathematical, statistical, econometric, simulation have been used in this study which are detailed in the relevant portions of the analysis. Detailed empirical analysis on population data of infrastructure projects sourced through global databases has been attempted in Chapter 4. The project finance software Dexia Crédit which is highly tuned for use in infrastructure sector, and has been optimally used in analysing the various characteristics of population data available in the Database. As the software also allows for graphical representation of the analysed data with the same data feeds, many figures was also possible in Chapter 4.

Apart from using basic statistical techniques like correlations and regressions the study has used multi-attribute evaluation models for Project Evaluation of Private Infrastructure Projects at the unit level. This has been dealt in detail in Chapter 5. Use of proven multi-criteria ranking methods was the hallmark in Chapter 6 to compare the progress made in the various infrastructure sectors. The software by Rank Tool Inc. has facilitated the ranking of various parameters selected after surveying the infrastructure sectors and benchmarking it to prescribed Best Practices.

2.6. LIMITATIONS OF THE STUDY

Risk Management in Infrastructure Project financing being in the evolutionary stage, the greatest challenge in developing a robust risk measurement framework is the lack
of good, clean data on past risk events. Many a times only qualitative data/ estimates/patterns only are available which restricts an highly empirical research study in the area. Further, it has to be mentioned that many financial institutions and infrastructure sponsors are not ready to part with cash flow data on projects financed/handled by them. The researcher had experienced great difficulty in accessing such data and to that extent the objectivity could have suffered.

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