



CONTENTS

		Page No.
	Acknowledgements	i - iii
	Contents	iv - viii
	List of Tables	ix -xi
	List of Charts	xii
	List of Figures	xiii
 Chapter - I	 Introduction	 1 - 28
1	Infrastructure	1
1.1	Characteristics and Risks of Infrastructure Projects	2
1.2	Infrastructure and Economic Development	3
2	Transport	5
3	Maritime Transport	9
3.1	Maritime History	10
3.2	Containerisation	13
4	Ports	15
4.1	Efficiency of Ports	16
5	The Indian Scenario	16
6	Research Objectives	18
7	Methodology and Models	19
8	Data Collection	22
9	Research Path	22
	Endnotes	23
 Chapter - II	 Literature Survey	 29 - 78
1	Overview of Studies other than those on Efficiency and Productivity of Ports	30
2	Review of Studies on Efficiency and Productivity of Ports	35
2.1	Studies Using Partial Productivity Indicators	38
2.2	Studies using the Engineering approach	39
2.3	Studies using Formal Methods	39

2.3.1	Stochastic Frontiers	42
2.3.1.1	Stochastic Cost Frontiers	42
2.3.1.2	Stochastic Production Frontiers	44
2.3.2	Data Envelopment Analysis	48
3	Survey of Port Studies undertaken in India	61
	Endnotes	64
Chapter - III	The Indian Economy and the Economy of Gujarat: An Overview	79 - 121
1	India - Past, Present and Future	80
1.1	The Pre-Liberalisation Phase	80
1.2	The Process of Liberalisation	82
1.2.1	Disinvestment	82
1.2.2	Reforms in the Industrial Sector	82
1.2.3	External Sector Reforms	83
1.2.4	Service Sector	84
1.2.5	Financial Sector	85
1.2.5.1	Banking Sector Reforms	86
1.2.5.2	Debt Market Reforms	87
1.2.5.3	Foreign Exchange Market	87
1.2.6	Fiscal Reforms	88
2	The Indian Economy and its Main Sectors	90
2.1	Agriculture	94
2.2	Manufacturing and Industry	96
2.3	Service Sector	96
3	The External Sector	97
3.1	India's Foreign Trade	97
3.1.1	Sectoral Composition of India's Foreign Trade	99
3.1.2	India's Merchandise Trade	102
3.1.3	Trade Openness	105
3.1.4	Foreign Investment Inflows	107
4	Gujarat – India's Premier State	112
4.1	Economic Profile of Gujarat	113
	Endnotes	120

Chapter - IV	Containerisation: The Indian Scenario vis-à-vis the Global Scenario	122 - 178
1	Introduction	122
1.1	Impact of Transport Costs	123
1.1.1	The Impact on Trade	123
1.1.2	The Impact on Economic Growth	123
2	What is Containerisation?	124
2.1	ISO Definition of Freight Container	125
2.2	History of Containers	125
2.3	Classification of Containers	126
2.4	Benefits of Containerisation	130
3	Global Container Market	134
3.1	World Container Throughput	135
3.1.1	Containerised Cargo Flows along Major Trade Routes	139
3.2	Global Container Fleet	143
3.2.1	The World Fleet	143
3.2.1.1	World Containership Fleet	146
4	Containerisation in India	169
4.1	Indian Throughput	169
	Endnotes	177
Chapter - V	Indian Ports – Emphasis on Container Handling Ports	179 -240
1	Introduction	179
1.1	Definition of a Sea Port	181
1.2	Economic Analysis of Seaports' Activities	182
1.3	Types of Ports by Ownership Structure	186
1.4	Changing Functions of Ports	188
2	Indian ports	190
2.1	Regulatory Framework for Indian Ports	191
2.2	Historical Legacy of Indian Ports	193
2.3	Post Independence and Pre Liberalisation Period	194
2.4	Post Liberalisation Era	195
2.4.1	The New Millennium	196

2.5	Traffic Projections	208
2.6	Port Capacity	212
2.6.1	Capacity at Indian Ports	213
2.6.1.1	Major Ports	213
2.6.1.2	Non - major Ports	217
2.6.1.3	Container Handling Capacity and Proposed Addition	219
3	Port Development in Gujarat	226
3.1	Policies	230
3.2	Cargo Through Gujarat Ports	231
3.2.1	GMB Ports	233
3.2.2	Kandla Port	233
4	Conclusion	236
	Endnotes	239
Chapter - VI	Methodology and Models	241-297
1	Port Performance as an Indicator of Port Competitiveness	241
1.1	Importance of Performance Measurement	242
1.2	Measurement of Port Performance	243
2	Concepts in Performance Measurement	246
2.1	Benchmarking Models	252
3	Data Envelopment Analysis Models	255
3.1	CCR Model Algorithm	257
3.2	BCC Model	269
3.3	Ranking in DEA	275
3.3.1	Super-Efficiency Model	275
3.3.2	Cross-Efficiency Model	278
3.4	Extensions to the Basic DEA Models	278
3.5	Strengths and Limitations of DEA	281
4	Concept of Productivity	282
4.1	Importance of Productivity	283
4.2	Productivity Management	283
4.3	Productivity Measures	285
4.4	Productivity Indices	286

4.4.1	Malmquist Productivity Index and its Decomposition	287
	Endnotes	293
Chapter - VII	Efficiency Analysis of the Container Handling Ports of India	298-340
1	Sample Size	299
2	Input and Output Variables	300
2.1	Descriptive Statistics	303
3	Data Sources	305
4	Model Orientation	306
5	Empirical Results and Analysis	308
5.1	The DEA Efficiency Analysis	308
5.2	Ranking Using Super-Efficiency Model	316
5.3	The Malmquist Productivity Index	319
5.3.1	Results in Terms of Means	320
5.3.2	Detailed Firm-Wise Break-Up of the Results	324
5.4	The Rank-Sum Test	331
6	Summary and Conclusions	333
	Endnotes	338
	Bibliography	341-370
	Appendix	371-372
	Glossary	373-384