TABLE OF CONTENTS

PREFACE & ACKNOWLEDGEMENT……I

ABSTRACT ……..V

INDEX OF FIGURES…… VI

INDEX OF TABLES……..VII

LIST OF ABBREVIATION……VIII

1 Introduction 1

1.1 Materials Management in the Indian Railways…… 1

1.2 Shift in Nature of Procurement…… 3

1.3 Evolution of Procurement Policy…… 4

1.4 Strategic Level of the Indian Railways: The Railway Board…….. 6

1.5 Consolidation of the Indian Railway Network…… 7

1.6 Materials Management Cadre…….. 7

1.7 Roles of Materials Management Cadre…… 8

1.8 Functions of Materials management Department…… 9

1.9 Objectives of the Materials Management Function……. 10

1.9.1 Materials Management Function……. 11

1.9.2 Materials Management Organization in Zonal Railways…… 13

1.9.3 Organization at Head-Quarter Level…… 13

1.9.4 Organization at Divisional Level…….. 13

1.9.5 Organization at Depot Level……. 14

1.10 Purchase Budgets…… 14

1.11 Rationale of the Study…….. 15

1.12 Scope of the Study…….. 18

1.13 Structure of the Thesis……. 19

1.14 References…… 21

2 LITERATURE REVIEW 23

2.1 Meaning of Public Procurement……. 23

2.2 Public Procurement and Supply Chain Management……... 23

2.3 Procurement……... 25

2.3.1 Purchase as a Driver of Supply Chain…… 25

2.4 Public Procurement……... 28

2.5 Importance of Public Procurement……... 30

2.6 Quality in Public Procurement……. 31

2.7 Contract Management…….. 32

2.8 Financial Management……. 32
2.9 Important Factors in Public Procurement……... 32
2.9.1 Market Conditions…….. 32
2.9.2 Political Environment……. 33
2.9.3 Organization Culture…….. 33
2.9.4 Individual Transaction Perspective……. 34
2.9.5 Make and Buy Decision…….. 34
2.9.6 Rule of Law Codes And Manual…… 34
2.9.7 Key challenges in Public Procurement…….. 35
2.9.8 System Approach…… 35
2.9.9 Multiple Stakeholder……. 36
2.9.10 Make in India……. 36
2.9.11 Value for Money…… 36
2.9.12 Decision Making…… 36
2.9.13 Human Resource Issues……. 37
2.10 Ethics…….. 37
2.11 Supplier Relation Management…….. 38
2.12 Performance Measurement System (PMS)……. 39
2.13 Material Management Information System (MMIS) and e-procurement…….. 40
2.14 Estimation of Optimum Number of Supplier……. 40
2.15 Vendor Managed Inventory (VMI)……. 41
2.16 Gaps in the Literature…….. 43
2.17 Research Questions…….. 44
2.18 Chapter Summary…… 45
2.19 References…….. 45
3 RESEARCH METHODOLOGY 59
3.1 Introduction ……. 59
3.2 Case Study Approach…….. 59
3.2.1 Analysis of Organizational Climate Supplier Relationship…….. 60
3.2.2 Knowledge Transfer Perspective for Supplier Relation Management….. 60
3.2.3 Study of Requirement Based Supplier Relation Management…….. 60
3.2.4 Study of Supplier…….. 60
3.3 Research Methodology…… 61
3.4 Research Objectives…… 63
3.5 Research Design…….. 63

3.5.1 Literature Review…….. 63

3.5.2 Exploratory Interviews…….. 64

3.5.3 Workshop Outcomes…….. 66

3.5.4 Value Chain of Inbound Flow of Material……. 73

3.6 Reference…… 75

4 INDIAN RAILWAYS PROCUREMENT PROCESS 77

4.1 Operations of the Indian Railways…….. 77

4.1.1 System of Procurement……. 77

4.1.2 Stocking Depots……. 78

4.1.3 Source Selection Procedure…….. 78

4.2 Procurement Process……... 80

4.2.1 Raising of Indents by Stocking Depots……. 80

4.2.2 Tendering Process…….. 81

4.2.3 Type of Tendering……. 81

4.2.4 The Tender Process…… 81

4.2.5 Inspection, Receipt and Payment…….. 82

4.2.6 Receipt & Payment…… 82

4.3 Private Procurement versus Public Sector Procurement…… 83

4.3.1 Public Procurement…… 85

4.3.2 Transparency…….. 85

4.3.3 The Common in Public and Private Procurement……. 86

4.3.4 Difference in Public and Private Procurement……. 86

4.4 Role of Procurement in Organization……. 87

4.5 Evolution of Supply Chain Function in the Indian Railways……. 87

4.6 Frame work of Procurement in the Indian Railway…… 89

4.6.1 Challenges in Business Process of Inbound Supply Chain of the Indian Railways. 91

4.6.2 Supplier Relation Management in Public Procurement…….. 93

4.7 Case Study I: Procurement of High Speed Diesel in the Indian Railways……. 94

4.7.1 Background……. 94
4.7.2 Tendering & Qualifying Requirement…… 96
4.7.3 Maintenance of Bulk Storage and Dispensing Installations…….. 96
4.7.4 Annual Usage charge……. 97
4.7.5 Qualifying Requirements for Tender…… 97
4.7.6 Price Variation Clause…….. 98
4.7.7 Deliberation on Pricing Mechanism…… 99
4.7.8 Fuel Management System at a Division…… 102
4.7.9 Vendor Managed Fuel Management System at Karnataka State..... 104
Road Transportation Corporation (KSRTC), Bannimantapa, Mysuru
4.8 Case Study II: Procurement of Electricity in the Indian Railways…… 106
4.8.1 Roadmap for Supply Chain optimization of Electrical Energy…….. 107
4.8.2 Mapping of Current Electric Supply Chain of Indian Railways…….. 108
4.8.3 Findings and Discussion…… 110
4.8.4 Optimization of Contract Demand at Traction Substation…… 111
4.8.5 Direct Power Procurement by the Indian Railways…….. 115
4.8.6 Roadmap for Cost Optimization…… 115
4.8.7 Procuring Electricity through Power Exchange…… 116
4.8.8 Energy Conversion Measures……. 117
4.9 Summary…….. 118
4.10 References…… 118
5 PUTTING VENDOR MANAGED INVENTORY IN INDIAN RAILWAYS 119
5.1 Vendor Managed Inventory (VMI)…… 119
5.1.1 Just-in-Time, MRP, and Lean Supply Chains…….. 120
5.1.2 Bullwhip Effect……. 120
5.1.3 Gaps in the Literature…… 120
5.2 Assessing Material Management in the IR…….. 121
5.2.1 Bullwhip Effect Manifestation in the Procurement Processes of the IR.. 121

5.2.2 Key performance indicator (KPI) in case of VMI…… 124
5.2.3 Logistics cost..... 125
5.2.4 Customer service…… 126
5.5 Theoretical Framework for implementation of VMI in the Indian Railways……. 126
5.5.1 Assessing Existing System……. 126
5.5.2 Redesign of Procurement System for the Indian Railways……... 129
5.5.3 Proposed System and Implementation Plan…….. 130
5.5.4 Arranging Transport on 3PL System……. 131
5.6 Reference …… 133
6 SUPPLIER-INDIAN RAILWAYS DYAD 135
6.1 Role of Procurement…… 135
6.2 Supply Chain Management……. 136
6.2.1 Level of Maturity of Supply Chain…….. 137
6.3 Supplier Rating System for the Indian Railways…… 138
6.3.1 Quality Rating…… 140
6.3.2 Price Rating…… 141
6.3.3 Delivery Rating……... 141
6.3.4 Service Rating…… 142
6.3.5 System Rating…… 142
6.3.6 Vendor Rating…… 142
6.4 Business Process Reengineering (BPR) of Procurement Processes…… 144
6.4.1 Purchase Portfolios…… 145
6.5 Case I Re-Engineering Material Management Processes in the Indian Railway… 152
6.5.1 As Is system…… 154
6.5.2 To BE SYSTEM of Procurement Process of IR…….. 156
6.5.3 Potential implementation problem…… 158
6.6 Supplier Service Quality……. 158
6.6.1 Measurement of service quality offered by Supplier…… 159

6.7 Interpretation of Gaps in Service Quality…….. 162

6.8 Conclusions……. 165

6.9 References…… 165

7 SUMMARY AND CONCLUSIONS 169

7.1 Context of Study…… 169

7.2 Summary of the Work Done..... 169

7.3 Contributions Made..... 171

7.3.1 Implication for Theory…….. 171

7.3.2 Implications for Social Sustainability…….. 175

7.4 Quantum of Work.....175

7.5 Quality of Work.....176

7.6 Limitations 176

7.7 Future Research 176

7.4 References…… 177

Bibliography..... 178

Annexure -1.....195

Annexure -2.....211

Annexure -3.....221

Annexure -4..... 223