Table of Contents

Chapter 1 Introduction to SCM – the central theme of this research

- Introduction to SCM .........................................................12
- The Objective of a Supply Chain ....................................13
- The Importance of Supply Chain Decisions .................14
- Stages of Supply Chain .....................................................14
- Process Views of a Supply Chain ..........................15
- Cycle View of Supply Chain Processes ..................16
- Processes of Supply Chain .............................................16
- Importance and Complexity of Transportation / Logistics Process ..........................................................20
- Supply Chain Definitions ............................................26
- History and evolution of SCM – Development trends ....27
- Information Technology in a Supply Chain ................30

Chapter 2 Literature Review

2.1 Supply Chain Management - Process and Managerial Competencies ..........................................................34

2.2 Architecture and Competitiveness of Supply Chain: Indian Experience ..........................................................35
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>SCM Strategy: Integration and Implementation Issues, Success Factors</td>
<td>36</td>
</tr>
<tr>
<td>2.4</td>
<td>Supply Chain Management or Logistics</td>
<td>40</td>
</tr>
<tr>
<td>2.5</td>
<td>SCM Performance Management and Measurement</td>
<td>42</td>
</tr>
<tr>
<td>2.6</td>
<td>Technology in SCM: Is there a choice &amp; the pill to remove all ills?</td>
<td>46</td>
</tr>
<tr>
<td>2.7</td>
<td>SCM: Importance of Information Sharing</td>
<td>51</td>
</tr>
<tr>
<td>2.8</td>
<td>Technology &amp; RFID</td>
<td>52</td>
</tr>
<tr>
<td>2.9</td>
<td>IT and Management</td>
<td>63</td>
</tr>
<tr>
<td>2.10</td>
<td>Integrated electronic supply chain</td>
<td>64</td>
</tr>
<tr>
<td>2.11</td>
<td>Techno-change Management</td>
<td>65</td>
</tr>
<tr>
<td>2.12</td>
<td>Top management Support for IT support change</td>
<td>66</td>
</tr>
<tr>
<td>2.13</td>
<td>Sourcing and Procurement</td>
<td>69</td>
</tr>
<tr>
<td>2.14</td>
<td>Case Studies of Supply chains of different Industries /service sectors</td>
<td>71</td>
</tr>
<tr>
<td>2.15</td>
<td>Multimodal supply chains: iron ore from Australia to China</td>
<td>72</td>
</tr>
<tr>
<td>2.16</td>
<td>Management of service supply chains: the case of management consulting</td>
<td>72</td>
</tr>
<tr>
<td>2.17</td>
<td>Service quality in supply chain: Indian Auto Industry</td>
<td>73</td>
</tr>
<tr>
<td>2.18</td>
<td>Making connection between SCM and sustainability</td>
<td>73</td>
</tr>
<tr>
<td>2.19</td>
<td>Different definitions of SCM</td>
<td>79</td>
</tr>
</tbody>
</table>
Chapter 3  Research Design

3.1 The Research problem in hand ...........................................82
3.2 Importance of this research study ......................................83
3.3 Scope, boundary of this research ......................................85

Chapter 4  About Organization, where research was carried out

4.1 Perspectives of Bulk Ore Industry – Ore Logistics Chain ......86
4.2 About Ore Supply Chain ..................................................88
4.3 Ore Logistics Chain for Export .........................................90
4.4 About Case Company allowing to undertake this research project work ..........................................................94
4.5 Product profile of case company ........................................96
4.6 Process Flow and components of company's Supply Chain...100
4.6.1 Road Transportation of Cargo - Long-Haul Movement ......100
4.6.2 Road Transportation of Cargo - Short Haul Movement ......106
4.6.3 River Transport of Cargo ..............................................107
4.6.4 Sea Transport of Cargo ..............................................110
4.7 Performance of Ore Logistics Chain ..................................112
4.8 As-Is Supply Chain Process Flow for Road segment..........114
4.9 As-Is and To-Be process flow for River-Sea segment..........116
4.10 Selection of Technology .................................................118
4.11 RFID Technology for Road Segment ..............................123
4.12 Solution Envisioning for Road Segment ............................128
4.13 GPS Technology for River-cum-sea segment ....................131
4.14 Solution Envisioning for River-Sea Segment .....................135

Chapter 5  Statement of Problem, Objectives and Hypothesis
5.1 Statement of Problem and Objectives ........................................139
5.2 The Introduction to Problem ....................................................139
5.3 Hypothesis .................................................................................141

Chapter 6 Research Methodology, Data Collection and Analysis

6.1 Brief Introduction ........................................................................144
6.2 Undertaking Pilot Studies .............................................................146
6.3 Ordering of Hardware, Middleware and Site Infrastructure Installation ........................................146
6.4 Design and Development of Application Software ...............147
6.5 RFID Cargo Management System for Road (OTS) ...............148
6.6 Barge Monitoring System (BMS) for River Segment ..........162
6.7 Live Roll-out, Data Acquisitions & Implementation .............173

Chapter 7 Results and Discussion

7.1 Overview .....................................................................................177
7.2 Transaction time .........................................................................180
7.3 Barge Turn-Around Time (TAT) ..................................................183
7.4 Missing Trip Identification and Reporting for Road Segment ..185
7.5 Handling Losses in Road segment ..............................................187
7.6 Improving Visibility and Coordination in Supply Chain ........190
7.7 Visibility and Coordination for Truck Journey Time (TJT) .....192
7.8 Hypothesis Testing # 1A & 1B, 2A & 2B and # 3 .................200
7.9 Employee Feedback survey for testing Hypothesis # 3 ........212

Chapter 8 Recommendations, Summary, Limitations & Further Scope
Overview .................................................................222

8.1 Barge Turn-Around Time (TAT) .............................224

8.2 Reduction in Missing Trips .................................226

8.3 Reduction in Transit or Handling Losses ..............228

8.3.1 Transit Losses in Road Segment .......................228

8.3.2 Transit Losses in River segment .......................229

8.4 Visibility and Coordination ..................................231

8.5 Increased Productivity ........................................232

8.6 Better Response System for Freight Payments ........233

8.7 Improved Safety Conditions ...............................234

8.8 Limitations of Research and Scope for further work ......236-238

Bibliography .............................................................239-252

APPENDIX ...............................................................253-259

Glossary .................................................................260

APPENDICES

• List of missing trucks with month-wise frequency .........253-256

• Questionnaire- Feedback Survey of Logistics Automation..257-259

• Map of Goa