USE OF INFORMATION TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT IN CERAMIC TILE INDUSTRY IN SRI LANKA: A STUDY OF TWO MAJOR PLAYERS

MASTER OF BUSINESS ADMINISTRATION
IN
INFORMATION TECHNOLOGY

B A Prasad Keerthiratne
Department of Computer Science and Engineering
University of Moratuwa
December, 2009
USE OF INFORMATION TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT IN CERAMIC TILE INDUSTRY IN SRI LANKA: A STUDY OF TWO MAJOR PLAYERS

By

B A Prasad Keerthiratne

This Dissertation was submitted to the Department of Computer Science & Engineering of the University of Moratuwa in partial fulfillment of the requirement for the Degree of Master of Business Administration.

Department of Computer Science and Engineering
University of Moratuwa
December, 2009
Declaration

“I certify that this dissertation does not incorporate any material previously submitted for a degree or diploma in any university to the best of my knowledge and believe it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text.“

--------------------------------     ------------------------------
Signature of the Candidate      Date
B A Prasad Keerthiratne

To the best of my knowledge, the above particulars are correct.

--------------------------------     ------------------------------
Supervisor        Date
Dr. Chandana Perera
Abstract

Currently, most of the companies attempt to find the ways to improve their flexibility, responsiveness and turn competiveness by changing their operations strategy, method and technology which includes Information Technology (IT) in Supply Chain Management (SCM). Literature reveals that many organizations have managed to improve efficiency, responsiveness and reduce inventory level, overall cost by using IT in SCM. However, the level of IT usage for SCM in ceramic tiles industry is not known. Therefore, the research objectives were to identify the level of IT usage to facilitate SCM process and the potential barriers that affects the IT implementation and adoption for SCM in ceramic tile industry in Sri Lanka.

Based on the user views and literature, a conceptual model was developed in order to meet research objectives. The qualitative and quantitative data collected from sixty three executives/managers in two major tile manufacturing companies, top thirty suppliers and thirty two dealers/distributors in tile industry through multiple questionnaires and direct interviews.

The results of the exploratory interviews and the survey highlighted that both companies indicate super performance in terms of several best practices in SCM. However, both companies demonstrated weakness in several areas. The majority of the weaknesses have arisen out of information related cause. Furthermore, it was identified that the level of overall IT adoption in both companies are not satisfactory level. These results lead to investigate the barriers that affect slow down IT adoption for SCM in ceramic tile industry in Sri Lanka. The finding reveal that technological barriers, organizational barriers and external barriers have been contributed towards the slow down IT implementation and IT adoption in SCM in ceramic tile industry in Sri Lanka.
Acknowledgement

This dissertation is an outcome of effort to complete a successful research during the second year of MBA in IT course. Many people helped me in various ways to make this venture a success during this time period.

First of all, my gratitude should go to my supervisor, Dr. Chandana Perera who helped me with his valuable advices and guided me through the right path.

My gratitude is extended to Mrs. Visaka Nanayakkara, head of department and the staff of the CSE Department of University of Moratuwa for their devotion and commitment towards the MBA program. I also wish to convey my heartfelt thanks to all lecturers who guided me during the entire course for nearly two years.

I am pleased to mention the executives/managers of Lanka Tiles PLC, Lanka Walltile PLC and my colleagues who participated and contributed their views and responses by spending time for interviews, filling questionnaires, which lead to comprehend my research results. I specially thank to Mr. Mahendra Jayasekera for encouraging me and also allowing me to access information in both companies.

Finally I would like to thank to my parents, children and my wife Nilmini, for bearing up with me and constantly encouraging me during two years period of time.

B A P Keerthiratne
MBA/IT 08/9066
Table of Contents

Chapter 1: Introduction ........................................... 1

1.1 Background of Tile Industry ................................................................. 1
1.1.1 Sri Lankan Context ........................................................................... 1
1.1.2 Players in the Market ......................................................................... 2
1.1.3 Behavior and Attributes of Ceramic Tile Industry in Sri Lanka ........ 3
    1.1.3.1 Purchasing and Inventory Management .................................. 5
    1.1.3.2 Selling and Distribution .............................................................. 6
    1.1.3.3 Tiles Manufacturing .................................................................. 7

1.2 Motivation .............................................................................................. 8

1.3 Problem Statement .................................................................................. 9

1.4 Problem Justification ............................................................................. 10

1.5 Research Objectives .............................................................................. 11

1.6 Significance of the Study ...................................................................... 11

1.7 Research Limitations/implications .......................................................... 12

1.8 Data Collection & Analysis .................................................................... 12

1.9 Overview of the Dissertation .................................................................. 12

Chapter 2: Literature Review ............................................. 13

2.1 Introduction ........................................................................................... 13

2.2 What is SCM? ....................................................................................... 13

2.3 Objectives of IT in SCM ....................................................................... 16

2.4 Practical Benefits of IT in SCM ............................................................. 17

2.5 The Factors Affecting to IT adoption for SCM ..................................... 21

2.6 SCM in Sri Lankan Context ................................................................. 27

2.7 How Significant is IT in SCM for Ceramic Tiles Industry? ................. 27

2.8 Summary ............................................................................................... 31
5.3 Reliability of Survey Items ................................................................. 49

5.4 Demographic Information ................................................................. 51
  5.4.1 Age Distribution of the Sample in Case Study Companies ............... 51
  5.4.2 Highest Educational Qualification Distribution of the Sample .......... 51
  5.4.3 Experience Distribution of the Sample ......................................... 52
  5.4.4 Job Designations of the Sample ................................................. 53
  5.4.5 Field of Work Distribution of the Sample ...................................... 53
  5.4.6 Distribution of Main Business of the Dealer/Distributor Sample ...... 54
  5.4.7 Distribution of Business Experience of the Dealer/Distributor .......... 55
  5.4.8 Distribution of Suppliers Based on Product Category the Sample ...... 55

5.5 Frequency Analysis of Independent Variables .................................... 56

5.6 Data Analysis for Identification of Barriers ....................................... 57
  5.6.1 Technological Barriers ................................................................. 57
  5.6.2 Organizational Barriers ............................................................... 59
  5.6.3 External Barriers ......................................................................... 63
    5.6.3.1 Supplier Readiness ............................................................... 63
    5.6.3.2 Dealer/Distributor Readiness ............................................... 65

5.7 Qualitative Analysis ......................................................................... 69
  5.7.1 The Current SC Practices in Ceramic Tile Industry in Sri Lanka ...... 69
  5.7.2 The Current Issues in Ceramic Tile Industry in Sri Lanka .............. 71
    5.7.2.1 Purchasing and Inventory Management Practices and Issues ...... 71
    5.7.2.2 Selling and Distribution Practices and Issues ......................... 73
    5.7.2.3 Tiles Manufacturing Practices & Issues .................................. 75
  5.7.3 The Level of IT adoption in SCM in Ceramic Tile Industry ............ 75
  5.7.4 How Important is IT in SCM in Ceramic Tiles Industry? ............... 81
  5.7.5 How Best the Issues Could be Overcome? ..................................... 85

Chapter 6: Conclusions and Recommendations .................................. 88

6.1 Conclusions ...................................................................................... 88
  6.1.1 SC Practices and Issues .............................................................. 88
  6.1.2 Level of IT Implementation and Adoption .................................... 88
  6.1.3 Barriers of IT Adoption .............................................................. 89
6.2 Recommendations........................................................................................................90

References ....................................................................................................................93

Bibliography ...............................................................................................................96

Appendix .....................................................................................................................97

Appendix A: Questionnaire for Interviews.................................................................97
Appendix B: Questionnaire for Employees...............................................................102
Appendix C: Questionnaire for Suppliers.................................................................107
Appendix D: Questionnaire for Dealers/Distributors .............................................109
Appendix E: Frequency Distribution Analysis.........................................................111
List of Tables

Table 2-1: A summary of factors affecting IT adoption derived from literature ....22
Table 4-1: Survey sample size ................................................................................. 44
Table 4-2: Methodology of data collection ............................................................. 45
Table 4-3: Measurement of technological barriers .................................................. 46
Table 4-4: Measurement of organizational barriers ................................................ 46
Table 4-5: Measurement of external barriers .......................................................... 46
Table 4-6: Measurement of level of IT adoption ..................................................... 47
Table 5-1: Statistics of the questionnaire distribution and responses received ...... 48
Table 5-2: Reliability statistics of data for variable ‘Incompatibility’ .................... 49
Table 5-3: Reliability statistics of data for variable ‘Incapability’ ......................... 49
Table 5-4: Reliability statistics of data for variable ‘IT competency’ ..................... 49
Table 5-5: Reliability statistics of data for variable ‘Awareness’ ......................... 49
Table 5-6: Reliability statistics of data for variable ‘Resources’ ............................ 50
Table 5-7: Reliability statistics of data for ‘Industry Specific Characteristics’ ..... 50
Table 5-8: Reliability statistics of data for variable ‘Organizational Structure’ ..... 50
Table 5-9: Reliability statistics of data for variable ‘Organizational Culture’ ...... 50
Table 5-10: Reliability statistics of data from dealer/distributors ......................... 50
Table 5-11: Reliability statistics of data from suppliers ........................................ 50
Table 5-12: One-Sample statistics for technological barriers in Company-A ...... 57
Table 5-13: T-Test results of technological barriers in Company-A ..................... 58
Table 5-14: One-sample statistics for technological barriers in Company-B ........ 58
Table 5-15: T-Test results of technological barriers in Company-B ..................... 59
Table 5-16: One-sample statistics for organizational barriers in Company-A ...... 60
Table 5-17: T-Test results for organizational barriers in Company-A .................. 61
Table 5-18: One-sample statistics for organizational barriers in Company-B ...... 61
Table 5-19: T-Test results for organizational barriers in Company-B .................. 62
Table 5-20: One-sample statistics for level of supplier readiness ......................... 63
Table 5-21: T-Test results for level of supplier readiness ..................................... 64
Table 5-22: Use of computers in supplier’s business .......................................... 64
Table 5-23: Use of e-mails in supplier’s business ............................................. 64
Table 5-24: Use of Internet in supplier’s business ............................................. 65
| Table 5-25: | Ability of receiving XML orders ....................................................... 65 |
| Table 5-26: | Ability of receiving orders in EDI.......................................................... 65 |
| Table 5-27: | One-sample statistics for level of readiness of dealers/distributors ... 66 |
| Table 5-28: | T-Test results for level of readiness of dealers/distributors .............. 66 |
| Table 5-29: | Use of computers in dealer/distributor's business................................ 67 |
| Table 5-30: | Use of e-mails in dealer/distributor's business ...................................... 67 |
| Table 5-31: | Dealer/distributor who has website ........................................................... 67 |
| Table 5-32: | Preferred method of placing orders .......................................................... 67 |
| Table 5-33: | Preference for use of English ................................................................... 68 |
| Table 5-34: | Willingness to invest on IT ...................................................................... 68 |
| Table 5-35: | Summary of the comparison of SC practices and level of usage .......... 69 |
| Table 5-36: | Comparison of basic technology tools and level of adoption ............... 78 |
| Table 5-37: | Comparison of intermediate technology tools and level of adoption .... 79 |
| Table 5-38: | Comparison of advanced technology tools and level of adoption .......... 80 |
| Table 5-39: | The summary of comparison of level of IT adoption............................... 80 |
| Table 5-40: | One sample statics for important IT systems for Company-A .......... 81 |
| Table 5-41: | T-Test for important IT systems for Company-A ................................... 82 |
| Table 5-42: | One sample statics for important IT systems for Company-B ........... 82 |
| Table 5-43: | T-Test for important IT systems for Company-B ................................... 83 |
| Table 5-44: | Summary of potential benefits that expect from IT systems ............... 84 |
| Table 5-45: | Suggestion to overcome barriers in Company-A ................................... 86 |
| Table 5-46: | Suggestion to overcome barriers in Company-B ................................... 87 |
List of Figures

Figure 1-1: Supplier chain partnerships in the ceramic tiles industry in Sri Lanka....4
Figure 1-2: Local purchases and import ratio...............................................................6
Figure 2-1: SCM integration and managing business process across SC.............14
Figure 2-2: Cost breakdown of manufacturing floor tile........................................28
Figure 2-3: Trend of increases in inventory level.....................................................30
Figure 3-1: Conceptual framework...........................................................................33
Figure 4-1: Overview of research approach .............................................................42
Figure 5-1: Age distribution of the sample..............................................................51
Figure 5-2: Educational level distribution of the sample........................................52
Figure 5-3: Experience distribution of the sample...................................................52
Figure 5-4: Position of designation distribution of the sample.........................53
Figure 5-5: Field of work distribution of the sample.................................................54
Figure 5-6: Distribution of main business of the dealer/distributor sample ......54
Figure 5-7: Distribution of business experience of the dealer/distributor sample....55
Figure 5-8: Distribution of suppliers based on product category of the sample.....56
## List of Abbreviation

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PL</td>
<td>Third Party Logistics</td>
</tr>
<tr>
<td>APS</td>
<td>Advanced Planning System</td>
</tr>
<tr>
<td>CRM</td>
<td>Customer Relationships Management</td>
</tr>
<tr>
<td>EAS</td>
<td>Electronic Approval System</td>
</tr>
<tr>
<td>EDI</td>
<td>Electronic Data Interchange</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
</tr>
<tr>
<td>ES</td>
<td>Enterprise System</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>JIT</td>
<td>Just in Time</td>
</tr>
<tr>
<td>LTPLC</td>
<td>Lanka Tiles PLC</td>
</tr>
<tr>
<td>LWPLC</td>
<td>Lanka Walltile PLC</td>
</tr>
<tr>
<td>MRP</td>
<td>Material Requirements Planning</td>
</tr>
<tr>
<td>MRPII</td>
<td>Manufacturing Resources Planning</td>
</tr>
<tr>
<td>RCLPLC</td>
<td>Royal Ceramic Lanka PLC</td>
</tr>
<tr>
<td>SC</td>
<td>Supply Chain</td>
</tr>
<tr>
<td>SCM</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>SRM</td>
<td>Supplier Relationships Management</td>
</tr>
<tr>
<td>WIP</td>
<td>Work-in-Progress</td>
</tr>
<tr>
<td>WMS</td>
<td>Warehouse Management System</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Markup Language</td>
</tr>
</tbody>
</table>