COPYRIGHT© INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

THE IMPACT OF SUPPLY CHAIN MANAGEMENT AND KNOWLEDGE MANAGEMENT PRACTICES ON BUSINESS PERFORMANCE AMONG SELECTED PHARMACEUTICAL MANUFACTURERS IN BANGLADESH: A MANAGERIAL PERSPECTIVE

BY

MAHBUBUL HAQUE

A dissertation submitted in fulfilment of the
Requirements for the degree of Doctor of Philosophy
in Business Administration

Kulliyyah of Economics and Management Sciences
International Islamic University
Malaysia

AUGUST 2012

ABSTRACT

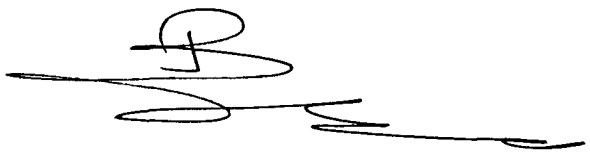
This era of globalization has generated unprecedented challenges for the companies in the market place, where the competition is now being waged between supply chains and not confined to only between companies any more. The conventional business models must, therefore, integrate an array of activities across the supply chains; this, however, calls for an effective knowledge transfer to the appropriate employees across the organizations. Due to its technological nature, the pharmaceutical industry is intimately involved in the adoption, generation and preservation of knowledge; thus for the strategic initiatives to bear fruits in this competitive business landscape, effective knowledge management across different entities of the supply chain is of utmost importance. The current research examines, from managerial perspective, the impact of supply chain management (SCM) and knowledge management (KM) practices on business performance among drug manufacturers in the pharmaceuticals industry of Bangladesh. In so doing, it explores the interrelationships among the above three constructs of the proposed model that incorporates two other mediating ones, namely, business competitiveness and customer satisfaction. For this purpose, a questionnaire containing fifty five statements, besides those of demographic and general information of the companies, is provided to the managers working in different pharmaceutical companies. In order to ensure the reliability of the measurement scales of the underlying constructs as well as the readability of the statements, a pilot study is performed. A total of three hundred and four managers have participated in this survey with a response rate of fifty eight percent. Structural equation modeling (SEM) is employed as the principal data analysis technique using software AMOS version 16.0. The findings of the study demonstrate that out of ten research hypotheses, five are validated with customer satisfaction fully mediating between the two antecedents, namely, SCM and KM practices and the two consequences, namely, business competitiveness and business performance. Five competing models are put forward and compared with the baseline model, the revised research framework. The study also performs two structural invariances and finds that although the managerial positions of the executives exert moderating influence on the baseline model, their boundary-spanning roles do not. The theoretical implications of the study call for adopting systems thinking theory and theory of constraints, where the current approach of cost minimization is to be supplanted by that of throughput maximization, with each entity considering its profitability being contingent upon that of the whole supply chain. The policy recommendations of the study vis-à-vis the industry relate to a host of issues: shrinking the current large supplier base, recognition of purchasing as a strategic weapon, considering the business operations from a holistic perspective and tailoring the IT infrastructure to the needs across the supply chain, the paramount importance of top management commitment and imparting of training, instituting benchmarking practices and rewarding the executives based on their know-how and for knowledge sharing in the performance appraisal process. The study concludes with a few limitations and suggestions for future research.

خلاصة البحث

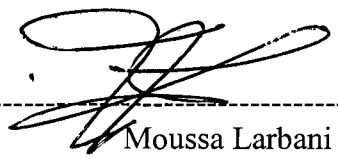
في هذه الحقبة من العولمة برزت تحديات للشركات في السوق، حيث ان المنافسة الحقيقيه الآن هي بين سلاسل التوريد وليس على الشركات. لذلك فان على الأعمال التقليدية دمج مجموعة من الأنشطة عبر سلاسل التوريد، وهذا يدعو إلى نقل المعرفة الفعالة للموظفين ذات الصلة عبر المنظمات. ان صناعة المستحضرات الصيدلانية تشارك بشكل وثيق في تبني والمحافظة على المعرفة، وبالتالي عن المبادرات الاستراتيجية لتؤتي ثمارها في هذا المنافسه التجارية. ان البحث الحالي يدرس، من وجهة نظر الإدارة تأثير إدارة سلسلة التوريد وإدارة المعرفة في أداء الأعمال بين الشركات المصنعة للدواء في صناعة المستحضرات الصيدلانية في بنغلاديش. للقيام بذلك يجب ان استكشاف العلاقات المتبادلة بين الثوابت الثلاثة المذكورة أعلاه من النموذج المقترح الذي يشتمل على اثنين آخرين ، وهما القدرة التنافسية ورضا العملاء. لهذا الغرض، استبيان يحتوي على خمسه و خمسون عباره، الى جانب تلك المعلومات الديموغرافية والعامة للشركات، وتقدم إلى المديرين العاملين في شركات الأدوية المختلفة من أجل ضمان موثوقية المقاييس و سهولة قراءة البيانات، تم تنفيذ دراسة تجريبية. وقد شارك ما مجموعه ثلاثه مئه و اربعه مديرين في هذه الدراسة مع معدل الاستجابة يصل الى ثمانيه و خمسون بالمائه. و استخدمت معادله نمذجه الهيكلية (SEM) لتحليل البيانات الرئيسي وذلك باستخدام برنامج (AMOS 16.0). النتائج التي توصلت إليها الدراسة أن من أصل عشره فرضيات البحث، فان خمس صحيحه مع رضا العملاء بشكل كامل من وساطة بين السوابق، وهما، المجلس الاعلى للقضاة والممارسات كم والعواقب، وهما، والقدرة التنافسية التجارية وأداء الأعمال. وضعت خمسة نماذج المتنافسة إلى الأمام، وبالمقارنة مع النموذج الأساسي في إطار الأبحاث المنقحة. الدراسة يجري أيضا اثنين من تفاوت في الهيكلية، ويرى أنه على الرغم من وظائف إدارية من المديرين التنفيذيين ممارسة الاعتدال تأثير على نموذج خط الأساس، وعلى الحدود، التي تمتد أدوار لا تفعل ذلك. آثار النظرية من الدراسة تدعو تبني نظم تفكير نظرية ونظرية القيود، حيث النهج الحالي في عملية تخفيض الكلفة هو أن تحل محلها تعظيم الإنتاجية، مع كل كيان النظر في وحدتها الربحية على أن يكون من سلسلة التوريد بأكملها. توصيات السياسة العامة لصناعة الدراسة وجها لوجه وتتعلق مجموعة من القضايا: الانكماش الحالي قاعدة مورد كبير، تقديرا لشراء كسلاح استراتيجي، والنظر في العمليات التجارية من منظور شامل وتكييف البنية التحتية لتكنولوجيا المعلومات والاحتياجات عبر سلسلة التوريد، على الأهمية القصوى لالتزام الإدارة العليا وتلقين التدريب، وتأسيس ممارسات القياس ومكافأة المديرين التنفيذيين على أساس مدى المعرفة وتقاسم المعرفة في عملية تقييم الأداء. وتخلص الدراسة مع عدد قليل من القيود واقتراحات للبحث في المستقبل

APPROVAL PAGE

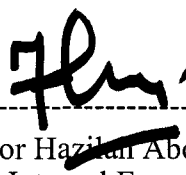
The dissertation of Mahbubul Haque has been approved by the following:



Rafikul Islam
Supervisor



Moussa Larbani
Co-supervisor



Noor Hazilah Abd Manaf
Internal Examiner

Suhaiza Hanim Dato' Mohamad Zailani
External Examiner

Najibah bt Mohd Zin
Chairman

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

Mahbubul Haque

Signature .....Mahbubul Haque..... Date ....27:08:12.....

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

DECLARATION OF COPYRIGHT AND AFFIRMATION OF FAIR USE OF UNPUBLISHED RESEARCH

Copyright © 2012 by Mahbubul Haque. All rights reserved.

THE IMPACT OF SUPPLY CHAIN MANAGEMENT AND KNOWLEDGE MANAGEMENT PRACTICES ON BUSINESS PERFORMANCE AMONG SELECTED PHARMACEUTICAL MANUFACTURERS IN BANGLADESH: A MANAGERIAL PERSPECTIVE

No part of this unpublished research may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written permission of the copyright holder except as provided below.

1. Any material contained in or derived from this unpublished research may only be used by others in their writing with due acknowledgement.
2. IIUM or its library will have the right to make and transmit copies (print or electronic) for institutional and academic purposes.
3. The IIUM library will have the right to make, store in a retrieval system and supply copies of this unpublished research if requested by other universities and research libraries.

Affirmed by Mahbubul Haque

Mahbubul Haque
Signature

27.08.12
Date

Dedicated to

Most Loving Parents
Whose Compassion for Me Flows like a Waterfall
That Continually Nourishes My Soul

ACKNOWLEDGEMENTS

First and foremost, the author would like to pay his infinite gratitude to the Almighty Allah (swt.) for bestowing His blessings on him to sustain the rigors of this PhD. journey of his to its desired completion. It is Him, Who assisted the author in his best of times, and it is Him, Who held his nerve whenever he was found wanting in his most trying times. In all humility, the author thus prostrates himself in absolute submission to Him and to His exalted glory.

The author expresses his profound gratefulness to his supervisor Professor Dr. Rafikul Islam for providing him with invaluable suggestions and guidance at every stage of his PhD research. His prompt response in offering insightful comments, in going through numerous drafts of the manuscript, and in weeding out the redundancies in them is most gratefully acknowledged. The author offers his genuine thankfulness to his co-supervisor Professor Dr. Moussa Larbani, his two examiners, Dr. Noor Hazilah and Dr. Suhaiza Hanim, and coordinator of PhD. Program, Dr. Azura Omar, whose critical comments in improving the thesis contents on many an occasion, post-defense in particular, did a world of good to him. In this regard, the author acknowledges with immense gratefulness the genuine concern attached to him by Dr. Mustafizul Karim, who not only lent him a ready hand, a caring heart and the most pleasant demeanor in navigating the rough waters of a PhD. life, but also offered his generous inputs in upgrading the contents of various chapters of his dissertation.

The author extends his most sincere appreciation to those personnel working in different companies in the pharmaceutical industry of Bangladesh who took their precious time to take part in this survey research. But for their help, this thesis would not have seen the light of the day. In this regard, the author gratefully recalls the enormous help offered him by his colleagues Mr. Shamsad Ahmed and Ms. Sharmin Shamaly in securing contacts with top managers in those companies. The prompt help of Dr. Sohel-uz-Zaman in getting access to prior literature surveys deserves particular mention. Besides, the author records his heart-felt gratitude to his much amiable departmental colleagues back home, whose best of wishes held him in good stead. A very special note of gratitude is reserved for Afia Muqtadir, whose soul-soaked feelings for the author remains ever so priceless to him; may Allah profusely bestow His glad tidings upon her and her family..

The author remembers, with much fondness, his two wonderful sisters –Apu (Zakia) and Moyna (Ratul) – for their deepest concern for their only brother in this arduous journey of his. Sincere gratitude is due to Dr. Shahida Begum, Dr. Aminul Islam and Dr. Salam Akanda for their best of wishes for the author. The author is also indebted to all his classmates and friends, particularly, Dr. Adewali Abideen, Dr. Wahibur Rokhman, Br. Nasser Alareqe and Dr. Tahir Jan for their valuable assistance in doing SEM analysis; Sister Rohamah and Br. Azrin in formatting and printing of the thesis; and his PhD. compatriots, Br. Fouad bin Amin, Br. Sirazul Islam, Br. Sayed Uddin, Br. Sakeeb Ferdous and Br. Forbis Ahamed for their unstinted moral support.

Last but always the most, it is his parents – Professor Dr. Anwarul Haque and Umme Hasin Monowara – whose hearts incessantly issue forth a steady stream of prayers that help him endure, with much fortitude, the agonies of his solitary sojourn in his PhD. pursuit. The author remains in eternal debt to them; may Allah bless them with handsome dividends, and seal their place in the best of Heavens. Ameen.

TABLE OF CONTENTS

Abstract ii
Abstract (Arabic) iii
Approval Page iv
Declaration v
Copyright Page vi
Dedication vii
Acknowledgements viii
Table of Contents ix
List of Tables xiii
List of Figures xv
List of Abbreviations xvii

CHAPTER ONE: INTRODUCTION 1
1.1 Background of the Study 1
1.2 Health Sector of Bangladesh 4
1.2.1 Healthcare Delivery System 6
1.3 Pharmaceuticals Industry Landscape 8
1.3.1 The Global Pharmaceuticals Industry 8
1.3.1.1 R&D-based MNCs 8
1.3.1.2 Generic Firms 10
1.3.1.3 Manufacturing Process 11
1.3.2 Bangladesh Pharmaceuticals Industry 11
1.3.2.1 Current Drug Market and Pharmaceutical Supply Chain 14
1.3.2.2 Business Competitiveness – Bangladesh Perspective 15
1.3.2.2(a) Bangladesh Competitiveness Indices 15
1.3.2.2(b) Pharmaceutical industry Competitiveness – Porter' 5 Forces Framework Indices 17
1.4 Problem Statement 18
1.5 Research Questions 21
1.6 Research Objectives 22
1.7 Significance of the Study 23
1.8 Operationalization of the Study Variables 26
1.9 Organization of the Study 28

CHAPTER TWO: LITERATURE REVIEW 29
1.1 Introduction 29
2.2 Supply Chain Management Practices (SCMP) 29
2.2.1 Supply Chain Management (SCM) Defined 29
2.2.2 Drivers of Supply Chain 31
2.2.3 Bull-whip Effect in Supply Chain 33
2.1.3.1 Bull-whip Effect on Performance 34

2.2.4 Uncertainty in Supply Chain.....36
2.3 Dimensions of SCM Practices and Their Impact on Organizational Outcomes..... 36
2.3.1 Collaborative Relationship with Suppliers and Customers..... 40
2.3.1.1 Supplier Relationship..... 41
2.3.1.2 Customer relationship..... 42
2.3.2 Intra-organizational Practices..... 43
2.3.2.1 Management Commitment..... 44
2.3.2.2 Participative Management..... 45
2.3.3.3 Employee Training and Development..... 46
2.3.3 Logistics Design, Lean and Quality Practices..... 46
2.3.3.1 Logistics Design and Lean Practices..... 47
2.3.3.2 Quality Practices..... 48
2.3.4 IT Infrastructure..... 49
2.3.5 Summary of Meta-analysis on SCM Practices..... 50
2.4 Knowledge Management Practices (KMP)..... 56
2.4.1 Knowledge and its Dimensions..... 56
2.4.2 Types of Knowledge..... 58
2.4.2.1 Tacit Knowledge..... 58
2.4.2.2 Explicit Knowledge..... 59
2.4.2.3 Individual Knowledge..... 59
2.4.2.4 Organizational Knowledge..... 60
2.4.3 Knowledge Management (KM) Defined..... 60
2.4.4 Relevance of Knowledge Management..... 63
2.5 Dimensions of Knowledge Management Practices..... 64
2.5.1 Deployment of Hard Aspects of KM..... 66
2.5.2 Practicing Soft Relationships in KM..... 69
2.5.2.1 Collaboration..... 69
2.5.2.2 Trust..... 70
2.5.2.3 Learning..... 71
2.5.2.4 Performance Rewards..... 73
2.5.3 Summary of Meta-analysis on KM Practices.....73
2.6 Relationship between KM and SCM..... 78
2.7 Studies Done in the Pharmaceutical Industry in Bangladesh.....81
2.8 Chapter Summary.....85

CHAPTER THREE: THEORETICAL UNDERPINNING AND DEVELOPMENT OF HYPOTHESES..... 87
3.1 Introduction..... 87
3.2 Theoretical Frameworks Used in the Study..... 87
3.2.1 Technology Acceptance Model (TAM)..... 88
3.2.2 Theory of Constraints (TOC)..... 89
3.2.3 Resource-based View of the Firm..... 93
3.2.4 Systems Thinking Theory.....94
3.2.5 Social Capital Theory..... 95
3.3 Proposed Hypothesized Model..... 96
3.4 Research Hypotheses..... 97
3.4.1 The Linkage between SCM Practices and Business

Competitiveness..... 98
3.4.2 The Linkage between SCM Practices and Customer Satisfaction.. 98
3.4.3The Linkage between SCM Practices and Business Performance...99
3.4.4 The Linkage between KM Practices and Business Competitiveness.....99
3.4.5 The Linkage between KM Practices and Customer Satisfaction.....101
3.4.6 The Linkage between KM Practices and Business Performance.....100
3.4.7 The Linkage between Customer Satisfaction and Business Competitiveness.....101
3.4.8 The Linkage between Customer Satisfaction and Business Performance.....101
3.4.9 The Linkage between Business Competitiveness and Business Performance.....102
3.4.10 Mediated Relationships..... 102
3.5 Chapter Summary..... 103

CHAPTER FOUR: RESEARCH METHODOLOGY..... 104
4.1 Introduction..... 104
4.2 Philosophical Stance of the Current Study..... 104
4.3 Sampling Design Process..... 106
4.3.1 Population..... 107
4.3.2 Sampling Frame..... 107
4.3.3 Sampling Technique..... 107
4.3.4 Sample Size.....108
4.4 Reliability and Validity of the Instrument..... 109
4.5 Instrumentation of Measurement Items..... 110
4.6 Instrument Development Process.....117
4.7 Data Collection.....118
4.8 Data Analysis..... 119
4.9 Findings from the Pilot Study.....123
4.9.1 Demographic Profile of the Respondents..... 124
4.9.2 Reliability of the Measurements.....125
4.10 Chapter Summary.....126

CHAPTER FIVE: RESULTS AND DISCUSSION.....127
5.1 Introduction..... 127
5.2 Sample Characteristics..... 127
5.3 Data Assessment.....131
5.4 Descriptive Statistics, Reliability and Correlations..... 133
5.5 Exploratory Factor Analyses..... 136
5.6 Structural Equation Modeling (SEM).....140
5.6.1 Confirmatory Factor Analyses (CFA)..... 141
5.6.1.1 CFA of Supply Chain Management Practices(SCMP)..... 142
5.6.1.2 CFA of Knowledge Management Practices (KMP)..... 146
5.6.1.3 CFA of Business Competitiveness (BCOM)..... 149
5.6.1.4 CFA of Customer Satisfaction (CSAT)..... 151

5.6.1.5 CFA of Business Performance (BPER)..... 154
5.6.2 Structural Models..... 156
5.6.2.1 Impact of SCMP on BCOM, CSAT and BPER..... 157
5.6.2.2 Impact of KMP on BCOM, CSAT and BPER..... 161
5.6.2.3 Mediating Effects..... 166
5.6.2.3.(a) BCOM as a Mediator among SCMP, KMP and BPER... 166
5.6.2.3.(b) CSAT as a Mediator among SCMP, KMP and BPER.... 169
5.6.3. Full-fledged Structural Model..... 174
5.7 Competing Models..... 181
5.7.1 Competing Model I..... 181
5.7.2 Competing Model II..... 185
5.7.3 Competing Model III..... 188
5.7.4 Competing Model IV..... 191
5.7.5 Competing Model V..... 194
5.8 Summary of Competing Models..... 197
5.9 Structural Invariance..... 198
5.9.1 Test of Managerial Position Invariance..... 198
5.9.2 Test of Boundary-spanning Role Invariance..... 202
5.10 Discussion of the Findings..... 206
5.10.1 Indicators of Study Variables..... 206
5.10.2 Impact of SCM Practices..... 209
5.10.3 Impact of KM Practices..... 221
5.10.4 Relationship between SCM and KM practices in the Pharmaceutical industry in Bangladesh..... 236
5.10.5 Analysis of Competing Models and Structural Invariance..... 237

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS..... 240
6.1 Introduction..... 240
6.2 Summary of the Study Hypotheses..... 241
6.3 Theoretical Implications..... 243
6.4 Policy Recommendations..... 245
6.5 Study Limitations and Suggestions for Future Research..... 248

BIBLIOGRAPHY..... 251

APPENDICES..... 283

LIST OF TABLES

Table No.		Page No
1.1	Public Expenditure on Health, on Average (1981 – 2010)	04
1.2	Life Expectancy at Birth in terms of Gender and Location (2001 – 2008)	05
1.3	Global Competitiveness Index	16
2.1	Impact of Bull-whip Effect on Supply Chain Performance	35
2.2	Meta-analysis of SCM Practices	51
2.3	Definitions of Knowledge Management by different authors (in year)	61
2.4	Meta-analysis of Knowledge Management Practices	74
4.1	Demographic Profile of the respondents (Pilot study)	124
4.2	Reliability values of the Variables (Pilot study)	126
5.1	Demographic Profile of the Research Participants	128
5.2	General Information of the Companies Surveyed	130
5.3	Normality Testing of the Variables	132
5.4(a)	Descriptive Statistics and Cronbach Alpha Values	134
5.4(b)	Correlation Measures among the Variables	135
5.5(a)	Factor analyses: Supply Chain Management Practices	138
5.5(b)	Factor analyses: Knowledge Management Practices	139
5.6	The results of CFA for Supply Chain Management Practices (SCMP)	145
5.7	The results of CFA for Knowledge Management Practices (KMP)	148
5.8	The results of CFA for Business Competitiveness (BCOM)	151
5.9	The results of CFA for Customer satisfaction (CSAT)	154
5.10	The results of CFA for Business Performance (BPER)	156
5.11	The results of CFA of SCMP with BCOM, CSAT and BPER	161

5.12	The results of CFA of KMP with BCOM, CSAT and BPER	165
5.13	The results of BCOM as a Mediator	169
5.14	The results of CSAT as a Mediator	173
5.15	Comparison between two Mediators – BCOM and CSAT	173
5.16	Significance of the Path Co-efficients in the Revised Model	178
5.17	Summary of Hypotheses Testing	179
5.18	Comparison of Competing Model I with Baseline Model	185
5.19	Comparison of Competing Model II with Baseline Model	188
5.20	Comparison of Competing Model III with Baseline Model	191
5.21	Comparison of Competing Model IV with Baseline Model	194
5.22	Comparison of Competing Model V with Baseline Model	197
5.24	Comparison of baseline model with other Competing Models	197
6.1	Summary of the Research Hypotheses	241

LIST OF FIGURES

Figure No.		Page No.
1.1	Healthcare Delivery System	07
1.2	Growth of Pharmaceutical Market (in millions)	12
1.3	Bangladesh Pharmaceutical Supply Chain	14
1.4	Industry Analysis vis-à-vis Porter's 5-forces Framework	17
2.1	A Typical Supply Chain	30
2.2	Bull-whip Effect: Increasing Variability of the Orders	33
2.3	A Typical Experience with Knowledge Management Deployment	63
2.4	Relationship between Business Value Chain and KVC	80
3.1	Linkage between TOC, Lean and Business Goal	91
3.2	Taguchi Loss Function Curve	92
3.3	The Proposed Hypothesized Model	97
4.1	Sampling Design Process	106
4.2	Instrument Development Process	118
5.1	Initial Measurement Model of SCMP	143
5.2	Modified Measurement Model of SCMP	145
5.3	Initial Measurement Model of KMP	146
5.4	Modified Measurement Model of KMP	147
5.5	Initial Measurement Model of BCOM	149
5.6	Modified Measurement Model of BCOM	150
5.7	Initial Measurement Model of CSAT	152
5.8	Modified Measurement Model of CSAT	153
5.9	Initial Measurement Model of BPER	154

5.10	Modified Measurement Model of BPER	155
5.11	Initial Model of SCMP with BCOM, CSAT and BPER	158
5.12	Modified Model of SCMP with BCOM, CSAT and BPER	160
5.13	Initial Model of KMP with BCOM, CSAT and BPER	162
5.14	Modified KMP with BCOM, CSAT and BPER	164
5.15	Initial Model of BCOM as a mediator	166
5.16	Modified Model of BCOM as a mediator	168
5.17	Initial Model CSAT as a mediator	170
5.18	Modified Model of CSAT as a mediator	172
5.19	Initial Hypothesized Model	175
5.20	Revised Model (Baseline)	177
5.21	Competing Model I (Initial)	183
5.22	Competing Model I (Modified)	184
5.23	Competing Model II (Initial)	186
5.24	Competing Model II (Modified)	187
5.25	Competing Model III (Initial)	189
5.26	Competing Model III (Modified)	190
5.27	Competing Model IV (Initial)	192
5.28	Competing Model IV (Modified)	193
5.29	Competing Model V (Initial)	195
5.30	Competing Model V (Modified)	196
5.33	Structural Model for Managers	200
5.34	Structural Model for Non-manager	202
5.35	Structural Model for Boundary-spanners	204
5.36	Structural Model for Non-boundary spanners	205

LIST OF ABBREVIATIONS

ACSI	American Customer Satisfaction Index Model
AMOS	Analysis of Moment Structures
API	Active Pharmaceutical Ingredient
APICS	American Production and Inventory Control Society
BAPI	Bangladesh Association of Pharmaceutical Industry
BC/BCOM	Business Competitiveness
BP/BPER	Business Performance
CA	Competitive Advantage
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
cGMP	Current Good Manufacturing Practices
CR	Customer Relationship
CS/CSAT	Customer Satisfaction
DKS	Decision Knowledge Sharing
DSS	Decision Support System
EDCL	Essential Drug Company Limited
EFA	Exploratory Factor Analysis
ER	Emergency Room
ERP	Enterprise Resource Planning
HRM	Human Resource Management
ICT	Information and Communication Technology
ISO	International Organization for Standardization
IT	Information Technology

JIT	Just-in-Time
KM	Knowledge Management
KMP	Knowledge Management Practices
KMS	Knowledge Management System
KMO	Kaiser-Meyer-Olin
KPI	Key Performance Indicator
KVC	Knowledge Value Chain
MDG	Millennium Development Goals
MLE	Maximum Likelihood Estimation
MNC	Multinational Corporation
MSC	Multimedia Super Corridor
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Lest Squares
PDP	Performance Development Plan
PEU	Perceived Ease of Use
PU	Perceived Usefulness
RBV	Resource-based View
RMSEA	Root Mean square Error of Approximation
SCL	Supply Chain Learning
SCM	Supply Chain Management
SCMP	Supply Chain Management Practices
SCPK	Supply Chain Process Knowledge
SEM	Structural Equation Modeling
SI	Supplier Involvement
SME	Small and Medium Enterprise

SPSS	Statistical Package for Social Science
TAM	Technology Acceptance Model
TGA	Therapeutic Goods Administration
TLF	Taguchi Loss Function
TOC	Theory of Constraints
TQM	Total Quality Management
TRA	Theory of Reasoned Action
TRIPS	Trade Related Intellectual Property Rights
UKMHRA	United Kingdom Medicine and Healthcare Products Regulatory Agency
UML	Unified Modeling Language
USFDA	United States Federal Drug Administration
WIP	Work-in-Process
XBRL	Extensible Business Reporting Language

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The world, metaphorically and yet so cogently argued by Friedman (2007), has turned 'flat', thanks to the onslaught of globalization. While it has blurred the geographical divides, it has as well, as its corollary, spawned fierce competition among the companies in the marketplace. The competitive edge of a company over its rivals is hinged heavily on its ability to cope with multiple challenges to rein in cost, enhance product quality and offer superior customer service (Lei, 2007). Shaped by sweeping technological innovations and shifting customer demands, this competition has pitted the companies against each other, so much so that the key to their survival is contingent upon obtaining the products/materials from the right source or suppliers, at the right price, with the right quality and quantity and in real-time (Onesime *et al.*, 2004). This calls for a doing away with the conventional business practices on their part in order to be more nimble, in a bid to garner the benefits of what Sull (2009) calls 'the upside of turbulence'. A very compelling reason for this is attributed to the fact that the competition is now being waged between or across supply chains, and not confined to only between companies any more (Seth *et al.*, 2006; Fynes *et al.*, 2005; Vickery *et al.*, 2003).

Given the unprecedented changes taking place at an exponentially faster rate in the arena of information technology, traditional business models must harmonize an array of activities across the supply chains to suit the demands of the fast-changing business environment. In so attaining, integration, however, calls for an effective

transmittal of knowledge amongst the individuals within the firm (Pagell, 2004; Sanders and Premus, 2005). Notwithstanding the radical advancement of technological prowess vis-à-vis knowledge transfer between individuals (Narasimhan and Kim, 2001; Zhou and Benton, 2007), effective communication would fall through if it is done only over phone or through e-mails or with scattered reports (Choo *et al.*, 2007). This is majorly due to the fact that knowledge, which is so specialized in nature, could carry a distinct or no meaning to people working in different functional departments. It does, therefore, warrant a shared understanding of knowledge (Zahra and Nielsen, 2002), through which disseminated information would appear meaningful to the appropriate employees across the organization (Slater and Narver, 1995; Baker and Sinkula, 1999). This, according to Luo *et al.* (2006), would facilitate effective knowledge transfer, and aid the employees from getting inundated in what Goldratt (1991) coins as 'Haystack Syndrome', in 'sifting information out of the data ocean'.

The pharmaceutical industry caters to the healthcare needs of a country – developed or developing. The innovation of new drugs and their distribution have been instrumental to the significant rise in longevity of the human race over the past century (Rao, 2008). However, as the pharmaceutical marketplace confronts daunting challenges with various stakeholders demanding the pharmaceutical products to be affordable, strategic planning would be of the essence (Holdford, 2005; Birdwell, 1994). For the pharmaceutical industry, it assumes special significance as medical commodities would require to be delivered through the supply chain, one of the aims of which is to guarantee a continual flow of drugs to consumers at a reasonable price, with minimal postponements and stockouts, with zero allowance for defects, and to their full satisfaction (Vecchione, 2009; Enyinda, 2009).

Due to its technological nature, the pharmaceutical industry is intimately involved in the adoption, generation and preservation of knowledge, with research and development playing a crucial role in the entire process. The current competitive business landscape demands a continual probing into the environment so that knowledge is garnered and disseminated promptly, to the appropriate personnel throughout the supply chain. For the strategic planning to bear fruits, effective knowledge management across different entities of the supply chain is of utmost importance as it helps the pharmaceutical industry acquire core knowledge and gain a competitive edge (Hung *et al.*, 2005).

With the above background, this research examines the influence of the supply chain management (SCM) and knowledge management (KM) practices on the business performance (BP) of drug manufacturers in the pharmaceuticals industry, with that of Bangladesh being taken as a case study. In doing so, it explores the interrelationship between the two antecedents, i.e., SCM and KM practices, and measures their impact on organizational outcomes i.e., business competitiveness, customer satisfaction and business performance of the pharmaceutical companies in Bangladesh.

The next section presents the pharmaceuticals industry landscape giving an overview of the Bangladesh pharmaceuticals industry, the statement of the problem of the current study and its significance followed by the research questions and objectives to be pursued in this study. However, first, a brief outline of the Bangladesh health sector vis-à-vis public health expenditure as well as people life expectancy is provided below.

1.2 HEALTH SECTOR OF BANGLADESH

Since independence in 1971, Bangladesh did not have any coherent policy vis-à-vis its health sector until 2000, when the first National Health Policy came into being (Chowdhury and Osmani, 2010). Prior to this, a number of *Five Year Plans* were introduced to address the problems that plague this sector; such plans would envisage actions geared toward public and private sector participation to impart healthcare services to the people, with an emphasis placed on primary as well as maternal and child health care. In order to facilitate these healthcare services, focus is given to the construction of community clinics for every 6000 people. Table 1.1 provides public health expenditure per capita during the last three decade (1981 – 2010).

Table 1.1
Public expenditure on health, on average (1981 – 2010)

Total expenditure on health	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010
At constant prices (Taka[a]) per capita	62	67	107	137	155	212
At Dollar prices per capita	1.20	1.46	2.46	3.16	3.41	5.22
As a percentage of total budgetary expenditure	5.21	5.09	6.79	6.83	6.23	6.66

Source: Bangladesh Bureau of Statistics, Statistical Yearbook, various years; Ministry of Finance, Bangladesh Economic Review, various years (as cited in Chowdhury and Osmani, 2010)

[a]*Taka: Currency in Bangladesh*

As can be inferred from Table 1.1, per capita public expenditure over a period of three decade (1980 – 2010) has increased by almost three-and-a-half times, from a yearly average of Tk. 62 per person to Tk. 212 per person. In dollar terms, this shows an even higher annual increase, from $1.2 per person to $5.22 per person over the corresponding period. While the increase shows an upward trend, the absolute figure of expenditure seems quite paltry. This low absolute amount is as well reflected in the allocation of funds to public health sector as a percentage of total budgetary expenditure.

Against this situation, Bangladesh has, however, gained some progress in meeting targets of Millennium Development Goals (MDG) by 2015. There has been a significant decline in infant and child mortality resulting in an increase in life expectations of the people. Table 1.2 exhibits life expectancy at birth along area and gender divide.

Table 1.2
Life expectancy at birth in terms of gender and location (2001 – 2010)

Year	Life expectancy at birth			
	Urban	Rural	Male	Female
1991	65.0	55.8	55.7	56.5
2001	67.2	60.2	64.0	64.5
2002	67.6	64.4	64.5	65.4
2003	67.8	64.3	64.3	65.4
2004	67.9	64.3	64.4	65.8
2005	68.0	64.6	64.4	65.8
2006	68.1	66.0	65.4	67.8
2007	68.3	66.2	65.5	67.9