DEVELOPMENT OF LEAD AND COLLABORATIVE BENCHLEARNING FRAMEWORK FOR BENCHMARKING IMPLEMENTATION WITHIN CLUSTERS OF SMEs

MASOOMEH ZEINALNEZHAD

THESIS SUBMITTED IN FULFILMENT OF THE DEGREE OF
DOCTOR OF PHILOSOPHY

FACULTY OF INFORMATION SCIENCE AND TECHNOLOGY
UNIVERSITI KEBANGSAAN MALAYSIA
BANGI

2013

PEMBANGUNAN KERANGKA PROSES "LEAD AND COLLABORATIVE BENCHLEARNING" BAGI PELAKSANAAN "BENCHMARKING" DALAM KLUSTER IKS

MASOOMEH ZEINALNEZHAD

TESIS YANG DIKEMUKAKAN UNTUK MEMPEROLEH IJAZAH
DOKTOR FALSAFAH

FAKULTI TEKNOLOGI DAN SAINS MAKLUMAT
UNIVERSITI KEBANGSAAN MALAYSIA
BANGI

2013

DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

15 August 2013

MASOOMEH ZEINALNEZHAD
P48035

ACKNOWLEDGMENTS

First and foremost praise is to Almighty Allah for all his blessings for giving me patience and good health throughout the duration of this PhD research.

I am very fortunate to have Professor Dr. Muriati Mukhtar and Professor Dr. Shahnorbanun Sahran as research supervisors. I gratefully acknowledge their helpful guidance, encouragement, patience, trust, hospitality and continuous assistance. They helped me whenever I was in need.

Also very special thanks to all post graduate staffs of FTSM for their help, friendship, and creating a pleasant working environment throughout my years in UKM. Furthermore, I would like to express my high appreciation to my late supervisor Prof. Dr. Baba Md. Deros who guided me a lot as my initial motivator.

I wish to express my sincere gratitude to the very special person my lovely mother for her endless support and courage which definitely helped me to keep up the spirit during this effort. I have gotten invaluable support also from my loving sister Fatemeh and my three caring brothers Amir, Amin, Omid and my all friends. Without your support, I would not have had the strength to finish this work.

And of course, I owe my deepest gratitude to my dearest husband Towhid and my lovely son AmirMohammad for their love, understanding and support that they gave me during these past four years.

With love and appreciation, I dedicate this work to the spirit of my father who instilled in me the desire to learn and the drive to succeed. He has always been there for me as a rock support. I am indebted to my father and will love him forever.

ABSTRACT

A variety of academic and industry reports have stated that small and medium enterprises (SMEs) in developing countries lack the methodology and the "know-how" for managing quality. However, these deficiencies can be overcome by incorporation of SMEs into related clusters and implementing benchmarking. SMEs in clusters have unique characteristics, such as access to communal infrastructure, constructive dialogue, joint development, and knowledge sharing. The collaborative nature of SMEs in clusters allows them to quickly adapt to dynamic changes through well-developed networks involving SMEs and large enterprises, consultants, suppliers, financial institutions, and the government. However, current existing benchmarking frameworks, on their own, do not address the particular characteristics of clustered SMEs to accomplish effective benchmarking. Hence, related benchmarking concepts, lead benchmarking (LB), collaborative benchmarking (CB) and benchlearning (BL) need to be merged to address these characteristics. This combination is consistent with the characteristics and facilities of clustered SMEs. Therefore, the aim of this research is to develop a combined framework, called "LCB Process Framework", for benchmarking implementation within clustered SMEs. The research objectives in support of the research aim are: (1) To explore the SMEs' issues related to the benchmarking implementation, lead performances, ICTs and learning, (2) To define the LCB, (3) To determine the CSFs of LCB implementation within the clustered SMEs, (4) To develop a framework for LCB implementation, the "LCB Process Framework", and (5) To validate the "LCB Process Framework". The research was conducted through a triangulation across methods approach which involved four phases, namely, exploratory research, empirical study, framework construction and validation. After a pilot study to validate the survey instrument, for the main study, 412 questionnaires were distributed amongst Iranian SMEs located in four well-developed industrial estates (primary clusters), involved in the metal sectors. The response rate was 36.65%. Using statistical package for the social sciences (SPSS) software, the exploratory factor analysis (EFA) resulted in construction of five critical success factors (CSFs) of LCB, namely management, employees, government, processes, and communications. Using analysis of moment structures (AMOS) software, confirmatory factor analysis (CFA) followed by structural equation modelling (SEM) analysis was applied to develop the "CSFs-LCB model". This model formed the foundation of the development of the "LCB Process Framework" for benchmarking implementation within clusters of SMEs. The "LCB Process Framework" was validated through the Delphi technique. The results demonstrate that the combination of LB, CB and BL is a promising solution for sustainable growth of clustered SMEs. LCB facilitates information flow and knowledge sharing among SMEs. It benchmarks lead measures and thus considers future performance analysis. It enhances the progress of organizational learning and transforms SMEs into learning organizations. The LCB Process Framework could be applied in clusters of SMEs in similar developing and newly industrialized countries with minor modifications.

ABSTRAK

Pelbagai laporan akademik dan industri telah menyatakan bahawa industri kecil dan sederhana (IKS) di negara membangun tidak mempunyai kemahiran dan pengetahuan tentang pengurusan kualiti. Walau bagaimanapun, kekurangan ini boleh diatasi dengan membentuk kluster IKS yang berkaitan dan melaksanakan *benchmarking*. Kluster IKS mempunyai ciri unik seperti infrastruktur komuniti, dialog yang membina, pembangunan bersama dan perkongsian pengetahuan. Sifat kerjasama antara IKS dalam kluster membolehkan mereka cepat menyesuaikan diri apabila wujud perubahan dinamik. Ini dilakukan melalui rangkaian yang terhasil dari pengibatan IKS dan perusahaan besar, perunding, pembekal, institusi kewangan dan kerajaan. Walau bagaimanapun, rangka kerja *benchmarking* sedia ada, secara berasingan, tidak mengambil kira ciri kluster IKS yang unik untuk menghasilkan pelaksanaan *benchmarking* yang berkesan. Oleh itu, konsep *benchmarking* berkaitan, *lead benchmarking (LB), collaborative benchmarking (CB)* dan *benchlearning* perlu digabungkan untuk mengambil kira ciri tersebut. Justeru itu, matlamat kajian ini adalah untuk membangunan rangka kerja gabungan yang dikenali sebagai LCB, bagi pelaksanaan *benchmarking* dalam kluster IKS. Objektif kajian untuk menyokong matlamat kajian ini adalah: (1) Menganalisis isu tentang pelaksanaan *benchmarking*, *lead performances*, komputer dan teknologi maklumat, dan pembelajaran, (2) Mendefinisikan LCB, (3) Menentukan indikator faktor kejayaan pelaksanaan LCB dalam kluster IKS, (4) Membangunkan rangka kerja untuk pelaksanaan LCB "Rangka Kerja Proses LCB", dan (5) Mengesahkan rangka kerja LCB menggunakan teknik Delphi. Kajian ini menggunakan pendekatan triangulasi merentasi kaedah yang melibatkan empat fasa, iaitu fasa penerokaan, kajian empirikal, pembinaan rangka kerja, dan pengesahan rangka kerja. Selepas kajian rintis untuk pengesahan instrumen kajian dilakukan, melalui kajian utama, 412 soal selidik telah diedarkan kepada IKS dalam sektor logam di Iran dalam empat Estet Perindustrian termaju (kluster primer). Kadar maklum balas adalah 36.65%. Dengan analisis faktor penerokaan (EFA) SPSS, lima indikator faktor kejayaan pelaksanaan LCB telah dibangunkan. Kelima-lima indikator ini adalah 'pengurusan', 'pekerja', 'kerajaan', 'proses' dan 'komunikasi'. Seterusnya, analisis faktor pengesahan (CFA) AMOS, disusuli dengan analisis persamaan struktur model (SEM) digunakan untuk membangunkan rangka kerja LCB. Rangka kerja LCB ini membentuk asas kepada "Rangka Kerja Proses LCB" yang dibangunkan bagi pelaksanaan *benchmarking* dalam kluster IKS. Rangka kerja proses LCB disahkan melalui teknik Delphi. Keputusan kajian menunjukkan bahawa kombinasi LB, CB dan *benchlearning* adalah satu penyelesaian yang berpotensi untuk menyokong pertumbuhan mampan kluster IKS. LCB memudahkan aliran maklumat dan perkongian ilmu di kalangan IKS. Ia menanda aras *lead measures* dan seterusnya mempertimbangkan analisis prestasi masa hadapan. Ia juga melicinkan proses pembelajaran organisasi dan sekaligus merubah IKS menjadi *learning organizations*. Rangka kerja proses LCB boleh juga digunakan oleh kluster IKS dalam negara perindustrian membangun yang lain dengan sedikit pengubahsuaian.

TABLE OF CONTENTS

		Page
DECLARATION		iii
ACKNOWLEDGMENTS		iv
ABSTRACT		v
ABSTRAK		vi
CONTENTS		vii
LIST OF TABLES		xv
LIST OF FIGURES		xvii
LIST OF ABBREVIATIONS		xix
CHAPTER I	**INTRODUCTION**	
1.1	Introduction	1
1.2	Background of the Study	2
	1.2.1 Features and Growth Challenges of SMEs	2
	1.2.2 Challenges of Benchmarking within SMEs	4
	1.2.3 Characteristics of Clustered SMEs	5
	1.2.4 Benchmarking in Clusters of SMEs	7
1.3	Problem Statement	8
1.4	Research Objectives	12

1.5	Research Methodology	12
1.6	Research Assumptions and Scope	14
1.7	Significance of the Research	15
1.8	The Thesis layout	18
CHAPTER II	**LITERATURE REVIEW**	
2.1	Introduction	21
2.2	Small and Medium Enterprises	23
	2.2.1 Definition of SMEs	24
	2.2.2 Characteristics and Significance of SMEs	25
	2.2.3 Barriers to SMEs' Growth	28
	2.2.4 Growth Challenges of SMEs in Iran	29
	2.2.5 Application of ICTs among SMEs	32
2.3	Clusters of SMEs	34
	2.3.1 Definition of Industrial Cluster	35
	2.3.2 Characteristics of Industrial SMEs	37
	2.3.3 The Contribution of Clusters to SMEs' Growth	39
	2.3.4 The Role of ICTs in Clusters' Development	42
2.4	Benchmarking	44
	2.4.1 Definition of Benchmarking	44
	2.4.2 The Evolution of Benchmarking	45
	2.4.3 Classification of Benchmarking Methodologies	47
	2.4.4 Benchmarking Models	54
	2.4.5 The Role of ICTs in Benchmarking Implementation	63
2.5	Benchlearning	64

	2.5.1 The Benchlearning Methodology	65
	2.5.2 Benchlearning's Legacy from Benchmarking	69
2.6	The CSFs of Benchmarking Implementation	70
2.7	The Identified Gap	75
2.8	Summary	80
CHAPTER III	**THE INITIAL CONCEPTUAL FRAMEWORK**	
3.1	Introduction	81
3.2	Definition of LCB	82
3.3	CSFs of LCB Implementation	83
3.4	The Conceptual Framework for LCB	90
3.5	Initial Hypotheses Development	92
3.6	Summary	93
CHAPTER IV	**RESEARCH METHODOLOGY**	
4.1	Introduction	94
4.2	The Research Approach	95
4.3	The Research Design	96
4.4	Research Instruments	101
	4.4.1 Sampling Strategy	102
	4.4.2 Sampling Frame	104
	4.4.3 Research Variables	105

	4.4.4 The Questionnaire Design	106
	4.4.5 The Codebook	107
4.5	Questionnaire Validation	107
4.6	The Pilot Study	108
	4.6.1 Validity	108
	4.6.2 Reliability	109
4.7	Questionnaire Refinement	109
4.8	The Verification Study	110
4.9	The Data Collection Strategy	111
4.10	The Data Analysis Strategy	112
	4.10.1 One-way ANOVA Test	113
	4.10.2 Independent-Samples t-test	113
	4.10.3 Confirmatory Factor Analysis (CFA)	113
	4.10.4 Structural Equation Modeling (SEM)	114
4.11	The Delphi Method	121
4.12	Summary	121
CHAPTER V	**DATA ANALYSIS AND RESULTS – PILOT STUDY**	
5.1	Introduction	123
5.2	The Organizations' Demographics	124
5.3	Analysis of the Questionnaire Findings	126
	5.3.1 Benchmarking Implementation Issues	126
	5.3.2 Managers' Perceptions of LCB	130
	5.3.3 CSFs of LCB Implementation	133

	5.3.4	Learning Dimensions	135
	5.3.5	ICT Skills' Challenges	137
5.4		Questionnaire Refinement for the Main Study	138
5.5		The Research Hypotheses	140
5.6		Summary	141
CHAPTER VI		**DATA ANALYSIS AND RESULTS – THE MAIN STUDY**	
6.1		Introduction	143
6.2		Organizations' Demographics	144
	6.2.1	General Plants' Information	144
	6.2.2	Benchmarking Implementation Issues	147
	6.2.3	Lead Performance Indicators and Lead Benchmarking Methodologies	150
	6.2.4	Learning Dimensions	154
	6.2.5	ICT Issues	154
6.3		PART 1 - Definition of the LCB	158
	6.3.1	Evaluation of Data Quality and Data Preparation	159
	6.3.2	Correlation	160
	6.3.3	Reliability	161
	6.3.4	Validity	161
	6.3.5	Exploratory Factor Analysis (EFA)	162
6.4		PART 2 – CSFs of LCB	167
	6.4.1	Evaluation of Data Quality and Data Preparation	169
	6.4.2	Correlation	170
	6.4.3	Reliability	171

	6.4.4 Validity	171
	6.4.5 Exploratory factor Analysis (EFA)	171
6.5	Structural Equation Modelling (SEM)	176
	6.5.1 Confirmatory Factor Analysis (CFA)	176
	6.5.2 The Structural Model Analysis	188
	6.5.3 Bootstrapping Analysis	190
6.6	Summary	192

CHAPTER VII LCB FRAMEWORK DEVELOPMENT AND VALIDATION

7.1	Introduction	194
7.2	Process Overview of the LCB	195
7.3	LCB Process Framework Development	198
	7.3.1 Stage 1 – Initial Preparation	202
	7.3.2 Stage 2 – Diagnosis Phase	205
	7.3.3 Stage 3 – Benchlearning	210
	7.3.4 Stage 4 – Implementation	214
	7.3.5 Stage 5 - Monitoring	216
7.4	LCB Process Framework Validation	218
	7.4.1 Delphi Method – Round 1	220
	7.4.2 Delphi Method – Round 2	220
7.5	Modified LCB Process Framework	223
7.6	Summary	226

CHAPTER VIII SUMMARY AND CONCLUSIONS

8.1 Introduction 228

8.2 Summary of the Findings 228

8.2.1 Exploring the SMEs' issues related to the benchmarking implementation, lead performances, ICTs and learning 231

8.2.2 Definition of the LCB 235

8.2.3 Determining the CSFs of LCB implementation within the clustered SMEs 236

8.2.4 Development of the LCB Process Framework 236

8.2.5 Validation of the LCB Process Framework 239

8.3 Theoretical Contributions 239

8.4 Practical Contributions 241

8.5 Suggestions for Future Research 241

8.6 Conclusion 245

REFERENCES 247

APPENDIXES

A The Figures Related to Benchmarking Frameworks 263

B Brief information about Mashhad 272

C A Sample Questionnaire Used in the Pilot Study 273

D The Lists of the Experts in Various Requirements 280

E The Information Related to the Pilot Study 281

F The Modified Questionnaire for the Main Study 290

G	The Information Related to the Main Study	302
H	The SPSS Outputs Related to Section 6.2.3 and 6.2.5	308
I	The AMOS Outputs Related to Sections 6.3, 6.4, and 6.5	324
J	The Delphi Technique	347
K	The Academic and Industry Experts	355
L	The Correlation Matrices	360
M	The Code books	367
N	The Publications	372

LIST OF TABLES

Table No.		Page
2.1	Definition of SMEs in the Selected Countries	25
2.2	SMEs' Characteristics, Strengths and Weaknesses versus Large Organizations	27
2.3	Comparison between Shares of Iranian Firms in Total Value Added in 2002 and 2007	30
2.4	Barriers to SME Development in Iran	31
2.5	Categorization of Industrial Clusters and Examples	37
2.6	The Most Important Benefits of Clustering Approach	41
2.7	A Chronological List of Various Benchmarking (BE) Methodologies	49
2.8	A Historical Analysis of Current Benchmarking Frameworks, 2005 onwards	57
2.9	Contribution of Related Benchmarking Methodologies and Frameworks to Clustered SMEs' Features	77
3.1	The Critical Success Factors of LCB and their Cited Dimensions	85
4.1	Measures for Testing Framework Fit	120
5.1	Descriptive Analysis of the Organizations' Demographics	125
5.2	Descriptive Statistics of the LCB Constructs	131
6.1	The Characteristics of the Surveyed Industrial Estates (IE)	145
6.2	The Demographics of the Surveyed SMEs	146
6.3	LCB's Item Codes and Item Descriptions	158

6.4	Total Variance Explained	164
6.5	Rotated Component Matrix	166
6.6	Item Codes and Item Descriptions Related to CSFs of LCB	168
6.7	Total Variance Explained	173
6.8	Rotated Component Matrix	175
6.9	The Modification Indices (Covariances)	184
6.10	The Modification Indices (Covariances)	187
7.1	Level of Consensus and Importance	221

LIST OF FIGURES

Figure No.		Page
1.1	The Research Design	13
2.1	Seven Generations in the Benchmarking Evolution	47
2.2	Initial Conceptual Framework of Lead Benchmarking	53
2.3	Brokered Collaborative Benchmarking	62
2.4	Generic Benchmarking Process Map	63
2.5	The Process of Benchlearning	66
2.6	Using the Good Example's Performance as a Springboard to a Higher Level of Aspiration	68
2.7	Comparison of Implementation Time of Changes between the Traditional Change Process and Benchlearning Process	69
2.8	From Benchmarking to Benchlearning	70
2.9	A Framework for CSFs of Cooperative Benchmarking	72
2.10	A Framework for CSFs of Benchmarking	74
2.11	A Schematic Representation of the Identified Gap	79
3.1	A Schematic Representation of a Typical Cluster	90
3.2	The Initial Conceptual Framework for the Study	91
4.1	The Four Main Phases of the Research Procedure and their Results	97
4.2	The Detailed Research Procedure	100
5.1	The Completed Phases of Benchmarking	127
5.2	The Research Conceptual Framework	141
6.1	Frequencies of the Surveyed SMEs from each Industrial Estate	145

6.2	The Completed Phases in Benchmarking Implementation	147
6.3	The Respondents' Preferred Type of Benchmarking	148
6.4	The Frequencies of Lead Performances' Scores	151
6.5	The Frequencies of Lead Benchmarking Methodologies' Scores	153
6.6	The Scree Plot – LCB	165
6.7	The Scree Plot – CSFs of LCB	174
6.8	The 1st Order CFA for LCB Definition	178
6.9	The 2nd Order CFA for LCB Definition	179
6.10	The 1st Order CFA for CSFs	181
6.11	The Measurement Model for the CSFs of LCB	183
6.12	The Modified Measurement Model for the CSFs of LCB	186
6.13	The SEM for the CSFs of LCB (CSFs-LCB)	189
7.1	A Process Overview of LCB Implementation	195
7.2	The proposed LCB Process Framework	200
7.3	Stage 1 – Initial Preparation	202
7.4	Stage 2 – Diagnosis Phase	206
7.5	Stage 3 – Benchlearning	210
7.6	The Steps for Ensuring Reliable Data	212
7.7	Stage 4 – Implementation	215
7.8	Stage 5 – Monitoring	217
7.9	The Two-Round Delphi Procedure	219
7.10	The Modified LCB Process Framework	224

LIST OF ABBREVIATIONS

SME	Small and Medium Enterprise
SMEs	Small and Medium Enterprises
LEs	Large Enterprises
UNIDO	United Nations Industrial Development Organization
ISIPO	Iran Small Industries and Industrial Parks Organization
WTO	World Trade Organization
R&D	Research and Development
ICT	Information and Communications Technology
ICTs	Information and Communications Technologies
CSF	Critical Success Factor
CSFs	Critical Success Factors
LCB	Lead and Collaborative Benchlearning
SEM	Structural Equation Modelling
LB	Lead Benchmarking
CB	Collaborative Benchmarking
BL	Benchlearning
GDP	Gross Domestic Product
QFD	Quality Function Deployment
NSDC	National SME Development in Malaysia
SPC	Statistical Process Control
TQM	Total Quality Management
BPR	Business Process Reengineering
IT	Information Technology
HR	Human Resource
JIT	just-in-time Systems
ERP	Enterprise Resource Programming
SWOT	Strengths, Weaknesses, Opportunities, Threats

NPD	New Product Development
DOE	Design of Experiments
SD	Standard Deviation
EU	European Union
ANOVA	Analysis Of Variance
SCM	Supply Chain Management
EFQM	European Foundation for Quality Management
ISO	International Standards Organization

CHAPTER I

INTRODUCTION

1.1 INTRODUCTION

For transition economies, small and medium enterprises have frequently presented the only practical prospects for rises in both employment and value added (UNIDO 2003; Mirbargkar 2009). Hence, developing the SMEs is a key factor in economic growth and innovation. In this context, benchmarking is considered an important strategic tool for SME development (Hong et al. 2012) as the potential contribution to competitive advantages and continuous improvement of SMEs has long been recognized (St-Pierre & Delisle 2006). Benchmarking implementation leads to organizational growth, knowledge transfer, cost effective solutions, improved process performance, as well as creativity (Williams et al. 2012). However, many SMEs have not found it easy to be employed (Asrofah et al. 2010) due to several constraints, among which are their limited resources. To this end, employing the cluster approach seems to be a tool for SMEs to overcome their challenges (Karaev et al. 2007). Along with benchmarking, as an appropriate method to enhance competitiveness, clustering has been extensively recognized by numerous organizations during the last decades (Carpinetti & Oiko 2008). It is admitted that as a means for improving the growth and competitiveness of SMEs, clustering is receiving increasing attention today. Clustering can increase the availability of production resources. It can also improve quality while lowering expenses. Finally, it is claimed that clustering can result in access to open-market prospects, innovation, and economic excellence (Zhao et al. 2010; Carpinetti & Oiko 2008).

Hence, great efforts are being made to promote clusters of SMEs to face growing global competition in the emerging economies (Zhao et al. 2010), especially

in countries like China, India, Korea, Indonesia, and Iran where a large number of industrial cluster initiatives are currently emerging. In this regard, companies will require greater collaboration, coordination, and systematic integration. This, in turn, demands a higher level of trust as well as partnership among the organizations involved by implementing benchmarking to gain competitive advantages (Campaniaris 2011). Yet, such an inquiry cannot be accomplished without considering a number of issues. In this context, this introductory chapter presents the background of the study, and then defines the problem. The background section deals with particular features related to the SMEs along with the clustered SMEs. Also, in this section, there is a discussion on the SMEs' growth barriers as well as their challenges in benchmarking implementation followed by benchmarking in clusters of SMEs. Subsequently, the problem statement, the research methodology, research objectives, research assumptions and the scope, and significance of the research are all described. Finally, this chapter concludes with a perspective of the thesis layout.

1.2 BACKGROUND OF THE STUDY

It is a fact that the number of manufacturers who are currently employing benchmarking techniques is rising; nonetheless, most SMEs do not find it easy to use this technique efficiently due to some difficulties (Asrofah et al. 2010). In order to adopt such a methodology, both benefits and barriers must be identified. For this reason, this section elaborates on the status of benchmarking implementation and its related challenges in the context of SMEs, particularly clusters of SMEs.

1.2.1 Features and Growth Challenges of SMEs

Small and medium enterprises are considered the foremost driver for economic development as well as encouraging private ownership alongside entrepreneurial expertise (Gadenne & Sharma 2009). Furthermore, such organizations are said to be crucial for sustained and long-term growth, as well as dynamism and employment (Thassanabanjong et al. 2009). Commonly, the largest part of the workforce is employed by SMEs that are also in charge of income generation opportunities (Singh et al. 2010). In comparison with larger organizations, most SMEs have unassuming systems and procedures along with more flexibility and instant feedback. They also

have short chains for decision-making while granting better perception and speedier response to the customers' needs (Singh et al. 2008). SMEs are known to have less structured processes. Their decision making processes are also determined by the entrepreneur-owner. Principally technological, there is also the tacit knowledge in SMEs to advance by learning processes which hinge around the "learning by doing" kind of thought (Garengo et al. 2005). Besides, the scarcity of human resources and financial resources are known typical issues of SMEs (Singh et al. 2008). The point is that the training along with the development activities in SMEs is likely to be small-scale and ad hoc. Singh et al. (2008) noted that major problems of SMEs are to be attributed to product design and development capability, as well as training, infrastructure and networking.

Additionally, SMEs have restricted contact with suppliers, customers, and with professional organizations (Ghobadian & Gallear 1997). If they intend to recognise actual improvement opportunities and convert them into operative actions, the SMEs are required to seek advice from external consultants (Maire et al. 2008). As highlighted by UNIDO (2003), individual SMEs typically have trouble making use of those market opportunities which require large product quantities as well as homogeneous standards and regular supplies. In addition, individual SMEs cannot accomplish economies of scale when buying inputs like the equipment, raw materials, finance, consulting services, etc. The internalization of functions like training, market intelligence logistics, and technology innovation are also hampered significantly due to the companies' small size which can also hinder achieving the specialized and efficient division of labour which can elevate cumulative improvements regrinding production competence and innovation. Finally, in developing economies, SMEs are often said to be locked in their routines and seem to be unable to introduce innovative improvements for their products and processes, or to exceed their organizations' restrictions in order to seize new market opportunities. This is due to their low profit margins (UNIDO 2003).

Nevertheless, they can greatly benefit from being linked to national, regional and global networks of firms and value chains; such linking can help them to overcome the inherent limitations (UNIDO 2003). The point to accentuate is that

SMEs entering niche markets can prosper in the global marketplace. By doing so, they are able to make use of innovative information technologies as well as powerfully utilising the networking schemes which are being sponsored by national agencies. Finally, they can cultivate durable domestic partnerships as well overseas affiliation and strategic alliances (Webb & Sayer 1998).

1.2.2 Challenges of Benchmarking within SMEs

Benchmarking has been defined as the practice of comparing one's own performance with that of other firms recognized as the best in class (Kuula & Putkiranta 2012). Although benchmarking is utilized extensively by many large and important establishments (Carpinetti & Oiko 2008), SMEs do not make use of such a technique very readily (Cassell et al. 2001; Bernard 2005). Nevertheless, the potential contributions of benchmarking to SMEs for obtaining competitive advantages and continuous improvement have long been recognized (St-Pierre & Delisle 2006). It is also well agreed that an improved perception of the process advantages and disadvantages, as well as enhanced cycle time, improved customer satisfaction and supplier management, reduced production costs, increased competitive advantages and profitability, and creativity, amongst others, have been all recognized as the benefits associated with implementing benchmarking (Magd 2008; Park et al. 2012). To boost organizational efficiency in solving internal problems, benchmarking provides organizations with new means, notions, and implements. Thus, benchmarking practitioners can overcome the paradigm blindness that is the inability to change their regular ways of thinking and operating.

Despite the growing interest in benchmarking as an efficient quality management technique in developed countries and industrialized economies, the fact is that few SMEs trust and use it in transition countries. Most of these companies fear that benchmarking is costly and time consuming. Moreover, benchmarking implementation requires supporting activities and resources, among which are the firm's infrastructure, long-term planning, human resource management, and open interdepartmental communications. In a broader sense, benchmarking is said to be pricey and time consuming (Massa & Testa 2004); the result is that individual SMEs typically lack adequate resources with which to implement a benchmarking project.

Yet, the real dilemma in implementing benchmarking in SMEs is most likely a lack of understanding what this technique is in reality and this arises from various approaches being in use. Moreover, numerous interpretations exist to define the term benchmarking (Bernard 2005).

Garengo et al. (2005) proclaimed that although the SMEs can greatly make use of benchmarking, they are commonly unaware of the needed techniques, or seem to be so. The SMEs will be able to boost their operative and monetary performances if they make use of benchmarking. This indicates that benchmarking is beneficial for SMEs but the conventional performance models typically used for large organizations cannot be utilized by SMEs (St-Pierre & Delisle 2006). Various studies have indicated that theories and practices developed for larger organizations may not be appropriate for SMEs (Cassell et al. 2001; Premkumar 2003; Bernard 2005; St-Pierre & Delisle 2006; Bruque & Moyano 2007). As proposed by Cassell et al. (2001), the benchmarking activities designed for SMEs are required to be appropriate for such firms' environment and constrictions. If this is done, implementing such recognised activities can be successful and finally end up with improved performance.

Besides, there is a need to extend the theoretical and practical aspects of benchmarking in SMEs by studying the process of benchmarking, rather than merely considering its results (Bernard 2005). In fact, the development of specific benchmarking practices for SMEs is needed because of unique strategic objectives, larger environmental uncertainty, and inadequate resources (St-Pierre & Raymond 2004).

1.2.3 Characteristics of Clustered SMEs

Clusters, or clustering, have been defined as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and finally the associated institutions in a particular field that compete while also cooperating" (Porter 1990). It is affirmed that clusters can enable the members to benefit when they appear in those places in which specific infrastructure exists including specialized training foundations, and common infrastructures such as ICT, telecommunications, etc. (Karaev et al. 2007).

As maintained by Zhao and his associates (2010), there is an association between industrial clusters and innovation (Zhao et al. 2010). As a prerequisite to forming a cluster, a suitable business environment can be the foundation for the critical mass of SMEs to emerge. It is highlighted that one of the most indispensable features for more developed clusters is in fact the firms' interaction in cooperative actions for strategic gains. Illustrations of such gains include collective actions, resource sharing, joint development or experimentation, co-production, economies of scale and scope (Fensterseifer 2007). Besides, if it is intended to establish a competent cluster, trust building and beneficial negotiation should be amid the cluster actors, as well as information exchange and determining common strategic purposes. There should also be some agreement on joint development strategy as well as implementing such a strategy systematically and coherently (Karaev et al. 2007).

The other important contributing factor is the existence of enterprise culture within the clusters of SMEs affording a knowledge sharing environment which can enable formation of the SMEs' alliances; consequently, these alliances can make use of emerging business opportunities for their value creating potential (Mason et al. 2008; Park et al. 2012).

The reviewed literature suggests that clustering helps SMEs promote their competitiveness (Campaniaris 2011) while providing them with such advantages as closer working relationships for innovations (Mohannak 2007), and having access to a skilled workforce as well as decreased transportation and transaction expenses (cited in Campaniaris 2011). Also, other benefits of clustering for SMEs include sharing of communal essentials, like a common end product market, labour force, technology, and natural resources. Also, clustering results in competition urging the firms to remain inventive and advance or generate new technology (Porter 1990). Furthermore, clustering leads to cooperation between the firms. Finally, knowledge and technology transfer can be enabled through the social infrastructure within the cluster.

It is also highlighted that formal establishments such as companies, labour unions, and specialized institutes can play a vital role in reinforcing the cooperation between the cluster organizations (Karaev et al. 2007). The social interactions and interpersonal relationships that are forged between people, organisations and sectors

contribute to and foster innovation (Mohannak 2007). Such professional interaction yields profits for the small firms while providing them with the flexibility to enter evolving niche markets once there is a change in both the demand and the technology (Campaniaris 2011).

To be concise, clustered SMEs are said to have unique characteristics; existence of supportive local institutions, availability of specialized suppliers and service providers, access to a skilled workforce, and incentive to compete are but a few of such characteristics (Steinfield & Scupola-Hugger 2005).

1.2.4 Benchmarking in Clusters of SMEs

Today, it is generally accepted that the geographical co-location of the companies can yield a positive effect on the economic performance of the companies in a cluster; there remains no controversy on whether firms within a cluster have higher economic performance than the ones outside the cluster (Andersen et al. 2006). Instead, the discussion hinges around understanding whether it is possible to design a national and/or regional cluster policy which is able to positively affect the performance and outcome of the companies within a cluster (Andersen et al. 2006). When benchmarking concepts and practices are implemented in order to improve mutual actions among establishments involved in a cluster, then joint cooperation, bonds and information exchange, and a developed culture of incessant innovation will all be stimulated among the companies; accordingly, the cluster's collective efficiency will be developed, too (Carpinetti & Oiko 2008).

It is asserted that there is paucity of research combining the needs of SMEs in clusters and benchmarking models. From the literature reviewed, to the best of the author's knowledge, there are only two academic papers dealing with the above mentioned subject. However, benchmarking in clusters differs from cluster benchmarking discussed by Andersen et al. (2006). In this regard, by employing a clustered benchmarking approach, McAdam and O'Neill (2002) endeavoured to examine the value efficiency in a group of building services organizations which resembled each other geographically and administratively. In the above mentioned qualitative research, a strategic benchmarking approach was implemented by the 26

units or councils within the cluster. Afterwards, the researchers established a comparison between the cluster and the best practice UK measures for building services. The study finally concluded that by comparing a single service unit with the best practice, indeed the clustering approach proved to be very advantageous.

Similarly, developing while applying a benchmarking information system which had been primarily designed to be implemented within a cluster was examined through a survey conducted by Carpinetti and Oiko (2008) who succeeded in recommending the application of the concepts related to the business performance improvement for the purpose of managing the clustered companies' performance. In this way, a new approach was proposed by the above mentioned researchers which elaborated on how the so-called collective efficiency of a cluster can be improved. The point to remember is that the above application had a benchmarking information system which involved two main components: while the first component was the database itself which was developed in a SQL server, the second one was a web application developed in Active Server Pages and was designed for remote access to the database. Yet, the aforementioned authors admitted that constructing a database able to remain meaningful for benchmarking purposes could take a long time. Moreover, they affirmed that for collecting as well as inputting the data, management maturity, an organizational culture of performance management, along with systematic procedures are all required, too. Regardless of the highlighted difficulties along with the absence of experience in benchmarking and performance management to be overcome, the above study proves that the majority of organizations were able to become cognizant of the fact that employing the benchmarking system was be a step towards competently managing the cluster's improvement.

1.3 PROBLEM STATEMENT

Against the above backdrop, it seems that SMEs represent the vast majority of firms in most countries and employ a large percentage of the workforce. Particularly in developing countries, SMEs are regarded as stimulating private ownership and entrepreneurial skills. Hence, the SMEs must be supported and empowered through various improvement strategies for sustained economic growth. However, it is obvious that the individual SMEs have typical issues which obstruct them from effectively

competing in the market. The most important issues in this regard entail a lack of skilled human resources, limited financial funds, inadequate training, limited ICT infrastructure, imperfect contacts with suppliers and customers, a need for consultants' assistance, relying on government support, and partial export opportunities. Furthermore, the SMEs often face difficulties in capturing market opportunities, gaining the economies of scale while purchasing inputs, and introducing innovative improvements for their processes and products. Yet, regardless of their obstacles, the SMEs would still be able to survive and compete with large organizations in the market if they accepted the two previously suggested strategies in parallel for their improvement, namely joining clusters and implementing benchmarking.

In this context, SMEs can primarily overcome their inherent limitations with regard to economies of scale and the scope imposed by their size and frequent isolation in order to improve their productivity and competitiveness via clustering. In this case, the involved SMEs can greatly benefit from several amenities offered by clusters which may include co-production and having access to skilled manpower along with having access to financial institutions as well as resource sharing and collective actions which in turn result in lower production and transportation costs; specialized training institutions; communal ICT infrastructure; easy access to suppliers and consultation agencies; and government support, as well. Other facilities of clustered SMEs entail the existence of an appropriate business environment for exporting purposes, sharing common end product markets and technology, knowledge sharing and collaboration for achieving economies of scale, and closer working relationships which can foster innovation as well speedy diffusion of new knowledge.

However, the most difficult process in creating a cluster is to develop sustained collaboration for connecting the SMEs together (Sureephong et al. 2007); in order to fulfil such an objective, the ICTs must be developed. In this context, for a cluster of SMEs, the role of ICT as a powerful instrument for information flow and promotion of joint actions should be particularly determined. Consequently, knowledge sharing will be enhanced along with improvement of the cluster's organizational learning and collective efficiency. In addition, SMEs need to implement benchmarking as a quality management technique if organizational learning of the best practices and continuous

improvement are desired. To this date, it has been admitted that implementing benchmarking yields several benefits for the SMEs. Such benefits include a better understanding of one's own strengths and weaknesses, improving customer satisfaction and supply management, reducing production costs, promoting creativity and innovation, and finally increasing competitive advantages and profitability.

As mentioned above, SMEs encounter some challenges for competitiveness and growth. Paradoxically, despite the growing interest in benchmarking as an efficient quality improvement technique in developed countries, there are fewer SMEs which still trust and utilize it in the transition countries. Presumably this is because implementing benchmarking is costly and time consuming. Correspondingly, individual SMEs face other benchmarking issues such as a low level of willingness to share knowledge and concern about confidentiality. Moreover, implementation of benchmarking needs supporting resources such as the firm's infrastructure, long-term planning, human resource management, along with open interdepartmental communications. In this regard, although the individual SMEs encounter various challenges in implementing benchmarking, they can access most requirements by adopting a cluster approach as well as entering into cluster-based relations. It needs to be asserted that cooperative competition, joint development and collaboration, shared resources and ICTs, trust and knowledge sharing, training institutions, expert consultants, financial institutions, as well as local and national government support can be enlisted as some of the facilities associated with the industrial clusters need for practical benchmarking.

Due to these unique features of industrial clusters, clustered SMEs can implement benchmarking more easily and more effectively, as compared with individual companies. As such, the clustered SMEs need a benchmarking framework which has been especially developed in order to consider their characteristics. Nevertheless, it is proffered later in the next chapter of this research that there is no single existing model for benchmarking which solely and completely addresses the SMEs' particular issues in clusters (refer to sub sections 2.4.3 and 2.4.4).

For that reason, all the facilities and requirements of the clustered SMEs can significantly contribute to combining some of the existing models and developing a

synergistic benchmarking framework, exclusively designed for the features of clustered SMEs. Yet, only one study conducted by Carpinetti and Oiko (2008) has been reported to elaborate on benchmarking implementation amongst the clustered SMEs although they reportedly play significant roles in developing an economy. The point to be highlighted here is that basically, this study does not introduce a benchmarking model for implementation; instead, it attempts to present a benchmarking information system designed for collaborative use within a cluster. Indeed, it is a database including benchmarks and a web application for remote access to the database.

Due to the fact that a lot of benchmarking implementations have not delivered the promised functionality (Deros et al. 2006) and resulted in some costly failures, it is principally essential to identify the factors which lead to successful implementation of benchmarking. By accentuating that the critical success factors (CSFs) of benchmarking implementation within clustered SMEs substantially differ from the others, it can be concluded that development of a comprehensive benchmarking framework for them is required. Few, if any, studies have explored what factors contribute to the success of benchmarking implementation within SME clusters. To this end, this issue still remains a major concern for both academicians and practitioners urging further development of a holistic framework which can thoroughly consider all the characteristics of industrial clusters.

The following is a list of questions raised because of the aforementioned conclusions:

1. What are the SMEs' issues related to the benchmarking implementation, lead performance, ICTs, and learning?
2. What is the definition of LCB (Lead and Collaborative Benchlearning)?
3. What are the CSFs of LCB implementation within the clustered SMEs?
4. For the clustered SMEs, can an LCB Process Framework be proposed and validated?

1.4 RESEARCH OBJECTIVES

The current research aim is to develop a combined framework (named LCB: Lead and Collaborative Benchlearning) for benchmarking implementation within SME clusters. Then the main research objectives in support of the research aim are as follows:

1. To explore the SMEs' issues related to the benchmarking implementation, lead performance, ICTs and learning.
2. To define LCB.
3. To determine the CSFs of LCB implementation within the clustered SMEs.
4. To develop a framework for LCB implementation, the "LCB Process Framework", within the clustered SMEs.
5. To validate the "LCB Process Framework".

1.5 RESEARCH METHODOLOGY

To address the research questions and then achieve the research objectives, this research study was conducted through four main phases, as shown in Figure 1.1.

The first phase of the procedure involved reviewing several sources that were as relevant and current as possible. Through the theoretical study, several data sources were reviewed, including different databases such as Emerald, Elsevier, ScienceDirect, and EBSCO Publishing, as well as ProQuest Dissertations and Theses. Also, some governmental studies and reports, census reports on demographics, and related academic books were studied. The literature survey of the published theories and past empirical studies helped in identifying the gap, as well as formulating the problem, and defining the research objectives.

The second phase, the empirical study, entailed designing and validating the survey questionnaire in order to test the research hypotheses outlined earlier. Next, this phase encompassed running the pilot study followed by refining the research conceptual framework as well as the questionnaire based on the analysis of the obtained results.

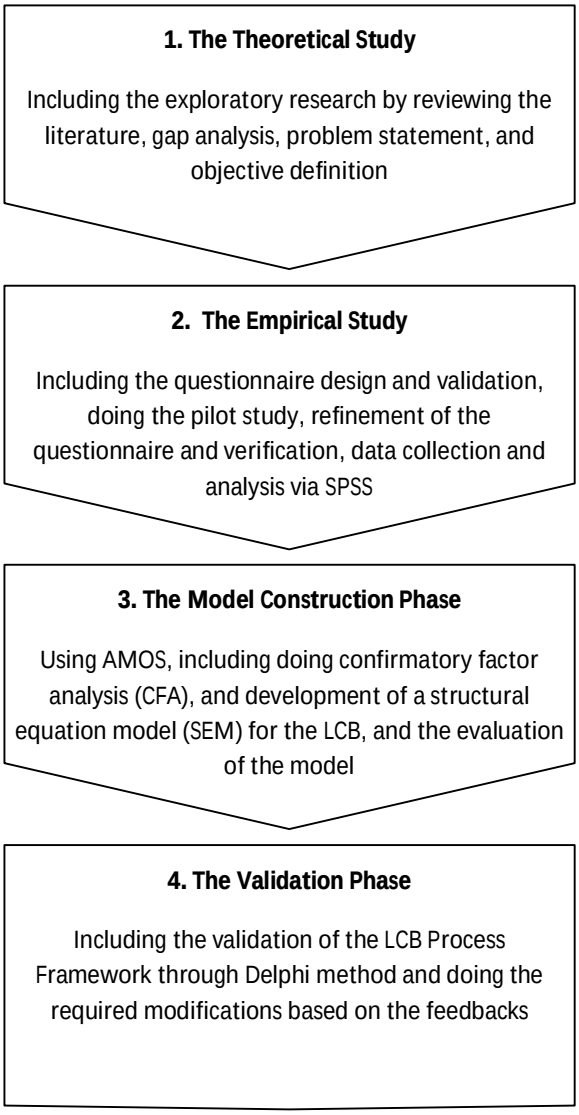

Figure 1.1 The Research Design

Furthermore, other steps of this phase included translation of the questionnaire and then its verification, as well as performing the postal survey questionnaire and data collection. Using SPSS software through EFA and analysis of the obtained data in this phase resulted in defining the constructs (latent variables) related to the LCB as well as the CSFs of the LCB.

The third phase is related to the model construction which was undertaken by constructing an initial model for the CSFs of the LCB. Subsequently, the *Measurement Model* was validated via confirmatory factor analysis (CFA) using the AMOS software. Further, in this phase, a structural equation model (SEM) was developed for the CSFs of the LCB (named CSFs-LCB) which was then assessed based on the goodness-of-fit criteria. The outcome of this phase was establishment of an initial version of a framework for the LCB implementation (namely, the LCB Process Framework) within the clustered SMEs.

Lastly, the fourth phase was to confirm the validity of the LCB Process Framework by assessing it via the Delphi technique. In this context, industrial experts were hired to test the applicability of the LCB Process Framework for use by clustered SMEs.

1.6 RESEARCH ASSUMPTIONS AND SCOPE

The main assumption of this study is that clustered SMEs require a benchmarking tool specifically designed and tailored to their characteristics and requirements. Having this in mind, it is worth mentioning that the delimitations of this study will be as follows:

- The current research is conducted for industrial manufacturers of metal parts. Hence, the data is collected from organizations responsible for manufacturing metal parts and mostly engaged in producing automobile spare parts. The results could be generalized to the other industrial sectors but this should be done only after due consideration of the size of the member organizations, the characteristics of the supply chain issues, management procedures, and relevant required infrastructure such as ICT and the entrepreneurial environment.

- The present research is conducted for clustered SMEs for which the assumption is that there are well-developed business networks involving SMEs and large enterprises, suppliers, financial institutions, training institutions, expert consultants, and government support. Moreover, it is assumed that

competition and cooperation, joint development and collaboration, trust building and constructive dialogue, knowledge sharing, resources, and innovative capabilities are all in their place in the cluster. Hence, this study is not applicable to individual organizations, unless they act in a network which has similar infrastructure such as benchmarking clubs or they create an extended network enterprise (Lai 2010).

- This study is conducted from the perspective of small and medium enterprises (SMEs). The results could be generalized to larger organizations; though some of the identified CSFs affecting the LCB adoption within the clustered SMEs might not be relevant to large organizations.

- The research data of the current study was collected from organizations located in the North East of Iran limiting the applicability of the results to Iran. Nevertheless, these results could be also generalized for other developing and newly industrialized countries after studying the extent and characteristics of the similarities which exist between the government policies, economic policies, social status, goals, business cycles, and cultural aspects.

1.7 SIGNIFICANCE OF THE RESEARCH

The urge to strengthen the SMEs' effectiveness and efficiency has led to the development of a practical benchmarking framework for their sustained improvement. This study of benchmarking methodology is motivated by its increased practitioner use as a continuous improvement tool. The study attempts to increase the body of knowledge of the quality management theory, particularly on a new benchmarking methodology in the context of industrial clusters. In addition, the study explores ICTs' roles in benchmarking implementation within clustered SMEs. It also aims at determining the critical factors influencing the success of benchmarking implementation, particularly within clustered SMEs. It is hoped that the results of the study will also yield significant contributions towards the development of benchmarking theory, its methodology and applications.

By thoroughly regarding the findings through the relevant literature review, it is seems that no such study and/or survey to date has been conducted with reference to

Iranian industrial clusters. Thus, this study provides a direction for research in the use of benchmarking in clustered SMEs in Iran.

In essence, the major contribution of this study is that it is a pioneering attempt to assist benchmarking implementation within industrial clusters by creating a coherent framework that logically links the industrial clusters' desires and various methods of benchmarking for the empirical test. Another contribution of the study would its being one of the first attempts to investigate the role of ICT in benchmarking implementation within clustered SMEs.

In order to better understand the reasons why some organizations utilize benchmarking to learn best practices and improve their performance and efficiency, it is essential to analyze various factors which can influence the success of benchmarking and identify how they can do so. It has been mentioned earlier that while most of the existing studies on benchmarking have ignored the theoretical perspective, they have been more inclined to underline the methodological aspects and development of the tools. Regarding the characteristics of clustered SMEs in developing countries, the current study focuses on developing the benchmarking CSFs while underpinning a framework to support the study. Such a perspective is indeed consistent with the vision of The Fifth Socio-Economic Development Plan of the Islamic Republic of Iran (2010-2015) that aims at developing SMEs as well as promoting clusters for long-term sustainable growth. Yet, there exists little literature that deals with the notion of quality management within the industrial clusters, particularly in the Iranian context, since 2005 when Vision 2025 was introduced. This study provides a document and guideline on benchmarking for the policy makers and administrators, especially in Iran and similar developing and newly industrialized countries.

In a more particular sense, the Iran Small Industries and Industrial Parks Organization (ISIPO), as well as the Industrial Estates' Company of Khorasan Razavi (KIEC 2011) might be well assisted by employing the introduced LCB Process Framework for effective benchmarking implementation among the SME members of the clusters. It is worth mentioning that the LCB Process Framework is a cost-effective and time-efficient way to establish innovative ideas which help facilitate

smooth interaction among different organizations and can simultaneously entail increasing information sharing and common performance, as well. Moreover, the detailed CSFs will provide ideas on what needs to be focused on in order to achieve continuous improvement.

This research also adds to the body of knowledge by providing empirical findings on benchmarking implementation issues. The questionnaire survey data analysis provides mapping of the perceptions of the Iranian firms' managers of benefits, barriers, and enablers for effective benchmarking implementation. The empirical data will also provide information on: (a) the demographic profile of the sample, namely the information related to the extent of the preferred benchmarking methodology as well as its challenges and benefits, learning dimensions, and the ICT implementation within the clustered SMEs; (b) the CSFs that influence the benchmarking implementation within the clustered SMEs; and (c) the descriptive profile and correlation analysis of the investigated factors.

The findings also present a novel benchmarking concept (called the LCB) which is a combination of the three existing models, namely the collaborative benchmarking (CB), lead benchmarking (LB), and benchlearning (BL). The LCB definition will be developed based on structural equation modelling (SEM) which will later be approved statistically. Instead of dealing with a micro-level perspective of the analysis, the structural equation analysis of the assumed relationships between the factors affecting the LCB implementation provides a macro-level perspective.

Based on a generic benchmarking model (adopted from Stapenhurst 2009), and along with some guidelines from Anand and Kodali (2008), the statistically significant model of CSFs-LCB will become a process framework for benchmarking implementation within SMEs clusters. This is a generic process which could also be customized for other developing countries with due consideration. In summary, it can be concluded that this research is a pioneering attempt which theoretically contributes to the body of knowledge by introducing a combined benchmarking framework designed exclusively for the circumstances of industrial clusters.

In addition, this study is undeniably different from other previously conducted studies because it synthesizes the three existing benchmarking models (namely, LB, CB, BL) to define a comprehensive benchmarking framework (namely, LCB); it also examines the relationships between the latent variables.

Furthermore, this study contributes to the development of research methodology since it makes use of triangulation including the semi-structured interviews, the survey technique, and Delphi method in order to study the benchmarking methodology as well as its significant dimensions and indicators.

Moreover, this study examines the interrelationship among the five CSFs of benchmarking implementation, namely, management, employees, government, processes, and communications. Besides, their direct effects on the LCB were also examined by this study. Meanwhile, it needs to be highlighted that, to this date, adopting the Delphi technique to validate the researcher's proposed framework is a rather new approach, to the best of the author's knowledge, as it has only been utilized in one survey (by Hartman & Baldwin 1995) for similar purposes.

This research will provide a basis for further research in the field of benchmarking.

1.8 THE THESIS LAYOUT

Chapter I of this study provides a general introduction by over viewing the challenges faced by benchmarking implementation in SMEs, particularly clustered SMEs. It also presents the research problems and the research objectives. In addition, this chapter deals with the scope of the research and the significance of this study. Finally, this chapter describes the thesis outline.

Chapter II deals with the literature relevant to the characteristics of SMEs and clustered SMEs, the definitions and types of benchmarking methodology, benchlearning, and the CSFs of benchmarking implementation. Moreover, gap analysis and the necessary background to facilitate developing the research questions and then the research framework of this study are also presented in the discussions provided in this chapter.

The Definition of the LCB alongside the theoretical framework used in this study is discussed in **Chapter III** which also elaborates on the relationship between the related CSFs and the LCB, as well as the relationship between the effects caused by change orders. In addition, Chapter III develops and describes the conceptual framework. It also identifies the hypothesised relationships between the variables in the conceptual framework.

Chapter IV presents the research methodology employed in the study. It also presents the research design, the measurement of research variables, the sampling methods, and the data collection procedures. The rest of the chapter deals with the statistical analytical techniques and the tools used for the data analysis.

Following the literature review and development of the conceptual framework for the LCB implementation within the clustered SMEs, a pilot study was undertaken and the results are detailed in **Chapter V**. The role of this study was to refine the conceptual model and test the validity of the questionnaire survey. Employing a questionnaire was achieved through soliciting the perceptions of Malaysian managers on the significance of a number of the CSFs of the LCB implementation. A range of statistical analysis techniques was also utilized to exploit the collected data for the purpose of confirming the model factors and sub-factors and ultimately a model was finalized for the CSFs of the LCB (named the CSFs-LCB).

Chapter VI deals with the empirical analysis of the data which was collected through the questionnaire. The results of the descriptive analysis, the Exploratory Factor Analysis (EFA), and the Confirmatory Factor Analysis (CFA) are documented in this chapter. Furthermore, the structural model of the casual relationships between quantifiable factors affecting the LCB and the LCB's constructs is also tested through structural equation modelling (SEM) along with testing the hypotheses.

Based on the approved structural equation model of the CSFs-LCB, in **Chapter VII** a framework is exhibited to demonstrate the process of implementing the LCB within the SMEs clusters. The proposed LCB Process Framework is validated by the Delphi technique while the related statistical analysis of the experts' responses is reported in this chapter, as well.

C**hapter VIII** summarizes the research study. In the last chapter, the research objectives are assessed and the achievement methods are described. Chapter VIII presents a summary of the findings, significant research contributions and implications of the research at both the theoretical and practical levels. It also discusses the limitation faced by the current study. Finally, this chapter identifies future research scope emanating from this research study.

CHAPTER II

LITERATURE REVIEW

2.1 INTRODUCTION

Until the mid-seventies, the role of small and medium enterprises (SMEs) was insignificant in economic development because the mass production paradigm dominated in the industry that time. When in the early 1980s unemployment rose in Europe, the interest in SMEs increased. Large firms' fragmentation led to the creation of new SMEs (Fathian et al. 2008) and a vision for SME-based economic growth was developed. By particularly supplying the components, parts, and sub-assemblies to larger companies (Gadenne & Sharma 2009; Singh et al. 2010), the SMEs prospected to cooperate with large organizations once the markets became globalized (Singh et al. 2008). This was the case for the reason that the supplied items were manufactured by the SMEs with relatively lower prices in comparison with the in-house production prices (Singh et al. 2010). Up to now, many nations have acknowledged the value of small and medium enterprises. SMEs are known as the engine of the growth for any economy (Okpara 2009) and the backbone of the developed economies worldwide (Saleh & Ndubisi 2006; Singh et al. 2008; Mirbargkar 2009). Further, the SMEs took advantages of synergy effects that could appear once they joined the clusters as they indeed initiated such cooperative relations with other SMEs as well as the associated partner institutions. In reality, the size restrictions experienced by the SMEs could be overcome by such a situation while their overall competitiveness was improved (Karaev et al. 2007), and their challenges connected with globalization and trade liberalization was met.

It is worth noting that the organizations are currently obliged by recent challenging times to be more effective in their actions (Clements 2010) and that they

have to endeavour to remain more competitive in the marketplace compared to previous eras. For the purpose of addressing the augmented pressures imposed by the globalization process as well as comprehensively making use of the opportunities offered by the global market, the SMEs' managers are supposed to reconsider their management techniques. In addition, the SMEs are presently identified by tacit knowledge that is claimed to be linked with the local context intensely while in nature such knowledge is particularly technical. Because of such reasons, the SMEs are forced by the emergence of competitive environments alongside some incidents (e.g. the ever-growing markets globalization) to undertake qualitative development (Garengo et al. 2005). In this regard, one of the most practical management tools is benchmarking, that has been a popular management technique for continuous improvement since its appearance in the 1980s. It is asserted that for supporting the SMEs' qualitative growth as well as addressing the increasing demand for developing advanced and organized administrative policies, benchmarking can be employed as a possible method (Garengo et al. 2005) which is also identified to be vital to maintain incessant quality improvement (Dattakumar & Jagadeesh 2003).

Many authors have contributed to the literature on benchmarking (Gao & Li 2010; Amaral & Sousa 2009). Recent studies demonstrate that benchmarking is used by the majority of organizations in all parts of the world (Gomes & Yasin 2011; Joo et al. 2011; Lockamy III 2011; Moriarty 2011; Shabani et al. 2012; Hong et al. 2012), and many organizations intend to continue the use of benchmarking in the future (Adebanjo et al. 2010). Particularly, in the case of manufacturing sector, a plethora of study exists to demonstrate the application of benchmarking (Gurumurthy & Kodali 2009). Benchmarking is based on a simple theory, "to know the road ahead, ask those coming back" (a Chinese proverb). In other words, it is wise to learn from the experiences of others rather than trying to reinvent the wheel (Karlof & Lovingsson 2006). Essentially, the organizations constantly strive to challenge their practices through benchmarking that is a learning process and they try to evaluate such practices in relation to best practices. Undeniably, benchmarking introduces new ideas and methods of improvement to the SMEs. By demonstrating the methods which have been already tested for solving the problems, benchmarking also helps the organizations to successfully avoid resistance to change (Karlof & Lovingsson

2006). Yet, benchmarks in many organizations revolve around hard data instead of soft data while they mostly overlook non-financial procedures, among which the customer's satisfaction, human resources, along with innovation (Moffett et al. 2008). Hence, to address future changes, benchmarking needs a re-conceptualization through focusing on lead performance measures.

In this context, this chapter reviews previous studies in four main parts. The first section investigates the SMEs' characteristics and importance, the issues and challenges related to the SMEs' growth, and the ICT's role in development of SMEs. In the second section, definition of clusters and their features are followed by the role of clusters in SME development as well as the role of the ICT in cluster development. Next, after a historical review of the benchmarking progress, in the third section, classification of benchmarking methodologies as well as benchmarking frameworks and tools are illustrated from different angles. Following them, The role of ICT in benchmarking implementation is reviewed and summarized. The fourth part of this chapter defining the benchlearning concept, discusses the benchlearning methodology and its legacy from benchmarking. Eventually, the literature review is concluded by a thorough summary including the gap definition and research questions.

2.2 SMALL AND MEDIUM ENTERPRISES

The small and medium enterprises, the SMEs, are found in every sector of the economy and play a critical role in economic development of countries. Since the SMEs provide employment and build a considerable contribution to exports and business (Jain 2007), they are crucial for vitality as well as sustained and long-term growth (Thassanabanjong et al. 2009). Generally, in developing countries, the SMEs account for more than 90% of all industrial enterprises, more than 70% of industrial employment, and more than 50% of industrial output (UNIDO 2003). As such, in developed countries, the SMEs usually employ a large percentage of the workforce. For instance, the SMEs in Australia employ nearly 49 per cent of all private sector employees (ABS 2008). In the European Union, the SMEs contribute to two-thirds of all employment (Carayannis et al. 2006). In addition, within the US economy, the SMEs account for the vast majority of firms and approximately half of the gross domestic product (GDP) is generated by non-agricultural sectors (Hammer et al.

2010). Accordingly, for economic development, the SMEs must be supported as "one of the major driving forces of motivating private ownership and commercial skills" (Gadenne & Sharma 2010).

2.2.1 Definitions of SMEs

Although the term SME refers to small and medium enterprise, there are a number of definitions provided for SME (Deros et al. 2006; Jafari et al. 2007; Fathian et al. 2008). Besides, definition of SMEs varies between countries (Thassanabanjong et al. 2009; Mirbargkar 2009; Ghanatabadai 2005; Fink & Dosterer 2006; Duan et al. 2002), so, many countries have their own definition of what constitutes an SME. Although some countries discriminate between manufacturing and service SMEs in addition to the industries types, the most typical criterion to define the SMEs is the number of employees involved (Campaniaris 2011). Table 2.1 presents various definitions of SMEs in the manufacturing sector of selected countries, including USA, EU, Australia, Malaysia, Iran and Indonesia. The table shows that the SMEs may be defined in a number of ways such as definition based on number of employees, turnover, and other quantitative and qualitative measures. However, the number of employees is the most commonly taken criteria for defining the SMEs.

As cited by most Iranian researchers (i.e. Ghanatabadi 2005; Mirbargkar 2009; Ale Ebrahim et al. 2010; Abbasi et al. 2010), there is little unanimity regarding the definitions of the SMEs in Iran. For instance, the Ministry of Industry and Mines as well as the Ministry of Agricultural Jihad have defined the SMEs as industrial and service enterprises having fewer than 50 employees. However, the Iranian Statistical Yearbook for year 1378 (1999/2000), categorized the businesses into four classes, namely the businesses with 1to 9 employees, 10 to 49 employees, 50 to 99 employees, and more than 100 workers. Hence, in the absence of a definitive classification of the SMEs in Iran, this study accepts the definitions provided by the Ministry of Industry and Mines and the Ministry of Agricultural Jihad for small firms as well as the European Union criteria for medium firms classification. It needs to be asserted that this is also in line with other Iranian researchers (i.e. UNIDO 2003; Ghanatabadi 2005; Ale Ebrahim et al. 2010; Abbasi et al. 2010) in the context of SMEs' definition. Accordingly, for the purposes of this study small firms were the businesses

employing fewer than 50 employees while the medium firms are demarcated to be those that hire fewer than 250 persons.

Table 2.1 Definition of SMEs in the Selected Countries

Source: Ale Ebrahim et al. 2010

Country	Category of Enterprise	Number of Employees	Turnover	Other Measures
USA	Small	Fewer than 500		
USA	Medium	500 – 2499		
EU*	Small	10 – 50	Less than € 10 (13.5 USD) million turnover	Less than € 10 (13.5 USD) million bst**
EU	Medium	Fewer than 250	Less than € 50 (67.6 USD) million turnover	Less than € 43 (58.2 USD) million bst
Australia	Small	5 – 20		
Australia	Medium	Fewer than 200		
Malaysia	Small	5 – 50	Between RM 250,000 and less than RM 10 million	
Malaysia	Medium	50 – 150	Between RM 10 million and RM 25 million	
Iran	Small	Fewer than 10 or 50		
Iran	Medium	10 – 100 or 50 - 250		
Indonesia	Small	5 – 19		avs*** of a maximum of IDR1 billion (110,000 USD)
Indonesia	Medium	20 – 99		avs of more than IDR1 billion, but less than IDR50 billion (5.5 million USD)

* EU: European Union, **bst: balance sheet total, ***avs: annual value of sales

2.2.2 Characteristics and Significance of SMEs

The SMEs' effectiveness is widely acknowledged by the literature (Cagliano et al. 2001; Ghazinoory 2004; Ghanatabadi 2005; Deros et al. 2006; Fathian et al. 2008; Feizpour & Mahmoudi 2008; Sanayei & Rajabion 2009; Okpara 2009; Singh et al. 2010). SMEs are vital for each country's economy (Akhavan & Jafari 2008), and particularly to the developing ones (Fathian et al. 2008; Gadenne & Sharma 2009). For developing economies, the SMEs often present the only sensible prospects for rises in employment and value-added (UNIDO 2003; Mirbargkar 2009). Development of the SMEs is a key factor in the economic growth and innovation. In the manufacturing sector, the small and medium enterprises form critical linkages between industries by running as suppliers of parts and sub-assemblies to larger companies (Gadenne & Sharma 2009; Singh et al. 2010; Sohail & Boon Hoong 2003; Saleh & Ndubisi 2006). As noted by Okpara (2009), the SMEs' benefits in an economy include fosterage of entrepreneurial and managerial talents, establishment of

jobs at a low capital cost, reducing income disparities, and the training of skilled and semi-skilled workers for future industrial development. Additionally, the SMEs have consistently proven their ability of innovation and introducing of new technologies to the market (Ochoa-Laburu et al. 2005).

Fundamentally, the success of the SMEs depends on the form of the entrepreneurs/owners, who manage the activities of the company. Therefore, instead of being formal, in SMEs the decision-making processes are somewhat centralized while the bases for such decisions are laid on the managers' personal expertise and experience (Garengo et al. 2005). As cited in Garengo et al. (2005), the SMEs have individual characteristics such as unstructured processes, informal relationships, simple organizational structure, informal control systems, focusing on technical aspects and production, compete based on cost and manufacturing capability, and learning by doing (Cagliano et al. 2001; Ghobadian & Gallear 1997). In comparison with large organizations, SMEs' unpretentious systems and procedures bring in flexibility, instant feedback, a short chain for policymaking, better perceptions as well as prompt reaction concerning the customers' requirements (Singh et al. 2008; Okpara 2009). In addition to be ensured of a stable macroeconomic environment through government intervention and governance arrangements, the SMEs need to invite external consultants for the purpose of recognizing actual improvement areas; afterwards, the SMEs are required to transform them into effective actions (Maire et al. 2008).

Comparing the SMEs with large organizations, Deros et al. (2006) concluded that SMEs differ in consideration of their systems, procedures, structures, cultures alongside their behaviour, human resources, and finally the market and customers (refer to Table 2.2). In summary, some common characteristics of the SMEs include emerging out of individual initiatives and skills, greater operational flexibility, high propensity to adopt technology, high capacity to innovate export, high employment orientation, utilization of locally available human and material resources, reduction of regional imbalances (Ankur 2010), as well as resilience to shocks and crisis. Regarding the SMEs' particular characteristics, it can be concluded that their required improvement activities must be specific to their circumstances.

Table 2.2 SMEs' Characteristics, Strengths and Weaknesses versus Large Organizations

Source: Deros et al. 2006

SMEs characteristics	**Strengths**	**Weaknesses**
Structure Flat with very few layers of management, top management highly visible and close to the point of delivery Less delegation Division of activities limited and unclear Low degree of specification Flexible structure and information flows Strategic process incremental and heuristic	Faster communication line, quick decision-making process, faster implementation Short decision-making chain High incidence of innovativeness and unified culture Very few interest groups Breeding ground for new business ventures and entrepreneurs	Low specialisation may result in lack of experience in change initiatives Need outside assistance Owner controls everything and lacks delegation can stifle growth Lack of capital and credit facilities
Systems and processes Activities and operations not governed by formal rules and procedures Low degree of standardization and formalization People-dominated Simple planning and control system Incidences of "gut feeling" decisions are more prevalent Informal evaluation, control, and reporting procedure Flexible and adaptable processes	Simple system encourage innovation, allows flexibility and speed of response to customer needs/demands Act as training ground for new entrepreneurs and workers	Lack of proper system – difficulty in ensuring efficiency of work, and high variability in work outcome Lack of proper/effective time and cash flow management "Gut feeling" approach may result in wrong decisions Limited application of new technology Inadequate infrastructure Shortage of new materials
Culture and behaviour Operations and behaviour of employees influence by owners'/managers' ethos and outlook Organic, not strong departmental/functional mind-set, corporate mind-set Unified/fluid culture Result-oriented	Corporate mind-set is conducive for new change initiatives High staff loyalty and hard work to company As a seed-bed from which large companies grow As a group provides significant economic output and savings in foreign exchange	Lack of managerial and technical expertise Uncommitted or dictatorial owner/manager ethos can damage new initiatives Danger when loyalties and emotional ties are place above competence and performance
Human resources High personal authority and commitment of the owner Few decision makers Dominated by pioneers and entrepreneurs Individual creativity encourages and high incidences of innovativeness Modest human capital, financial resources and know-how Individuals normally can see the results of their endeavours Low incidence of unionisation Low degree of resistance to change More generalists, some staff may cover more than one department	High authority, commitment and responsibility can creates cohesion and enhance common purposes amongst the workforce to ensure job is done Innovative environment will support improvement culture Early union involvement needed to ensure success Fewer employees – better relationship, knows almost everyone Provides employment opportunities	Lack of financial support, e.g. no training budget, ad hoc, and small-scale approach can stifle improvement efforts Improvement needs investment in human resources Shortage of skilled workers
Market and customers Span of activities narrow Limited external contacts Normally dependent on small customer based on close contact, easily accessible and many known customers personally Product and services mostly for local market, few national or international	Immediate feedback from customers Able to respond quicker Understand better customer needs Aid to large companies Stimulate market competition	Marketing constraints and knowledge International marketing extensive, after sales support not as extensive as large businesses Easily suppressed and dictated by larger multinationals (if they are customers), e.g. product cost, etc.

2.2.3 Barriers to SMEs' Growth

Although the SMEs are playing an increasingly more significant role in the economic development, only few have achieved a high growth. The main barriers to a sustainable growth in the SME sector are resource constraints in terms of finance, time, people, and a general lack of knowledge (Khan et al. 2007). Such obstacles hinder the SMEs from adopting new technologies required for improvement (Grando & Belvedere 2006; Fawcett et al. 2009). More especially, the SMEs in developing countries need government's supporting programs. In addition, the SMEs suffer from an insufficient management resources, long-term strategies (McAdam & Kelly 2002), and strategic information shortage (McNamee et al. 2003). As well, SMEs typically intend to either work for local niches or advance the somewhat narrow specialties (Singh et al. 2010; Cagliano et al. 2001). Yet, the SMEs often work under the restrictions imposed by a flat organizational structure as well as operating under the absence of technical know-how and novelty as well as dealing with condensed intellectual capital. It is declared that the employees are habitually incapable of identifying their short or mid-term occupational objectives; therefore, they will be discouraged by the SMEs' flat structure. However, sometimes, "the direct involvement of the owner(s), coupled with flat hierarchical structures and less number of people ensure that there is greater operational flexibility" (Ankur 2010). Singh et al. (2008) noted that the major problems in SMEs are normally associated with the product design as well as the development competence, training infrastructure, and finally networking. Moreover, the SMEs do not peruse any comprehensive framework for quantifying their competitiveness and development of their strategies (Singh et al. 2008). In addition, there are other obstacles for the competitiveness of SMEs, including failing to address the need for multiple technological capabilities as well as having systems which are immature to transfer the technology. Besides, they suffer a lack of management aptitude (Singh et al. 2010). Some of these barriers are also reflected in the study done by Deros et al. (2006) with the addition of repeated raw material shortages, managements with limited knowledge in new improvement methodologies, having no knowledge related to the marketing techniques alongside having lowly access to channels for distribution and market information. Other barriers to the growth in the SMEs include low level of ICT usage, organizational

resistance to change, paucity of perceived return on investment and not knowing the quality management tools (such as benchmarking) and their advantages.

This literature review highlights the need to motivate the processes of the qualitative growth in the SMEs (Garengo et al. 2005). In the global marketplace, the SMEs may continue to thrive by accelerating their re-invention of business strategies (NSDC 2007) to find new way of growth via the best practice benchmarking.

2.2.4 Growth Challenges of SMEs in Iran

The small and medium enterprises constitute more than 90 per cent of all the enterprises in Iran (Bayati & Taghavi 2007) and then, they have a vital role in the development of the country. However, in the past, mostly due to several political problems, they were neglected by the government. Analysing the root causes of the underdevelopment of SMEs revealed that until the fourth development plan in Iran (before 2005), the government policies were mainly directed towards large enterprises (LEs). Economic planners and policy makers looked at the SMEs as peripheral institutions whose economic contributions were limited to creating low-tech jobs (UNIDO 2003). In addition, there was still a lack of interest in academic circles in studying issues related to the SME's development. These factors inhibited the creation of an enabling environment for the SMEs in Iran. For example, as reported in Table 2.3, in 2002, 99.2% of all the businesses were SMEs with 1 to 49 employees, whereas the total of large enterprises (LEs) with more than 50 employees amounted to only 0.8%. However, in 2007, 87.7% of the firms were SMEs, whilst 12.3% were LEs. As well, Table 2.3 presents this fact that in 2002, 63.4% of all the workers was employed in the businesses with fewer than 50 employees, while in 2007, 62.4% of employees worked in the SME sector. Surprisingly, a particularly dramatic decrease was recorded in the number of the SMEs after 5 years, whereas, number of the large enterprises (the firms with more than 50 employees) increased slightly in 2007. This suggests that with such dispiriting trends, there is an urgent need to support the SME sector for continuing to survive.

Table 2.3 Comparison between Shares of Iranian Firms in Total Value Added in 2002 and 2007

Source: UNIDO 2003

Explanation	**Year 2002**			**Year 2007**		
	No. of Firms	**No. of Employees** (Thousand)	**Value Added** (Billion Rials)	**No. of Firms**	**No. of Employees** (Thousand)	**Value Added** (Billion Rials)
SMEs	438939	1364.3	38596.5	28208	1338.0	292905.4
LEs	3483	787.2	97199.0	3906	804.8	245893.0
Total	442422	2151.5	135795.5	32114	2142.8	538798.4
Percentage of SMEs /Total	99.2%	63.4%	28.4%	87.7%	62.4%	54.4%
Percentage of LEs/Total	0.8%	36.6%	71.6%	12.3%	37.6%	45.6%

In this regards, according to the UNIDO's (the United Nations Industrial Development Organization) analysis, Iranian SMEs have faced several difficulties in their struggle for survival, growth, and development. These barriers are summarized into the following five categories (UNIDO 2003):

1. Market barriers, referring to market restrictions such as contracts, price, and controls;
2. Financial barriers, related to various financial obstacles faced by the SMEs such as a lack of appropriate banking services;
3. Barriers arising from a lack of information needed by the SME managers;
4. Barriers resulting from inappropriate government interventions; and
5. Legal barriers to the SME development.

Table 2.4 illustrates these obstacles and gives a thorough analysis of the barriers which prevent the SME development in Iran.

Table 2.4 Barriers to SME Development in Iran

Source: UNIDO 2003

No.	Major Barrier	Explanations
1	Market Barriers	• Existence of purchasing monopolies (monopolies) • Stringent nature of contracts SMEs have to conclude with large enterprises (LEs) • Existence of monopolized markets in various sectors • Fluctuations in supply and demand, specifically in the food industry • Government subsidization of state owned companies, resulting in unfair competition • Lack of marketing mechanisms and resulting inability to access national and international distribution channels • Smaller volume in raw material purchases resulting in higher prices
2	Financial Barriers	▪ Lack of commercial and specialized banks that would lend money to SMEs, and similar loan criteria for all categories of firms ▪ Smaller firms have great difficulties in offering collateral for loans ▪ Mounting liquidity pressure on SMEs following the adoption of contractionary macro-economic policies by the government ▪ Delays in receipt of income from sales, leading to inability of banks to secure loans and liquidity pressure on SMEs, which drives them towards more expensive unofficial markets; ▪ Absence of joint ventures and lack of government facilities for forging joint ventures ▪ Weak business environment for SMEs
3	Lack of access to Information	• Marketing information (on domestic and foreign markets, price structures, packaging requirements, etc) • Information on the financial and technological standing of SMEs to enable investors to select healthy businesses for their investment • Technical and scientific information • Information on raw material suppliers and buyers
4	Government Policies	▪ Inability to create an enabling environment for SMEs ▪ Policies that are harmful to SMEs, e.g. subsidies for state-owned firms ▪ SMEs often have to refer to various government agencies for a variety of reasons, but often lack the necessary workforce or bureaucratic skills to negotiate effectively with these organizations ▪ Although the overall rate of tax collection is not high in Iran, the unequal collection of tax places a burden on firms that report their revenue status transparently and eventually encourages large-scale tax evasion ▪ The administrative hurdles for the collection of duties and the lack of institutions to resolve possible disputes arising from arbitrary decisions
5	Legal Barriers	• Complicated registration for entering into the tender business • The need for any start-up company to have a Board of Directors • The need for start-up companies to have at least two partners • Time-consuming registration procedures requiring up to three months to register a business • Lack of specialized courts to deal with trade disputes • Obsolete trade laws • Absence of a meaningful codification system • Inappropriate legal position of shareholders/mangers • Lack of consistent and comprehensive legal framework for SMEs • Lack of differentiation between SMEs and LSEs in tax laws • Rigid and inflexible labour laws

By international standards, these data suggest that the SME sector has a tremendous potential for the growth in Iran. Nowadays, Iran's government promotes and supports the SME growth as part of its overall national development strategy. In this context, *The Fifth Socio-Economic Development Plan of the Islamic Republic of*

Iran (2010-2015) (UNIDO 2007) sets the guidelines for building 50 new industrial parks by 2015 and assigns $70 billion/700,000 billion Rials investment in mining and industry. The five-year plan is part of the "Vision 2025", a plan for the long-term sustainable growth. To achieve these objectives, the SME development policies must be implemented. In this context, main policies of the ISPIO, the *Iran Small Industries and Industrial Parks Organization* (www.sme.ir), are listed below:

- Creating a healthy environment for the development of the SMEs.
- Promoting entrepreneurship and developing human resources in small industries.
- Strengthening the SME's management capabilities.
- Market development and promoting the business networks, industrial clusters as well as subcontracting.
- Enhancing the SMEs' information technology capabilities.
- Developing and improving technological capacities of the small industries.
- Supporting the start-ups and providing suitable mechanisms for venture activities.
- Providing necessary infrastructures by establishing industrial parks/regions whether public or specialized, technology parks, technology and business service centres as well as ready-made workshops.

In this regard, to create a favourable climate for the SME growth in Iran, the UNIDO has suggested supporting the cluster development for the SMEs, as well as setting up science and technology parks, developing business networks, and technology transfer amongst the others.

2.2.5 Application of ICTs among SMEs

Nowadays businesses are increasingly relying on information technologies for their survival (Phukan & Dhillon 2002). Much attention has been given over the years to the successful adoption and use of information and communication technologies (ICTs) by organizations (Fink & Disterer 2006) for driving the global competitiveness