

KNOWLEDGE QUALITY EFFECT ON SMALL AND MEDIUM-SIZED
ENTERPRISES' COMPETITIVENESS THROUGH IMPROVISATIONAL
CREATIVITY, COMPOSITIONAL CREATIVITY AND INNOVATION

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DEDICATION

To my parents for their love and support

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ABSTRACT

The concept of competitiveness involves the level of creative actions and ability to produce quality goods and services. For Small and Medium Enterprises (SME), competitive advantage is contingent upon their timely decisions and speed-to-market production capabilities. Many researchers have considered competitiveness as the degree of creativity and innovation. In recent years, the concept of quality has been synthesized with data, information, and knowledge while advancements in knowledge management concepts have made it necessary to consider knowledge quality (KQ) as well. A sample of 358 Malaysian SMEs was used applying partial least squares (PLS) approach which is a variance based structural equation modeling method. This thesis proposes that organizational factors such as absorptive capacity (AC), functional diversity (FD), knowledge network (KN), organizational structure (OS), organizational culture (OC), and technology utilization (TU) influence the sense-making activities (KQ dimensions) of business entities. This research combined theories of sense making, creativity, and organizational improvisation and developed a cogent model helping to understand and examine the structural relationships between organizational factors, KQ, and competitiveness. The findings indicate that TU, AC, FD, and OC are significant contributors to sense-making activities of Malaysian SMEs and TU, AC, and OC are found to be indirectly significant with improvisational creativity (IC), compositional creativity (CC), and innovation. Actionable KQ and accessibility KQ are found as mediators to the relationship between intrinsic KQ, contextual KQ, and IC and CC. The results of PLS-multi group analysis show a discrepancy between the results of Malay and Chinese ethnic groups. Finally, importance-performance map analysis indicates that IC and actionable KQ have the highest importance on Malaysian SMEs' innovation.

ABSTRAK

Konsep daya saing melibatkan tahap tindakan kreatif dan keupayaan untuk menghasilkan barangan dan perkhidmatan yang berkualiti. Bagi Perusahaan Kecil dan Sederhana (PKS), kelebihan daya saing adalah bergantung kepada keputusan yang tepat pada masanya dan keupayaan pengeluaran pantas ke pasaran. Ramai penyelidik mengambil kira daya saing di tahap kreativiti dan inovasi. Kebelakangan ini, konsep kualiti telah disintesis dengan data, maklumat dan pengetahuan manakalagemajuan dalam konsep pengurusan pengetahuan menjadikan pertimbangan kualiti pengetahuan (KQ) penting. Sampel kajian terdiri daripada 358 PKS Malaysia digunakan menggunakan pendekatan *partial least squares* (PLS), pemodelan persamaan struktur kaedah berasaskanvarians. Tesis ini mencadangkan bahawa faktor organisasi seperti keupayaan penyerapan (AC), kepelbagaian fungsi (FD), rangkaian pengetahuan (KN), struktur organisasi (OS), budaya organisasi (OC), dan penggunaan teknologi (TU) mempengaruhi aktiviti membuat pertimbangan (dimensi KQ) bagi entiti perniagaan. Kajian ini menggabungkan teori membuat pertimbangan, kreativiti, dan penambahbaikan organisasi untuk menghasilkan satu model yang meyakinkan dalam membantu memahami dan mengkaji hubungan antara faktor struktur organisasi, KQ, dan daya saing. Dapatan kajian menunjukkan bahawa TU, AC, FD, dan OC merupakan penyumbang besar kepada aktiviti membuat pertimbangan PKS. Akhir sekali, TU, AC, dan OC didapati signifikan tidak secara langsung dengan kreativiti penambah baik (IC), kreativiti kerencaman (CC), dan inovasi.KQ boleh tinda dan KQ Kebolehcapaian ditemui sebagai mediator kepada hubungan antara KQ intrinsik, KQ kontekstual, dan IC dan CC. Keputusan PLS-pelbagai analisis kumpulan menunjukkan percanggahan antara keputusan Melayu kumpulan etnik Melayu dan Cina. Akhir sekali, Peta kepentingan Prestasi analisis menunjukkan bahawa IC dan KQ boleh tinda mempunyai kepentingan yang paling tinggi kepada inovasi PKS Malaysia.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	ABSTRAK	vi
	TABLE OF CONTENTS	vii
	LIST OF TABLES	xii
	LIST OF FIGURES	xv
	LIST OF ABBREVIATIONS	xvi
	LIST OF APPENDICES	xviii
1	INTRODUCTION	1
	1.1 Introduction	1
	1.2 Role of SMEs in Competitive Landscape	2
	1.3 Malaysian SMEs' Competitiveness	3
	1.4 Statement of the Problem	4
	1.4.1 Challenges Facing Malaysian SMEs	5
	1.5 Research Questions	7
	1.6 Research Objectives	8
	1.7 Significance of Study	8
	1.8 Scope of Study	9
	1.9 The Structure of the Thesis	10
	1.10 Definitions of the Terms	11
	1.11 Summary	12
2	LITERATURE REVIEW	13
	2.1 Introduction	13

2.2	Overview of Total Quality	13
2.2.1	Costs of Poor Quality Information and Knowledge	14
2.2.2	The Purpose of Total Information Quality Management	15
2.2.3	TIQM Principles	17
2.2.3.1	Universal Principles of Quality Management	17
2.2.4	TIQM Processes	23
2.2.5	Evaluating IQ Methodologies	24
2.3	Data Quality	25
2.3.1	Dimensions of Data Quality	26
2.4	Information Quality	28
2.4.1	Dimensions of Information Quality	29
2.5	Knowledge Quality	30
2.5.1	TKQM	31
2.5.2	Dimensions of KQ	33
2.5.2.1	Intrinsic KQ	33
2.5.2.2	Contextual KQ	35
2.5.2.3	Actionable KQ	36
2.5.2.4	Accessibility KQ	36
2.6	Determinants of KQ and Related Theories	37
2.6.1	Functional Diversity	37
2.6.2	Absorptive Capacity	39
2.6.3	Knowledge Network	40
2.6.4	Organizational Structure	42
2.6.5	Organizational Culture	44
2.6.6	Technology Utilization	46
2.7	SMEs	47
2.7.1	Malaysian SMEs	49
2.7.2	Competitiveness in SMEs	50
2.8	Creativity	51
2.8.1	Improvisational Creativity and Related Theories	52
2.8.1.1	History of Organizational Improvisation	53
2.8.1.2	Definition of Organizational Improvisation	54
2.8.1.3	Types of Improvisation	58

2.8.1.4	Required Settings for Improvisation	59
2.8.1.5	Elements Impacting Quality of Improvisation	60
2.8.2	Compositional Creativity	63
2.9	Innovation	67
2.10	Summary	70
3	METHODOLOGY	71
3.1	Introduction	71
3.2	Research Process	71
3.3	Research Design	72
3.3.1	Type of Investigation	73
3.3.2	Study Setting: Contrived Vs. Non-contrived	74
3.3.3	Time Horizon	74
3.4	Previous Theoretical Models	74
3.5	Theoretical Model of this Study	79
3.5.1	Dependent, Mediating and Independent Variables	81
3.5.2	Hypotheses	81
3.6	Sampling Procedures	90
3.6.1	Probability Sampling	91
3.6.2	Population	91
3.6.3	Unit of Study	92
3.6.4	Sample Size	92
3.7	Data Collection Methods	93
3.8	Sources of Data	93
3.8.1	Primary Data	94
3.8.2	Secondary Data	98
3.9	Questionnaire Development	98
3.9.1	Reliability and Validity	100
3.9.2	Pre-Test and Pilot Test	101
3.10	Data Analysis	104
3.10.1	Partial Least Square-Structural Equation Modeling (PLS-SEM)	105
3.11	Summary	106

4	ANALYSIS	107
	4.1 Introduction	107
	4.2 Demographics	107
	4.3 Case Screening	108
	4.3.1 Missing Data in Rows	108
	4.3.2 Unengaged Responses	109
	4.4 Variable Screening	109
	4.4.1 Missing Data in Columns	109
	4.4.2 Outliers	110
	4.4.3 Normality	111
	4.4.4 Common Method Bias	111
	4.4.5 Non-Response Bias	113
	4.5 Reliability and Validity of Formative Constructs	114
	4.5.1 Indicator Significance	114
	4.5.2 Test of Collinearity	115
	4.5.3 Indicator Relevance	118
	4.6 Sample Size	121
	4.7 Detecting Multi-Collinearity of Reflective Measurement Items	122
	4.8 Reliability and Validity of Measurement Model	125
	4.9 Structural Model Assessment	128
	4.9.1 Results of Bootstrapping	129
	4.9.2 R^2 Values, f^2 Effect Size, q^2 , and Q^2	131
	4.9.3 Goodness of Fit in PLS-SEM (SRMR)	134
	4.10 Mediation Analysis	134
	4.11 Importance-Performance Map Analysis (IPMA)	141
	4.12 PLS Multi-Group Analysis (PLS-MGA)	144
	4.13 Post-Hoc Power Analysis	146
	4.14 Conclusion	147
5	CONCLUSION	149
	5.1 Introduction	149
	5.2 Overview of Findings	149

5.2.1 Findings on the Discrepancies of Demographic Variables	149
5.2.2 Structural Model Assessment	151
5.2.3 Discussion on Test of Hypotheses	151
5.2.4 Mediation Hypotheses	158
5.2.5 Predictive Accuracy	160
5.3 Contribution of the Study	161
5.3.1 Theoretical Contribution	161
5.3.2 Practical Contribution	163
5.3.3 Managerial Implications	164
5.4 Addressing Research Questions	165
5.5 Limitations	166
5.6 Future Research	166
5.7 Conclusion	167
REFERENCES	169
Appendices A - D	200 - 212

LIST OF TABLES

TABLE NO.	TITLE	PAGE
2.1	European Union's definition of SMEs	48
2.2	Malaysian SMEs definition	50
2.3	Organizational perspective of improvisation	54
2.4	Psychological, sociological, and other perspectives of improvisation	57
3.1	List of companies in electronic and telecommunication industry of W.P. Kuala Lumpur page1	94
3.2	List of companies in electronic and telecommunication industry of W.P. Kuala Lumpur page 2	95
3.3	Number of companies with complete profiles	97
3.4	Items of questionnaire	99
3.5	Cronbach's Alpha of pilot study	102
3.6	Validity results of the pilot study	103
4.1	Demographic information	108
4.2	Univariate Statistics for missing values	110
4.3	Descriptive regarding outliers and normality	110
4.4	Testing Harman's one-factor	112
4.5	Indicator significance of formative items	115
4.6	Collinearity for intrinsic KQ ^a	116
4.7	Collinearity for contextual KQ ^a	116
4.8	Collinearity for actionable KQ ^a	117
4.9	Collinearity for actionable KQ ^a	117
4.10	Bivariate correlation of intrinsic KQ	118
4.11	Bivariate correlation of contextual KQ	119
4.12	Bivariate correlation of actionable KQ	120
4.13	Bivariate correlation of actionable KQ	120

4.14	AVE, composite reliability (CR), and Cronbach's Alpha (CA), and discriminant validity	125
4.15	Item loadings, cross loadings, and VIF for each item	126
4.16	Heterotrait-Monotrait Ratio (HTMT)	127
4.17	HTMT confidence intervals	127
4.18	Results of bootstrapping	129
4.19	Significance testing results of the total effects of exogenous constructs on target constructs	131
4.20	R^2 and Q^2 values	132
4.21	f^2 effect size	133
4.22	q^2 effect size	133
4.23	SRMR value and bootstrapping result	134
4.24	Mediation analysis of contextual KQ for the relationship between intrinsic KQ and improvisational creativity	135
4.25	Mediation analysis of contextual KQ for the relationship between intrinsic KQ and compositional creativity	136
4.26	Mediation analysis of actionable KQ for the relationship between intrinsic KQ and improvisational creativity	136
4.27	Mediation analysis of actionable KQ for the relationship between intrinsic KQ and compositional creativity	137
4.28	Mediation analysis of accessibility KQ for the relationship between intrinsic KQ and improvisational creativity	138
4.29	Mediation analysis of accessibility KQ for the relationship between intrinsic KQ and compositional creativity	138
4.30	Mediation analysis of actionable KQ for the relationship between contextual KQ and improvisational creativity	139
4.31	Mediation analysis of actionable KQ for the relationship between contextual KQ and compositional creativity	139
4.32	Mediation analysis of accessibility KQ for the relationship between contextual KQ and improvisational creativity	140
4.33	Mediation analysis of accessibility KQ for the relationship between contextual KQ and compositional creativity	141
4.34	Result of IPMA for innovation as a target construct	142

4.35	Result of IPMA for improvisational creativity as a target construct	143
4.36	Results of IPMA for compositional creativity as a target construct	144
4.37	PLS-MGA results for two ethnic groups	145
4.38	Post-hoc power analysis	147

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
2.1	Degree of improvisation	63
2.2	Classification of improvisation and composition activities	66
2.3	Improvisational creativity, adapted from Amabile's theory of creativity	67
2.4	Amabile (1997) model of creativity to innovation	69
3.1	Research process for the study	72
3.2	KQ on firm performance	75
3.3	KQ in project teams	76
3.4	Knowledge sharing, KQ, and innovativeness	77
3.5	Improvisational creativity	78
3.6	A unified KM model in SMEs	79
3.7	Theoretical model	80
3.8	A sample of company profile	96
4.1	Measurement model before deleting items	123
4.2	Main measurement model for analysis	124
4.3	IPMA for innovation as a target construct	142
4.4	IPMA for improvisational creativity as a target construct	143
4.5	IPMA for compositional creativity as a target construct	144

LIST OF ABBREVIATIONS

AC	-	Absorptive capacity
AccKQ	-	Accessibility KQ
AKQ	-	Actionable KQ
AVE	-	Average variance extracted
CC	-	Compositional creativity
CKQ	-	Contextual KQ
EFQM	-	European Foundation of Quality Management
FD	-	Functional diversity
HTMT	-	Heterotrait-monotrait
IC	-	Improvisational creativity
IKQ	-	Intrinsic KQ
IPMA	-	Importance-performance map analysis
IS	-	Information systems
ISO	-	International organization of standardization
IQ	-	Information quality
IT	-	Information technology
KN	-	Knowledge network
KM	-	Knowledge management
KQ	-	Knowledge quality
MGA	-	Multi group analysis
MNCs	-	Multinational companies
OC	-	Organizational culture
OS	-	Organizational structure
PLS	-	Partial least square
QFC	-	Quality function development
SEM	-	Structural equation modeling

SMEs	-	Small and medium-sized enterprises
SRMR	-	Standardized root mean square residual
TIQM	-	Total information quality management
TKQM	-	Total knowledge quality management
TQC	-	Total quality control
TU	-	Technology utilization
VAF	-	Variance accounted for
VIF	-	Variance inflation factor

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Questionnaire	200
B	Items' normality and outlier descriptive statistics	205
C	PLS-MGA results for Malay ethnicity	211
D	PLS-MGA results for Chinese ethnicity	222

CHAPTER 1

INTRODUCTION

1.1 Introduction

Quality is not a new concept and obtaining high quality goods and services has been an issue for all companies. In recent years, the concept of quality was synthesized with data and information. In addition, advancements in knowledge management (KM) concepts have made it necessary to consider knowledge quality (KQ) as well. It is argued that the mere utilization of KM and its systems is not sufficient to becoming creative and prosperous in this turbulent market. Instead, it is the quality or high standard of knowledge that is essential for the survival of businesses. KQ is referred to the usefulness and innovativeness of acquired knowledge (Soo *et al.*, 2004). In addition, Yoo *et al.* (2011) defined KQ as “the extent to which the awareness and understanding of ideas, logics, relationships, and circumstances are fit for use, relevant and valuable to context, and easy to adapt”.

Drucker (2014) indicated the significance of creativity and innovation as the principal ingredients for companies to compete and survive in this arena of continuous change. In knowledge-based economies, a company’s value is specified through the intellectual property it possesses. Many companies depend excessively on these assets for their competitive capabilities and growth (Kaplan and Norton, 2004). So, innovation becomes vital for company’s stamina in this competitive era (Dervitsiotis, 2010). High level competition increases the degree of innovation in all industries as companies compete fiercely to offer products at lower costs, enhance their functionalities, boost their products and improve their services (Lafley and

Charan, 2008) as more innovative companies enjoy higher profits resulted from their product and service innovations (Hamel, 2008).

Nevertheless, the importance of being creative and innovative is stated and it is believed that KQ has a significant role in the competitive capability of SME. Therefore, the role of KQ in SMEs' competitiveness has to be studied and its determinants and dimensions have to be pinpointed. This study shows the extent to which Malaysian SMEs can leverage their competitiveness capability through KQ to boost their success in this post-modern society.

1.2 Role of SMEs in Competitive Landscape

SMEs have a remarkable role in world economy and in global context as more than 99% of companies are SMEs (Cornell, 2012). SMEs produce between 40% and 50% of global GDP (Wurzer and DiGammarino, 2008) and they participate in 80% of worldwide economic growth (Jutla *et al.*, 2002; Singh *et al.*, 2009). In addition, the R&D expenditure of SMEs has increased by 10 times more than big enterprises over the past two decades (Chesbrough, 2010). Compared to big enterprises, SMEs have limited resources (Chesbrough and Garman, 2009) and they encounter higher risks (Bianchi *et al.*, 2010) but they can outperform big enterprises due to their agile and flexible capabilities.

Advancements in developing countries indicate that there is a requirement for understanding SMEs' competitiveness (Cornell, 2012) and examining strategies to overcome their competitive challenges. This will aid governmental programs to help SMEs and increase their presence in worldwide economy (Cornell, 2012; Habaradas, 2009). In spite of the challenges confronted by SMEs, they are still the wheels of creativity (Cornell, 2012) and they possess the potential to boost their involvement in innovative activities. Cornell (2012) claimed that some of the innovations made by SMEs are changing the competitive landscape of many industries. This thesis shows the related factors for being competitive as well as the role of KQ on SMEs' competitiveness.

Several theories are used in this study to underpin SMEs' competitiveness, KQ, and its determinants. KQ and its dimensions can be evaluated through sense-making theory proposed by Dervin (1998). Organizational knowledge creation theory introduced by Nonaka and Takeuchi (1995) is evaluated to understand the organizational enabling conditions that lead to knowledge creation and fuel the process of innovation. Moreover, Amabile's theory of creativity (Amabile, 1996), and organizational improvisation theory are evaluated to understand competitiveness and the factors related to creativity and the consideration of innovation as a result of creativity. These theories will be elaborated in chapter 2 and chapter 3 of this thesis.

1.3 Malaysian SMEs' Competitiveness

SMEs as small knowledge groups play a significant role in creative processes. Flexible and agile capabilities of SMEs facilitate creative processes. SMEs make up more than 92 percent of companies in Malaysia and there are 645,136 companies registered under SMEs in Malaysia (Malaysia, 2012). According to Malaysia and Ekonomi (2006), with best practices in SME sector, companies can elevate their performance and competitiveness. By doing so, they can increase SMEs' growth and have positive impact on Malaysia's economic development (Unit, 2006). Anuar and Mohd Yusuff (2011) claimed that Malaysian SMEs can increase their degree of competitiveness through monitoring their current practices and benchmarking it with the best practices.

Malaysian SMEs have been under pressure to boost their performance (Aris, 2007). According to Anuar and Mohd Yusuff (2011), short product life cycle, high competition, knowledgeable and sophisticated customers, and augmenting labour costs have led to a condition where Malaysian SMEs have to be flexible, innovative, and responsive. Gunasekaran and Ngai (2003) indicated that SMEs used to compete on quality and price issues, but their current competition level shadows on all competitive perspectives involving responsiveness and flexibility.

According to Singh *et al.* (2009), global competition has endangered Asian domestic SMEs whose products and services are localized. Trade liberalization has enabled foreign companies to easily enter remote and underdeveloped markets in Asia. On the other hand, the number of multinational companies (MNCs) is growing in Malaysia and the country has been the recipient of foreign direct investments since the 1960s (Giroud, 2007) hence the need for Malaysian SMEs to consider their competitive capabilities in order to not lag behind MNCs and foreign manufacturers and retailers. It is crucial to study KQ in SMEs since it is the source of creativity and innovativeness. Competitiveness in SMEs is gauged through the degree of creativity and innovation.

1.4 Statement of the Problem

Previous researches on SMEs have focused on data quality (Ballou *et al.*, 1993; Ballou and Pazer, 1982, 1985; Ballou and Tayi, 1989; Batini *et al.*, 2004; Batini *et al.*, 1986; DeLone and McLean, 1992; Demeter *et al.*, 2007; Goodhue and Thompson, 1995; Jarke and Vassiliou, 1997; Liu *et al.*, 2008; Redman, 2001; Wand and Wang, 1996; Wang *et al.*, 1995; Wang and Strong, 1996) and information quality (Batini *et al.*, 2004; Benjelloun *et al.*, 2009; Berti-Equille and Moussouni, 2005; Bilenko and Mooney, 2003; Breunig *et al.*, 2000; Dasu *et al.*, 2002; English, 1999; Fellegi and Sunter, 1969; Fox *et al.*, 1994; Little and Rubin, 2014; Liu and Chi, 2002; McCallum *et al.*, 2000; Missier and Batini, 2003; Monge, 2000) and the body of literature lacks research on KQ in SME context. Furthermore, Soo *et al.* (2004) studied the role of KQ in firm performance of large firms. Yoo *et al.* (2011) studied KQ in project teams. Yoo (2012b, 2014) studied KQ in large firms as well. Therefore, this thesis focuses on KQ in SME context.

Furthermore, in data and information quality contexts, success is due more to the technological aspects. Yet, in KQ, since the concept is multidisciplinary, all organizational and behavioural factors should be examined in detail. Unfortunately, little attention has been devoted to KQ and this study aims to investigate all aspects

of KQ (its dimensions, determinants, and consequences) that result in SMEs' competitiveness.

Little is known about KQ and this study is amongst the few that considers a broad view toward the determinants and dimensions of KQ and pioneers the examination of the role of KQ in creativity among SMEs. Previous research (Soo *et al.*, 2004; Yoo *et al.*, 2011) only examined several determinants of KQ. They considered absorptive capacity, functional diversity, and knowledge network as the determinants of KQ. This thesis takes a meticulous approach toward the determinants of KQ and intends to study organizational culture, organizational structure, and technology as other determinants of KQ. In addition, previous research (Yoo, 2012b, 2014; Yoo *et al.*, 2011) considered dimensions of KQ as intrinsic KQ, contextual KQ, and actionable KQ. By virtue of sense-making theory (Dervin, 1998), this study examines another dimension of KQ as accessibility KQ and it considers KQ as a progression of four dimensions i.e. intrinsic KQ, contextual KQ, and actionable KQ, and accessibility KQ.

Many recent studies mainly focus on innovation capabilities in big enterprises (Van de Vrande *et al.*, 2009). Other researchers (Lee *et al.*, 2010; Madrid-Guijarro *et al.*, 2009) stated the importance of understanding and evaluating the SMEs' competitiveness. The concept of competitiveness in SMEs is still vague in management literature due to the lack of research conducted on this topic. To address this research gap, this thesis introduces a holistic model of competitiveness for SMEs with the premise that competitiveness in SMEs is achieved directly through KQ.

1.4.1 Challenges Facing Malaysian SMEs

Malaysian SMEs have experienced a transformation from agricultural-based to industry-based and knowledge-based companies and it transforms to a developed economy to pursue its 2020 goal (Khalique *et al.*, 2011; Ong *et al.*, 2004). According to Ahmad and Seet (2009), the failure rate of Malaysian SMEs stands at 60 percent and this reflects the challenges that companies encounter in order to be competitive.

Bhatiasevi (2009) indicated that the concept of globalization is forcing the Malaysian companies to move toward a knowledge-based economy.

According to Bhatiasevi (2009), Malaysian companies need to be knowledge-driven to tackle the potential issues and be on track towards its 2020 vision plan. There are several challenges faced by SMEs such as the lack of technology (Muhammad *et al.*, 2010) and the lack of access to social networks (Teoh and Chong, 2008). Alam (2010) indicated that social barriers are the locus of control restraining Malaysian SMEs from achieving a core competency. Khalique *et al.* (2011) concluded that intellectual capital is one of the main challenges of Malaysian SMEs. On the other hand, several researchers considered intellectual capital as the main factor for being competitive in SMEs (Bataneh and Al Zoabi, 2011; Leitner, 2011). Therefore, it can be observed that KQ in SMEs is important and it needs to be addressed properly. In addition, organizational factors that can influence KQ in SMEs are of great significance.

Mahmud and Hilmi (2014) found a positive relationship between organizational learning and SME performance of Malaysian SMEs. In addition, they showed that organizational learning mediates the relationship between total quality management and Malaysian SMEs' performance. Idar *et al.* (2012) found a positive relationship between strategic planning practices and Malaysian SMEs' performance. In addition, they found market orientation to be a mediating factor between strategic planning practices and performance as well. They defined market orientation as the firm's culture that produces value for the customers. Chin *et al.* (2014) developed a conceptual framework hypothesizing the positive role of external integration and Malaysian SMEs' performance.

However, it can be observed that several studies have been conducted with reference to organizational factors and Malaysian SMEs, but the aforementioned studies merely examined the firm performance and they did not focus on Malaysian SMEs' competitiveness. Several organizational factors such as organizational structure, openness, technology, and functional diversity are missing and none of these researches considered KQ as a mediator.

1.5 Research Questions

In order to boost growth, SMEs have to be creative. Considering Malaysia as a developing country, low level of creativity would affect the performance and overall output of businesses. The country has plans in creating a private sector-led economy. The 10th Malaysia Plan (Malaysia, 2012) clearly stated that the creativity of SMEs will be harnessed as the primary drivers of Malaysia's growth. The creativity process in SMEs is facilitated by the high standard of KQ. However, acknowledging perceived KQ and its substructures that shape employees' sense-making processes is critical.

- i. What are the substructures of perceived KQ amongst Malaysian SMEs?

Understanding the infrastructure capabilities/factors that influence perceived KQ is important as well. Specifying those factors participative to KQ can help SMEs to configure a better business setting for employees. However, it is critical to recognize which organizational factors have higher impact on perceived KQ and if they are indirectly participative to SMEs' creativity and innovation or not.

- ii. What are the determinants of perceived KQ amongst Malaysian SMEs?

KQ can have several consequences (Yoo, 2014). It is substantial to understand which dimensions of KQ result in creativity and innovativeness. In other words, in which stage of the sense-making activity, the entities come out with novel ideas, processes, products, and services. In this study, SMEs' competitiveness is gauged through their degree of creativity and innovation from which creativity is divided into improvisational creativity and compositional creativity.

- iii. Is there any relationship between perceived KQ and Malaysian SMEs' competitiveness?
 - Is there any relationship between perceived KQ and improvisational creativity of Malaysian SMEs?

- Is there any relationship between perceived KQ and compositional creativity of Malaysian SMEs?
- Is there any relationship between perceived KQ and Malaysian SMEs' innovativeness?

1.6 Research Objectives

Research objectives are designed to address the research questions. In this manner, this study tries to shed light on the concept of KQ by determining the substructures of KQ and the organizational factors participative to KQ. Furthermore, in terms of possible results KQ might have in SMEs, this study examines its possible impact on improvisational creativity, compositional creativity, and innovation. Therefore, the research objectives are:

- i. To determine the substructures of perceived KQ amongst Malaysian SMEs.
- ii. To identify the determinants of perceived KQ amongst Malaysian SMEs.
- iii. To examine whether there is a relationship between KQ and Malaysian SMEs' competitiveness in terms of improvisational creativity, compositional creativity and innovativeness.

1.7 Significance of Study

By virtue of this research, SMEs can observe where they are now and what they lack from among these factors (substructures of KQ) and what plans they should develop to reside in the path of creativity. This thesis takes a new approach towards the process of creativity through examining improvisational and compositional creativity by virtue of KQ.

Theoretical contributions of this study would be the examination of all aspects of KQ through developing a unified model of competitiveness for SMEs. In

terms of dimensions of KQ, accessibility KQ is considered as another dimension of KQ and three new organizational factors (organizational structure, organizational culture, and technology) are examined as substructures of KQ. In addition, this is the first study that examines the role of KQ in creativity in terms of improvisational creativity and compositional creativity.

This study provides critical information for the government to come up with an ideal standard for Malaysian SMEs that motivates growth and boosts performance (both innovative and financial performance). The results also guides towards practical ways to improve KQ in SMEs. Large enterprises can benefit from the results of this study as well. Furthermore, this research indicates the extent and the areas in which the government could assist and support SMEs and the policies to make in order to generate the best settings for knowledge in SMEs (Malaysia, 2012).

The result of this study will provide the government with an understanding of KQ and guide in evaluating appropriate business settings for SMEs thereby aiding policy makers to guide and support SMEs in the right way. The 6% sustaining growth rate needed to achieve the 2020 plan will require Malaysia to incite internal competitiveness and unleash creativity-led growth and innovation (Malaysia, 2012). Finally, based on the results of this study, managers can observe what the sources of creativity are and how it leads to innovation.

1.8 Scope of Study

SMEs are considered as the key drivers of economic prosperity in Southeast Asia countries (Charoensukmongkol, 2015) such as Malaysia (Kurnia *et al.*, 2015). Despite the fact that emerging economies in Southeast Asia are growing globally (Scheela *et al.*, 2015; Julian *et al.*, 2014; Theng and Boon, 1996), few researches have been conducted in Malaysia to empirically examine the role of KQ in SMEs' creativity and innovation capabilities. While there are substantial differences between managerial perspectives of the Western and Southeast Asian countries in

managing SME (Bjerke, 2000; Wu and Leung, 2005), there are few empirical investigations that examined the notion of SME competitiveness in Malaysia.

The scope of this study is Malaysian companies from both manufacturing and service industries. Only those companies that are registered under small and medium sized enterprises are the focus of this study while micro companies, i.e. those companies with the number of employees of less than 5, are omitted.

1.9 The Structure of the Thesis

The first chapter of this thesis provides a brief background about KQ and its importance. In addition, SMEs' competitiveness and its importance in Malaysian context are emphasized. The challenges facing Malaysian SMEs, research gap as well as research questions and objectives are stated.

The second chapter of this study provides a broad review of the literature and previous studies that had been conducted about KQ and empirical studies that have examined determinants and substructures of KQ are reviewed. Relevant theories of sense-making and its relevance to KQ along with theories of creativity and improvisation are briefly examined. This chapter also presents the theoretical framework and the research hypothesis that will be tested in the study.

Chapter 3 as the methodological chapter of this study provides necessary information about the type of study, research design and all other related information about the procedure of the study such as sampling strategy, data collection methods, and the development of the survey questionnaire. Pre-test and pilot test are addressed as well.

Chapter 4 provides the analytical approaches analysing the collected data. In this chapter, frequency analysis, descriptive statistics, and partial least squares as a variance-based method of analysis are conducted. Reliability and validity analyses for formative and reflective constructs are conducted accordingly to assess the

measurement model. To examine the structural model, the results of bootstrapping for hypothesis testing, indirect effects, model's predictive accuracy, and multi-group analysis are considered.

Chapter 5 as the final chapter of this study summarizes the results that have been generated in the findings chapter. It provides the insights about the findings and shows the implication of the study. Discussions and recommendations are made and the chapter finishes by stating the limitation of the study and suggestions for future research.

1.10 Definitions of the Terms

Knowledge Management: it is a set of practices used by organizations to identify, create, represent, and distribute knowledge.

Knowledge Quality: knowledge quality is the high standard of knowledge that helps firms work better, develop novel and useful products or services, reduce costs, and increase sales.

Intrinsic Knowledge Quality: it is defined as the knowledge that has quality by virtue of itself.

Contextual Knowledge Quality: it is defined as the knowledge that is associated with the context of the task at hand.

Actionable Knowledge Quality: it is defined as the extent to which knowledge is expandable, adaptable, or simply applied to tasks.

Accessibility Knowledge Quality: it is referred to the degree of system availability, degree of flexibility, ease of use, and ease of access.

Absorptive Capacity: it is defined as the learning capability of each company.

Functional Diversity: it is defined as the degree of hiring employees with different skills and expertise.

Knowledge Network: it is defined as the capability to take advantage of external knowledge from external environment such as customers, competitors, suppliers, and so forth.

Organizational Culture: it is defined as the behaviour of humans within an organization and the meaning that people attach to those behaviours.

Organizational Structure: it is defined as how activities such as task allocation, coordination and supervision are directed towards the achievement of organizational aims.

Improvisational Creativity: it is defined as ideas that surface in a novel and creative way without planning/preparation.

Compositional Creativity: it is defined as lower degree of creativity that results in variations and embellishments in products, processes, services, and ideas.

1.11 Summary

This chapter has provided some insights about KQ and a concise background of research at hand. The importance of SMEs and their role in the global market and competitive landscape has been stated. Further, Malaysian SMEs as the context of this study were examined and it was shown that Malaysian government accentuates on SMEs' competitiveness. Gaps of the study followed by research questions, objectives, as well as the definitions of the terms and the significance of study were expressed.

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