

**Bangor University**

## **DOCTOR OF PHILOSOPHY**

### **Strategy formulation and firms' performance : the case of high-tech SMEs in the UK**

Izadi, Hossein

*Award date:*  
2012

*Awarding institution:*  
Bangor University

[Link to publication](#)

#### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

#### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



PRIFYSGOL  
**BANGOR**  
UNIVERSITY

**Strategy Formulation and Firms' Performance:  
The Case of High-Tech SMEs in the UK**

Hossein Izadi

A Thesis Submitted to Bangor University in Partial Fulfilment of the  
Requirement of the Degree of Doctor of Philosophy

Bangor Business School

Bangor University

UK

May 2012

*This thesis is dedicated to my nice family, especially...*

*To my beloved Sahereh and Sana for their unconditional support and love*

## DECLARATION/STATEMENTS

### **Declaration:**

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree unless as agreed by the University for approved dual awards.

Signed ..... (candidate)

Date .....

### **Statement 1:**

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used, the extent and nature of the correction is clearly marked in a footnote(s).

All other sources are acknowledged by footnotes and/or a bibliography.

Signed ..... (candidate)

Date .....

### **Statement 2:**

I hereby give consent for my thesis, if accepted, to be available for photocopying, for inter-library loan and for electronic repositories, and for the title and summary to be made available to outside organisations.

Signed ..... (candidate)

Date .....

## ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my supervisor, Dr. Azhdar Karami for his guidance and assistance through all the stages of my PhD research. He has supported me throughout my thesis with his patience and knowledge, whilst allowing me the room to work in my own way. Dr Karami has helped me to solve the various difficulties, which emerged during the course of this empirical study. His insightful thoughts and sincere encouragement have enabled me to study SMEs with academic rigour. The opportunity of working with him over the past three years has been a unique professional experience.

I wish to thank Bangor University for all its academic and administrative support and services, which have enabled me to carry out this PhD research programme. I am thankful to the Business School's academic and administrative staff. I thank them for their comments and suggestions regarding my research work, and their administrative support. Thanks to Dr Gareth Griffiths as my second supervisor and Professor Yener Altunbas for their help with the statistical analysis and advices in this regard and all other areas in this study.

I must acknowledge all the biotechnology and pharmaceutical SMEs across the UK; obviously, their responses helped me to complete this thesis.

I am grateful to my good friends at Bangor Business School, especially Jenny Byast and Bryan Jones for their generous help. I appreciate their friendship and will never forget the wonderful time we spent together.

Finally, I wish to express my gratitude and love to my wife, Sahereh and my daughter, Sana. During all these years, my wife has managed her job and looked after Sana as a lovely mother. Sana's patience and encouragement have kept me in good spirits. In addition, I wish to express my thanks to my Mum and late Dad for instilling into me the importance of hard work, and to my wife's family for their kindness and encouragement.

## **ABSTRACT**

The objective of this study is to investigate the relationship between strategy formulation and firms' performance in high-tech small and medium-sized enterprises (SMEs) in the UK, thereby contributing to the knowledge in the field of strategic management. The study explores the factors associated with effective strategy formulation process and firms' performance in SMEs sector. To achieve this, the empirical investigation in high-tech SMEs operation in biotechnology and pharmaceutical industry across the UK, was conducted to test the hypotheses and address the research objective.

A positivistic approach was taken in order to support existing knowledge and theory with the undertaking of further empirical research. Therefore, this study employs a deductive approach and a cross-sectional research method to collect data and answer the research questions. In order to target a dispersed population a postal survey was undertaken. The data-gathering instrument was a self-completing questionnaire aimed at managers of SMEs. A total of 357 completed and valid questionnaires returned. In order to analyse the data and answer the research questions both descriptive and statistical analysis were carried out.

It is revealed in this study that an effective strategy formulation model comes from employment of environmental scanning tools, development and monitoring the content of a mission statement, development of suitable competitive strategy, and a SMEs individual approach to strategy formulation. This study concludes that the factors associated with effective strategy formulation affect the performance of high-tech SMEs and that by using the findings in this study managers will be able to increase the performance level of their high-tech SMEs by the creation of an effective strategy.

## TABLE OF CONTENTS

DEDICATION	ii
DECLARATION/STATEMENTS	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xii
LIST OF FIGURES	xv
ABBREVIATIONS	xviii

### Chapter One: Introduction

1.1. Introduction	2
1.2. The research Background	2
1.3. The Rational of the Study	5
1.4. Performance	8
1.5. Objectives of Study and Research Questions	11
1.6. Research Methodology	12
1.7. Structure of the Thesis	14

### Chapter Two: Literature Review

2.1. Introduction	17
2.2. Strategy	17
2.2.1. Definition of Strategy	17
2.2.2. Origin of Strategy	23
2.2.3. Perspective on Strategy	27
2.3. Strategic Management	29
2.4. Strategy Formulation	31
2.5. Environmental Scanning	33
2.5.1. Typology of Environmental Scanning	35
2.5.2. Environmental Scanning and High-Tech SMEs	39
2.6. Mission Statement	43
2.6.1. Mission Statement and Performance	49

2.7. Competitive Forces and Strategies	52
2.7.1. Cost Leadership	54
2.7.2. Differentiation	55
2.7.3. Focus	55
2.8. Strategic Capability	57
2.8.1. Knowledge-Based View (KBV)	62
2.9. Environment and Strategy Formulation Approaches	66
2.10. Strategy Formulation Approaches	68
2.10.1. Formal Strategy Formulation	70
2.10.2. Dynamic Strategy Formulation	72
2.11. Organisational Performance	74
2.11.1. Performance Measurement	76
2.11.2. The Evaluation of Performance Measurement	78
2.11.3. Balanced Score Card (BSC)	79
2.12. Summary	84
Chapter Three: Research Context and Conceptual Framework	
3.1. Introduction	87
3.2. Introduction to High-Tech SMEs	87
3.2.1. Definition of SMEs	87
3.2.2. Role of SMEs in the UK	89
3.2.3. High-Tech Industries in the UK	93
3.2.4. Biotechnology and Pharmaceutical Industry in the UK	95
3.2.4.1. Medical Technology and Diagnostics Sector	98
3.2.4.2. Medical Biotechnology Sector	100
3.2.4.3. Industrial Biotechnology Sector	102
3.3. Research Framework of Strategy Formulation Model in High-Tech SMEs in The UK	104
3.3.1. Defining a ‘Strategy Formulation Process’	104
3.3.2. An Outline of Research Framework	105
3.3.3. Impact of Environmental Scanning	106
3.3.4. Effect of the Mission Statement	109
3.3.5. Generic Types of Strategy	111



3.3.6. Knowledge-Based View (KBV)	114
3.3.7. Characteristics of SMEs	117
3.3.8. Dynamic and Formal approaches to Strategy Formulation	119
3.3.9. Performance Measurement	122
3.4. Summary	125
Chapter Four: Research Design and Methodology	
4.1. Introduction	127
4.2. Research Strategy	127
4.2.1. The Research Process	127
4.2.2. Rational for Performing a Questionnaire survey	129
4.2.3. Discussion of Postal and Digital Questionnaire Instrument	131
4.2.4. Errors in Questionnaire Survey Research	134
4.3. Data Collection	136
4.3.1. Questionnaire Construction	136
4.3.1.1. Needed Data	136
4.3.1.2. Type of Questions	138
4.3.1.3. Measurement Considerations	139
4.3.2. Reliability and Validity of Questionnaire	141
4.3.2.1. Reliability	142
4.3.2.2. Validity	143
4.3.3. Steps to Improve the Response Rate	144
4.3.4. Pilot Study	146
4.4. Survey Process	148
4.4.1. Research Area	148
4.4.2. Sample Frame	152
4.5. Data Analysis Plan	155
4.5.1. Data Coding	155
4.5.2. Defining Research Variables and Their Measurements	155
4.5.2.1. General Information	156
4.5.2.2. Tendency to Type of Environmental Scanning	156
4.5.2.3. Mission statement Components	160
4.5.2.4. Identification the Type of strategy	163

4.5.2.5. Recognition View to Strategy	165
4.5.2.6. Identification Strategy Formulation Approach	168
4.5.2.7. Measuring Performance	171
4.6. Summary	175
Chapter Five: Data Analysis	
5.1. Introduction	178
5.2. Descriptive Analysis	178
5.2.1. General Demographic Profile	178
5.2.2. General SMEs Strategic Management Profile	184
5.2.3. Validity Analysis	188
5.2.4. Reliability Analysis	191
5.2.5. Hypotheses Descriptive Analysis	199
5.2.5.1. Type of Environmental Scanning	192
5.2.5.2. Mission Statement	197
5.2.5.3. Types of Strategy	201
5.2.5.4. Knowledge-Based View (KBV)	207
5.2.5.5. Strategy Formulation Approach	210
5.2.5.6. Performance	215
5.3. Correlation Analysis	222
5.3.1. Environmental scanning and Performance of SMEs ( $H_1$ )	223
5.3.2. Mission Statement and Performance of SMEs ( $H_2$ )	227
5.3.3. Type of Strategy and Performance of SMEs ( $H_3$ )	232
5.3.4. Knowledge-Based View (KBV) and Performance of SMEs ( $H_4$ )	236
5.3.5. SMEs' Characteristics and Strategy Formulation Approaches ( $H_5$ )	237
5.3.6. Approach to Strategy Formulation and Performance of SMEs ( $H_6$ & $7$ )	241
5.4. Multiple Regression analysis	246
5.4.1. Interpretation of Multiple Regression analysis	248
5.5. Summary	249
Chapter Six: Discussion	
6.1. Introduction	255
6.2. General Demographic and Strategic Management Profile of High-Tech	255

SMEs	
6.3. Research Questions	257
6.3.1. Types of Environmental Scanning and Performance of SMEs	257
6.3.2. Mission statement and Performance of SMEs	262
6.3.3. Types of Competitive Strategies and Performance of SMEs	266
6.3.4. Knowledge-Based View (KBV) to Strategy Formulation and Performance of SMEs	269
6.3.5. Characteristics of SMEs and Their Strategy Formulation Approach	271
6.3.6. Strategy Formulation Approaches and Performance of SMEs	275
6.4. Strategy Formulation Model	279
6.5. Summary	282
 Chapter Seven: Conclusion	
7.1. Introduction	286
7.2. Major Findings	286
7.2.1. Type of Environmental Scanning and its Impact on Performance	287
7.2.2. Mission statement and its Impact on Performance	288
7.2.3. Type of Competitive Strategy and Their Impact on Performance of SMEs	289
7.2.4. Knowledge-Based View to strategy Formulation and its Influence on Performance of SMEs	290
7.2.5. Characteristics of SMEs and Their Affect on Strategy Formulation approach	291
7.2.6. Strategy Formulation Approaches and Their Impact on Performance of SMEs	292
7.2.7. Strategy Formulation Model and its Influence on Performance of SMEs	294
7.3. Theoretical Contributions	294
7.4. Practical Implications	299
7.5. Limitation of Study	302
7.6. Suggestions for Further Research	304
7.7. Summary	305
 Appendices	

Appendix A: Covering letters for the Questionnaire	307
Appendix B: Questionnaire	309
Appendix C: Pilot Study's Feedback Form	316
Appendix D: Data Dictionary	317
References	331

## LIST OF TABLES

Table 2-1: Sources of Competitive Advantage from varied perspective

Table 2-2: Perspectives of knowledge assets

Table 2-3: Comparison of eight performance-measuring models

Table 3-1: European Commission's definition of SMEs

Table 3-2: Number of SMEs and LEs in whole economy of the UK

Table 3-3: Employment of SMEs and LEs in whole economy of the UK

Table 3-4: Turnover of SMEs and LEs in whole economy of the UK

Table 3-5: Number and percentage of SMEs and LEs in Health Biotechnology in whole economy of the UK

Table 3-6: Types of environmental scanning and their components

Table 3-7: Measurable and Non-Measurable contents of a mission statement

Table 3-8: elements of each type of generic competitive strategy

Table 3-9: Content of RBV and KBV

Table 3-10: Characteristics of formal and dynamic mode of strategy formulation

Table 3-11: Indicators of BSC perspectives

Table 4-1: Data matrix in cross-sectional research

Table 4-2: Layout of questionnaire questions and related variables

Table 4-3: Number of newspaper articles, journal paper and books about high-tech SMEs

Table 4-4: Number of distributed and completed questionnaires and response rate

Table 4-5: Data dictionary for general information

Table 4-6: Data dictionary for type of environmental scanning ( $H_1$ )

Table 4-7: Data dictionary for mission statement ( $H_2$ )

Table 4-8: Data dictionary for type of competitive strategy ( $H_3$ )

Table 4-9: Data dictionary for recognition view to the strategy ( $H_4$ )

Table 4-10: Data dictionary for identification strategy formulation approach ( $H_{5, 6 \text{ and } 7}$ )

Table 4-11: Data dictionary for measuring performance

Table 5-1: Place of SMEs

Table 5-2: Respondents job position

Table 5-3: Size of enterprises

Table 5-4: Age of SMEs

Table 5-5: Cross-tabulation between size and Age of SMEs

Table 5-6: Strategy-designing period in high-tech SMEs

Table 5-7: Foresee future of high-tech industry

Table 5-8: strategy-revising period in high-tech SMEs

Table 5-9: Interval between formulation and implementation of strategy

Table 5-10: Z-test for testing the sample and population mean proportion

Table 5-11: Cronbach's alpha comparison between variables

Table 5-12: Type of environmental scanning and their factors

Table 5-13: Frequency and mean of factors of types of environmental scanning

Table 5-14: Descriptive analysis of type of scanning

Table 5-15: Percentage of factors of elements of measurable and non-measurable elements

Table 5-16: Descriptive analysis of mission statement

Table 5-17: Descriptive analysis of types of competitive strategy

Table 5-18: Frequency and mean of non-focus and focus type of generic competitive strategies

Table 5-19: Frequency and of factors of focus type of competitive strategy

Table 5-20: Central tendency, dispersion and distribution of non-focus and focus type of generic competitive strategies

Table 5-21: Frequency and mean of factors of KBV

Table 5-22: Descriptive analysis of KBV

Table 5-23: Frequency of factors of strategy formulation approaches

Table 5-24: Descriptive analysis of strategy formulation approach

Table 5-25: Percentage and mean of factors of BSC perspectives

Table 5-26: Percentage and mean of perspectives of BSC

Table 5-27: Central tendency, dispersion and distribution of performance and its levels

Table 5-28: Correlation between environmental scanning and performance of SMEs

Table 5-29: Correlation between types of environmental scanning and low performance of SMEs

Table 5-30: Correlation between types of environmental scanning and moderate performance of SMEs

Table 5-31: Correlation between types of environmental scanning and high performance of SMEs

Table 5-32: Correlation between mission statement and performance of SMEs

Table 5-33: Correlation between measurable elements of mission statement and performance of SMEs

Table 5-34: Correlation between non-measurable elements of mission statement and performance of SMEs

Table 5-35: Correlation between generic type of competitive strategy and performance of SMEs

Table 5-36: Correlation between cost leadership-focus type of strategy and performance of SMEs

Table 5-37: Correlation between differentiation-focus type of strategy and performance of SMEs

Table 5-38: Correlation between Knowledge-based view and performance of SMEs

Table 5-39: Correlation between characteristics of SMEs and dynamic approach to strategy formulation

Table 5-40: Correlation between characteristics of SMEs and formal approach to strategy formulation

Table 5-41: Correlation between strategy formulation approach and performance of SMEs

Table 5-42: Correlation between dynamic strategy formulation and performance of SMEs

Table 5-43: Correlation between formal strategy formulation and performance of SMEs

Table 5-44: Results of multiple regression analysis on SMEs performance

Table 5-45: Summary of hypothesis testing

## LIST OF FIGURES

Figure 2-1: illustrates the correlation between ten dominant strategy schools

Figure 2-2: Approaches to strategy

Figure 2-3: Strategic management process

Figure 2-4: Porter's Five Forces Model of Competition

Figure 2-5: Generic competitive strategies and their attraction to SMEs

Figure 2-6: Knowledge creation process

Figure 2-7: Balanced Score Card Performance measurement model

Figure 3-1: Number of SMEs and LEs in whole economy of the UK

Figure 3-2: Employment of SMEs and LEs in whole economy of the UK

Figure 3-3: Turnover of SMEs and LEs in whole economy of the UK

Figure 3-4: UK manufacturing Gross Value Added (GVA) per head and employment costs in 2007

Figure 3-5: Percentage of change 2009 to 2010

Figure 3-6: Distribution of medical technology companies by employee bands

Figure 3-7: Profile of UK medical technology sector by company age

Figure 3-8: Distribution of medical biotechnology companies by employee bands

Figure 3-9: Profile of UK medical biotechnology sector by company age

Figure 3-10: Profile of UK Industrial biotechnology sector by company age

Figure 3-11: the outline of research model

Figure 3-12: Influence of environmental scanning on performance of SMEs

Figure 3-13: Effect of mission statement on performance of SMEs

Figure 3-14: relationship between type of competitive strategy and performance of SMEs

Figure 3-15: relationship between KBV to strategy formulation and performance of SMEs

Figure 3-16: SMEs characteristic and strategy formulation approach

Figure 3-17: Approaches to strategy formulation and performance of SMEs

Figure 3-18: Four perspectives of BSC

Figure 4-1: Process of a deductive study

Figure 4-2: Tree diagram of total survey error

Figure 4-3: Steps in the development of the survey instrument



Figure 4-4: Flowchart of the questionnaire survey process

Figure 5-1: Place of SMEs

Figure 5-2: Respondents job position

Figure 5-3: Age of SMEs

Figure 5-4: Cross-graph between size and Age of SMEs

Figure 5-5: Comparison between strategy-designing period and future foreseeing period in high-tech SMEs

Figure 5-6: Interval between formulation and implementation of strategy

Figure 5-7: Distribution of irregular environmental scanning

Figure 5-8: Distribution of periodic environmental scanning

Figure 5-9: Distribution of continuous environmental scanning

Figure 5-10: Distribution of elements of mission statement

Figure 5-11: Distribution of non-measurable elements of mission statement

Figure 5-12: Distribution of measurable elements of mission statement

Figure 5-13: Distribution of type of strategy

Figure 5-14: Distribution of cost leadership-focus competitive strategy

Figure 5-15: Distribution of differentiation-focus competitive strategy

Figure 5-16: Distribution of KBV

Figure 5-17: Distribution of strategy formulation approach

Figure 5-18: Distribution of dynamic strategy formulation

Figure 5-19: Distribution of formal strategy formulation

Figure 5-20: Percentage of perspectives of BSC in low performance SMEs

Figure 5-21: Percentage of perspectives of BSC in moderate performance SMEs

Figure 5-22: Percentage of perspectives of BSC in high performance SMEs

Figure 5-23: Distribution of low performance SMEs

Figure 5-24: Distribution of moderate performance SMEs

Figure 5-25: Distribution of high performance SMEs

Figure 5-26: Distribution of performance in high-tech SMEs

Figure 5-27: Scatter plot of correlation between environmental scanning and performance

Figure 5-28: Scatter plot of correlation between types of environmental scanning and levels of performance

Figure 5-29: Scatter plot of correlation between mission statement and SMEs performance

Figure 5-30: Scatter plots of correlation between elements of mission statement, non-measurable and measurable, and performance of SMEs

Figure 5-31: Scatter plot of correlation between generic competitive strategy and performance of SMEs

Figure 5-32: Scatter plots of correlation between types of competitive strategy, cost leadership-focus and differentiation-focus, and performance of SMEs

Figure 5-33: Scatter plot of correlation between KBV and performance of SMEs

Figure 5-34: Scatter plot of correlation between age of SMEs and approaches to strategy formulation

Figure 5-35: Scatter plot of correlation between size of SMEs and approaches to strategy formulation

Figure 5-36: Scatter plot of correlation between strategy formulation approach and performance of SMEs

Figure 5-37: Scatter plot of correlation between dynamic and formal strategy formulation approaches with performance of SMEs

Figure 6-1: Correlation between environmental scanning and its type with different levels of performance

Figure 6-2: Correlation between mission statement and its elements with performance of SMEs

Figure 6-3: Correlation between generic competitive strategy and its types with performance of SMEs

Figure 6-4: Generic competitive strategies and their attraction to high-tech SMEs

Figure 6-5: Correlation between a knowledge-based view and performance of SMEs

Figure 6-6: Correlation between characteristics of SMEs and strategy formulation approaches

Figure 6-7: Correlation between approaches to strategy formulation and performance of SMEs

Figure 6-8: Strategy formulation model and influence of factors on performance of SMEs

## **ABBREVIATIONS**

BERR: the Department for Business, Enterprise and Regulatory Reform

BIS: Department for Business, Innovation and Skills

BSC: Balanced Scorecard

CEO: Chief Executive Officer

GVA: Gross Value Added

High-Tech: High-Technology

KBV: Knowledge-Based View

OECD: Organisation for Economic Co-operation and Development

ONS: the Office for National Statistics

RBV: Resource-Based View

SECI: Socialization–Externalization–Combination–Internalization

SIC: Standard Industrial Classification

SMEs: Small and Medium-sized Enterprises

UKSPA: the United Kingdom Science Park Association

VAT: Value Added Tax

VIF: Variance Inflation Factor