



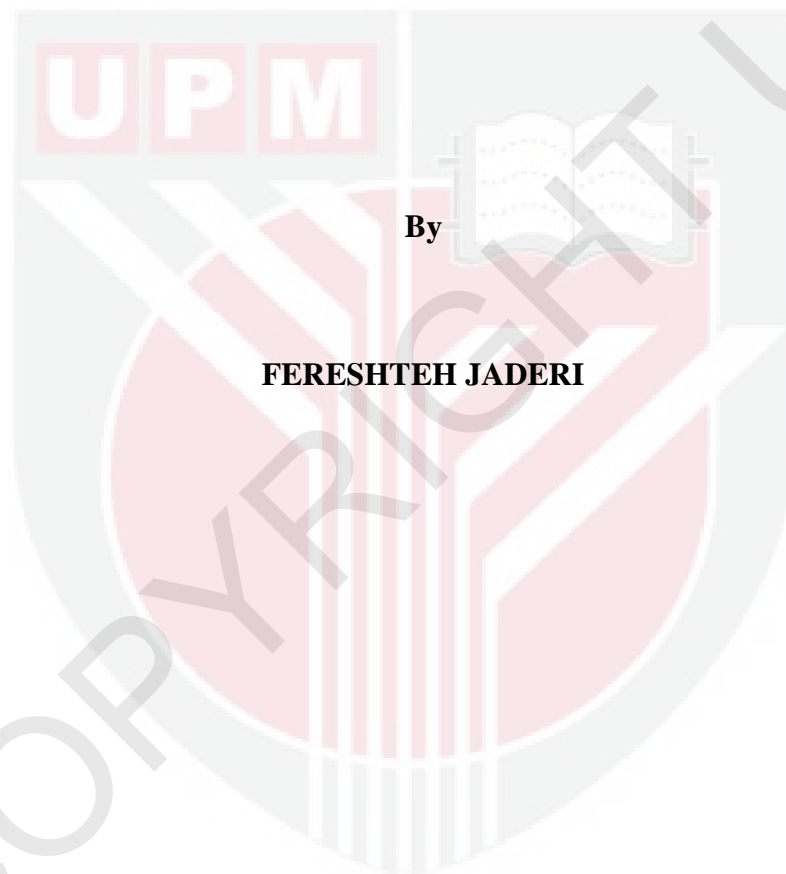
UNIVERSITI PUTRA MALAYSIA

***IDENTIFICATION OF SUSTAINABILITY INDICATORS FOR OIL AND
PETROCHEMICAL INDUSTRIES DEVELOPMENT IN
SOUTHWEST COAST OF IRAN***

FERESHTEH JADERI

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**IDENTIFICATION OF SUSTAINABILITY INDICATORS FOR OIL AND
PETROCHEMICAL INDUSTRIES DEVELOPMENT IN
SOUTHWEST COAST OF IRAN**



By

FERESHTEH JADERI

**Thesis submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

July 2012

DEDICATION

This thesis is dedicated to the people, whom I love most,

*My parent; my father and mother for their constant support, love and guidance
during all moments of my life*

My family; brother and sisters

To my supervisor Dr Zelina Zaiton Ibrahim

To all my advisors, lecturers and teachers that help me to achieve my goal

To my friends

and

Those who helped me,

All what I can say is thank you and ALLAH bless you

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

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July 2012

Chair: Zelina Zaiton Ibrahim, PhD

Faculty: Environmental Studies

This study aims to develop an integrated sustainable development model for oil and petrochemical industries. There are five specific objectives. The first objective is to identify appropriate sustainability model indicators for the city environmental system. The second objective is to identify and evaluate the sustainability indicators for industrial systems. The third is to conduct a risk assessment model of petrochemical companies. The fourth is to determine the sustainability management model in the industry system. The final objective is to develop an integrated sustainable development model for oil and petrochemical industries. The city environmental system was based on Mahshahr, located near the major Petrochemical Economic Free Zone (Petzone) in the southwest coast of Iran. The industrial system investigated was for the Fajr Petrochemical Company (PC), in the Petzone. Two models were developed. The city environmental system included social, economic and environmental subsystems. The industrial system comprised economical, social, environmental, safety, and health subsystems. The city sustainability indicators were

identified Delphi group method, Analytical hierarchy structure, and fuzzy logic methods. Quantitative and fuzzy methods are used to evaluate the risk and vulnerability models for industrial system. The city environmental and industrial systems models were then combined to develop an integrated sustainable development model. For the city system total of 218 indicators were identified. The fuzzy model showed that Mahshahr city was at the medium level of sustainability (54.5%). For industrial system a total of 48 indicators were identified. The industrial system model indicated that Fajr PC was also a medium level of sustainability (56.1%). The results of the risk assessment showed a non-critical level of industrial vulnerability. The sustainability management model results, for Fajr PC from qualitative (65.9%) and fuzzy (57.2%) approaches were at the high and medium levels respectively. The integrated sustainability model of Fajr PC showed that the sustainability systems (50%) and sustainability assets (48.56%) were at medium levels. There was no significant difference between the two results. This study quantified and aggregated the city environmental and industrial sustainability systems into an integrated sustainable development model. This allowed the overall sustainability of the oil and petrochemical company within an urban environment to be estimated. This sustainable development study is the first carried out in Iran. The results can serve as benchmarks for the improvement. These indicators and models identified in this study may be employed for other sectors. This type of information can support decision making in order to assist government policymaking towards the sustainable development of coastal zones and oil and petrochemical industries.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia Sebagai memenuhi keperluan untuk ijazah Doktor falsafah

**PENGENALPASTIAN PETUNJUK KEMAPANAN MINYAK DAN
PEMBANGUNAN INDUSTRI PETROKIMIA DI
PANTAI BARAT IRAN**

Oleh

FERESHTEH JADERI

Juli 2012

Pengerusi: Zelina Zaiton Ibrahim, PhD

Fakulti: Pengajian Alam Sekitar

Kajian ini bertujuan untuk membangunkan model pembangunan bersepadu yang mapan untuk industri minyak dan petrokimia. Terdapat lima objektif khusus. Objektif pertama adalah untuk mengenal pasti penunjuk model keamanan yang sesuai untuk sistem alam sekitar bandar. Objektif kedua adalah untuk mengenal pasti dan menilai penunjuk keamanan bagi sistem perindustrian. Ketiga ialah untuk menjalankan model penilaian risiko syarikat petrokimia. Keempat adalah untuk menentukan model keamanan pengurusan dalam sistem industri. Matlamat akhir adalah untuk membangunkan model pembangunan bersepadu yang mapan dalam industri minyak dan petrokimia. Sistem alam sekitar bandar adalah berasaskan Mahshahr, yang terletak berhampiran Petrokimia utama Ekonomi Zon Bebas (Petzone) di barat daya pantai Iran. Sistem industri yang dikaji adalah Syarikat Petrokimia Fajr (PC), di dalam Petzone. Dua model telah dibangunkan. Sistem alam sekitar termasuk subsistem sosial, ekonomi dan alam sekitar. Sistem perindustrian terdiri daripada subsistem ekonomi, sosial, alam sekitar, keselamatan, dan kesihatan.

Penunjuk kemapanan bandar telah dikenal pasti di bawah kaedah kumpulan Delphi, struktur hierarki analitikal dan kaedah logik kabur. Kaedah kuantitatif dan kabur yang digunakan untuk menilai risiko dan model kerentanan bagi sistem perindustrian. Model sistem alam sekitar bandar dan industri telah digabungkan untuk membangunkan model pembangunan mapan bersepadu. Untuk sistem Bandar, sejumlah dari 218 petunjuk telah dikenal pasti. Model kabur menunjukkan bandar Mahshahr adalah pada tahap kemapanan yang sederhana (54.5%). Untuk sistem perindustrian sebanyak 48 petunjuk telah dikenal pasti. Model sistem perindustrian menunjukkan bahawa Fajr PC juga terletak pada tahap kemapanan yang sederhana (56.1%). Keputusan penilaian risiko menunjukkan tahap kerentanan perindustrian yang tidak kritikal. Keputusan model pengurusan kemapanan untuk Fajr PC dari pendekatan kualitatif (65.9%) dan kabur (57.2%) masing-masing berada di tahap yang tinggi dan sederhana. Model kemapanan bersepadu Fajr PC menunjukkan bahawa sistem kemapanan (50%) dan aset kemapanan (48,56%) berada pada tahap sederhana. Tidak terdapat perbezaan yang ketara antara dua keputusan.. Kajian ini mengkuantifikasi dan mengagregatkan sistem kemapanan bandar alam sekitar dan industri dalam model pembangunan mapan bersepadu. Ini membenarkan kemapanan keseluruhan syarikat minyak dan petrokimia dalam persekitaran bandar yang dianggarkan. Hasil pembangunan mapan ini adalah yang pertama yang dijalankan di Iran. Hasilnya boleh berfungsi sebagai penanda aras untuk penambahbaikan.

Petunjuk dan model yang dikenal pasti dalam kajian ini boleh digunakan bagi sektor lain. Maklumat jenis ini boleh menyokong membuat keputusan untuk membantu penghasilan dasar kerajaan ke arah pembangunan mapan zon pantai dan industri minyak dan petrokimia.

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I certify that a Thesis Examination Committee has met on **24th July** to conduct the final examination of Fereshteh Jaderi on his thesis entitled “Identification of Sustainability Indicators for Oil and Petrochemical Industries Development in Southwest Coast of Iran” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U. (A) 106] 15 March 1998. The committee recommends that the student be awarded the Doctor of Philosophy.

Members of the Examination Committee are as follows:

Mohammad Firuz bin Ramli, PhD

Associate Professor,
Faculty of Environmental Studies
Universiti Putra Malaysia
(Chairman)

Sutarji Kasmin, PhD

Associate Professor
Faculty of Environmental Studies
Universiti Putra Malaysia
(Internal Examiner)

Mohd Rusli bin Yacob, PhD

Senior Lecturer
Faculty of Environmental Studies
Universiti Putra Malaysia
(Internal Examiner)

Yannis A. Phillis, PhD

Professor
Department of Production Engineering and Management
University of Crete
Greece
(External Examiner)

SEOW HENG FONG, PhD

Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

This thesis was submitted to the Senate of University Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of philosophy. The members of the supervisory Committee were as follows:

Zelina Zaitun Ibrahim, PhD

Associate Professor
Faculty of Environmental Studies
University Putra Malaysia
(Chairman)

Ramdzani Abdullah, PhD

Associate Professor
Faculty of Environmental Studies
University Putra Malaysia
(Member)

Mad Nasir Shamsudin, PhD

Professor
Faculty of Environmental Studies
University Putra Malaysia
(Member)

Neamat Jaafarzadeh Haghghi fard, PhD

Associate Professor
Faculty of Health,
University of Jondi Shapour Medical Sciences, Ahvaz, Iran
(Member)

Ahmad Reza Yavari, PhD

Associate Professor
Faculty of Environment
University of Tehran-Iran
(Member)

Seyed Mohammad Bagher Nabavi, PhD

Associate Professor
Faculty of Marine Biology
Khorransahr University of Marine Science
and Technology, Iran
(Member)

BUJANG BIN KIM HUAT, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

FERESHTEH JADERI

Date: 24 July 2012



TABLE OF CONTENT

ABSTRACT	iii
ABSTRAK	v
ACKNOWLEDGEMENT	vii
APPROVAL	Error! Bookmark not defined.
DECLARATION	xi
LIST OF TABLES	xv
LIST OF FIGURES	xvii
LIST OF ABRIVIATION	xix
CHAPTER	
1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	9
1.3 Research Questions	14
1.4 Research Objectives	15
1.5 Conceptual Framework	15
1.6 Thesis Organization	17
2 LITERATURE REVIEW	18
2.1 Introduction	18
2.2 Indicators of Sustainable Development	19
2.3 Industrial Sustainable Development	31
2.4 Sustainable Development of Coastal Zones	42
2.5 Modeling Sustainable Development	47
2.6 Modeling Risk Assessment	51
2.7 The Delphi Group Method	60
2.8 Fuzzy Logic	62
2.8.1 Fuzzy Rules	63
2.8.2 Fuzzy inference	64
2.9 The Fuzzy Delphi Approach	71
2.10 Sustainability Fuzzy Logic Modeling and MCDA	72
2.11 Summary	74
3 MATERIALS AND METHODS	76
3.1 Introduction	76

3.2	Study Area	79
3.2.1	Environmental System	79
3.2.2	General Condition of the Study Area	82
3.2.3	The Mahshahr City	85
3.2.4	Iran Oil and Petrochemical Industries	87
3.2.5	The Mahshahr Petrochemical Economic Zone	88
3.2.6	Fajr Petrochemical Company	91
3.3	Data Collection	96
3.3.1	Introduction	96
3.3.2	Environmental System	98
3.3.3	Industrial System	99
3.4	Environmental System Sustainability Model	102
3.4.1	Introduction	102
3.4.2	Identification of Sustainable Development Indicators	105
3.4.3	Development of Environmental System Sustainability Model	113
3.4.4	Statistical Analysis	119
3.5	Industrial System Sustainability Model	120
3.5.1	Introduction	120
3.5.2	Industrial Sustainability Development Methodology	123
3.5.3	Vulnerability and Internal Risk Assessment Model	137
3.5.4	Industrial Sustainability Management Model	152
3.6	Integrated Sustainable Development Modeling of Industries	159
3.6.1	Introduction	159
3.6.2	Integrated Industrial System Sustainability Model	160
4	RESULTS AND DISCUSSIONS	167
4.1	Environmental System Sustainability Model	167
4.1.1	Identified Indicators	167
4.1.2	Evaluation of Indicators Based on Their Priorities	171
4.1.3	Selected Consistence Indicators	174
4.1.4	Model of Environmental system	177
4.1.5	Prioritize and Selection of Identified Indicators	185
4.1.6	Discussion	192
4.2	Industrial System Sustainability Development	195
4.2.1	Health Subsystem Sustainability of Fajr P.C	195
4.2.2	Social Subsystem Sustainability of Fajr P.C	196
4.2.3	Safety Subsystem Sustainability of Fajr P.C	198

4.2.4	Economic Subsystem Sustainability of Fajr P.C	200
4.2.5	Environmental Subsystem Sustainability	201
4.2.6	Industrial System Sustainability of Fajr P.C	208
4.2.7	Discussions	210
4.3	Industrial Risk Assessment Models	214
4.3.1	Application of Qualitative Risk Assessment	214
4.3.2	Application of Fuzzy Risk and Vulnerability Model	216
4.3.3	Conclusion	219
4.4	Industrial System Sustainability Management Model	220
4.4.1	Application of Fuzzy Sustainability Management Model	220
4.4.2	Conclusions	223
4.5	Integrated Industrial System Sustainability Model	225
4.5.1	Application of Integrated industrial sustainability model	225
4.5.2	Conclusion	228
5	SUMMARY AND CONCLUSION	230
5.1	Introduction	230
5.2	Summary	230
5.3	Conclusions	240
5.4	Limitations of the Study	241
5.5	Recommendations and Future Researches	242
REFERENCES	Error! Bookmark not defined.	
APPENDICES		267
Appendix A		267
Appendix B		270
Appendix C		271
Appendix D		282
Appendix E		290
Appendix F		302
BIODATA OF STUDENT		305
LIST OF PUBLICATIONS		306