



Institute of Technology Management and Entrepreneurship

**THE EFFECTS OF E-PROCUREMENT PRACTICES AND RISK
MANAGEMENT ON PROCUREMENT PERFORMANCE THROUGH
SUSTAINABLE SUPPLY CHAIN**

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**THE EFFECTS OF E-PROCUREMENT PRACTICES AND RISK
MANAGEMENT ON PROCUREMENT PERFORMANCE THROUGH
SUSTAINABLE SUPPLY CHAIN**

AHMED JUMAA ALQUBAISI

A thesis submitted

in fulfillment of the requirements for the degree of Doctor of Philosophy

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2024

DECLARATION

I declare that this thesis entitled “The Effects of E-Procurement Practices and Risk Management on Procurement Performance through Sustainable Supply Chain” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



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AHMED JUMAA ALQUBAISI

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23/01/2024

Date :.....

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.



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Supervisor Name :.....
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Date :.....

DEDICATION

This work is dedicated to the individuals who have played pivotal roles in my journey, guiding and inspiring me towards success.

To my esteemed parents, I express my deepest appreciation. Their unwavering support, unwavering love, and heartfelt prayers have always propelled me towards excellence. Their constant desire for my well-being and success have been a driving force behind my endeavors.

I extend my heartfelt gratitude to my beloved spouse, whose unwavering presence has been a source of unwavering strength and support. Your love, companionship, and encouragement have been instrumental in navigating the challenges faced throughout the years.

To my cherished son, you have been a constant motivation in my life. Your presence has been a source of joy and fulfillment, spurring me to reach new heights of achievement.

Lastly, I express my profound gratitude to my esteemed guide, Associate professor.Ts. Dr. Nurul Akmar Binti Emran. Her profound insights and expertise in the field of e-procurement practices and risk management on procurement performance have significantly shaped this work. Her visionary guidance and unwavering support have been invaluable, enriching the depth and quality of my research.

May this dedication serve as a testament to the profound impact these remarkable individuals have had on my personal and academic journey. Their unwavering support and guidance shall forever be etched in my heart.

ABSTRACT

In today's dynamic business environment, risk management (RM) plays a vital role in identifying opportunities and threats, guiding decision-making, and shaping the future of organizations. Effective procurement methods remain crucial for success in the oil and gas sector. However, poor procurement performance often leads to delivery delays, growth failures, and distribution challenges. With advancements in technology, organizations are increasingly leveraging electronic procurement (e-procurement) and RM to enhance their supply chains and overall procurement performance. This study focuses on Abu Dhabi National Oil Company (ADNOC), a prominent energy company in the UAE, which has adopted e-procurement to streamline its procurement process. The study aims to investigate the interplay of e-procurement, RM, and sustainable supply chain (SSC) and their impact on procurement effectiveness within ADNOC. A conceptual framework is proposed, and the study examines the correlation between these factors and procurement performance. Data was collected through a random sample of 376 personnel from ADNOC's procurement, evaluation, and management levels. Structural equation modeling (SEM) using AMOS software was employed to analyze the collected data and assess the study hypotheses. The findings revealed a strong positive association between procurement success and e-procurement, RM, and SSC. Additionally, the study identified the mediating role of SSC in the relationship between RM and procurement performance. This research contributes theoretically by validating the dimensions of e-procurement, RM, SSC, and procurement performance through exploratory factor analysis and confirmatory factor analysis. It also establishes the mediating role of SSC in the oil and gas industry. Furthermore, the study provides statistical evidence supporting the proposed framework, which serves as a valuable model for companies relying on procurement for sustained business operations. The findings have practical implications for decision-makers at ADNOC and other oil and gas companies, enabling them to understand the impact of e-procurement, RM, and SSC on procurement success. Moreover, policymakers and stakeholders in the oil industry worldwide can benefit from the insights into the mediating role of SSC. This research contributes to advancing procurement practices and enhancing performance in the oil and gas sector, ensuring sustainable operations in an ever-evolving business landscape.

KESAN AMALAN E-PEROLEHAN DAN PENGURUSAN RISIKO TERHADAP PRESTASI PEROLEHAN MELALUI RANTAI BEKALAN MAPAN

ABSTRAK

Di dalam persekitaran perniagaan yang dinamik pada hari ini, pengurusan risiko (RM) memainkan peranan penting dalam mengenal pasti peluang dan ancaman, membimbing pembuatan keputusan, dan membentuk masa depan organisasi. Kaedah pengadaaan yang berkesan kekal penting untuk kejayaan dalam sektor minyak dan gas. Walau bagaimanapun, prestasi pengadaaan yang lemah sering menyebabkan kelewatan penghantaran, kegagalan pertumbuhan, dan cabaran pengedaran. Dengan kemajuan teknologi, organisasi semakin memanfaatkan pengadaaan elektronik (e-procurement) dan RM untuk meningkatkan rangkaian bekalan dan prestasi pengadaaan secara keseluruhan. Kajian ini memberi tumpuan kepada Abu Dhabi National Oil Company (ADNOC), sebuah syarikat tenaga utama di UAE yang telah mengamalkan e-procurement untuk menyelaraskan proses pengadaannya. Kajian ini bertujuan untuk menyiasat hubungan timbal balik antara e-procurement, RM, dan rangkaian bekalan lestari (SSC) serta impaknya terhadap keberkesanan pengadaaan dalam ADNOC. Satu kerangka konseptual dicadangkan, dan kajian ini mengkaji korelasi antara faktor-faktor tersebut dan prestasi pengadaaan. Data dikumpulkan melalui sampel rawak sebanyak 376 kakitangan dari peringkat pengadaaan, penilaian, dan pengurusan ADNOC. Pemodelan persamaan berstruktur (SEM) menggunakan perisian AMOS digunakan untuk menganalisis data yang dikumpulkan dan menilai hipotesis kajian. Penemuan kajian menunjukkan hubungan yang kuat dan positif antara kejayaan pengadaaan dan e-procurement, RM, dan SSC. Selain itu, kajian ini mengenal pasti peranan pengantaraan SSC dalam hubungan antara RM dan prestasi pengadaaan. Penyelidikan ini memberikan sumbangan secara teori dengan memvalidasi dimensi e-procurement, RM, SSC, dan prestasi pengadaaan melalui analisis faktor eksploratori dan analisis faktor pengesahan. Ia juga menetapkan peranan pengantaraan SSC dalam industri minyak dan gas. Selain itu, kajian ini menyediakan bukti statistik yang menyokong kerangka yang dicadangkan, yang merupakan model berharga bagi syarikat-syarikat yang bergantung kepada pengadaaan untuk operasi perniagaan yang berterusan. Penemuan ini mempunyai implikasi praktikal bagi pembuat keputusan di ADNOC dan syarikat-syarikat minyak dan gas lain, membolehkan mereka memahami impak e-procurement, RM, dan SSC terhadap kejayaan pengadaaan. Selain itu, para pembuat dasar dan pihak berkepentingan dalam industri minyak di seluruh dunia dapat mendapatkan manfaat daripada wawasan mengenai peranan pengantaraan SSC. Penyelidikan ini menyumbang kepada pembangunan amalan pengadaaan dan peningkatan prestasi dalam sektor minyak dan gas, memastikan operasi yang lestari dalam landskap perniagaan yang sentiasa berubah.

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TABLE OF CONTENTS

	PAGE
DECLARATION	
APPROVAL	
DEDICATION	
ABSTRACT	i
ABSTRAK	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	ivv
LIST OF TABLES	vii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xii
LIST OF APPENDICES	xii
LIST OF PUBLICATIONS	xiii
CHAPTER	
1. INTRODUCTION	1
1.1 Introduction	1
1.2 Background	1
1.3 Research problem	6
1.4 Research objectives	8
1.5 Research questions	9
1.6 Significance of the research	9
1.7 Scope of the research	11
1.8 Definition of key terms	12
1.9 Structure of the thesis	13
1.10 Summary	15
2. LITERATURE REVIEW	16
2.1 Introduction	16
2.2 Concept of procurement	16
2.3 Weaknesses in procurement process	18
2.4 Overview of procurement performance in UAE	20
2.5 Procurement performance	21
2.5.1 Measurement of procurement performance	23
2.6 E-procurement	26
2.6.1 Definition of e-procurement	28
2.6.2 E-procurement and procurement performance	29
2.6.3 E-Procurement in UAE oil and gas sector	31
2.6.4 Measurement of e-procurement	34
2.7 Sustainable supply chain	36
2.7.1 Supply chain in the Oil and Gas industry	43
2.7.2 The challenges of the supply chain	47

2.7.3	The measurement of the supply chain	49
2.8	Risk management (RM)	52
2.8.1	Risk management in the Oil and Gas sector	55
2.8.2	Risk management in oil and gas in UAE	56
2.8.3	Risk management in supply chain and procurement	58
2.8.4	Risk management practices	61
	2.8.4.1 Risk Identification	62
	2.8.4.2 Risk analysis	63
	2.8.4.3 Risk evaluation	64
	2.8.4.4 Risk response	64
2.9	Hypothesis development	65
2.9.1	E-procurement and sustainable supply chain	65
2.9.2	Risk management and sustainable supply chain	67
2.9.3	E-procurement and procurement performance	69
2.9.4	Risk management and procurement performance	70
2.9.5	Sustainable supply chain as mediator	74
2.10	Related theories of the research	77
2.10.1	Balanced scorecard (BSC) theory	78
	2.10.1.1 BSC's role in procurement and supply chain	84
2.11	Research framework	88
2.12	Literature gaps	90
2.13	Summary	92
3.	RESEARCH METHODOLOGY	94
3.1	Introduction	94
3.2	Research philosophy and paradigm	94
3.3	Research approach	96
3.4	Research design	98
3.5	Data collection	100
3.5.1	Population and sample size	100
	3.5.1.1 Population size	101
	3.5.1.2 Sample size	101
	3.5.1.3 Sample techniques	103
3.6	Data collection process	105
3.6.1	Data collection instrument	107
3.6.2	Pilot research	110
3.6.3	Reliability of questionnaire	111
3.7	Materials and instrumentation	112
3.7.1	Risk management practices	113
3.7.2	Sustainable supply chain	114
3.7.3	Procurement performance	116
3.7.4	E-Procurement practices	117
3.8	Data analysis	118
3.8.1	Descriptive analysis	120
3.8.2	Factor analysis	120
	3.8.2.1 Exploratory factor analysis (EFA)	121
	3.8.2.2 Confirmatory factor analysis (CFA)	122

3.8.3	Structural equation modeling (SEM)	122
3.8.4	Mediation analysis	123
	3.8.4.1 Baron and Kenny's Theory	124
	3.8.4.2 Bootstrapping approach (indirect effect)	125
3.9	Ethical assurances	125
3.10	Justifications for using covariance based (CB-SEM)	126
3.11	Summary	127
4.	RESULTS AND DISCUSSION	128
4.1	Introduction	128
4.2	Terminology	128
4.3	Exploratory data analysis (EDA)	129
	4.3.1 Data reliability	130
	4.3.2 Exploratory factor analysis	131
	4.3.2.1 KMO and Bartlett's test	131
	4.3.2.2 Communalities	132
	4.3.2.3 Total variance explained	133
	4.3.2.4 Rotated component matrix	135
4.4	Descriptive statistics	136
	4.4.1 Response rate	136
	4.4.2 The outliers	139
	4.4.3 Demographic analysis	142
	4.4.4 Central tendency measures	144
4.5	Construct validity	146
	4.5.1 Convergent validity	147
	4.5.2 Discriminant validity	148
4.6	Inferential statistics	150
	4.6.1 Structural equation modeling (SEM)	150
	4.6.2 Confirmatory factor analysis (CFA)	151
4.7	The structural model	158
	4.7.1 Model fit indices	161
	4.7.2 Path analysis estimates	162
	4.7.3 Hypotheses testing	164
4.8	Mediation analysis	166
	4.8.1 Baron and Kenny's method	167
	4.8.2 Bootstrapping method (indirect effect)	169
4.9	Summary	172
5.	CONCLUSION AND RECOMMENDATION	174
5.1	Introduction	174
5.2	Overview of the research	174
5.3	Findings concerning the research objectives	177
5.4	Contributions of the research	182
	5.4.1 Theoretical contribution	183
	5.4.2 Research methodology contribution	185
	5.4.3 Practical contribution	187
5.5	Limitations of the research	189

5.6	Research recommendations	191
5.7	Conclusions	194
REFERENCES		197
APPENDICES		256

LIST OF TABLES

TABLE	TITLE	PAGE
Table 1.1	Structure of the thesis	13
Table 2.1	The measurements of procurement performance	25
Table 2.2	Definitions and findings of supply chain management	40
Table 2.3	BSC in the energy sector	87
Table 3.1	The design of questionnaire structure	99
Table 3.2	Non-probability and probability sampling techniques	105
Table 3.3	Summary of Pilot test	110
Table 3.4	Reliability Cronbach's Alpha classifications by Pallant (2016)	112
Table 3.5	Measurement items for risk management practices	113
Table 3.6	Measurement items for sustainable supply chain	115
Table 3.7	Measurement items for procurement performance	116
Table 3.8	Measurement items for e-procurement	117
Table 4.1	Reliability Cronbach's Alpha Coefficients	130
Table 4.2	KMO values in the Bartlett's test	132
Table 4.3	Communalities of variables	133
Table 4.4	Total Variance Explained of variables	134
Table 4.5	Rotated component matrix of variables	135
Table 4.6	Survey response rate	137
Table 4.7	Missing data distribution by questionnaires variables	139
Table 4.8	The demographic profile of the staff and managers	142

Table 4.9	Descriptive Statistics of constructs	146
Table 4.10	The amount of AVE and composite reliability of dimensions.	148
Table 4.11	Correlations between Constructs	149
Table 4.12	Fit indices of measurement models	152
Table 4.13	The significance and strength of relationships between constructs	153
Table 4.14	Standardized regression weights	163
Table 4.15	Hypothesis validation and significance of direct relationships	166
Table 4.16	The summary of between risk management and procurement performance	170
Table 4.17	The summary of between e-procurement and procurement performance	171

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 2.1	The evolution stages of supply chain management	41
Figure 2.2	Oil and Gas supply chain	44
Figure 2.3	The dimensional model of RM in the Oil and Gas companies	65
Figure 2.4	Four perspectives of Balanced Scorecard theory	80
Figure 2.5	Lag and lead indicators based on the BSC model	83
Figure 2.6	A model of hypotheses	89
Figure 3.1	Research design steps	96
Figure 3.2	G*Power Screenshot of the Applied Setting	103
Figure 3.3	Data collection process	108
Figure 3.4	A 3-variables mediation model	124
Figure 4.1	Outliers in the dataset of variables	141
Figure 4.2	The measurement model of risk management	154
Figure 4.3	The measurement model of sustainable supply chain	155
Figure 4.4	The measurement model of e-procurement	156
Figure 4.5	The measurement model of Procurement performance	157
Figure 4.6	The Construct of Structural Model	160
Figure 4.7	The direct and indirect effect path in the mediation model	167
Figure 4.8	A Three-Variable Mediation Model	168

LIST OF ABBREVIATIONS

ADCO	-	Abu Dhabi Company for Onshore Oil Operations
ADNOC	-	Abu Dhabi National Oil Company
AVE	-	Average variance extracted
BSC	-	Balance Scorecard model
CFA	-	Confirmatory factor analysis
EFA	-	Exploratory factor analysis
EIA	-	Exporting countries forum
EM	-	Expectation-maximization
EMARAT	-	Emirates General Petroleum Corporation
GDP	-	Gross domestic product
GoF	-	Goodness of fit
IT	-	Information technology
PLS	-	Partial least squares
PP	-	Procurement performance
RM	-	Risk management
SC	-	Supply chain
SDG	-	sustainable development goals
SEM	-	Structural equation modelling
SPSS	-	Statistical package for the social science
SQC	-	Statistical quality control
VIF	-	Variance inflation factor
VRIN	-	Valuable, rare, inimitable, and non-substitutable
ZADCO	-	Zakum Development Company

LIST OF APPENDICES

APPENDIX	TITLE	PAGES
Appendix A	List of Arbitrators	256
Appendix B	Questionnaire	257
Appendix C	Factor Analysis	266

LIST OF PUBLICATIONS

The followings are the list of publications related to the work on this thesis:

AlQubaisi, A. J., and Emran, N. A., 2022. The impact of risk management on procurement performance through SSC within (ADNOC) in UAE: A proposed framework. *Journal of Positive School Psychology*, 6(3), pp.4856-4864.

AlQubaisi, A. J., Emran, N. A., and Sam, M. F. M., 2022. A mediation role of sustainable supply chain in e-procurement of ADNOC the largest energy company in UAE. *Journal of Positive School Psychology*, 6(3), pp.4865-4877.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides a comprehensive examination of key aspects within the realm of procurement practices, risk management, sustainable supply chain, and procurement performance. In particular, the research takes a focused perspective on ADNOC, the largest energy company in the United Arab Emirates (UAE), to establish a contextual framework. The subsequent section offers a clear definition of relevant terms, facilitating a common understanding for readers. Following this, the chapter presents the problem statement and the purpose of the research, which are driven by identified challenges. The research questions and hypotheses are formulated accordingly, highlighting the investigative direction. Additionally, the significance of the research is underscored, emphasizing its potential contributions to the field. The chapter further delves into the research scope, outlining the boundaries and parameters that define the study. Lastly, the chapter concludes with a succinct summary, encapsulating the main points discussed.

1.2 Background

In today's competitive business environment, optimizing supply chain management is necessary. Information and Communication Technologies (ICTs) are the key instrument for efficient supply chain management (Shcherbakov and Silkina, 2021). As a result of their positive influence on individual and organizational productivity and efficiency, E-procurement systems have risen in popularity over the last few years. Software-as-a-Service (SaaS)-based E-procurement services offer online supply management solutions (Nozari,

Fallah and Szmelter-Jarosz, 2021). To reduce manual procurement operations, the use of E-procurement technologies (EPTs) has been widespread since they can substantially boost a company's transaction processing abilities. According to research, businesses that employ E-commerce as a business strategy and use digital supply chain management activities obtain remarkable results in commercial operations. E-commerce is viewed as a stimulant for commercial process improvements, and its use has become a major issue for businesses today. The adoption of electronic procurement, which assists in unifying the purchasing process all across the supply chain, has shown a growing trend over the years. The concept of electronic procurement alludes to the inclusion of procuring, negotiation, purchasing, receiving, and post-purchase evaluation (Singh and Chan, 2022).

E-procurement is a platform that automates and rationalizes the procedures of an organization, from demand to payments, using web technology and its facilities. EPTs are not a newly discovered procedure since there have been numerous attempts to use electrical systems to produce computerized procurement systems for companies, including electrical workflow systems and Electronic Data Interchange (EDI) (Singh and Chan, 2022). There are many categories of E-procurement; however, for this research, we consider five practical applications of E-procurement technologies, namely E-tendering, E-sourcing, E-informing, E-ordering, and E-reverse auctioning. Corporations such as manufacturing firms are currently using E-procurement to achieve numerous advantages, such as increased productivity among employees and decreased costs, by obtaining fast-track services and cheaper products. For industries and firms, implementing elements of E-commerce, such as E-procurement, for their firm's business processes has become an increasingly significant criterion (Bhattacharyya, Maitra and Deb, 2021).

To optimize organizational expenditures, eliminate management expenses, and increase effectiveness in operational functions, EPTs involve automating the organizational acquisition of products and services by using web-based technologies. In general, procurement in an organizational pricing hierarchy is one of the most significant sectors. It is obvious why EPT is more popular, as it contributes to a reduction in operating expenses and cycle buying times while enhancing comparable costing. Evidence indicates that EPTs using enterprises minimize transactional expenses by up to 42%. (Singh and Chan, 2022; Nandankar and Sachan, 2020). The EPTs compress pricing discussions from months to hours, reducing a considerable amount of time and effort in the organization. Moreover, shorter purchase processing times allow greater versatility and precise purchase requisition information. The approach of E-procurement enables production to be increased and corporate expenses to be lowered, and it allows firms to obtain certain advantages to strengthen their management skills and make the functioning of their supply chain more visible (Nandankar and Sachan, 2020).

The United Arab Emirates (UAE) is widely recognized as one of the most economically successful Middle Eastern states. With significant reserves of oil and gas, the country has played a crucial role in the global energy market. The UAE accounts for approximately 4 percent of the world's oil reserves and 3.5 percent of its gas reserves (Shin, and Kim, 2021). As the seventh-largest producer and fourth-largest net exporter of crude oil and natural gas, the UAE holds a prominent position in the industry (Salim and Alsyouf, 2020).

Recognizing the need to diversify its economy beyond oil and gas, the UAE has embarked on a strategy to reduce its dependence on finite resources (Salim and Alsyouf, 2020). This shift towards economic diversification has opened up opportunities for the

development of other sectors, including manufacturing. The UAE Ministry of Economy has set ambitious targets to expand the manufacturing sector's contribution to the country's GDP, aiming for a 20 percent share by 2021 and 25 percent by 2025 (Chaturved et al., 2021). To achieve these goals and enhance its global competitiveness, the UAE seeks to improve its ranking in the global manufacturing industry indices.

Dubai, with its thriving manufacturing industry, is a key player in the UAE's economic diversification efforts. As the third-largest manufacturing hub in the country, Dubai has witnessed substantial growth and aims to contribute USD 19 million to research and development (Rand D) by 2030, with its industry value expected to rise from USD 11.2 billion to USD 16.1 billion (Obaideen et al., 2021). The Dubai Industrial Strategy outlines a vision of creating 27,000 employment opportunities and generating AED 165 billion in GDP from the manufacturing sector by 2030.

Effective procurement and supply chain management are crucial for the success of industries across the UAE, considering its diverse workforce of 180 nationalities from various cultures and religions. The oil and gas industry, in particular, has made significant strides in adopting the latest technologies for exploration and extraction. However, it is essential to critically examine the supply chain and procurement processes to optimize their value. Modern supply chain systems and techniques offer solutions to challenges such as inventory management, market forecasting, contractor management, and master data management (Modgil, Singh and Hannibal, 2022).

Procurement efficiency plays a vital role in the success of the oil and gas industry (Kabirifar and Mojtahedi, 2019). Van Weele (2003) defines efficient procurement as the satisfaction of priorities and objectives, the alignment of expected and actual results, and the

acquisition of capital to meet goals and objectives. To achieve this efficiency, vendors must actively participate in the procurement process, and oil and gas companies strive for quick performance and market competitiveness, leading them to adapt their procurement systems. Supply chain management emerges as the best technique to improve supply chain planning across industries (Monczka et al., 2020).

In recent years, the concept of sustainability has gained significant attention in both industry and academia. Supply chain sustainability, which involves following standard operating procedures to limit environmental impact, has become a key focus for corporations worldwide. Sustainability initiatives encompass reducing pollution, deforestation, ozone depletion, and global warming. Emerging economies, including the UAE, have recognized the importance of sustainability and are actively prioritizing it to remain competitive on the global stage (Hough, 2021).

Despite the growing recognition of the significance of procurement performance and supply chain management, there are still challenges that need to be addressed. Poor procurement outcomes can hinder purchasing functions, and traditional risk management plans may not adequately address the evolving procurement processes. Effective risk management is crucial for procurement success and overall supply chain efficiency. The UAE, like other countries, faces unique procurement performance difficulties and risks within its oil and gas supply chain management (Schneller et al., 2023).

Furthermore, the public sector procurement procedures in the UAE have traditionally involved lengthy processing periods, paperwork burdens, bidder threats, lack of transparency, and discretion in contracting. To overcome these challenges, the adoption of e-procurement has gained momentum worldwide, leading to increased efficiency, cost

savings, shorter procurement procedures, reduced corruption, improved compliance, and standardized purchasing in many countries. However, the utilization of e-procurement in the UAE's public sector is still relatively slow.

To address the various challenges and complexities in procurement and supply chain management within the UAE's oil and gas industry, this research aims to investigate the relationship between risk management, procurement performance, and sustainable supply chain management. By examining these variables, this study intends to contribute to the existing body of knowledge and provide valuable insights for practitioners, policymakers, and researchers in the field of procurement and supply chain management.

1.3 Research problem

The implementation of e-procurement has emerged as a potential solution to enhance the efficiency and effectiveness of procurement processes in the oil and gas (Oil and gas) industry (Aslam et al., 2023). However, there remains a significant knowledge gap regarding the impact of e-procurement and risk management on the relationship between supply chain management and procurement performance (Molepo and Jahed, 2022), particularly in the context of the Oil and Gas industry in the UAE (Krishnan, 2020; Rushton et al., 2022). This lack of empirical evidence and understanding hampers organizations like ADNOC from making informed decisions and optimizing their procurement practices to drive sustainable development and growth.

The Oil and Gas industry, being prone to various risks such as market volatility, health and safety concerns, environmental performance, and high production costs, necessitates effective risk management within the supply chain (Sakib et al., 2021; Hassija et al.,