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A conceptual framework of Critical factors for risk mitigation and management in the procurement process: A framework from the UAE petroleum Industry

Maitha Mohammed saeed Hasan aljneibi[1], Dr.Siti Norbaya Binti Yahaya[2]

maitha.aljneibi10004@gmail.com[1], sitinorbaya@utem.edu.my[2]
Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia
Corresponding Author: Dr.Siti Norbaya Binti Yahaya,
Email: sitinorbaya@utem.edu.my

Abstract

Petroleum procurements are typically in high demand in most economies around the globe. The procurement of the commodities is characterized by transportation of crude oil from where it is extracted to refineries by ship or pipeline. UAE Oil and gas industry are at risk due to the massive capital investment, the involvement of many parties, the use of complex technology, as well as the high environmental and social impacts. Furthermore, effective risk mitigation in UAE oil and gas industry requires appropriate knowledge, an up-to-date database about pipeline failure causes. However, there was very little research done on the risk factors that affect the performance of procurement of petroleum products especially in UAE where wide variations in supply and prices are experienced. This study therefore this study intended to develop conceptual framework of Critical factors for risk mitigation and management in the procurement process: A framework from the UAE petroleum Industry

Key words: *UAE, petroleum Industry, oil and gas industry*

1. Introduction

Petroleum products are a very significant component of the world economy of any country. Various petroleum products are used to carry out multiple economic operations (Shqairat and Sundarakani, 2018). For example, in many nations around the world, gasoline and diesel are used for road transport, while oil is very essential in electricity generation. This is a clear sign that oil products play a key position in most nations in the world's financial growth (A. Kassem et al, 2019). It is also essential to note that most households in developing nations depend strongly on petroleum products as energy sources such as tiny and medium-sized businesses (SMEs) lighting and running. In essence, most countries ' economies are affected by petroleum products (Kojima et al., 2010). With the critical role that petroleum products play in boosting economic development, product flows effectively and efficiently through the entire supply chain need to be ensured. In order to guarantee harmony and capacity to satisfy market demand, the operations that take place between procurement, processing, transportation and distribution of the products need to be closely managed (Obaid Aldhaheri, 2016). The petroleum supply chain includes upstream and downstream operations. The primary operations on the upstream hand include exploring, producing, trading and transporting

crude oil to the refineries. On the other side, downstream activities require the marketing and distribution to end consumers of refined petroleum products (Nnadili, 2006). Most Sub-Saharan African nations do not generate their own crude oil and are therefore dependent on imported oil from other nations. There are, however, a few countries that generate their own crude oil, but most nations need worldwide logistics to acquire the crude oil for local refining or to import finished products (Dafir et al, 2016). UAE is one of the region's nations with a local refinery that processes crude oil into various products for sale in the region. For completed petroleum products, UAE also has underground pipeline transport (Cordesman,2018). Occasionally, pumping stations influencing operational effectiveness owing to energy outages. There are several activities in the supply chain of petroleum products, but this research will concentrate on purchasing, transporting and delivering petroleum products in the UAE (Kojima, et al., 2010).

Furthermore, UAE Oil and gas industry are at risk due to the massive capital investment, the involvement of many parties, the use of complex technology, as well as the high environmental and social impacts (Rodhi, & Wiguna, 2018). The risk is the possibility of the occurrence of some uncertain, unexpected, and even unwanted events, which will change the probability prospect of a given investment. In general, risk factors and hazards could be induced in the oil and gas sector by the parameters contained in the industrial system (Rodhi,, 2018). Disasters can happen at any time and certainly cannot be prevented, but their impacts can be minimized by the adoption of a strategy for dealing with disasters. Risks should be mitigated since the beginning to prevent disasters. Therefore, any risk analysis must be integrated with the disaster risk assessment

Effective risk mitigation in UAE oil and gas industry requires appropriate knowledge, an up-to-date database about pipeline failure causes (Balfe et al., 2014), and accurate values about the probability and severity levels of the RFs to identify the factors which require prioritization. However, the data that the existing risk analysis methods contain is uncertain with regard to the probability and severity. For example, the data is it not available or is there a possibility that it is incorrect (Yazdani-Chamzini, 2014).

Siddharth *et al*. (2013) study on evaluating petroleum supply chain performance in India established that the following factors are important in evaluating the performance purity of product, market share, and steady supply of raw material and use of information technology. Kojima et al. (2010) study on petroleum markets in Sub-Saharan Africa revealed that petroleum products are widely used in most countries and have far-reaching micro and macroeconomic effects. Shibia & Kieyah (2011) also studied the petroleum industry established that leading petroleum companies have some level of power to influence activities in the industry.

It is evident from the studies conducted that extensive research has been conducted as far as the petroleum industry is concerned. However, there was very little research done on the risk factors that affect the performance of procurement of petroleum products especially in UAE where wide variations in supply and prices are experienced. This study therefore this study intended to develop conceptual framework of Critical factors for risk mitigation and management in the procurement process: A framework from the UAE petroleum Industry

2. The Oil and Gas Industry

Two major markets, upstream and downstream, usually include a ventures in the mining, gas and petrochemical industries. The top-level sector is concerned with extracting natural resources from crude oil and gas such as discovering new oil and gas deposits and establishing oil and gas processing facilities. The downstream sector, on the other hand, is concerned with the refining and purification of crude oil by means of petrochemical plants and gas processing and with the supply of products ready for distribution using pipelines and pumped systems from the upstream sector. The downstream sector is (EKT, 2015). As described above, this essay concentrates on the petroleum and gas industry in Abu Dhabi, which is the cornerstone of its economy. Abu Dhabi is one of the biggest oil producers and production firms in the world and is the key owners of the UAE's oil reserves (around 94percent). Figure 2.1 reveals that UAE production and use of oil from 2004 to 2013 was increasing dramatically, rendering UAE the sixth largest oil producer with an output of 3.5 million barrels per day in 2014 (Duong, 2015).

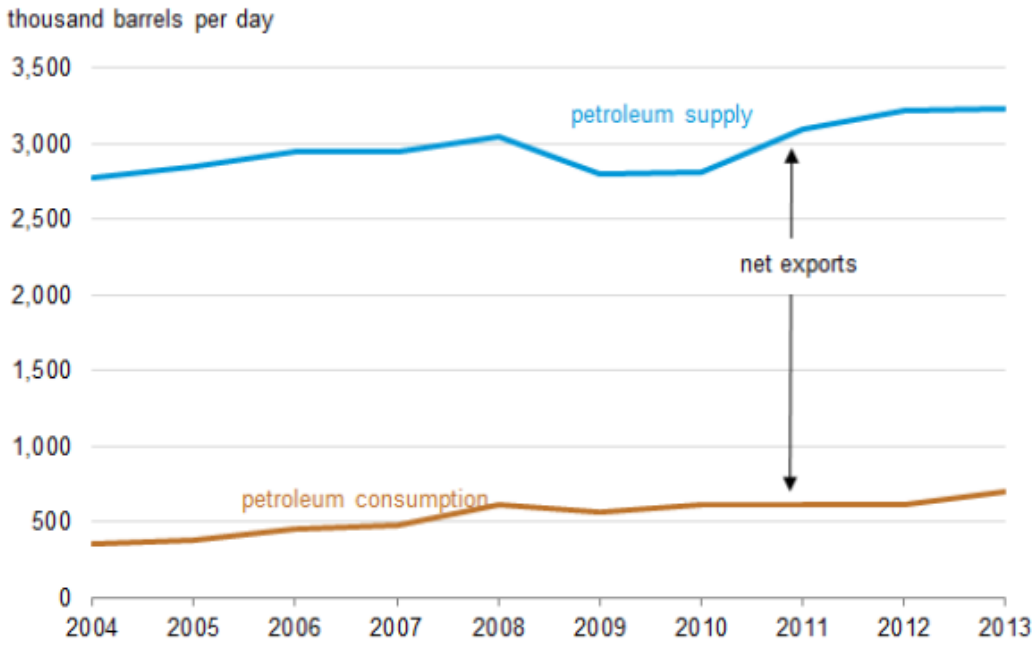

Figure 1: UAE petroleum and other liquids supply and consumption, 2004-2013 Source: (EIA, 2017)

3. Abu Dhabi's oil and gas projects: A challenging environment

The main oil and gas schemes, with an duration of six years from preparation, commissioning, and managing, are well-known as capital intensive ventures (Likierman, 1980). For example, the Abu Dhabi Oil Refining Company (Takreer) awarded a contract of approximately US$ 9.6 billion to increase its refining capacity by 417 thousand barrels per day in order to expand the Ruwais refinery. In addition to large volumes of construction materials, including some 800 000 cubic meters of concrete, 200 000 tons of reinforced steel, 8.5 million meters of power cables and 35 000 instruments this project needs nearly 10,000 staff with different capabilities (Vargas, 2014). Similarly, according to Mendez, (2012), Abu Dhabi Gas Industries Ltd (Gasco), which estimates the quantities of material used in those facilities as follows, has invested about US$ 12.6 billion in the development and development of gas plants in Ruwais and Habshan: about 780 000 cubic meters of concrete, 114 000

tons of structural steel, 1,87 thousand kilometers of pipeline, 160 kilometers of pipelines, 11,67 thousand kilometers of structure. Such massive financial commitments and technological specifications have significant expectations and obstacles for the project partners which may in effect hinder the completion of the project. As a consequence, it is important for the project's effectively milestones to be accomplished by strong collaboration and function together with main project participants (including the end user) as well as careful handling of the relationships with them (Sandhu & Gunasekaran, 2004). The next two sections provide an overview of key project players and provide a proper legal understanding that regulates their relations – the so-called 'contract.'

4. Related Theory

In the research literature, a number of theories have been engaged in studies on the adoption of new technologies. Some of these theories include: the diffusion of innovation (DOI) theory by Rogers in 1962; the technology, organization and environment (TOE) framework by Tornatzky and Fleischer (1990); the technology acceptance model (TAM); theory of reasoned action (TRA) and unified theory of acceptance and use of technology (UTAUT) (Williams, & Dwivedi, 2015). However, Oliveira technology adoption at the firm's (organizational) level, the TAM, TRA and UTAUT are useful in studies that explore innovation adoption by individuals. Since the focus of the current research is on procurement in petroleum company, the DOI theory and TOE framework are considered to be relevant in this study.

Roger's DOI theory posits that among other factors, the attributes of an innovation influence its diffusion and adoption (Rogers, 2003). He identified these attributes to include: i) relative advantage (the extent to which the innovation is viewed to be better than the existing idea, practice, knowledge or tool by users; i.e. perceived cost and benefits); ii) compatibility (the degree to which an innovation is consistent with the existing practice, experience, norms, needs and value system of the potential adopters); iii) complexity (the degree to which an innovation is perceived as difficult to understand and use); iv) trialability (the degree to which an innovation may be experimented with on a limited basis); and v) observability (the degree to which the results of adoption of innovation are visible to others) (Rogers, 2003). Although Sahin, (2006) was of the view that these attributes account for between 49% and 87% of variation in the adoption of innovation, Ibem and Laryea (2015) noted that the three attributes consistently found to be relevant to innovation adoption are relative advantage, compatibility and complexity. Mustonen-Ollila and Lyytinen (2003) explained that the factors identified by Rogers are perception measures that represent independent variables used in exploring the likelihood and propensity to, or actual adoption of, an innovation as the dependent variable.

Although Roger's DOI theory has been applied in ICT diffusion and adoption studies in construction (Chung, et al., 2013 and Ibem and Laryea, 2015 for examples), it has been criticized for not considering the influence of market and industry characteristics on adoption decisions by firms. Consequently, the TOE model developed by Tornatzky and Fleischer in 1990 seeks to address the inadequacies of the Roger's DOI theory (Teo et al., 2009; Oliveira and Martins; 2011). The TOE model contends that technological, organizational and environmental factors largely influence innovation adoption (Tornatzky and Fleischer, 1990). Oliveira and Martins (2011) explained that technological factors are concerned with the existing and emerging technologies and may include

current practices, equipment and technologies within and outside the organizations. The organizational factors are mainly management structure, organizational size, scope of activities resource base and others (Azadegan and Teich, 2010), while the environmental factors are the influence of industry characteristics, competitors, government and other institutions that have influence on the adopting unit (Azadegan and Teich, 2010; Oliveira and Martins, 2011).

Compared to the manufacturing, transportation, retailing and other service industries, who are early procurement in petroleum company (Teo et al., 2009), the construction industry is generally regarded as a late adopter of procurement in petroleum company (Eadie et al., 2010; Laryea and Ibem, 2014). However, existing theories and conceptual frameworks do not appear to have considered the influence of early adopters of procurement in petroleum company on the late adopters. Therefore, this study sought to include the external influence of other industries on the adoption of procurement in petroleum technologies and tools by organizations in the NBI.

5. Conceptual Framework

The review of literature covers two main areas. First, is the presentation of the underpinning theoretical framework of this study; and second, is the review of previous studies on the factors influencing Procurement adoption in petroleum company. The adoption of a new idea, process, product or service (innovation) has been explained from diverse perspectives in the literature. For example, Klein et al. (2001) described adoption as a decision to use an innovation within the organization, while Rogers (2003) defined adoption as a decision to make full use of an innovation. Rogers also made it clear that the decision to adopt an innovation consists of five phases of awareness, interest, evaluation, trial and adoption (Rogers, 2003). Further, Woodside and Biemans (2005) described adoption as "the decision-making process of an individual unit of adoption to use a product or service. Therefore, in this study, procurement in petroleum company adoption refers to the actual use of web-based technologies, tools or processes to support the execution of some or all aspects of construction procurement activities.

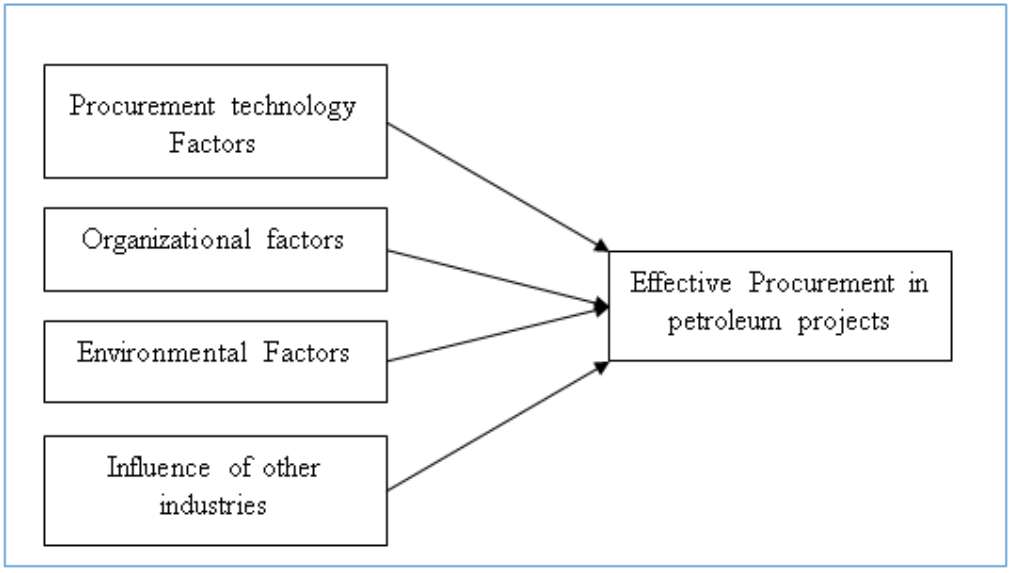

Figure 2: Conceptual framework of the study

6. Discussion and Conclusion

In the construction sector, a number of studies have attempted to explore the factors influencing an organizations' decision to procurement in petroleum company. For example, Ibem et al, (2016) found that the decision to procurement in petroleum company by 226 organizations in the Atlantic Canadian AEC industry was influenced by the perceived benefits of procurement in petroleum company in gaining access to a larger market and increased opportunities; reduction in paperwork; increased productivity; and reduction in the procurement cycle time and transaction cost. Teo et al. (2009) also found that firm size, top management support, perceived indirect benefits, and business partners influenced the adoption of procurement in petroleum company in 141 Architecture/Engineering/Construction firms in Singapore. In the UK, Eadie, et al. (2011) observed that in public and private sector organizations, there was a correlation between the size, procurement spending and sector an organization belonged to and procurement in petroleum company use. The authors found that the perceived benefits in time and cost savings, increased quality, visibility in the supply chain, efficiency, and effective communication associated with procurement in petroleum company were the key factors that influenced procurement in petroleum company use. Other factors identified in that study were improved inventory management, elimination of errors and convenience of archiving of completed work.

Elsewhere in Malaysia, Morledge, R., & Smith et al. (2013) revealed that the key factors that influenced procurement in petroleum company among 178 contractors were perceived usefulness of Procurement technologies in handling procurement work, and the complexity of Procurement technologies. Similarly, Tran and Huang (2014) noted that the adoption of Procurement in developing countries was influenced by technological, organizational, environmental, and managerial factors. Ibem, et al, (2016) also found that the speed of transactions, lower transaction cost and ease of use of the technologies had the highest positive impact on e- Procurement use in the South African construction industry. It is evident from this that the attributes of Procurement technologies, organizational characteristics and the operating environment are amongst the factors that can influence the decision to adopt Procurement by organizations. It was also observed that none of the existing studies explored the influence of other industries on the adoption of Procurement in the construction sector. Therefore, there is a need to explore this further, particularly in a developing country like UAE where the literature on Procurement in construction is very thin. A conceptual framework of this study was developed based on the findings of the literature review.

The framework (Figure 2) proposes that the factors that influence the decision by organizations in the NBI to use Procurement are: (i) the attributes of Procurement technologies; (ii) organizational factors; (iii) environmental factors; and (iv) the influence of other industries. Therefore, in this study, the key assumption is that the decision to use Procurement by organizations in the NBI is a product of the attributes of Procurement technologies, organizational, and environment factors, as well as the influence of other industries described as early adopters of Procurement.

7. Conclusion

ERM has been advocated as an approach to tackle risk management within companies by both regulators and international bodies. The main issue, though, seems to be improving the economic value. There are a number of conflicting guidelines about ERM, which means that implementation is

not an easy process for an organisation. The lack of a unified definition of an ERM framework provides daunting challenges to those who are conducting empirical research on risk management.

This paper has reviewed and proposed a unified ERM definition and an integration of various ERM definitions based on past literature. The components of effective ERM were gathered and proposed, based on various frameworks and previous literature, moreover, as with previous ERM studies, it can be concluded that these have not been of sufficient quality to be conclusive about the nature of the relationship between ERM and employee's performance.

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