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## The impact of internal and external factors on sustainable procurement: a case study of oil and gas companies

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**Abstract:** The contentious and growing sustainability concerns within the UAE's oil and gas industries have highlighted the necessity of systematically examining the internal and external organisational factors that influence sustainable procurement (SP) in the industry. This study investigates the internal and external factors most influencing SP in the UAE's oil and gas industry. Utilising questionnaires, the researcher obtained data from 100 procurement professionals working in three oil and gas companies operating in the UAE. The research framework, developed through an extensive literature review, was analysed and tested using structural equation modelling (SEM). The results reveal that both internal and external factors have a positive and statistically significant impact on sustainable procurement, although internal factors have a relatively greater effect. This study found that leadership in change management, internal management structure, management strategy, and infrastructure cost management, are the most influential internal factors affecting SP, whilst social and economic factors are the most influential external factors. An emphasis on these internal and external factors can help oil and gas companies operating in the UAE greatly improve their level of SP performance.

**Keywords:** internal factors; external factors; sustainable procurement; oil and gas industry.

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## **1 Introduction**

Sustainable procurement (SP) is increasingly on the agenda of academics and practitioners, such as purchasing and supply managers, who seek to demonstrate corporate social responsibility (CSR) in their supply chains (Genovese et al., 2014; Nadeem et al., 2017). Sancha et al. (2016) argued that CSR has been a prime challenge, driven by environmental, social, and economic issues. The same notion is evident in the UAE's oil and gas industry (Gulf News, 2017) and its significant impact on social, environmental, and economic sustainability (IFC and UNDP, 2017; The National, 2015). Carbon dioxide (CO<sub>2</sub>) emissions by the UAE's energy sector, which mainly consists of oil (28%) and gas production (71%) (Elizabeth and Jacqueline, 2011), account for 74% of the total emissions of the country (Gulf News, 2017). Moreover, the cost of projects carried out by the oil and gas industry is remarkably high (Kidd, 2017), which is a hindrance to its economic sustainability. Additionally, various other indications, such as increasing wastage and energy consumption, economic downturns, and oil price fluctuations, have exposed the fact that SP operations within the UAE's oil and gas industry might not be sustainable at the industry's current level of activity (Abu Dhabi QCC, 2015). These concerns, together with added emphasis on sustainability by different stakeholders (Foerstl et al., 2015), have prompted the UAE's oil and gas companies to incorporate more effective sustainability policies and practices into their SP activities. These facts raise a fundamental research question: which critical internal and external

factors that determine SP should be prioritised and utilised by the UAE's oil and gas industry when developing their procurement strategies and policies?

Moreover, despite the efforts industry managers are presently making to improve SP practices, there is limited systematic and empirical research concerning the internal and external factors that may have a critical impact on the level of SP within organisations (França et al., 2017). Furthermore, very few studies that investigated the impact of various factors on SP have focused on different industries within different countries (Erkul et al., 2015; Giunipero et al., 2012; Sarkis and Dhavale, 2015; Walker et al., 2012). Some factors highlighted by these studies were cost, environmental procurement, support from top management, advanced technology, infrastructure, environmental crises, investment cost, lack of clear standards and suitable regulations, and social and cultural differences. Since no empirical research has investigated the critical determinants of SP in the context of the UAE's oil and gas industry, this study aims to achieve the following research objectives:

- 1 Explore the most critical groups of factors with significant effects on SP.
- 2 Critically investigate the internal and external factors that should be prioritised in formulating SP strategies and policies.

This paper is organised into five sections: in Section 2, the literature review discovers and establishes internal and external factors hypothetically affecting SP. Second, based on the literature findings, the methodology section (Section 3) develops the research framework and hypotheses, as well as the data collection and analysis methods. Third, the data analysis and results in Section 4 analyses the data gathered from the surveys by using structural equation modelling (SEM). Fourth, the discussion section critically reviews the results of the data analysis are discussed in Section 5. Finally, Section 6, the conclusion, provides a summary of the paper, its unique contributions, theoretical and managerial implications, limitations, and future research directions.

## **2 Literature review**

### *2.1 SP overview*

SP is a comprehensive approach to purchasing products and services that takes into consideration the economic, environmental, and social impacts of an organisation's purchase decisions. Implementing an SP strategy ensures that the company's central values are communicated through the organisation's supply chain into the life cycle of its products and services (Epstein and Buhovac, 2014). It incorporates preparations for a fluctuating climate, a reserve- and carbon-free future, and a constructive, sympathetic, and all-encompassing humanity (Eades, 2012). SP is also an acquisition and investment process that takes into consideration the economic, environmental, and social effects of the organisation's expenditures. It allows firms to meet their necessities for goods, services, production mechanisms, and practicalities in a way that achieves worth on a whole-life basis, meaning that it creates benefits not only for the organisation, but also for people and the economy. An organisation committed to SP must contemplate the three aspects of sustainability (economic, social, and environmental) to create a more lasting

approach to procuring goods and services that will positively contribute to the community and beyond (Prieto et al., 2013).

SP has various aspects that need to be carefully emphasised at the firm policy level (Carter and Jennings, 2000a). A policy framework should cover social issues and include the planned development of targeted environmental impacts. The framework should also embrace the socioeconomic implications of effective SP practices. Sarkis and Zhu (2018) argued that procurement practitioners are expected to source ethical products and services that are economically feasible and have a minimal environmental impact. Fernando and Saththasivam (2017) defined the environmental aspects of sustainability as a firm's direct involvement with its customers and suppliers in planning environmental management and solutions together. There is a significant association between green practices and profitability within organisations (Coetzee and Bean, 2016; Feng et al., 2018). By contrast, the social aspects measure the ability of an organisation to be socially responsible to society and community stakeholder relationships through CSR programmes, as well as its ability to ensure equality (Fernando and Saththasivam, 2017). Nevertheless, studies with respect to social sustainability are very limited in the procurement literature (Winter and Knemeyer, 2013).

More recently, procurement functions have focused attention on sustainability, accompanied by other criteria such as cost, the supplier selection process, flexibility, lead time, and exposure to risk (Ghadge et al., 2018; Ghadimi et al., 2016; Silva and Figueiredo, 2018). Nevertheless, the degree to which these criteria are prioritised in making SP decisions can differ in accordance with the country and industry. Walker and Phillips (2009) demonstrated that sustainability-related views and opinions are relative, and may differ by organisation, industry, culture, and country. These differences, along with regional government regulations and benchmarking of sustainability standards, can make SP extremely difficult (Ghadge et al., 2018). With respect to SP in the UAE's oil and gas industry, the critical importance of these dimensions is inevitable, due to its huge investment and operational spending on procurement functions.

Moreover, since this industry is related to the UAE's energy sector, several critical sustainability issues are inevitable, such as the increasing level of energy consumption; the depletion of energy resources; and air, water, and soil pollution. A recent study by Jitendra et al. (2018) conducted in the Indian power and energy sector found that its supply chain and procurement activities have been leading to growing concerns over their environmental effects. Accordingly, whilst focusing attention on the abovementioned criteria, the industry's SP function should ensure continued improved processes, flow of employment, awareness of environmental issues, and economic feasibility, in order to make its procurement activities sustainable. The need for SP practices has led oil and gas companies to investigate various factors that might influence their sustainability (Gelderman et al., 2015). Accordingly, the possible internal and external determinants of SP, identified through an analysis of the literature, can be determined and analysed as follows.

## *2.2 Internal factors*

### *2.2.1 Leadership in change management*

Change management is a process that a management team follows sequentially in order to advance change from inception to delivery (Hayes, 2014). This process faces

organisational barriers that constrain a company's ability to pursue its goals (Hasselbalch et al., 2015). Change management in an organisation involves the implementation of new processes, strategies, and cultures. It requires effective leadership, the integration of individual and organisational change processes, as well as the integration of project design and change management. Thus, this factor is a key barrier to SP. Brammer and Walker (2011) argued that leadership is a key driver for the successful implementation of SP. Hence, effective leadership in change management can lead to successful SP. Biswal et al. (2017) suggested that lack of coordination is a significant barrier to sustainable supply chains. As pointed out by Choi et al. (2013), issues relating to coordination can arise as the result of poor leadership. In view of the above, it can be argued that a lack of leadership may lead to issues with respect to coordination amongst employees and procurement activities, and thereby SP performance.

The UAE's oil and gas industry has remained in a crisis because of changes such as the oil price drop during 2014–2017 (Statista, 2018), and thus, the rate of return for oil companies declined and the rate of return for suppliers providing materials and services was adversely affected. In light of this, it can undoubtedly be argued that the dissatisfaction of suppliers can drive a decline in SP performance (Mutai and Okello, 2016). Many oil and gas companies tried to reduce their expenditures on service providers and contractors in order to remain in business. The fall in the price of oil in recent years required oil and gas company leaders to focus on making their production process as efficient as possible while cutting the cost of production and adapting to the changes in the business environment. Hence, it is evident that companies must demonstrate change management and leadership to restructure and phase out non-core activities across different operational divisions, including the procurement department. Hence, we hypothesised that leadership in change management has a direct relationship with SP.

### *2.2.2 Cost of infrastructure*

Giunipero et al. (2012) argued that one of the critical deterrents to the adoption of SP practices is investment cost. Continuous upgrades to energy-efficient machines, tools, and improved re-manufacturing systems require large investments, which are hard to manage (Vachon and Klassen, 2006). Sustainability in procurement is thus, hampered by the high cost of acquiring capital goods and other important infrastructural development that must be implemented to replace current production systems with sustainable, state-of-the-art systems. Jones (2018) suggested that most production systems used by oil-producing companies were acquired many years ago, with some being obsolete. It can further be argued that many oil-producing companies have not adopted the concept of green products because of their prohibitive cost. However, the environmental costs could rise sharply at many companies, with little opportunity for financial payback (Clarke et al., 1994). The adoption of environment-friendly production systems has been limited by design and technology within the companies, making SP a challenge.

### *2.2.3 Internal management structure*

Most oil and gas companies have not been able to develop a strong internal management structure, because many still have the same management structures they had when they were state-owned. This attachment to the government has contributed to the absence of

executive support, a major barrier in the journey towards SP. Giunipero et al. (2012) highlighted that support from top management is the most influential driver in promoting SP. In particular, they emphasised a need for environmental innovation, advanced technology, and corporate infrastructure such as pollution control and environmental management systems. Spiller et al. (2015) further highlighted that management structure is one of the most significant factors affecting SP best practices. Rice and Spayd (2005) argued that a lack of management structure prevents companies from undertaking effective change management that can guarantee increased profitability and sustainability. Change management is a critical strategy that allows companies to adjust their practices and programs to improve their performance amidst changes such as oil price fluctuations. Hence, a lack of internal management structure inhibits investments in supply chains, thus, becoming a serious barrier to the adoption of SP practices at the institutional level.

#### *2.2.4 Management strategies*

Hawkins et al. (2011) argued that the allocation of resources, as well as innovation systems that are a critical component of management strategies, could become a vital issue for SP. In view of the above, it is evident that the absence of an effective management strategy can adversely affect SP. Some oil and gas companies in the Middle East need to develop their level of integration of supply chain, management, and technical capacities. Many companies lack clearly defined procurement strategies and practices, making it difficult to reach local and international standards. Consequently, some companies have adopted upgrading practices that may help improve quality and enable cost cutting (Zahid et al., 2014). Some companies in the oil industry lack the required management skills and effective strategies to strengthen their supply chain, after significant changes such as drops in oil prices. The current market requires improved managerial and technical capabilities for a company to achieve sustainability (Akaninyene and Mark, 2015). Thus, oil firms require a pool of highly qualified and talented managers who can provide effective management strategies for SP.

In accordance with the literature analysed above, it is undeniable that internal factors within oil and gas companies have an association with SP. The organisational SP system within those companies may have to cope with barriers associated with several internal factors that have hindered the development and implementation of SP in the oil industry after the drop in oil prices that started in 2014. This may be due to factors such as poor leadership and change management practices, declining revenue, a lack of internal management structure, a poor management structure, or a lack of employee commitment towards achieving sustainable development. Hence, this paper hypothesised that:

H1 Internal factors in oil and gas companies in the UAE have a statically significant impact on SP.

### *2.3 External factors*

#### *2.3.1 Political environment*

In any democracy, various groups, such as trade associations and business organisations are actively involved in the public procurement system. Due to individuals having different interests in the procurement system of any company, it may affect the

procurement process of a company through the alteration of procurement statutes, including their implementation. Such activities result in cost cutting measures and diversification. These are inclusive of the legal environment (Sarkis and Dhavale, 2015), such as all the public procurement policies that govern business activities, including manufacturing, finance, marketing, personnel, and contracts. Fisher (2013) argued that appropriate legal frameworks and regulations provide barriers to the execution of SP activities, since they are extremely political in nature. However, Sourani and Sohail (2011) contradicted this perspective by arguing that politicians were actually able to help in eliminating these barriers to SP.

### *2.3.2 Social environment*

Most oil companies, particularly those operating in Middle Eastern countries, lack social or external pressures from the government or public that can drive them towards social sustainability. The media and the civil societies in those countries do not bring problems to the public's attention, which can pressure firms to be more environmentally and socially responsible (Mougeot, 2017). Accordingly, it can be argued that the relative lack of consumer demand for social sustainability is insufficient to push private or public companies towards social sustainability. Thus, it is inevitable that private efforts by companies in the UAE to adopt sustainability will be lacking, and are being replaced by market pressures to ensure sustainability in the procurement process.

### *2.3.3 Economic environment*

It can be argued that economic environmental factors significantly affect SP. The key determinants that drive an economy, such as gross domestic product (GDP), GDP growth, inflation, exchange rate, and unemployment rate, can affect SP within oil and gas companies in several ways. Inflation and depreciation in the exchange rate can produce a negative impact on SP in terms of economic sustainability, as they increase the cost of purchases required for oil and gas production and distribution. On the other hand, it is arguable that GDP growth and increasing supply levels can promote SP economically, as they lead to a reduction in purchasing cost, given a plentiful supply of the materials, tools, and services required by oil and gas companies. Accordingly, it appears that SP and economic conditions are interrelated (Aigheyisi and Edore, 2015).

In accordance with the external factors reviewed above, this paper hypothesised that:

- H2 External factors in oil and gas companies in the UAE have a statically significant impact on SP.

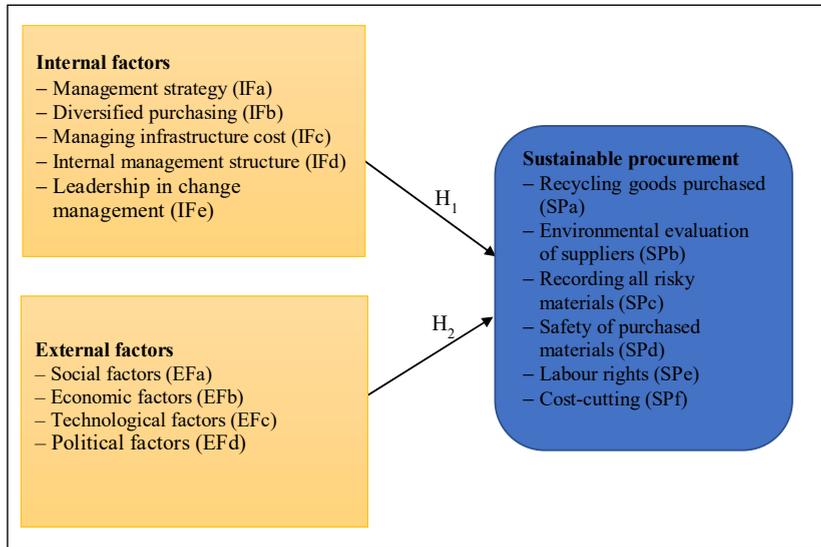
## **3 Methodology**

### *3.1 Theoretical framework*

Summarising the literature findings, Figure 1 shows the proposed research framework, illustrating the theoretical impact of internal and external factors on procurement sustainability in the UAE's oil and gas industry.

The model presents three key variables: internal factors, external factors, and SP. Both internal factors and external factors are considered independent variables that have an impact on SP, which is the dependent variable in the model. Internal factors were composed of leadership, management strategy, diversified purchasing, cost of infrastructure, and internal management structure, as they theoretically have an association with SP. The external factors, by contrast, were formed by considering political, social, technological and economic factors, which were hypothetically identified as affecting SP.

**Figure 1** Theoretical framework (see online version for colours)



### 3.2 Research design

To gain a better understanding of the internal and external factors affecting companies in the oil and gas sector in the UAE, quantitative research is necessary to establish the effectiveness of the strategies implemented to address the issue of sustainability in procurement. The researcher adopted the appropriate research design, population, sampling procedure, and data collection method to make inquiries into the stated problem. The appropriate research instrument enabled reliable and valid data collection procedures. The empirical data was collected in the second quarter of 2018.

### 3.3 Sources of data

This study uses primary data to analyse the internal and external factors affecting SP. The researcher used questionnaires to assess SP in the UAE's oil and gas sector. The UAE's oil and gas industry was selected for this research as there are various indications that its procurement operations might not be sustainable at the industry's current activity level.

An economic downturn, global oil price fluctuations, the significant costs of procurement activities, increasing wastage, and increasing environmental concerns about global climate change (Abu Dhabi QCC, 2015; IFC and UNDP, 2017; The National, 2015) are the major challenges that showcase the difficulty of ensuring SP throughout the UAE's oil and gas industry.

A research survey is appropriate in a descriptive study like this, where the researcher intends to explore the relationship between variables in a real-life context (Sekaran and Bougie, 2016). The researcher intends to describe aspects of a population through a selected sample of individuals who will complete questionnaires. The researcher attempts to capture the relationships that exist, such as prevailing attitudes, conditions, practices, social trends, and ongoing processes.

### *3.4 Research instrument*

The researcher used a questionnaire as the instrument of data collection. The questionnaire was the most fitting, since the target population, which comprises procurement professionals and other senior executives involved in procurement within the UAE's oil and gas companies, was literate. Collis and Hussey (2013) argued that a questionnaire is a data collection instrument delivered to respondents via non-personal means, such as a computer or telephone. They also posited that a structured questionnaire has a positivistic or phenomenological nature, and is qualitative or quantitative. A well-designed questionnaire assists the researcher in obtaining valid results. Questionnaires are advantageous because they are simple, reliable, and cost-effective compared with face-to-face interviews. The population of the procurement professionals comprises employees from different departments.

### *3.5 Data collection*

The researcher distributed questionnaires through email to employees working in the procurement departments of three oil and gas companies in the UAE. The researcher selected a sample size of 100 respondents ( $N = 100$ ). They included the head of procurement departments, procurement managers, team leaders, supervisors, and purchasing executives who were working in the procurement departments of the three selected oil and gas companies. The questionnaire contained a section asking respondents questions concerning personal information. The second part of the questionnaire included questions designed using a 1–5 Likert scale that measured the attitude of respondents by asking them the degree to which they agreed or disagreed with the stated issues. The use of questionnaires helped gather data that were used to match concepts with reality, as well as reduce inconveniences that arose from unfavourable interview experiences, such as scheduling.

### *3.6 Reliability and validity of the research instrument*

The reliability of the questionnaire was tested through examination of the Cronbach's alpha coefficient, where 0.7 indicated an acceptable level of reliability. The researcher adopted confirmatory factor analysis (CFA) to validate the association that existed between the dependent and the independent constructs.

### 3.7 Data analysis

The researcher analysed the primary data by employing descriptive statistics, utilising statistical packages for social sciences (SPSS) to meet the goals of the study. This computer software was able to generate all the descriptive statistical tools the researcher employed in analysing the data (Larson-Hall, 2015). The advantage of SPSS is its ability to facilitate data analysis and word processing for the presentation of analysed data. In the case of analysis using SEM, a model was deemed acceptable if the index demonstrated: CMIN/df with a figure ranging from 1 to 5; a comparative fit index (CFI) index and TLI indicating 1.00, and a root mean square error of approximation (RMSEA) of 0.08 or below.

## 4 Data analysis and results

### 4.1 Personal information of the respondents

This section comprises general information from the respondents who were chosen through random sampling. The respondents were selected from different departments of oil companies, and they had various professional qualifications. Furthermore, the procurement professionals had different levels of education, different levels of seniority in their departments, and belonged to different energy sectors. Thus, the researcher collected their personal information, and the results are presented in Table 1.

**Table 1** Personal Information of the respondents (N = 100)

<i>General information</i>		<i>Frequency</i>	<i>Percentage</i>
Gender	Male	70	70%
	Female	30	30%
Profession/occupation	Officer	45	45%
	Supervisor	15	15%
	Team leader	20	20%
	Purchasing executives	11	11%
	Procurement manger	6	6%
	Head of procurement department	3	3%
Educational level	High school	5	5%
	College diploma	22	22%
	Bachelor's degree	68	68%
	Postgraduate degree (Masters/PhD)	5	5%
Years in the current designation	11–20 years	3	3%
	21–25 years	90	90%
	More than 25 years	7	7%
Energy sector	Exploration and production	33	33%
	Processing and refining	34	34%
	Marketing and distribution	33	33%

The findings in Table 1 indicate that 70% of the respondents were male, and 30% were female. Regarding the respondents' occupations, 45% were engineers, 20% were team leaders, 15% were supervisors, and 11% were purchasing executives. Additionally, 6% and 3% of respondents indicated they were procurement managers and heads of the procurement department, respectively. Regarding education levels, 68% of the respondents had attained a bachelor's degree, while 22% had a college diploma. 5% of the respondents had postgraduate degrees, while another 5% indicated high school as their highest level of education.

For years in the current designation, 90% of the respondents had been working in their department for 21 to 25 years. Furthermore, 7% of the respondents revealed that they had been working at their company for more than 25 years, while the remaining percentage had been at their companies for 11 to 20 years. Finally, in relation to their energy sectors, 34% indicated that they worked in the processing and refining sector, 33% indicated that they belonged to the exploration and production sector, and 33% of respondents belonged to the marketing and distribution sector.

#### 4.2 Exploratory factor analysis

It is best practice, to determine first, whether the data are suitable for the analysis process. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were performed to test the suitability of the collected data. KMO is a statistical method that measures the sample adequacy to indicate how suitable the data are for factor analysis (Child, 2006). The Bartlett's test of sphericity, by contrast, is a test for the hypothesis that the correlation matrix of the data has an identity matrix (Child, 2006). Table 2 presents the results obtained for the two measures.

**Table 2** KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		.747
Bartlett's test of sphericity	Approx. chi-square	354.989
	Degrees of freedom	3
	Significance	.000

In this case, the KMO was 0.747, which indicated that the data obtained were suitable for factor analysis relating to the determinants of SP, since the KMO value obtained was more than the acceptable threshold value (0.05) (Child, 2006). With respect to Bartlett's test of sphericity, its significance level of  $p < 0.05$  indicates that the correlation that existed between the three items was good for the purpose of running a factor analysis on the proposed construct (Child, 2006). Thus, the data set was found to be free of multi-collinearity issues. Having tested the suitability of the data set for factor analysis, the rotating matrix component specified in Table 3 was used to test the validity of each construct. In this case, the constructs that were identified included internal factors, external factors, and SP.

As shown in Table 3, the SP construct revealed six relevant factors, while the other constructs relating to internal factors and external factors found five and four factors, respectively. In addition, the construct validity was confirmed, as the loadings of all the

factors identified exceeded 0.5. This will be analysed further by testing convergent validity and discriminant validity in Section 4.4.

**Table 3** Rotated component matrix for testing construct validity

	<i>Component</i>		
	<i>Sustainable procurement</i>	<i>Internal factors</i>	<i>External factors</i>
Environmental evaluation of suppliers (SPb)	.885		
Recycling goods purchased (SPa)	.874		
Recording all risky materials (SPc)	.822		
Safety of purchased materials (SPd)	.723		
Labour rights (SPe)	.718		
Cost-cutting (SPf)	.633		
Management strategy (IFa)		.824	
Diversified purchasing (IFb)		.714	
Managing infrastructure cost (IFc)		.663	
Internal Management Structure (IFd)		.646	
Leadership in change management (IFE)		.534	
Social factors (EFa)			.893
Economic factors (EFb)			.853
Technological factors (EFC)			.729
Political factors (EFD)			.445

### 4.3 Correlation analysis

This paper used the Pearson product-moment correlation matrix to analyse the association that existed between the internal and external organisational factors and SP. The significance of the correlation coefficients was assessed at the 95% confidence level.

**Table 4** Correlation matrix

	<i>SP</i>	<i>Internal factors</i>	<i>External factors</i>
SP	1.000		
Internal factors	0.851**	1.000	
External factors	0.880**	0.939**	1.000

Note: \*\*Correlation is significant at 95% confidence level.

As shown in Table 4, the positive correlations amongst the variables of this study highlight a remarkably positive association between SP and internal factors ( $r = 0.851$ ,  $p < 0.000$ ), as well as SP and external factors ( $r = 0.880$ ,  $p < 0.000$ ). The results listed above support Hypotheses 1 and 2 of this study. Moreover, the results strongly indicate that external factors have a relatively higher positive correlation with SP, implying that the external factors are more crucial than the internal factors in SP decision making.

#### 4.4 Structural equation modelling

##### 4.4.1 Confirmatory factor analysis

Throughout the SEM process, CFA was employed in order to test the proposed theoretical model statistically. CFA was conducted to verify the basic factors of the three constructs that were produced by exploratory factor analysis (EFA), and to validate the relationships that existed between the identified variables. Before adopting SEM in the study, it was necessary to conduct several tests on specifications, including distribution of normality, scales of measurement, and multicollinearity. These were tested by assessing the reliability, convergent validity, and discriminant validity of the constructs.

##### 4.4.1.1 Reliability

Reliability refers to the consistency that exists in a given measure used in the analysis of data. Cronbach's alpha is the test adopted in most cases by researchers in the process of determining the reliability of a given scale. If Cronbach's alpha has a value of 0.07 or more, the measure is said to be statistically reliable (DeVellis, 2003). In this way, the reliability of the data collected through questionnaires by the researcher from the field was tested. In the case of this study, all three variables attained a Cronbach's alpha of 0.700 or more (Table 5). This indicates that the three variables of SP, internal factors, and external factors adopted by the study have good psychometric properties.

**Table 5** Reliability testing

	<i>No. of items</i>	<i>Cronbach's alpha</i>
SP	6	0.715
External factors	4	0.708
Internal factors	5	0.711

**Table 6** Convergent validity analysis

	<i>Factors convergent validity (NFI)</i>
SP	0.840
External factors	1.000
Internal factors	1.000

##### 4.4.1.2 Convergent validity

The Bentler-Bonett normed fit index (NFI) was used to determine the variables' levels of convergent validity. NFI is used to investigate whether different techniques employed by a researcher can result in the generation of results that are similar under the same conditions (Schumacker and Lomax, 2004). An index of 0.8 or greater is deemed as satisfactorily fit. This study obtained a convergent validity of 0.89 (Table 6), which implies that there was significant convergent validity between the variables of the constructs used in the study.

4.4.1.3 Discriminant validity

This refers to the means by which various latent constructs can be differentiated from the other types of constructs. Fornell and Larcker (1981) argued that a latent variable should have an average variance extracted (AVE) that exceeds the squared correlations amongst the latent variable and other constructs. Thus, the square root of the AVE of the constructs should be bigger than its squared correlation between other constructs. Table 7 shows the square root of the AVE of each construct of the study and its average correlation with other constructs. The values written in bold denote that the square root of the AVE of each variable is higher than the squared correlations amongst all variables, and thus, the discriminant validity of all study constructs is supported.

**Table 7** Discriminant validity analysis

	<i>SP</i>	<i>Internal factors</i>	<i>External factors</i>
SP	0.781		
Internal factors	0.724	0.932	
External factors	0.774	0.882	1.127

4.4.2 SEM analysis

SEM analysis was conducted in order to represent and test the theoretical model relating to this study. CFA was used as the first step in identifying and assessing the model used in the SEM (Schermelleh-Engel et al., 2003). In this study, AMOS v.23 software was used to determine the first-order CFA model upon surveying the effect of internal and external factors on the level of SP in the UAE’s oil and gas companies. The model was tested at the 95% statistical confidence level. Figure 2 depicts the proposed structural model for the relationship between internal and external factors on SP in the oil industry. In the model, the path coefficients used to connect the various items to the factors are known as the factor loadings. They are also referred to as the standardised regression coefficients. In order to test the model’s goodness of fit, three measures, such as the chi-squared test ( $X^2/\text{dof}$ ), CFI, and the RMSEA, were used. Table 8 presents their values relating to the model, along with their acceptable ranges.

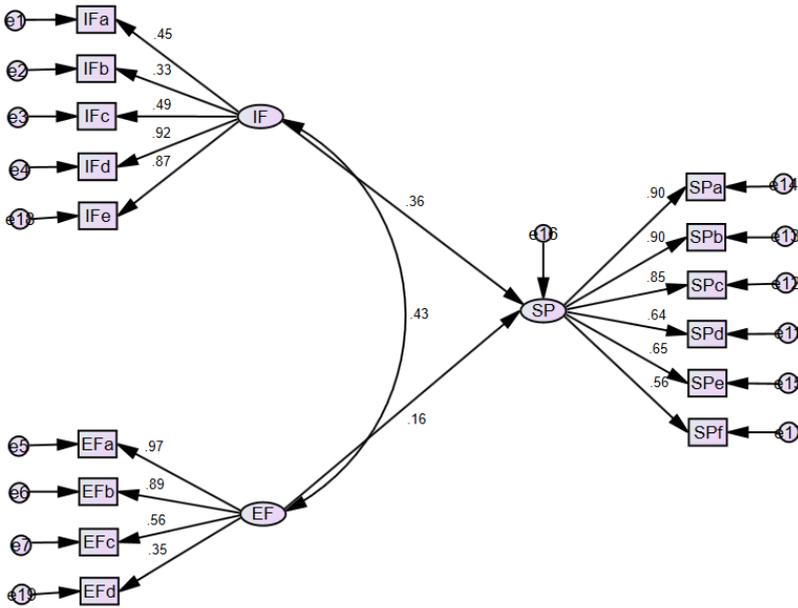
**Table 8** Model fitness indices

<i>Fit index</i>	<i>Acceptable range</i>	<i>Observed values</i>
Chi-squared test ( $X^2/\text{dof}$ )	$\leq 5$ (Gatignon, 2010)	3.89 ( $p = 0.005$ )
CFI	$\geq 0.70$ (Timothy, 2015)	0.728
RMSEA	$\leq 0.080$ (Awang, 2012)	0.071

From Table 8, it is clear that all goodness of fit indices were within the acceptable range of values (Gatignon, 2010; Timothy, 2015; Awang, 2012). Thus, it is evident that the model of internal and external factors with the level of SP in the oil industry is a statistical fit.

Figure 2 depicts the various paths in the structural model and their respective loadings. The results indicated that the group of internal factors had a significant and positive impact on SP (IF = 0.36;  $p < 0.005$ ). The impact of the group of external factors on SP was also found to be positive and statistically significant (EF = 0.16;  $p < 0.005$ ). In view of the above, both Hypotheses 1 and 2 were accepted.

**Figure 2** Proposed structural equation model (see online version for colours)



Moreover, the results indicated that the group of internal factors had a greater impact on SP than the group of external factors. On the other hand, the covariance between the groups of internal factors and external factors was 0.43, implying that a change in the group of internal factors would account for about 43% change in the group of external factors.

Figure 2 further indicates that each of the three constructs or latent variables, such as internal factors, external factors, and SP, consisted of positive factors. With respect to the SP construct, factors such as recycling goods purchased, the environmental evaluation of suppliers (SPb), recording all risky materials (SPc), the safety of purchased materials, labour rights (SPe), and cost-cutting (SPf) were positively associated with SP. The first three factors (Spa, SPb, and SPc) were identified as the key to SP, as their regression weights were higher than those of others. The items that had a positive impact on the construct of internal factors were diversified purchasing (IFa), management strategy (IFb), managing infrastructure cost (IFc), internal management structure (IFd), and leadership in change management (IFe). Amongst them, IFd and IFe were the most influential factors on the construct of internal factors. Conversely, with respect to the construct of external factors, social factors (EFa), economic factors (EFb), technological factors (EFc), and political factors (EFd) were identified as the ones having a positive effect on the group of external factors. However, the first two factors (EFa and EFb) were found to be the most influential factors on the construct of external factors.

## **5 Discussion**

The aim of the present study was to establish the impact of internal and external factors that influenced SP in the UAE's oil and gas industry. SEM was used for identifying, assessing, and testing the proposed model of the study in the context of the UAE. The study used the Varimax approach to generate the rotating component matrix (EFA), and its results showed that the three factors – internal factors, external factors, and SP – could be included in the conceptual framework of the study. The CFA analysis confirmed a high level of reliability and validity related to the constructs and variables, while measures as to the goodness of fit, such as the chi-squared test, CFI, and RMSEA, confirmed that the proposed model was statistically significant and had a good fit.

The results revealed that both internal and external factors had a positive and statistically significant impact on SP, although internal factors were identified as having a relatively greater effect on SP. With respect to internal factors affecting SP, leadership in change management, internal management structure, management strategy, and managing infrastructure cost were found to be the most influential factors, as their regression weights were higher.

The results of this study are consistent with those in Hayes (2014), who argued that the factors of change management and leadership were vital in oil and gas companies that intended to achieve an SP process. There is a need for management to follow all the sequential steps that are necessary from when change is implemented until it is delivered. Accordingly, the argument that poor leadership in change management negatively affects SP was supported. In addition, the substantial impact of internal management structure on SP that the present study discovered was supported by Spiller et al. (2015), as well as Giunipero et al. (2012), who stated that support from an effective management structure was the most influential driver in promoting SP. Similarly, the significant impact of the management of infrastructure cost was supported by Giunipero et al. (2012), who identified the investment cost of procurement as a major deterrent to the adoption of SP practices.

With respect to the effects of external factors on the level of SP in the oil industry, social and economic factors were found to be the most influential. These findings are in concurrence with the argument of Altum et al. (2016), who stated that external forces such as social, economic, and environmental factors were barriers to SP. Aigheyisi and Edore (2015) also supported the influence of economic growth on SP. Finally, the discussion leads one to conclude that the present SP practices of the UAE's oil and gas companies confirm the proposed theory of the present study. However, some factors that were included in the theoretical framework, including internal factors such as diversified purchasing, as well as external factors such as political and technology factors, were not strongly and significantly highlighted by the industry's current practices.

## **6 Conclusions, implications, limitations, and future research**

### *6.1 Conclusions*

In light of the existence of several sustainability issues in the UAE's oil and industry, and external environmental shocks such as fluctuating oil prices, it is important to investigate

the internal and external factors that affect the UAE's oil and gas industry. This study established that internal and external organisational factors relating to oil and gas companies operating in the UAE have a positive and significant impact on the level of SP in the oil industry. This was revealed by the positive correlation coefficients, as well as path coefficients, between internal factors and SP, and between external factors and SP. The group of internal factors, however, was identified as the latent variable that had the higher positive regression weight on SP. Leadership in change management, internal management structure, management of infrastructure cost, and management strategy were the internal factors within the group of internal factors that affected SP the most. This highlights the importance of robust leadership, as well as management strategies and practices, with respect to SP. External factors, such as social and economic environmental factors, were highlighted as statically significant external factors that affected SP. An emphasis on these particular internal and external factors can help oil and gas companies operating in the UAE improve their level and performance of SP.

Generally, in both the public and private sectors, there has been an increase in demand by customers, governments, societies, and clients for organisations to implement SP practices. Organisations that practice SP are able to meet their requirements for different goods, services, and utilities in their organisations by considering their private cost-benefits as well as the need to maximise the net benefits for the community. This study finally contributes towards academics' and practitioners' understanding of the most important and statistically significant factors affecting SP. Thus, the summarised findings can support the development, implementation, and monitoring of SP policies, strategies, and decisions within the UAE's oil and gas companies.

## *6.2 Theoretical and managerial implications*

Based on the analysis, it can be argued that SP systems within the UAE's oil and gas companies could be hindered in their development and implementation by negative aspects of the internal factors identified. These can be highlighted as the internal barriers to SP in the industry, which should be understood by procurement practitioners. As a result, a lack of leadership in change management, a lack of an internal management structure, inefficient management of infrastructure cost, and a poor management strategy, can lead to poor SP performance within the UAE's oil and gas companies. Moreover, negative trends related to two external variables, social and economic environmental factors could be considered critical external barriers to SP in the UAE's and oil gas industry. Growing social concerns over the natural environment, available resources, social sustainability (IFC and UNDP, 2017), the fluctuations of oil prices (Statista, 2018), and exchange rate depreciation contribute negatively to SP performance within the UAE's oil and gas companies. These facts highlight the importance of effective leadership and change management practices, as well as strong management strategy development and execution, including cost management related to procurement within the UAE's oil and gas companies.

Moreover, this study improves the procurement management literature by empirically demonstrating the significant effects of the critical internal and external factors that affect SP in a Middle Eastern country such as the UAE. The findings of this study contribute towards filling the research gap created by the limited literature on the UAE's oil and gas industry.

### 6.3 Limitations of the research and future research directions

The present study had a few limitations. In particular, the sample size used for SEM was 100 respondents, which might not be adequate to analyse the constructs thoroughly. Thus, the use of a larger sample could have resulted in more accurate findings than the ones obtained. Moreover, the constructs considered by the model were limited to three major factors: internal factors, external factors, and SP. Therefore, this study recommends that future researchers study other factors that are likely to affect SP by increasing the sample size and adding more latent constructs and observations to the research framework of this study. Furthermore, future researchers should test the model in this study, and its determinants of SP, in different countries and industries, due to the possible impact of contextual and cultural differences.

## References

- Abu Dhabi QCC (2015) *Greenhouse Gas Emissions Factors*, Abu Dhabi Technical Report [online] [https://qcc.abudhabi.ae/en/PublicationsStandards/2015-07%20%20%20Technical%20Report%20-%20Preliminary%20Assessment%20for%20GHG%20EFs\\_rev7.pdf](https://qcc.abudhabi.ae/en/PublicationsStandards/2015-07%20%20%20Technical%20Report%20-%20Preliminary%20Assessment%20for%20GHG%20EFs_rev7.pdf) (accessed 21 November 2018).
- Aigheysi, O.S. and Edore, O.J. (2015) 'Public procurement, governance and economic growth: some policy recommendations for Africa's growth and development', *International Journal of Development and Management Review*, Vol. 10, No. 1, pp.110–124.
- Akaninyene, O.U. and Mark, J. (2015) 'Effect of ethics and integrity on good public procurement system', *ARREV IJAH: An International Journal of Arts and Humanities*, Vol. 4, No. 1, pp.168–176.
- Altum, S., Carbary, L., Seitz, A., Preston, B., Serino, R. and Dunlap, A. (2016) 'High-efficiency exterior insulation and finish systems: R-30 walls in three-inch thickness – modelling, performance testing, and installation', *Exterior Insulation and Finish Systems (EIFS): Performance, Progress and Innovation*, ASTM International, West Conshohocken, PA.
- Awang, Z.H. (2012) *A Handbook on SEM: Structural Equation Modeling*, 4th ed., University Teknologi MARA Kelantan, Malaysia.
- Biswal, J.N., Muduli, K. and Satapathy, S. (2017) 'Critical analysis of drivers and barriers of sustainable supply chain management in Indian thermal sector', *International Journal of Procurement Management*, Vol. 10, No. 4, pp.411–430.
- Brammer, S. and Walker, H. (2011) 'Sustainable procurement in the public sector: an international comparative study', *International Journal of Operations & Production Management*, Vol. 31, No. 4, pp.452–476.
- Carter, C.R. and Jennings, M. (2000a) *Purchasing's Contribution to the Socially Responsible Management of the Supply Chain*, Center for Advanced Purchasing Studies, Tempe, AZ.
- Carter, C.R. and Jennings, M.M. (2000b) 'The role of purchasing in corporate social responsibility: a structural equation analysis', *Journal of Business Logistics*, Vol. 25, No. 1, pp.145–186.
- Child, D. (2006) *The Essentials of Factor Analysis*, 3rd ed., Continuum International Publisher, New York.
- Choi, T., Li, Y. and Xu, L. (2013) 'Channel leadership, performance and coordination in closed loop supply chains', *International Journal of Production Economics*, Vol. 146, No. 1, pp.371–380.
- Clarke, R.A., Stavins, R.N., Greeno, J.L., Bavaria, C.F., Esty, D.C., Smart, B., Piet, J., Wells, R.P., Gray, R.G., Fischer, K. and Schot, J. (1994) 'The challenge of going green', *Harvard Business Review* [online] <https://hbr.org/1994/07/the-challenge-of-going-green> (accessed 20 December 2018).

- Coetzee, N. and Bean, W.L. (2016) 'A green profitability framework to quantify the impact of green supply chain management in South Africa', *Journal of Transport and Supply Chain Management*, Vol. 10, No. 1 [online] <https://jtsm.co.za/index.php/jtsm/article/view/251/481> (accessed 2 October 2018).
- Collis, J. and Hussey, R. (2013) *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*, Palgrave Macmillan, London.
- DeVellis, R.F. (2003) *Scale Development Theory and Applications*, 2nd ed., Sage, Thousand Oaks, CA.
- Eades, D. (2012) *An Introduction to Sustainable Procurement*, Business in the Community, Ireland.
- Elizabeth, H. and Jacqueline, M.G. (2011) 'The costs and benefits of large-scale solar photovoltaic power production in Abu Dhabi, United Arab Emirates', *Renewable Energy*, Vol. 36, No. 2, pp.789–796.
- Epstein, M.J. and Buhovac, A.R. (2014) *Making Sustainability Work: Best Practices in Managing and Measuring Corporate Social, Environmental, and Economic Impacts*, Berrett-Koehler Publishers, London.
- Erkul, M., Kaynak, H. and Montiel, I. (2015) 'Supplier relations and sustainable operations: the roles of codes of conduct and human resource development', *International Journal of Integrated Supply Management*, Vol. 9, No. 3, pp.225–249.
- Feng, M., Yu, W., Wang, X., Wong, C.Y., Xu, M. and Xiao, Z. (2018) 'Green supply chain management and financial performance: the mediating roles of operational and environmental performance', *Business Strategy and the Environment*, Vol. 27, No. 7, pp.811–824.
- Fernando, Y. and Saththasivam, G. (2017) 'Green supply chain agility in EMS ISO 14001 manufacturing firms: empirical justification of social and environmental performance as an organizational outcome', *International Journal of Procurement Management*, Vol. 10, No. 1, pp.51–69.
- Fisher, E. (2013) 'The power of purchase: addressing sustainability through public procurement', *European Procurement & Public Private Partnership Law Review*, Vol. 8, No. 1, pp.2–7.
- Foerstl, K., Azadegan, A., Leppelt, T. and Hartmann, E. (2015) 'Drivers of supplier sustainability: moving beyond compliance to commitment', *Journal of Supply Chain Management*, Vol. 51, No. 1, pp.67–92.
- Fornell, C. and Larcker, D.F. (1981) 'Evaluating structural equation models with unobservable and measurement error', *Journal of Marketing Research*, Vol. 34, No. 2, pp.161–188.
- França, C.L., Broman, G., Robèrt, K.H., Basile, G. and Trygg, L. (2017) 'An approach to business model innovation and design for strategic sustainable development', *Journal of Cleaner Production*, Vol. 140, No. 1, pp.155–166.
- Gatignon, H. (2010) *Confirmatory Factor Analysis in Statistical Analysis of Management Data*, Springer, London.
- Gelderman, C.J., Semeijn, J. and Bouma, F. (2015) 'Implementing sustainability in public procurement: the limited role of procurement managers and party-political executives', *Journal of Public Procurement*, Vol. 15, No. 1, pp.66–92.
- Genovese, A., Koh, S.C.L., Kumar, N. and Tripathi, P.K. (2014) 'Exploring the challenges in implementing supplier environmental performance measurement models: a case study', *Production Planning & Control*, Vol. 25, Nos. 13–14, pp.1198–1211.
- Ghadge, A., Kidd, E., Bhattacharjee, A. and Tiwari, M.K. (2018) 'Sustainable procurement performance of large enterprises across supply chain tiers and geographic regions', *International Journal of Production Research* [online] <https://doi.org/10.1080/00207543.2018.1482431> (accessed 2 October 2018).
- Ghadimi, P., Azadnia, A.H., Heavey, C., Dolgui, A. and Can, B. (2016) 'A review on the buyer-supplier dyad relationships in sustainable procurement context: past, present and future', *International Journal of Production Research*, Vol. 54, No. 5, pp.1443–1462.

- Giunipero, L.C., Hooker, R.E. and Denslow, D. (2012) 'Purchasing and supply management sustainability: drivers and barriers', *Journal of Purchasing and Supply Management*, Vol. 18, No. 4, pp.258–269.
- Gulf News (2017) 'Energy sector emissions make for 74% of UAE total' [online] <https://gulfnews.com/news/uae/environment/energy-sector-emissions-make-for-74-of-uae-total-1.2138371> (accessed 1 October 2018).
- Hasselbalch, J., Costa, N. and Blecken, A. (2015) 'Investigating the barriers to SP in the United Nations', in *Humanitarian Logistics and Sustainability*, pp.67–86, Springer, Cham.
- Hawkins, T., Gravier, M. and Powley, E. (2011) 'Public vs. public sector procurement ethics and strategy', *Journal of Business Ethics*, Vol. 103, No. 4, pp.567–586.
- Hayes, J. (2014) *The Theory and Practice of Change Management*, Palgrave Macmillan, New York.
- IFC and UNDP (2017) *Mapping the Oil and Gas Industry to the Sustainable Development Goals* [online] [http://www.ipeca.org/media/3093/mapping\\_og\\_to\\_sdg\\_atlas\\_lr\\_2017.pdf](http://www.ipeca.org/media/3093/mapping_og_to_sdg_atlas_lr_2017.pdf) (accessed 1 October 2018).
- Jitendra, N.B., Muduli, K., Satapathy, S. and Tripathy, S. (2018) 'A framework for assessment of SSCM strategies with respect to sustainability performance: an Indian thermal power sector perspective', *International Journal of Procurement Management*, Vol. 11, No. 4, pp.455–471.
- Jones, C.M. (2018) 'The oil and gas industry must break the paradigm of the current exploration model', *Journal of Petroleum Exploration and Production Technology*, Vol. 8, No. 1, pp.131–142.
- Kidd, C. (2017) *Why the Oil and Gas Industry Needs Procurement More Than Ever* [online] <https://www.4cassociates.com/oil-and-gas-industry-procurement/> (accessed 28 November 2018).
- Larson-Hall, J. (2015) *A Guide to Doing Statistics in Second Language Research Using SPSS and R*, Routledge, London.
- Mougeot, F. (2017) 'Le travail des soignants de la psychiatrie française à l'épreuve du new public management', *Empan*, Vol. 3, No. 3, pp.65–70.
- Mutai, J.K. and Okello, B. (2016) 'Effects of supplier evaluation on procurement performance of public universities in Kenya', *International Journal of Economics, Finance and Management Sciences*, Vol. 4, No. 3, pp.98–106.
- Nadeem, S., Mohamad, M.H.B. and Abdullah, H.B.N. (2017) 'Sustainable procurement behavior: a case of government departments', *International Journal of Economic Perspectives*, Vol. 11, No. 1, pp.402–416.
- Prieto, G., Zečević, J., Friedrich, H., De Jong, K.P. and De Jongh, P.E. (2013) 'Towards stable catalysts by controlling collective properties of supported metal nanoparticles', *Nature Materials*, Vol. 12, No. 1, p.34.
- Rice, J.B. and Spayd, P.W. (2005) *Investing in Supply Chain Security: Collateral Benefits*, pp.1–35, Special report series, IBM Center for The Business of Government.
- Sancha, C., Wong, C.W. and Thomsen, C.G. (2016) 'Buyer-supplier relationships on environmental issues: a contingency perspective', *Journal of Cleaner Production*, Vol. 112, No. 3, pp.1849–1860.
- Sarkis, J. and Dhavale, D.G. (2015) 'Supplier selection for sustainable operations: a triple-bottom-line approach using a Bayesian, framework', *International Journal of Production Economics*, Vol. 166, Nos. 1–2, pp.177–191.
- Sarkis, J. and Zhu, Q. (2018) 'environmental sustainability and production: taking the road less travelled', *International Journal of Production Research*, Vols. 1–2, No. 56, pp.743–759.
- Schermelleh-Engel, K., Moosbrugger, H. and Müller, H. (2003) 'Evaluating the fit of structural equation models: tests of significance and descriptive goodness-of-fit measures', *Methods of Psychological Research Online*, Vol. 8, No. 2, pp.23–74.

- Schumacker, R.E. and Lomax, R.G. (2004) *A Beginner's Guide to Structural Equation Modelling*, Psychology Press, USA.
- Sekaran, U. and Bougie, R. (2016) *Research Methods for Business: A Skill Building Approach*, John Wiley and Sons, London.
- Silva, M. and Figueiredo, P.S. (2018) 'Supplier selection: a proposed framework for decision making', *International Journal of Procurement Management*, Vol. 11, No. 2, pp.233–249.
- Sourani, A. and Sohail, M. (2011) 'Barriers to addressing sustainable construction in public procurement strategies', *Engineering Sustainability*, Vol. 164, No. 4, pp.229–237.
- Spiller, P., Reinecke, N., Ungerma, D. and Teixeira, H. (2015) *The Drivers of Sustainable Procurement Performance, Procurement 20/20: Supply Entrepreneurship in a Changing World*, Wiley, London.
- Statista (2018) *Average Annual OPEC Crude Oil Price* [online] <https://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/> (accessed 1 December 2018).
- The National (2015) *Oil Companies Have a 'Responsibility' to Become More Environmentally Aware* [online] <https://www.thenational.ae/uae/environment/oil-companies-have-a-responsibility-to-become-more-environmentally-aware-1.59987> (accessed 28 November 2018).
- Timothy, B. (2015) *Confirmatory Factor Analysis for Applied Research*, The Guilford Press, New York.
- Vachon, S. and Klassen, R.D. (2006) 'Green project partnership in the supply chain: the case of the package printing industry', *Journal of Cleaner Production*, Vol. 14, No. 6, pp.661–671.
- Walker, H. and Phillips, W. (2009) 'Sustainable procurement: emerging issues', *International Journal of Procurement Management*, Vol. 2, No. 1, pp.41–61.
- Walker, H., Miemczyk, J., Johnsen, T. and Spencer, R. (2012) 'Sustainable procurement: past, present and future', *Journal of Purchasing and Supply Management*, Vol. 18, No. 4, pp.201–206.
- Winter, M. and Knemeyer, A.M. (2013) 'Exploring the integration of sustainability and supply chain management: current state and opportunities for future inquiry', *International Journal of Physical Distribution & Logistics Management*, Vol. 43, No. 1, pp.18–38.
- Zahid, M., Ghazali, Z. and Rahman, H.U. (2014) 'An integrated conceptual framework for corporate sustainability performance: a model and research propositions', *Science International*, Vol. 26, No. 4, p.1503.