

Implementing sustainable procurement in the United Arab Emirates public sector

Implementing
sustainable
procurement

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Abstract

Purpose – Despite making significant strides in transforming its environmental outlook over the past few years and promoting sustainable procurement (SP) in the public sector, the United Arab Emirates (UAE) is still facing serious challenges in moving up the global sustainability ranks. Thus, this study aims to assess and prioritize critical factors, including cost, organization, innovation capability, stakeholder, culture and market-related factors, and their respective sub-factors for the implementation of SP, and come up with recommendations.

Design/methodology/approach – This study uses the analytical hierarchy process model to prioritize the main factors and sub-factors that can critically affect the implementation of SP in the UAE public sector. Data were collected through a survey of 17 procurement experts working in procurement departments in public organizations in Abu Dhabi, UAE.

Findings – The results reveal that cost is the highest ranked critical factor, followed by an organization, whereas innovation capability is the lowest ranked of the main factors. The initial cost of green products and their life-cycle cost are the most prioritized of cost factors. An individual's commitment to change, top management support and organizational commitment are the highest-ranked sub-factors. Social awareness is the most important sub-factor among culture, and the supplier's capability is the highest ranked sub-factor in the market.

Social implications – The government should issue a standard practices handbook for SP to be used by public organizations to provide public procurers a clear method for conducting a proper cost–benefit analysis to evaluate and decide on sustainable purchases that fit the economy and society and meet the national sustainability agenda. Furthermore, additional attention needs to be paid to cultural factors such as social and environmental awareness by policymakers to succeed in achieving SP. Finally, top management and government officials must reevaluate their own personal values and commitment to sustainability issues as they participate in forming policies, rules, regulations and training programs designed for procurement managers within government organizations.

Originality/value – Although considerable research has been conducted on this topic, this study is unique in its presentation of a critical understanding of which factors and sub-factors are likely to significantly affect SP implementation in the UAE, which shall provide the relevant researchers and practitioners with the necessary knowledge to be ready for the changes that may lie ahead.

Keywords Sustainable development, Analytical hierarchy process, Public procurement, Green procurement, Sustainable procurement

Paper type Research paper

1. Introduction

1.1 Overview

Public procurement amounts to as much as 30 per cent of the gross domestic product (GDP) in several developing countries. Thus, the leveraging of this purchasing power through the procurement of sustainable goods and services can assist in driving markets toward sustainability, reducing negative organizational impact and producing positive social and environmental benefits (Walker and Phillips, 2009). Therefore, various countries, such as the



United Arab Emirates (UAE), are making use of diverse policies to drive sustainable public procurement, which can range from single-aspect guidelines or policies to more comprehensive action plans. The UAE has consistently endeavored to enhance the sustainability of its economy over the past few years (Vcantugakkas and Yapin, 2017). The UAE established the Ministry of Climate Change and Environment to tackle climate change issues in a way that is both economically logical and protective of natural resources (Gulf News, 2016). Pursuant to this goal, it has focused on green public procurement in collaboration with the relevant agencies (Aamir, 2017). This makes sense as the total government spending in the UAE accounts for roughly 24 per cent of the GDP (Oxford Business Group, 2018), offering insight into the expectation that government purchases of sustainable products and services will drive the market toward sustainable development.

1.2 Purpose and significance of the study

Despite making significant strides in transforming its environmental outlook over the past few years and being considered one of the top countries in sustainability in the region (Arcadis, 2016), the UAE is still facing serious challenges in maintaining sustainable growth and moving up the global sustainability ranks (Environmental Performance Index, 2018; World Economic Forum, 2017). This raises the question: Are the efforts made by the UAE government enough to successfully implement sustainable procurement (SP) in the public sector, or are there other factors that must be addressed?

SP implementation still faces substantial barriers and challenges globally (Walker *et al.*, 2012), as it is considered more expensive than ordinary procurement, and the comparative cost of the former inhibits organizational managers and officials from engaging in the focused implementation of SP practices (Walker *et al.*, 2012). Furthermore, it is unrealistic to expect public officers, managers and procurers to adopt SP practices in the absence of the appropriate information and tools. In addition, the supply of products that fulfill social and environmental criteria is also limited, to some extent, in various countries (Darnall *et al.*, 2008).

Although these critical factors have been discussed in the previous literature, there is still a need to investigate whether such factors are applicable to the UAE public sector to answer the question at hand. Hence, the purpose of this article is to achieve the following two objectives:

- (1) critically examine the key factors and the sub-factors that affect the successful implementation of SP in the UAE public sector; and
- (2) prioritize the most important key factors and the sub-factors that affect the implementation of SP in the UAE public sector by using the analytical hierarchy process (AHP) model and provide recommendations in light of the results.

2. Literature review

Sustainable public procurement is defined as a process used by public organizations to satisfy the need for goods and services that achieves value for money and provides benefits to the organizations, society and the economy while reducing negative environmental consequences (The United Nations Environment Programme, 2017). In this literature review, we aim to explore some of the previous efforts made on SP implementation by first introducing the previous contributions on SP from a global perspective; then exploring the available literature on SP in the UAE; and, finally, presenting some of the factors that influence SP implementation to support the analysis and discussion of the study.

2.1 Sustainable procurement in the public sector from a global perspective

Public procurement is frequently used at the national and international level to promote sustainable development (Walker and Brammer, 2009). The European Union, and USA, for example, makes use of several policy and legal instruments for the consideration of social and environmental issues in public procurement. The United Nations (UN) has developed detailed guidance on SP that addresses the economic, social and environmental prospects of sustainability (Brammer and Walker, 2011). Recent reviews by the UN revealed that a substantial proportion of national governments are including sustainable public procurement provisions in the thematic policies and strategies and procurement regulations (The United Nations Environment Programme, 2017).

2.2 Sustainable procurement in the United Arab Emirates

Looking at the previous literature conducted on SP in the UAE, it was noticed that there is a lack of research on the topic in the UAE. Most of the studies conducted on SP in the UAE focused on policy developments in specific areas, such as oil, gas and energy (Ekiugbo and Papanagnou, 2016; Luomi, 2015); hospitality (Rosalind Jenkins and Karanikola, 2014); and construction and buildings practices (Al-Aomar and Weriakat, 2012; Balasubramanian, 2014; Govindan *et al.*, 2016; Millin, 2014). No doubt, there is a need for studies in the legislative and policy areas for such a young country because the issue of green procurement implementation is considered new; yet, the lack of studies on other factors and drivers (internally and externally) is crucial for the successful implementation of SP in the UAE.

2.3 Factors that impact sustainable procurement implementation

Examination of available literature on SP revealed several analytical tools developed in recent years that help drive sustainability in procurement and make it simpler. These specifically include improved analytical tools, the development of ISO 20400 and new developments in product labeling. In academia, some of the previous literature stated that drivers of SP could be categorized as environmental drivers, social drivers and economic drivers (Bonnitcha, 2016). However, our review in the previous literature revealed that there are no standardized categories. Therefore, in this study, the investigation of the previous literature and feedback from the procurement experts led to organize these factors under six categories: Cost, Organization, Innovation Capability, Stakeholder, Culture and Market, as shown in Table I.

2.3.1 Cost. It has been widely accepted in the literature that SP is considered more expensive than ordinary procurement (Lundberg and Marklund, 2013). And, the comparative cost/benefit ratio of these projects inhibits organizational managers and officials from engaging in the focused implementation of SP practices (Walker *et al.*, 2012). Thus, many governments who adopted and supported sustainability programs are still facing funding issues (Preuss and Walker, 2011; Hasselbalch *et al.*, 2014). Such funding issues are caused by the perceptions of some government procurers and policymakers regarding the objectives of achievement, the best possible value for money and the promotion of sustainability in procurement being in conflict (Weller, 2012). This perception is explained by the literature as caused by many factors. First, the high initial cost of sustainable products and services is widely addressed, and some even suggest it could be the main barrier to implementing SP (de Souza Dutra *et al.*, 2017; Ameyaw *et al.*, 2012). Others oppose this and argue we should, in fact, be more concerned about the life-cycle cost of the sustainable products rather than the cost of the products themselves (Rahim *et al.*, 2014; Butt *et al.*, 2015). In addition, it was suggested that SP implementation requires

Factor (criterion)	Sub-factors (subcriteria)	Source
Cost	Cost of green products/services Life-cycle cost of green products Cost of infrastructure Cost of training and awareness Cost of supplier development	de Souza Dutra <i>et al.</i> (2017)
		Hasselbalch <i>et al.</i> (2014)
		Walker <i>et al.</i> (2012)
		Weller (2012)
		Ameyaw <i>et al.</i> (2012)
		Preuss and Walker (2011)
		Butt <i>et al.</i> (2015)
		Rahim <i>et al.</i> (2014)
		Delmonico <i>et al.</i> (2018)
		Zaidi <i>et al.</i> (2018)
Organization	Organizational commitment Organizational values Sustainable procurement policy and procedure Green HR practices Environmental training	Torres-Ruiz and Ravindran (2018)
		Iles and Ryall (2016)
		Yan <i>et al.</i> (2016)
		Blome <i>et al.</i> (2014)
		Viegas <i>et al.</i> (2014)
		Prasad <i>et al.</i> (2018)
		Meehan and Bryde (2015)
		Tay <i>et al.</i> (2015)
		Hasselbalch <i>et al.</i> (2014)
		Bhatty (2012)
		Pedersen <i>et al.</i> (2018)
		Ochoa <i>et al.</i> (2017)
		Tay <i>et al.</i> (2015)
		Walker and Phillips (2009)
		Nalini and Durai (2019)
Innovation capability	IT infrastructure Technology adaptation Effective knowledge sharing Ability to generate new ideas Ability to produce new products and services	Aragão and Jabbour (2017)
		Mosgaard (2015)
		Ryan <i>et al.</i> (2008)
		de Souza Dutra <i>et al.</i> (2017)
		Grandia <i>et al.</i> (2015)
		Meehan and Bryde (2011)
		Ardyan <i>et al.</i> (2017)
		Allal-Chérif (2014)
		Athapaththu and Karunasena (2018)
		Gliedt <i>et al.</i> (2018)
Stakeholder	Government pressure Regulator's governance Leadership/management support	Ardyan <i>et al.</i> (2017)
		Ardyan <i>et al.</i> (2017)
		Ryan <i>et al.</i> (2008)
		Prasad <i>et al.</i> (2018)
		Esfahbodi <i>et al.</i> (2017)
		Zeng <i>et al.</i> (2017)
		Meehan and Bryde (2015)
		Bhatty (2012)
		Ameyaw <i>et al.</i> (2012)
		Esfahbodi <i>et al.</i> (2017)
		Wong <i>et al.</i> (2016)
		Keast <i>et al.</i> (2015)
		Adjei (2010)
		Islam <i>et al.</i> (2017)
		Wong <i>et al.</i> (2016)
		Blome <i>et al.</i> (2014)
		Walker and Brammer (2009)

(continued)

Table I.
Critical factors that
influence sustainable
procurement
implementation

			Implementing sustainable procurement
Factor (criterion)	Sub-factors (subcriteria)	Source	
Culture	Social awareness	Athapaththu and Karunasena (2018)	101
	Environmental consciousness	de Souza Dutra <i>et al.</i> (2017)	
Market	Commitment to change	Nadeem <i>et al.</i> (2017a, 2017b)	
		Nadeem <i>et al.</i> (2017a, 2017b)	
		Grandia <i>et al.</i> (2015)	
		Weller (2012)	
		Liu <i>et al.</i> (2012)	
		Preuss and Walker (2011)	
	Availability of suppliers	Ali <i>et al.</i> (2018)	
	Supplier's awareness/development	Stritch <i>et al.</i> (2018)	
	Supplier's capability	Iles and Ryall (2016)	
	Availability of green products	Bag (2016a, 2016b)	
	Quality of green products	Blomea <i>et al.</i> (2015)	
		Viegas <i>et al.</i> (2014)	
			Table I.

changes of policy and infrastructure, such as IT and technology (Gliedt *et al.*, 2018); and the cost of development for the SP infrastructure within the organization is suggested to be high, especially in developing countries, which causes delays in SP implementation programs (Zaidi *et al.*, 2018; Delmonico *et al.*, 2018). Moreover, sourcing sustainable products from a global supply base exposes the buying government entities to a notable set of risks in the supply chain and naturally increases transportation distance that drives the cost even higher (Yan *et al.*, 2016; Torres-Ruiz and Ravindran, 2018). Therefore, some governments believe that it is more beneficial to invest in conducting programs to develop the sustainability of local suppliers instead of buying from the global market (Viegas *et al.*, 2014; Blome *et al.*, 2014).

2.3.2 Organization. Implementing SP requires the integration of core organizational business values into the life cycle of the organization's services and products over time to succeed (Ochoa *et al.*, 2017; Walker and Phillips, 2009). Many studies suggest that organizations have an important role to play if they want to succeed in implementing SP by securing organizational commitment to this change (Prasad *et al.*, 2018; Meehan and Bryde, 2015; Bhatti, 2012). In addition, aligning sustainability values with organizational values was also found to have a positive relationship with SP implementation and performance (Pedersen *et al.*, 2018). Moreover, the United Nations Global Marketplace (2012) highlighted other organizational drivers for the achievement of SP such as having effective and efficient policies, and the provision of appropriate training and guidance. In addition, it was suggested that changes in the purchasers' practices are not as much dependent on whether they understand, e.g. policies, tools and procedures, but rather a matter of whether the purchasers actually practice their knowledge (Mosgaard, 2015). These good organizational practices, such as green HRM, training and SP procedures, were found to motivate SP implementation in organizations (Nalini and Durai, 2019; Aragão and Jabbour, 2017; Ryan *et al.*, 2008).

2.3.3 Innovation capability. To conduct appropriate organizational changes, an organization needs to adapt to the changing environment and develop innovation capabilities (Schwarz and Huber, 2008). In fact, some have suggested that the failure to implement SP could be caused by inadequate capacity, with regard to technology and management (Meehan and Bryde, 2011; de Souza Dutra *et al.*, 2017). Thus, governments need to continuously adapt their purchasing activities to innovations in the market to succeed in sustainable public procurement (Grandia *et al.*, 2015). In addition, governments are required to create and apply innovative capabilities and IT infrastructure to ensure the development of various innovative modes of SP by choosing suppliers, selecting materials and applying processes (Allal-Chérif, 2014). Innovation capability is suggested to involve seven elements: vision and strategy; harnessing the competence base; organizational intelligence; creativity and idea management; organizational structures and systems; culture and climate; and management of technology (Lawson and Samson, 2001). Thus, it is asserted that technology adaptation, knowledge sharing and the ability to create new ideas and products can drive green innovation in organizations and create better opportunities for successful SP implementation (Athapaththu and Karunasena, 2018; Ryan *et al.*, 2008).

2.3.4 Stakeholders. The importance of the stakeholders' role in SP implementation has been widely discussed in the literature. First, successful SP implementation in an organization is essentially driven by the adaptation of specific governance frameworks for the incorporation of sustainability (Meehan and Bryde, 2015; Bhatti, 2012). Therefore, SP is being implemented in many countries because of the coercive pressure of governments and monitoring by creating public regulator entities (Prasad *et al.*, 2018; Esfahbodi *et al.*, 2017). Such public governance systems can help the governments optimize resources, obtain better value for the money and improve sustainability and project delivery (Wong *et al.*, 2016; Keast *et al.*, 2015; Adjei, 2010). Top management within organizations has also been highlighted as a main stakeholder in SP implementation, as they are required to show interest and continued support in achieving the SP initiatives (Blome *et al.*, 2014; Walker and Brammer, 2009; Islam *et al.*, 2017).

2.3.5 Culture. Cultural and social factors are fundamental players when implementing any change. Moreover, individual attitudes, especially the perception of self-responsibility toward the environment, were found to have a profound influence on the intention of SP behaviors, and the available information on green products significantly determined people's actual green procurement behaviors (Preuss and Walker, 2011; Liu *et al.*, 2012). In addition, a low social drive and poor education have been highlighted in the literature as another barrier to sustainability (Athapaththu and Karunasena, 2018; Weller, 2012; de Souza Dutra *et al.*, 2017). Such low social drive influences individual's behavior and commitment toward sustainability initiatives, leading to a misalignment between their values and organizational values (Nadeem *et al.*, 2017a). The role of individual attitude toward organizational changes in sustainability was also explored, and it was concluded it had an influence on the individual's ecological sustainability attitude and SP behavior (Nadeem *et al.*, 2017b; Grandia, 2016).

2.3.6 Market. Supply chains are mostly influenced by suppliers (Kaur and Singh, 2019); and SP is no different. Blome *et al.* (2015) highlighted the main issues in implementing SP, including lack of suppliers; low supplier knowledge; supplier development programs; and the code of conduct between buyers and suppliers. In addition, changing the market through SP requires other enablers, such as sustainable logistics, sustainable processes and sustainable manufacturing (Ali *et al.*, 2018). Thus, the lack of these enablers in many markets created a big challenge for the procurers because of the absence of alternative products and services and the perceived low quality of sustainable products and services

(Klassen and Johnson, 2004; Viegas *et al.*, 2014; Brammer and Walker, 2011). Moreover, Anttonen *et al.* (2013) have suggested that the slow market penetration of eco-efficient and sustainable services is because of a mismatch between the customers' needs and the service providers' offerings, and hence, the need for supplier development programs to close the gap in the suppliers' knowledge and awareness of sustainability (Iles and Ryall, 2016; Bag, 2016a, Blome *et al.*, 2014; Bag, 2018; Darminto *et al.*, 2018).

3. Methodology

This study used a three-phase design methodology using the AHP method to rationally and mathematically determine which factors are to be prioritized when it comes to SP implementation in the UAE public sector. According to Saaty (1990), AHP can help in selecting the best option to a complex problem by following these steps:

- develop a decision-making model which allows collecting all factors affecting the decision-making purpose in one place;
- evaluate the decision-making options based on comparing all elements pairs using Saaty's fundamental, nine-degree scale;
- estimate values of the weighting coefficients;
- verify compliance of each comparison matrix using the special consistency ratio (CR); and
- select the best option.

The AHP has been found useful in business, government and social studies because of its simplicity and ease of use, and has proved a theoretically sound and accepted methodology (Bag, 2016b). Also, it was found to be an appropriate method in investigating and prioritizing many procurement-related decisions (Benyoucef and Canbolat, 2007; Routroy and Pradhan, 2012; Saad *et al.*, 2016; Shiau *et al.*, 2003).

3.1 Phase 1 – analyzing the literature and developing the analytical hierarchy process model

This phase began by reviewing the available literature regarding the critical factors of SP that affect SP implementation in the industry and public sector. Identified factors were grouped into six categories indicated in Table I which was sent to the experts for their views and confirmation. After identifying and categorizing the critical factors of SP implementation, the hierarchical structure of the AHP model was developed, which included six main factors and 26 sub-factors identified as those necessary for implementing SP, as shown in Level 2 and Level 3 (Figure 1). Level 4 represents the rating scale used as a guide for decision-making points that affect the implementation of SP in the UAE public sector.

3.2 Phase 2 – interviews and data collection

The second phase of the study involved interviewing government procurement experts via a survey questionnaire to identify the factors that drive SP in the public sector. Nine-point scale questionnaires, based on the six main aspects related to the implementation of SP and the respective sub-factor (Table II), were distributed and collected to quantify the information obtained from the articles and to further explore the factors that affect the implementation of SP in the UAE public sector.

A total of 17 procurement managers who have 15+ years' experience in public procurement located via researchers' connection and word of mouth from 12 public

Figure 1.
AHP model

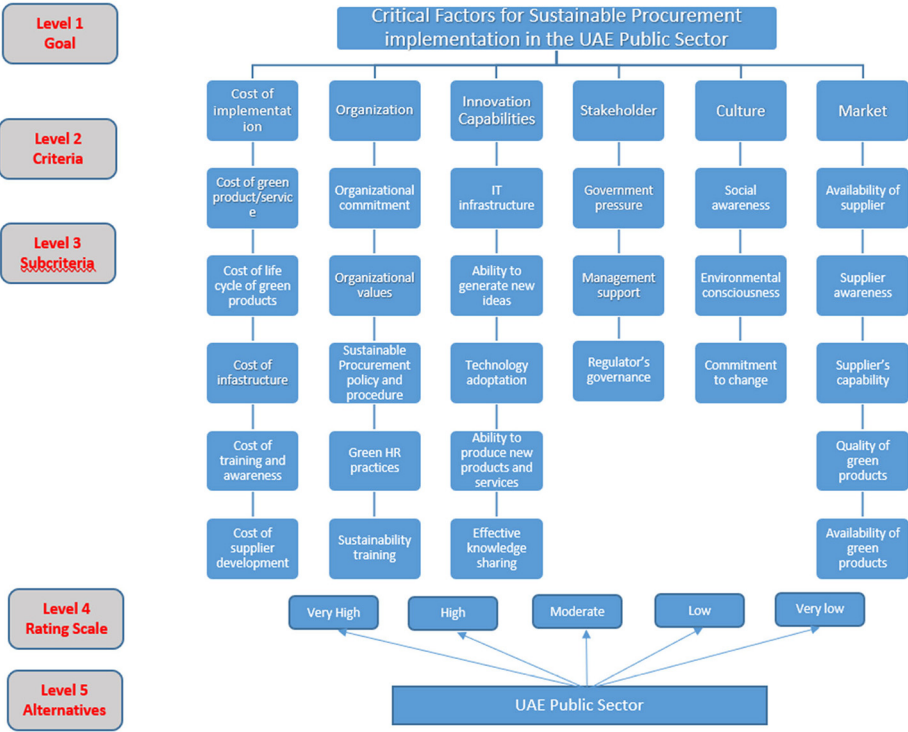


Table II.
1-9 AHP Scale of
preference

Importance	Definition	Explanation
1	Equal importance	Two criteria contribute equally to the objective
3	Moderate importance	Judgment slightly favors one factor over another
5	Strong importance	Judgment strongly favors one factor over another
7	Very strong importance	A criterion is strongly favored, and its dominance is demonstrated in practice
9	Absolute importance	Importance of one over another affirmed on the highest possible order
2,4,6,8	Intermediate importance	Use to show a compromise between the priorities above

organizations (anonymously) completed the questionnaire to identify and prioritize the 26 factors contributing to SP implementation that were collected in Phase 1. Each respondent was asked by a researcher to share his or her own judgment about the relative meaning and importance of the critical factors that influence SP implementation in the AHP model by conducting a pairwise comparison with respect to the impact. As suggested by Saaty (1990), these expert evaluations were then converted to meaningful numbers that were processed and compared over the entire range of factors and sub-factors to be analyzed in Phase 3 that is presented next.

4. Data analysis and results

Phase 3 of this study aimed to measure the collected data. In accordance to Saaty (1990), a nine-point scale was used to determine the pairwise comparison among the factors identified by the AHP model. The consistency among the comparison was checked by applying the consistency index (CI). Then, the consistency ratio (CR), which was calculated by dividing CI by the random index, was used to test whether a matrix for each factor was satisfactorily consistent (Saaty, 1990). A random pairwise comparison was simulated to give average random indices for the matrices used. The RI values are presented in Table III. If the CR is greater than 0.10, the matrix is said to be inconsistent (Saaty, 1990).

4.1 Main factors results

A pairwise comparison matrix of the six main critical factors to SP implementation was established based on the judgments made by the experts. Next, the AHP method was applied to determine the weights of the relative importance for each factor, in accordance with Saaty (1990). Table IV presents the geometric means of pairwise comparisons and the priority weights for the six main factors in the last column.

The results suggest that the cost of implementation is the most important factor to implement SP with a priority weight value of 0.35. In contrast, the innovation capability is the lowest ranked factor with a priority weight value of 0.05. The organization's role in SP implementation is ranked as the second critical factor with a priority weight value of 0.18. Culture and Market factors both came in third with priority weight values of 0.16 each. Finally, Stakeholder came in fourth with a priority weight value of 0.09. The CR value of this matrix was 0.04, and thus it is believed to be consistent.

4.2 Sub-factors results

To better understand the priorities of the main factor categories reported in Table IV, a similar approach was taken to establish a pairwise comparison of the sub-factors and prioritize them. The AHP results for all sub-factors pairwise matrices are presented in Table V.

<i>N</i>	1	2	3	4	5	6	7	8	9	10
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.48

Note: *n* is the number of factors

Table III.
Random index

Criteria	Cost of implementation	Organization	Innovation capabilities	Stakeholder	Culture	Market	Priority weight
Cost of implementation	1.00	4.00	4.80	3.60	3.40	1.00	0.35
Organization	0.25	1.00	4.60	2.60	1.20	1.47	0.18
Innovation capabilities	0.21	0.22	1.00	0.96	0.22	0.22	0.05
Stakeholder	0.28	0.38	1.04	1.00	0.75	0.94	0.09
Culture	0.29	0.83	4.58	1.34	1.00	1.67	0.16
Market	1.00	0.68	4.48	1.06	0.60	1.00	0.16

Note: CR value = 0.04 < 0.1 (consistent)

Table IV.
Geometric means of
the pairwise
comparisons of the
main criteria

Table V.
Geometric means of
the pairwise
comparisons of the
subcriteria

<i>Cost of Implementation</i>						
Subcriterion	Cost of green products	Life-cycle cost of green products	Cost of infrastructure	Cost of training	Cost of supplier development	Priority weight
Cost of green products	1.00	1.40	2.80	3.00	1.00	0.29
Life-cycle cost of green products	0.71	1.00	2.27	3.80	1.47	0.27
Cost of infrastructure	0.36	0.44	1.00	2.44	1.64	0.17
Cost of training	0.33	0.26	0.41	1.00	0.28	0.07
Cost of supplier development	1.00	0.68	0.61	3.57	1.00	0.20
CR value = 0.04 < 0.1 (consistent)						
<i>Organization</i>						
	Organizational commitment	Organizational values	SP policies and procedures	Green HR practices	Sustainability training	Priority weight
Organizational commitment	1.00	2.20	3.40	4.60	4.20	0.38
Organizational values	7.00	1.00	1.60	1.85	1.12	0.23
SP policies and procedures	8.00	5.00	1.00	1.00	0.84	0.29
Green HR practices	0.13	0.13	0.13	1.00	1.00	0.06
Sustainability training	0.11	0.17	0.17	0.20	1.00	0.04
CR value = 0.09 < 0.1 (consistent)						
<i>Innovation capabilities</i>						
	IT infrastructure	Ability to generate ideas	Technology adoption	Ability to produce new products	Effective knowledge sharing	Priority weight
IT infrastructure	1.00	0.65	1.91	0.59	0.97	0.15
Ability to generate ideas	7.00	1.00	2.60	1.47	1.13	0.30
Technology adoption	8.00	5.00	1.00	0.60	3.00	0.37
Ability to produce new products	0.13	0.13	0.13	1.00	3.60	0.14
Effective knowledge sharing	0.11	0.17	0.17	0.20	1.00	0.04
CR value = 0.07 < 0.1 (consistent)						
<i>Stakeholders</i>						
	Government pressure	Management support	Regulators' governance			Priority weight
Government pressure	1.00	3.00	3.80			0.31
Top management support	7.00	1.00	2.00			0.41
Regulators' governance	0.14	8.00	1.00			0.28
CR value = 0.09 < 0.1 (consistent)						
<i>Culture</i>						
	Social awareness	Environmental consciousness	Commitment to change			Priority weight
Social awareness	1.00	1.20	0.29			0.14
Environmental consciousness	7.00	1.00	0.25			0.37
Commitment to change	0.14	8.00	1.00			0.48
CR value = 0.05 < 0.1 (consistent)						
<i>Market</i>						
	Availability of suppliers	Supplier awareness	Supplier capability	Quality of green products	Availability of green products	Priority weight
Availability of suppliers	1.00	1.90	1.34	0.77	0.81	0.24
Supplier awareness	7.00	1.00	0.77	0.25	0.25	0.19
Supplier capability	8.00	5.00	1.00	0.49	0.49	0.34
Quality of green products	0.13	0.13	0.13	1.00	1.00	0.14
Availability of green products	0.11	0.17	0.17	0.20	1.00	0.09
CR value = 0.06 < 0.1 (consistent)						

Under the main factor of cost of implementation, five sub-factors were identified and analyzed, as shown in Table V. The results suggested the cost of green products as the highest ranked sub-factor, with a priority weight of 0.29, followed by the life-cycle cost of green products at 0.26, the cost of supplier development at 0.20 and the cost of infrastructure at 0.17. The cost of training came as the lowest ranked sub-factor at 0.07. The CR value was 0.04, which is below 0.1, indicating the consistency of the matrix.

Similarly, five sub-factors were identified under organizational factors, as presented in Table V. Organizational commitment carries the highest priority weight of 0.36, whereas sustainability training is the lowest weighted sub-factors (0.04) of the organizational factors. SP policies and procedures (0.29), organizational values (0.23) and green HR practices (0.06) are the second-, third-, and fourth-highest ranked sub-factor of the organizational factors, respectively. The matrix CR value is 0.09, demonstrating that the matrix is consistent.

Under the main factor of innovation capabilities, five sub-factors were analyzed in Table V, with technology adoption as the highest ranked sub-factor with a priority weight of 0.37, followed by ability to generate ideas as second (0.30) and IT infrastructure as third (0.15). While the ability to produce new products carries the fourth highest priority weight of (0.14), the effective knowledge sharing is the lowest sub-factor at (0.04). Because the CR of the matrix is below (0.1), it is identified as consistent.

Three sub-factors were analyzed under the main factor of stakeholders in Table V. The results suggested that management support is the highest ranked sub-factor at 0.411, followed by government pressure at 0.31. Government regulation came in as the lowest sub-factor at 0.28. This matrix is also consistent because of the CR value being below 0.1.

Likewise, under the main factor of culture, three sub-factors were analyzed in Table V, with commitment to change as the highest ranked factor at 0.48, environmental consciousness as the second-highest factor at 0.37, followed by social awareness (0.14) as last. Because the CR of the matrix is below 0.1, the matrix is consistent.

Finally, under the main factor of market, five sub-factors were analyzed in Table V. The results suggested that the capability of suppliers is the highest ranked sub-factor with a priority weight of 0.34, followed by the availability of suppliers at 0.24, the supplier awareness at 0.20 and the quality of green products at 0.17. The availability of green products came as the lowest ranked sub-factor at 0.09. The CR value is 0.06, which is below 0.1, indicating that the matrix is also consistent.

5. Discussion and implications

This study analyzed six main factors and 26 sub-factors that could influence SP implementation in the UAE's public sector and prioritized them in three phases using the AHP methodology to rank the factors, which is discussed below in accordance to their priority.

5.1 Cost of implementation

The findings of this study revealed that the cost of implementing SP is the most important main factor. This finding is in line with the highlighted previous literature (Walker *et al.*, 2012; de Souza Dutra *et al.*, 2017; Ameyaw *et al.*, 2012); and suggest that when it comes to deciding upon procurement of sustainable goods or services, the high cost of available green products in the market and their relative life-cycle costs make decision-makers reluctant to make such a decision and go over their organization's budget, regardless of the benefits. In addition, almost all the experts were in agreement with the significance of the cost of developing a supplier for sustainability, placing this sub-factor as the third most significant one. Moreover, the infrastructure and training costs are important but not as challenging as the other sub-factors in the cost factor. Although cost was the main barrier in implementing SP in this study, it was recommended that if SP is conducted in a systematic way (such as through detailed demand analysis; clear definition of the subject matter; and proper definition of product specifications and of award criteria), then SP can be implemented at all levels and in all public and private organizations in a cost-efficient manner (Stoykova, 2014).

5.2 Organization

Second, organization was the second most important main factor, ranking ahead of the remaining four main factors. Also, within this main factor, organizational commitment was the most important factor, which confirms some of the aforementioned literature’s findings that organizational commitment is the most important factor when implementing SP (Prasad *et al.*, 2018; Meehan and Bryde, 2015; Bhatt, 2012; Hasselbalch *et al.*, 2014). Implementing SP policies and addressing sustainability values within the organization’s vision were the second and third most important factors. However, green HR practices and sustainability training were alarmingly the two lowest ranked sub-factors. Promoting sustainability awareness and green HR practices is considered vital to drive other factors, and can prompt environmental maturity among organizations (Aragão and Jabbour, 2017; Ryan *et al.*, 2008). Such practices among government employees (mostly UAE nationals) would increase individual awareness of environmental and social issues and thus impact how they behave. Hence, their level of commitment to SP would increase, and they may overcome many obstacles.

5.3 Culture

The results ranked culture as the third most important factor to implementing SP in the UAE’s public sector. However, the sub-factor “commitment to change” is the most important factor within this main factor, and it is the most important sub-factor among all 26 sub-factors (Figure 2), which indicates that the experts face problems with employee commitment within their organizations, a phenomenon that must be addressed and discussed here. Since the majority of the public-sector workforce in the UAE consists of UAE nationals, this trend indicates that Emiratis tend to resist changes; thus, commitment to change can be considered one of the reasons why some government initiatives and projects are at a standstill and need to be further examined and solved (Bin Taher *et al.*, 2015; Al-Ali *et al.*, 2017). On the other hand, environmental consciousness and social awareness were the second and third most important sub-factors of this main factor, which suggests that the UAE’s public sector must work harder on sustainability awareness programs in their organizations. Although cultural factors were the third most important

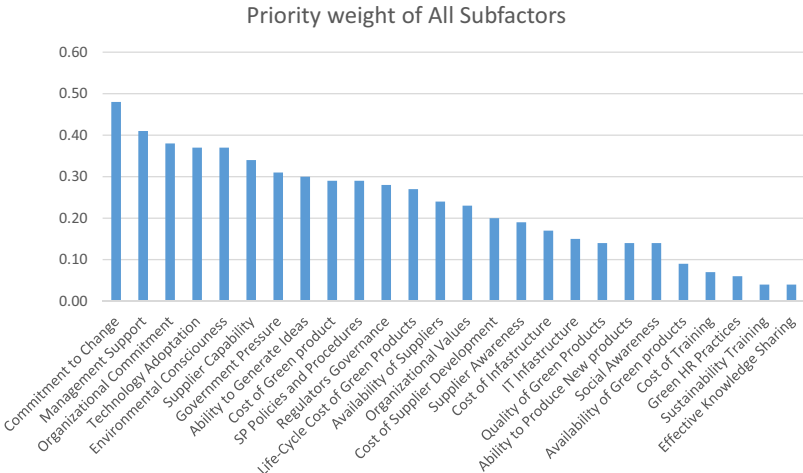


Figure 2.
Priority weight of all
sub-factors

main factors, when looking at the rankings of its sub-factors, the category is as important as cost of implementation and organizational factors. Thus, governments should consider cultural change management when developing sustainability-management initiatives (Delmonico *et al.*, 2018).

5.4 Market

According to the results, market factors were also ranked third most important among the main factors, which shows the importance of market factors and supports the previous literature that the forces of market are important drivers of SP (Blomea *et al.*, 2015; Viegas *et al.*, 2014; Anttonen *et al.*, 2013). The market factors analyzed in this study include three related to suppliers – supplier capability, availability of suppliers and suppliers' awareness – and two sub-factors related to products – quality and availability of green products. Interestingly, these results revealed that sub-factors related to suppliers are more important than the sub-factors related to products. The sub-factors supplier capability, supplier availability and supplier awareness were ranked first, second and third most important, respectively. This suggests that there could be a disconnect between public procurers and suppliers, and thus helping to create and support green suppliers in the UAE may be more important than focusing on sustainable products and services. Thus, the UAE must invest more into developing good partnerships with the available suppliers in the market to increase their capability and their understanding of sustainability.

5.5 Stakeholders

The results determined Stakeholder was the fifth ranking main critical factor. However, when reviewing the ranking of all its sub-factors, top management support came as the most important sub-factor, which is supported by the literature (Saferi *et al.*, 2018; Song *et al.*, 2017). Results also show the importance of stakeholders' interaction with government organizations in sustainability agenda, which can be a complicated task for both stakeholders and organizations. However, every stakeholder must buy-in sustainability and align their values with government sustainability agenda to facilitate successful transition from traditional procurement to SP. This idea, as asserted by Saferi *et al.* (2018), indicated that top management commitment in SP is developed when organization has their own goals and the people working on them share the same values and beliefs. Moreover, results support Song *et al.*'s (2017) assertion of positions or value appeals, as each stakeholder often differs on the requirement of SP. Thus, public organizations should balance benefits of different stakeholders, on the one hand, and develop specific or customized strategies to deal with the relationship with each stakeholder, on the other hand.

5.6 Innovation capability

Innovation capability was unsurprisingly ranked as the last main factor. During the interview phase, it was clear that innovation capability was the most troublesome factor to explain. It was also inferred that innovation capabilities and IT infrastructure vary from one organization to another; and the question of how innovation can promote SP was confusing to some of them. However, the sub-factors, ability to generate ideas and technology adoption came in the top third of the ranking of all sub-factors, which is beneficial to the study and supports the previous literature (de Souza Dutra *et al.*, 2017; Grandia *et al.*, 2015). Nevertheless, the results succeeded in establishing a link between innovation, IT infrastructure development and SP in the UAE public sector. Thus, the UAE must continue

to adopt technology implementation and innovation within the government practices as part of sustainability transition to achieve its sustainability goals.

6. Conclusion and recommendations

This study investigated the influences of SP implementation in the UAE's public sector by critically examining the key factors and sub-factors that affect its implementation found in the previous literature and then prioritizing them by using the AHP approach. Based on the results presented here, although cost- and organization-related factors were perceived as the main influences on SP implementation in the UAE's public sector, personal factors such as commitment to change and social awareness from employees and management are just as important and should be considered by the UAE government during its plans to implement SP initiatives. Additionally, this article therefore makes the following recommendations for practitioners:

- Although there is a national policy to promote sustainability in the UAE, the government should issue standard practices for SP to give public procurers a systematic way of conducting a proper cost-benefit analysis to decide on sustainable purchases that meet the national sustainability agenda.
- The UAE government should allocate a separate national budget dedicated to buying sustainable goods and services, thus relieving organizations from the burden of watching their expenditures and to help them avoid going over their budgets. This recommendation will also allow for better governance, so that funds can be released for projects determined to meet the government's sustainability goals and their progress can continue to be monitored.
- Organizations must engage in effective promotion of pro-environment values by conducting training and seminars to create uniform values associated with the organization's identity, by motivating and awarding green practices within the office and addressing environmental issues at every opportunity.
- Top management and government officials must reevaluate their own personal values and commitment to certain issues as they participate in forming policies, rules, regulations and training programs designed for procurement managers within government organizations in the UAE.

The findings of this article will not only contribute to filling the gap in knowledge concerning SP in the UAE but also provide a valuable reference for helping policymakers and practitioners take suitable measures to mitigate the barriers to adopting SP and to consequently promote the successful adoption of SP. Moreover, this article can serve as a guideline for international organizations and advocates interested in implementing SP within the UAE to ultimately achieve more sustainable development goals.

7. Limitations and the study

Although the research objectives were achieved, this study still has some limitations worth mentioning. First, it is limited by its relatively small sample size of 17 procurement experts and does not reflect the whole UAE government. Although the sample size was adequate for conducting AHP analyses, however, a quantitative research with a larger sample size would be useful to see whether the results would significantly differ from those reported in this study. Further, because AHP metrics were developed via experts' opinion, there are chances that this opinion is biased. Therefore, fuzzy AHP may be used to remove some of the uncertainties associated with AHP. Finally, future comparative studies could analyze the

differences between the study's findings in the UAE and results from more developed countries to better understand the problem and come up with market-specific solutions.

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Further reading

Center for International Earth Science Information Network Columbia University, available at: <https://epi.envirocenter.yale.edu/downloads/epi2018policymakerssummaryv01.pdf>

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