# Unpacking the role of innovation capability: Exploring the impact of leadership style on green procurement via a natural resource-based perspective

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ABSTRACT

In response to the growing urgency of environmental concerns in civil society, governments have been accelerating their pursuit of green procurement. However, green procurement faces substantial barriers and challenges that are internal to the governmental organizations. Using a natural resource-based view as the theoretical lens, this study developed and tested a model on how leadership styles and innovation capability influence green procurement. The findings showed that neither transformational nor transactional leadership styles influence green procurement, although they do influence innovation capability. Notably, innovation capability fully mediates the relationship between both transformational and transactional leadership styles and green procurement. Our findings offer a more advanced understanding of the impact of leadership style on e-procurement and the role of innovation capability, thereby addressing the crucial questions of how leadership style and innovation capability can enhance green procurement to improve environmental sustainability.

## 1. Introduction

### 1.1. Background

In response to the growing urgency of environmental concerns in civil society, governments have increased their awareness of the impact of their purchase decisions. Green procurement (GP) has emerged as an important concept at a national and international level helping to drive markets toward environmental sustainability and producing positive environmental benefits (Walker & Phillips, 2009). However, GP is a complex and extreme departure from traditional procurement methods, and it entails significant changes in fundamental organizational culture, beliefs, and technology surrounding procurement practices (Coggburn, 2004). Further, GP does not refer to any single process but to entire supply chains and types of services (Chersan, Dumitru, Gorgan, & Gorgan, 2020). For this reason, investigations that explore the internal factors that support the successful implementation of GP have been taking place for a decade.

Leadership attributes and styles are increasingly considered as a major precursor for successful green initiatives in organizations (Brammer & Walker, 2011; Liao & Zhang, 2020; Pirayesh & Pourrezay, 2019; Singh, Giudice, Chierici, & Graziano, 2020). Ultimately, an organization's orientation toward sustainability is driven by its leadership's understanding of value (Stahl, Brewster, Collings, & Hajro, 2019, p. 9). Further, Van den Berg, Labuschagne, and Van den Berg (2013) suggested that leadership and innovation management are two of the most important ways of increasing competitiveness and achieving better environmental performance. Hence, for GP to be developed and sustained, organizations must foster change by enhancing leadership and innovation capabilities (ICs) (Dost, Badir, Ali, & Tariq, 2016; Schwarz & Huber, 2008; Mazzucchelli, Chierici, Tortora, & Fontana, 2019; Zhang & Hartley, 2018). Successful GP transformation requires a shift in mindset to foster an environment that is conducive to innovation and novel value-added activities associated with sustainability and GP (Kumar & Rose, 2010; Fallon-Byrne & Harney, 2017).

### 1.2. Purpose and significance

GP is particularly significant for governmental organizations because of their vast scale and reach, as well as their foundational role in

fostering the norms of civilized life and the operations of the market (Kelman, 2007). The implementation of GP in the public sector is more challenging than in the private sector. This is because it involves a wide range of environmental criteria for groups of products and services that public organizations frequently procure (e.g., office equipment, uniforms, road work, and catering), and these must be taken into account in procuring (Grandia & Voncken, 2019). However, GP in the public sector remains less studied than in the private sector (Grandia & Voncken, 2019; Walker & Brammer, 2012). Little is known of the role that individual-level attributes play in the performance of procurers in implementing new procurement initiatives, such as GP (Grandia & Voncken, 2019). Recognizing this, Chersan et al. (2020) called for additional study of GP in the public sector and for a greater involvement of practitioners in work of this nature due to their more in-depth and comprehensive view of the elements that are related to GP.

Consequently, this study suggests that if public organizations focus on improving their leadership style and embrace the concepts and procedures of IC, it will help achieve successful GP implementation. Drawing upon this, and utilizing the resource-based view (RBV) and the natural-resource-based view (NRBV), this paper (1) examined the relationships between leadership style and GP; (2) investigated the relationships between leadership style and organizational IC; and (3) determined what, if any, direct and indirect effects IC has on the relationships between leadership style and GP.

### 1.3. Significance of the study

The significance of this study rests on two key concerns in the study of GP. The first regards the lack of empirical studies that examine the impact of leadership style or other aspects of leadership aspects on GP, although it is known that leadership can play a critical role in framing issues and modeling role behavior (Tourky, Kitchen, & Shaalan, 2020). It is well understood that "the main driving force for GP has often been the presence of motivated individuals in the procurement decision-making process" (Thomson & Jackson, 2007, p. 440), but there remains much to do to understand which leadership styles are most effective in driving innovation (Singh, Gupta, Busso, & Kamboj, 2021) and lead to the best GP implementation. Study of the leadership-innovation link have not proven conclusive (Sheehan, Garavan, & Morley, 2020, p. 399) and remain severely lacking in the public-sector context (Grandia, Steijn, & Kuipers, 2015). Second is a lack of understanding of the mechanisms that link leadership style with IC to promote GP. If public organizations are to address environmental performance in their business practices, they must pursue IC. Because GP is an innovation in management (de Souza Dutra et al., 2017), and given the complexity and cost of environmental preferences, its adoption cannot be easily implemented if individuals and green business processes alone are considered. This study takes innovation as the theoretical basis for the development of gains in GP and environmental performance by unearthing the indirect relationships in the leadership-innovation nexus (Sheehan et al., 2020; Singh et al., 2021). In this way, the study responds to calls for a more expansive consideration of the NRBV in innovation studies to address and accommodate broader sustainability issues, which have hitherto received limited attention (Gibson, Gibson, & Webster, 2021; Glavas & Mish, 2015).

The United Arab Emirates (UAE) public sector was selected as the context for this study. Like many governments worldwide, the UAE is seeking to promote innovation and GP by taking advantage of the latest technologies and innovation (Zaatari, 2019). Nevertheless, the UAE continues to face major challenges to its sustainable development and to improving its position in international sustainability rankings (Environmental Performance Index, 2018; World Economic Forum, 2017). This study collected data through a quantitative survey developed to measure specific leadership styles, IC, and GP implementation in the UAE public sector. Purposive sampling was used, and 213 valid responses were obtained. We sought to offer new evidence to establish the

importance of leadership attributes in attaining successful GP implantation via IC. Specifically, innovation management is a critical global strategic consideration for organizations that hope to implement GP or any other procurement initiatives. This paper's findings can aid academics and practitioners of environmental management and procurement in the UAE and around the region, specifically in terms of preparation for greater reforms to attain environmental sustainability.

## 2. Literature review and hypothesis development

GP was defined by Lacroix (2008) as seeking out and acquiring products and services that are predicted to have a reduced impact on the environment, calculated over their entire lifecycle, than their typical equivalents. Doing this entails integrating environmental concerns into purchasing decisions that would otherwise be based solely on price, performance, and quality. Research on the role that GP can ultimately play in environmental performance has been conducted using different approaches. Among these, however, no understanding has been developed of the mechanisms through which this relationship occurs, especially in the public sector context (Bleda & Chicot, 2020; Sheehan et al., 2020). To address the relationship between leadership style, IC, and GP, this study uses RBV and NRBV, as described the below.

### 2.1. Theoretical background

Ghadge, Kidd, Bhattacharjee, and Tiwari (2019) argued that RBV is one of the two best-suited theories for predicting the sustainability performance in a supply chain. RBV focuses on firm-level resources of company performance relative to traditional industry-level variables, which has been regarded as a major advantage for RBV (Peng, 2001). The RBV holds that competitive advantage can be more effectively achieved by exploiting internal instead of external factors, by contrast with the view taken by industrial organizations (Barney & Hesterly, 2010). The RBV approach conceptualizes firms as bundles of resources, heterogeneously distributed, in which resource differences persist over time. Moreover, firms with resources that satisfy the criteria of valuable, rare, imperfectly imitable, and non-substitutable (VRIN) can achieve sustainable competitive advantages (Barney, 1991). The RBV approach thus perceives firms as being generally diverse because they possess of heterogeneous resources; as a result of this, they are expected to pursue distinct strategies as they retain unique blends of resources (Teece, 2007). However, the RBV has been accused of failure to consider the biophysical and natural environment, or the essential natural resource constraints, that form the ultimate environment for a firm's innovative capability. Recent studies of management have moved scholarly attention from tangible to intangible resources (Lillis, Szwejczewski, & Goffin, 2015). Intangible assets are likely be distinguished from a strategic perspective, as they bring together the necessary ingredients for a sustainable advantage (Lillis et al., 2015).

Hart (1995) developed the RBV using the organization's relationship with nature. NRBV indicates that organizations should focus on their relationship to the environment and ensure sustainable development as they seek sustainable competitive advantage in the market place by following three interconnected strategies: sustainable development, product stewardship, and pollution prevention (Hart, 1995). The NRBV unpacks the three strategies and articulates their relationships with sustained competitive advantage and improved organizational performance by initiating green practices and green innovation, which may lead to superior competitive advantages in costs, reputation, legitimacy, future position, and long-term growth (Singh et al., 2020; Shahzad, Qu, Zafar, Rehman, & Islam, 2020; Masoumik, Abdul-Rashid, & Olugu, 2014). There have been similar calls to extend the RBV to accommodate sustainability (Gibson et al., 2021), including prospects to include interactions with external constituents, not least government and supply chain partners (McGahan, 2021). A greater focus on the environmentally friendly conduct of a range of activities and a focus on sustainable

development should therefore allow the organization to innovate and lead to the generation of competitive advantage.

## 2.2. Leadership style

Leadership style refers to the relatively consistent pattern of behavior that characterizes and distinguishes a given leader (DuBrin, 2001). Cyert and March (1963) may have been the first to suggest that the leadership and decision-making styles of management are valuable resources for an organization. However, it was Barney (1991) who put this in a theoretical context in the RBV that he developed, in which he suggested that a firm's human resources were made up of its employees' experience, relationships with others, leadership qualities, knowledge, business acumen, and problem-solving abilities (Barney, 1991). The RBV also suggests that organizational performance is influenced by the egocentric (self-enhancing) or collective (organizational) values of individuals in the organization (Todorovic & Schlosser, 2007). Experienced leadership style is a critical factor for individual learning outcomes and organizational learning (Froehlich, Segers, & Van den Bossche, 2014), whereas, organizational learning is considered to be a fundamentally strategic process and the only way to achieve sustainable competitive advantage for the future (De Geus, 1988). This has led to a significant number of studies that investigate leadership styles in many areas of business management, of which transactional leadership (TSL) and transformational leadership (TFL) are the most obvious (Bass & Avolio, 1995; Dvir, Eden, Avolio, & Shamir, 2002; Ehrhart, 2004; Mahdinezhad & Suandi, 2013). Both TSL and TFL are frequently used to measure leadership attributes in government operations in terms of job satisfaction and performance (Trottier, Van Wart, & Wang, 2008; ALFadhalah & Elamir, 2019; Hijazi, Kasim, & Daud, 2017). However, there have been few studies that have examined other factors, like social practice and performance, the environment, and business innovativeness (Nadeem, Mohamad, & Abdullah, 2017; Eikelboom, Gelderman, & Semeijn, 2018)

Avolio (1999) found that transformational leaders engender trust, seek to develop leadership in others, exhibit self-sacrifice, and serve as moral agents, focusing themselves and their followers on objectives that transcend the immediate needs of the workgroup. Transactional leaders, on the other hand, address the self-interest of their followers by providing reward or recognition in exchange for cooperation and compliance in the context of task requirements. Lowe, Galen Kroeck, and Sivasubramaniam (1996) suggested that TSL and TFL should not be regarded as mutually exclusive styles of leadership, such that leaders could exhibit both TSL and TFL. On this account, leaders should be able to switch between the two in relation to the given situation (Vera & Crossan, 2004). Dai, Dai, Chen, and Wu (2013) found that under RBV, TSL and TFL can both be suitable for achieving organizational goals. Using TFLs, managers can induce employee trust and positively affect organizational innovation by developing mechanisms for organizational learning (Hui, Phouvong, & Phong, 2018; Le & Lei, 2019; Alsalami, Behery, & Abdullah, 2014). TSL can induce organizational commitment through distributive justice, but it can also negatively and significantly influence organizational commitment (Dai et al., 2013). TFL has attracted increased research attention in many fields over the past decade due to its relationship-oriented nature and the wealth of empirical evidence concerning its positive impact on employee behaviors and attitudes (Hui et al., 2018; Le & Lei, 2019; Yukl & Becker, 2006). In general, both leadership styles can enhance collective employee efforts on the investment of personal resources, extra-role behavior regarding environmental goals, and organizational learning, all of which promote firm performance (Velasco Vizcaíno, Martin, Cardenas, & Cardenas, 2021).

## 2.3. Leadership style and green procurement

Leadership is a key element in addressing the crisis of governance that is currently facing the Earth's ecosystem. While economic,

corporate, and political discourses of leadership have been broadly and deeply interrogated, leadership from an environmental perspective continues to be somewhat neglected (Case et al., 2015). However, some attempts have been made to evaluate leadership in the context of sustainable development and environmental management. For example, Evans et al. (2015) conducted a review of environmental leadership research over a period of 10 years and concluded that leadership is one of the foremost factors in effective environmental governance. Other studies have found correlations among leadership style, GP, and environmental performance (Dubey, Gunasekaran, & Samar Ali, 2015; Nadeem et al., 2017; Nagel, 2000). It has been argued that a crucial factor that limits the implementation of GP is a misunderstanding of the operations of the general organization in relation to environmental and employee engagement exhibited by managers (Ruževičius & Dapkus, 2018). Finally, a recent study conducted in the UAE concluded that leadership in change management may be the most influential internal factor for GP in the oil and gas sector (Hashmi, Khan, & Ajmal, 2020). Using RBV (Barney, 1991), it seems that employee collective learning and conduct may depend on leadership type for resources that meet the VRIN criteria. These underpin the firm's capability to achieve superior performance. Drawing upon NRVB theory, leadership could be considered an essential resource, like any other resource available to a firm that could be utilized to achieve environmental performance goals, where the foremost aim of GP implementation would be to develop, motivate, and offer opportunities to the firm to enable improved job behaviors with the aim of supporting sustained competitive advantage and superior performance (see also Velasco Vizcaíno et al., 2021). This perspective was confirmed by Roman (2017), who concluded that the leadership style of an organization's top management is positively correlated with the probability that it will succeed in GP implementation. Blomea, Hollos, Paulraj, and Henke (2015) even suggested that the characteristics of top management are decisive for advanced green practices, including GP.

However, it remains debatable which style of leadership is better suited to obtaining successful GP implementation. TSL is thought to be less effective than TFL in this context, and it is less correlated with high performance and productivity than TFL is (Bass, Avolio, Jung, & Berson, 2003; Dvir et al., 2002; Gardner & Stough, 2002). In addition, TSL may be accompanied by punishment behavior and contingent rewards, which are considered the source of effectiveness by such leadership, while TFL affects the overall thinking and behavior of those led, creating a united understanding that produces success in organizational learning (Choudhary, Akhtar, & Zaheer, 2013; Mahdinezhad & Suandi, 2013).

Pursuant to this, following the NRBV, we propose that leadership style affects the implementation of GP. Hence, the following hypotheses are proposed:

- H1a. Transformational leadership has positive influence on green procurement.
- H1b. Transactional leadership has positive influence on green procurement.

## 2.4. Leadership style and innovation capability

IC includes seven elements: vision and strategy, creativity and idea management, organizational intelligence, harnessing the competence base, systems and technology management, culture and climate, and organizational structures (Lawson & Samson, 2001). An increasing number of academics accept that RBV can offer fresh insights into managing knowledge and IC (Ukko et al., 2016; Meso & Smith, 2000). This point of view considers that the existence of several organizational abilities and resources has a positive impact on innovation outcomes and can be employed to expand the research findings of the organization's IC (Mazzucchelli et al., 2019; Rajapathirana & Hui, 2018; Zhang & Hartley, 2018; Agarwal & Selen, 2009). Leadership has come to be recognized as a key resource for IC in firms and an important means of achieving

effectiveness, survival, and sustainable competitive advantage. Prior studies suggest that leadership behaviors may be the most important means of promoting IC (Bel, 2010; Tang & Yeh, 2015). TFL is considered to be a highly effective organizational style for promoting product and process innovation (Le & Lei, 2019; Lei, Leaungkhamma, & Le, 2020; Pirayesh & Pourrezay, 2019; Sheehan et al., 2020; Utoyo, Fontana, & Satrya, 2019). For example, Sahban (2019) found strong causal relationships among TFL, knowledge management, and product and process innovation. Sanda and Dodua (2017) argued that TSL can be used to enhance employee creativity and encourage innovation, to a certain degree. However, TFL can harm firm performance when it is combined with the contingencies of high technology uncertainty and low demand uncertainty (Chen, Sharma, Zhan, & Liu, 2019). Nevertheless, Dunne, Aaron, McDowell, Urban, and Geho (2016) found evidence to support the idea that leaders who are inspirational and who lead efficacious organizations establish environments that are more likely to yield new product innovations. When Feng-Cheng (2016) compared the influence of TSL and TFL in promoting employee creativity, a more significant positive influence of TFL was found than of TSL on employee creativity.

Ultimately, both TSL and TFL emphasize followers and fostering an infrastructure for enhanced performance (Velasco Vizcaíno et al., 2021). Although TSL provides feedback on performance, TFL leaders seek to involve their followers in goal achievement, encouraging IC and learning to improve overall performance (Bass et al., 2003). Pursuant to these observations and incorporating the considerations of RBV, the following hypotheses are proposed:

- H2a. Transformational leadership has a positive impact on innovation capability.
- H2b. Transactional leadership has a positive impact on innovation capability.

### 2.5. Mediating role of innovation capability

Public procurement can encourage business innovation by supporting the formation of markets for new products, technologies, and services from a knowledge management perspective (Bleda & Chicot, 2020). The RBV explains that organizations that possess certain resources can help attain their innovative goals (Barney, 1991). Hence, to pursue organizational changes, such as green initiatives, an organization must adapt to a changing environment and encourage sustained innovation (Rajapathirana & Hui, 2018; Schwarz & Huber, 2008). Kostopoulos, Spanos, and Prastacos (2002) found substantial interrelationships between the perspective of the NRBV and concepts of organizational innovation. According to Cheng and Yang (2017), IC consists of four aspects: (1) the capacity of developing new products, (2) the capacity of applying appropriate processes to produce new products, (3) the capacity of developing and adopting new product to satisfy future needs, and (4) the capacity of responding to accidental technology activities and unexpected opportunities. Thus, as a firm focuses on environmental sustainability, it is expected to ensure that it will continue to innovate in green practices, leading to competitive advantage. This, by extension, suggests that the organization's capacity to innovate in a sustainable manner must extend to GP (Modi & Patel, 2013). Therefore, firms should use their ICs to support the advancement of sustainable GP, taking various routes, including the choice of suppliers, selection of materials, and application of processes (Modi & Patel, 2013). In fact, Yang, Wang, Zhou, and Jiang (2019), determined that managers' focus on proactive environmental strategy promotes the development of IC in firms. In this connection, de Souza Dutra et al. (2017) indicated that a failure to implement GP might be traceable to insufficient technological and managerial capability. Hence, governments, like other organizations, must constantly adapt their procurement activity to innovations in the market to successfully pursue GP (Grandia et al., 2015). Some evidence has been collected that links GP with innovation. For example, in a study conducted in the UAE,

AlNuaimi and Khan (2019) found a positive relationship between IC and GP in the public sector. This relationship was also highlighted by Grandia et al. (2015), who indicated that the public sector should always adapt its procurement activities to respond to innovations in the market as they appear. Moreover, they argued that innovations in procurement could lead to the creation of a sustainable procurement model. For this reason, Meehan and Bryde (2011), among others, suggested that to better identify the drivers of GP, future studies should take advantage of developments in other areas of management, such as innovation management.

This review of the literature establishes a relationship between leadership style and GP and another one between leadership style and IC. Drawing on the RBV and NRBV and the results from the literature, it appears safe to conclude that IC could enhance the relationship between leadership style and GP. The following hypotheses are thus proposed:

- H3a. Innovation capability positively mediates the relationship between transformational leadership and green procurement.
- H3b. Innovation capability positively mediates the relationship between transactional leadership and green procurement.

Fig. 1 presents the relationships between the dependent, independent, moderating, and mediating variables.

## 3. Methods

A quantitative survey was distributed to test the conceptual framework, in accordance with the assumption that meaningful social research should be founded on the physical observation of research-associated phenomena, which can help facilitate the examination of the strength of the association between quantified constructs (Howell, 2012). This approach should be followed with a careful description of the observations made and their subsequent analysis and validation using acknowledged and established methods for the selection of samples, analysis of data, and validation of findings to ultimately produce a more scientific response to the research questions (Saunder, Lewis, & Thornhill, 2009).

### 3.1. Population and sample

A suitable and purposeful sample group was required as the target population for this study, among those fulfilling, the procurement functions of the public sector in the UAE. According to the UAE Government Portal (2019a), there are over 240 (federal and local) government entities in the UAE, among which 86 are located in Abu Dhabi. The total population working in the UAE defense and public sector is 13% of the entire UAE workforce, or 838,136 people (UAE Government Portal, 2019b). A key informant approach was followed in establishing the population for sampling and data collection, as suggested by Phillips and Bagozzi (1986). Using word of mouth, we made contact with six procurement experts working in Abu Dhabi public sector. From them, we learned that at least 23 government entities were already practicing GP. Drawing on the guidance of key informants, we sent email invitations to these organizations containing the statement of the purpose of the study. Only 11 entities responded to this email and directed us to a point of contact (POC) in their entities. After contacting each POC, we learned that the total number of employees working in procurement within their organizations was around 400 employees, which formed the target for this study. This detailed and purposeful sampling approach was a critical foundation for exploring our research topic, heeding calls to pay greater attention to appropriate unit of analysis in IC studies (Sheehan et al., 2020).

In May 2020, after permission was obtained from each employee's organization, a survey was distributed via a survey administration software platform (SurveyMonkey) to our sample of 400 procurement professionals working in public organizations. A total of 237
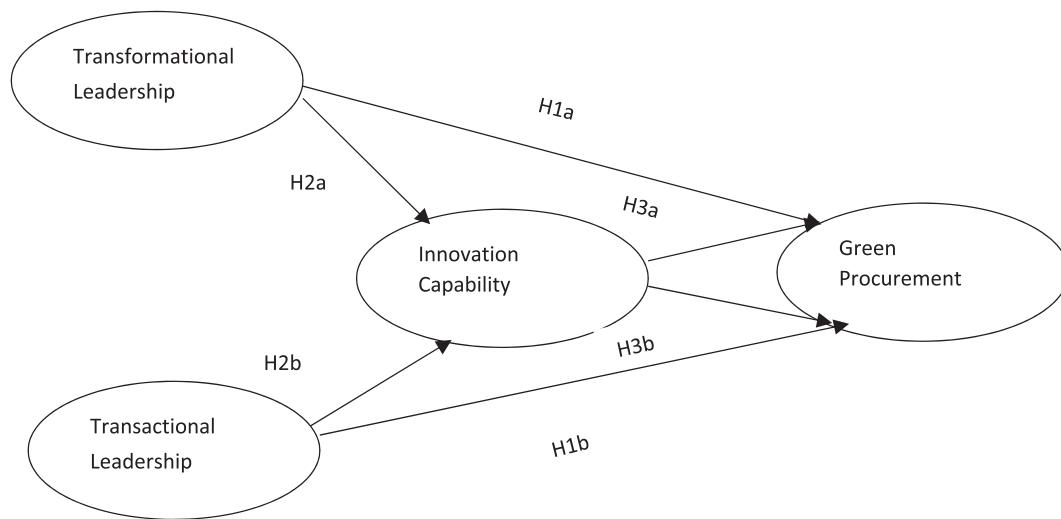
**Fig. 1.** Conceptual Framework.

respondents completed the survey, for a response rate of 59.3%. To ensure that irrelevant results would not be recorded, a question that checked whether respondents were working in a procurement function in their organization was used to eliminate 23 responses, leaving a final sample of 213. Table 1 presents the demographic characteristics of the sample.

### 3.2. Measures

Bell, Bryman, and Harley (2018) considered it reasonable to use previously developed questions in a novel questionnaire design, either by reproducing them or using them as inputs to support the creation of novel items. In this survey, preexisting research questions were used, as they had already undergone validation and peer-review. Using a five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree" key concepts, including GP, were measured (Hasselbalch, Costa, & Blecken, 2014); IC (Kumar & Rose, 2010); TFL (Carless, Wearing, & Mann, 2000) and TSL (Dai et al., 2013) (see Appendix A for the details of the scales and items).

### 3.3. Data analysis

Analysis was performed using the partial least squares (PLS) modelling approach, using SmartPLS 3.0 software to evaluate the measurement instrument and conceptual model at the same time. This approach was considered to be suitable because PLS can deliver valid results for small sample sizes (Chin, 1998). To determine whether the sample size ($N = 213$) was suitable, an analysis was conducted based on

**Table 1**
Descriptive statistics.

| Demographic variable | *N* | % |
|---|---|---|
| *Gender* | | |
| Female | 124 | 58.2 |
| Male | 89 | 41.8 |
| *Age (years)* | | |
| 18–24 | 32 | 15 |
| 25–34 | 56 | 26.3 |
| 35–44 | 57 | 26.8 |
| 45–54 | 34 | 16 |
| 55+ | 34 | 16 |
| *Education level* | | |
| High school diploma | 56 | 26.3 |
| Graduate degree | 113 | 53.1 |
| Postgraduate degree (master's degree or doctorate) | 44 | 20.7 |

a power analysis for logistic regression using the G*Power 3.1.9.4 software tool developed by Faul, Erdfelder, Buchner, and Lang (2009) and following the procedures established by Lipsey and Aiken (1990). We conducted an a priori power analysis using four predictors, including the interaction effect, as shown in the research model, with a medium effect size (0.15), a moderate significance level (0.05), and a high-power requirement (0.95). The results showed a minimum required sample size of 129, indicating that our sample was within the acceptable range. This size also exceeded the requirements for latent variable constructs, which require ten times the largest number of formative indicators used to measure one construct as recommended by Hair Jr, Sarstedt, Hopkins, and Kuppelwieser (2014).

To test construct reliability, we compared the values for Cronbach's α, composite reliability (CR), and average variance extracted (AVE). With respect to convergent validity, we checked the factor loadings for all measures to check for abnormalities. Next, we checked the discriminant validity of the measures by assessing whether the square root of the AVE for each construct was greater than its correlation with other factors (Kline, 2015). Multiple criteria were also used to evaluate the goodness of model fit, including the standardized root mean square residual (SRMR) and normed fit index (NFI). These tests were conducted to measure the predictive performance of the measurement model. Once the measurement model was determined to be adequate, we proceeded to test the hypotheses. The hypothesis testing in PLS-SEM follows similar popular procedures that were also used by Blome, Hollos, and Paulraj (2014) and Mikalef, Boura, Lekakos, and Krogstie (2019) when using SmartPLS.

## 4. Results

### 4.1. Assessing the measurement model

We evaluated construct reliability using the internal consistency measure. On the first run of the model on SmartPLS, we received an unacceptable Cronbach's α value of 0.694 for TSL. The AVE value of GP was below the acceptable threshold of 0.5. After the model was reviewed, question items TS3, GR2, GR7, and GR9 were removed to improve the internal reliability of the model. Table 3 shows the results of validity and reliability tests, demonstrating that all values for Cronbach's α and CR were above 0.70, suggesting acceptable reliability. We also assessed convergent validity by investigating the AVE in the measures. Table 2 shows that the values for the AVEs ranged from 0.616 to 0.694.

After the model was improved, the measures for our research model

**Table 2**
Confirmatory factor analysis.

| Measures | Items | Cronbach's Alpha | Composite Reliability | Average Variance Extracted |
|---|---|---|---|---|
| Green Procurement | 7 | 0.896 | 0.919 | 0.617 |
| Innovation Capability | 5 | 0.869 | 0.905 | 0.657 |
| Transformational Leadership | 7 | 0.927 | 0.941 | 0.694 |
| Transactional Leadership | 3 | 0.711 | 0.828 | 0.616 |

**Table 3**
Factor loadings, weights, and *t*-values.

| Model Construct | Measures | Factor Loading | Weights | *t*-Value |
|---|---|---|---|---|
| Green Procurement | GR1 | 0.770 | 0.179 | 20.027 |
| | GR3 | 0.840 | 0.200 | 38.294 |
| | GR4 | 0.826 | 0.175 | 23.767 |
| | GR5 | 0.819 | 0.167 | 23.829 |
| | GR6 | 0.749 | 0.158 | 18.822 |
| | GR8 | 0.738 | 0.186 | 18.908 |
| | GR10 | 0.751 | 0.210 | 20.209 |
| Innovation Capability | IN1 | 0.789 | 0.224 | 20.882 |
| | IN2 | 0.770 | 0.259 | 22.061 |
| | IN3 | 0.804 | 0.244 | 24.177 |
| | IN4 | 0.861 | 0.285 | 41.056 |
| | IN5 | 0.824 | 0.221 | 26.618 |
| Transformational Leadership | TF1 | 0.761 | 0.184 | 16.951 |
| | TF2 | 0.838 | 0.149 | 28.188 |
| | TF3 | 0.822 | 0.134 | 23.599 |
| | TF4 | 0.850 | 0.184 | 32.080 |
| | TF5 | 0.840 | 0.201 | 32.600 |
| | TF6 | 0.838 | 0.172 | 31.968 |
| | TF7 | 0.880 | 0.177 | 44.909 |
| Transactional Leadership | TS1 | 0.767 | 0.291 | 7.889 |
| | TS2 | 0.765 | 0.390 | 7.537 |
| | TS4 | 0.821 | 0.583 | 14.144 |

were assessed using confirmatory factor analysis. Table 3 presents the weights and loadings for the test. All measures demonstrated moderate loadings, suggesting acceptable convergent validity.

Finally, the discriminant validity of the measures was evaluated by determining whether the square root of the AVE for each construct was larger than its correlation with other factors. Table 4 reveals that each construct correlations were<0.83. Furthermore, the square root of the AVE for each construct was larger than the correlation between any pair of factors, verifying the discriminant validity of the scale. In addition, all items had strong factor loadings on their constructs. To further check the discriminant validity of the scale, we assessed the heterotrait-monotrait ratio (HTMT) check in SmartPLS. HTMT values are compared to a threshold of 0.85, as suggested by Henseler, Ringle, and Sarstedt (2015). If the HTMT value is higher than this threshold, it can be concluded that the model lacks discriminant validity. Because all the indicators obtained from our research were below 0.85, as reported in Table 5, we can conclude that there was high discriminant validity between the variables.

**Table 4**
Discriminant validity matrix.

| | GP | IC | TFL | TSL |
|---|---|---|---|---|
| Green Procurement (GP) | 0.786 | | | |
| Innovation Capability (IC) | 0.545 | 0.810 | | |
| Transformational Leadership (TFL) | 0.319 | 0.482 | 0.833 | |
| Transactional Leadership (TSL) | 0.333 | 0.279 | 0.247 | 0.785 |

**Table 5**
Heterotrait-Monotrait ratio (HTMT).

| | GP | IC | TFL | TSL |
|---|---|---|---|---|
| Green Procurement (GP) | | | | |
| Innovation Capability (IC) | 0.607 | | | |
| Transformational Leadership (TFL) | 0.331 | 0.529 | 0.833 | |
| Transactional Leadership (TSL) | 0.366 | 0.431 | 0.504 | 0.785 |

### 4.2. Structural model assessment

Before testing the structural model, we checked its fitness. The goodness of fit results obtained from SmartPLS 3.0 included an NFI value of 0.816, below the recommended value of 0.95. However, the SRMR value was 0.078, which is considered acceptable by Hu and Bentler (1999). Hence, the model can be considered to have good fit.

Adopting a psychometrically satisfactory measurement model, we continued to test the proposed hypotheses using SmartPLS 3.0 as shown in Fig. 2. Results determined that H1a was not supported ($\beta = 0.047$; $t = 0.676$; $P = .499$), demonstrating that TFL has no relationship with GP. H1b was also not supported ($\beta = 0.099$; $t = 1.280$; $P = .2011$), demonstrating that TSL also has no relationship to GP. Hence, both TFL and TSL have no direct relationship with GP. However, H2a was supported ($\beta = 0.410$; $t = 7.346$; $P < .001$), demonstrating that TFL has a positive influence on IC. Similarly, H2b was supported ($\beta = 0.181$; $t = 3.125$; $P < .005$), demonstrating that TSL also has a positive influence on IC. Furthermore, the results of the mediation test revealed that there were significant indirect effects between TFL and GP ($\beta = 0.201$; $t = 4.893$; $P < .001$). Likewise, the indirect effects between TSL and GP were also significant ($\beta = 0.089$; $t = 2.786$; $P = .005$). These demonstrate the full mediation effects of IC on the relationship between leadership style and GP. Table 6 presents the test results for all hypotheses.

### 4.3. Effect size comparison

To compare the impact of leadership style on GP and IC and determine which leadership style has a greater effect on GP, mediated by IC, we followed the approach suggested by Hair et al. (2014) to assess the coefficient of determination $R^2$, which represents the proportion of validation in the dependent variable that can be explained by one or more predictor variables, and to check the effect size $f^2$, which indicates the relative effects of a particular exogenous latent variable and endogenous latent variable using changes in $R^2$ (Chin, 1998). The results showed that the $R^2$ values for GP and IC were 0.311 and 0.260, respectively. Thus, leadership style contributed to 31% of GP changes and 26% of IC changes, and these values fell within the acceptable range presented by Falk and Miller (1992). The results for $f^2$, shown in Table 7, indicated that IC had a moderate effect size for GP. By contrast, TFL had no effect size for GP and only a moderate effect size for IC. Finally, TSL had a weak effect size for both GP and IC (Cohen, 1988).

## 5. Discussion

Governments are under significant pressure to transform their value chains and engage in GP and other activities with societal benefit (Porter and Kramer, 2006). The first set of hypotheses in this study predicted that both TFL and TSL would have a positive relationship with GP. However, the results indicated that neither TFL nor TSL had a significant effect on GP. This means that these styles of leadership in the organization do not influence the GP outcomes. Thus, TFL and TSL styles and practices in the public sector are not a key success factor for the success of GP implementation. This finding contrasts with earlier work (Dubey et al., 2015; Nadeem et al., 2017; Nagel, 2000), which indicated a correlation among these leadership styles, GP, and environmental performance. Thus, effective GP implementation may require additional abilities and knowledge in a leader beyond the specific skills and
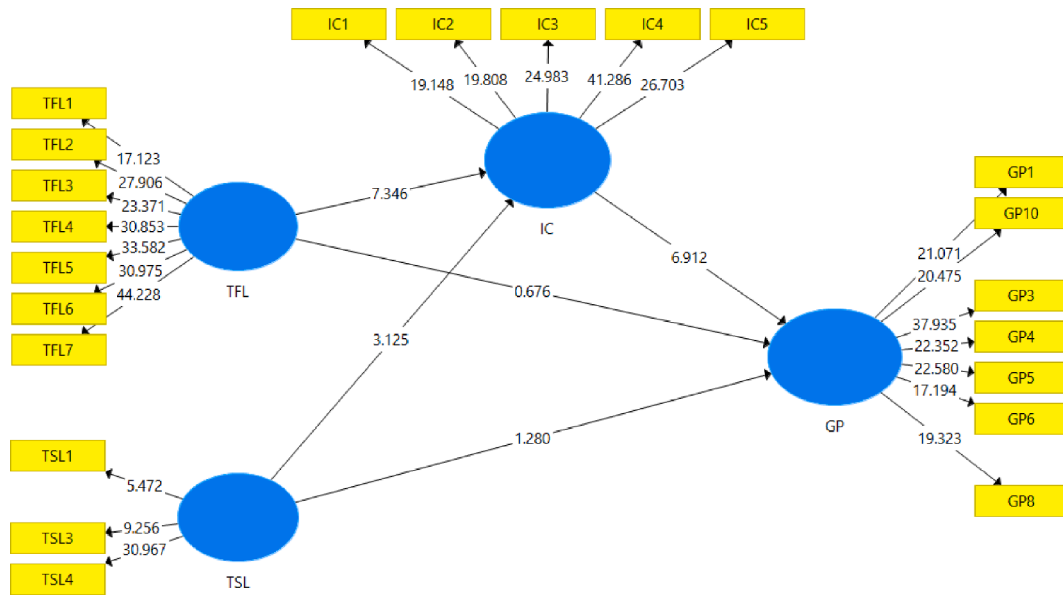
**Fig. 2.** Output from SmartPLS 3.0.

**Table 6**
Hypothesis testing.

| Hypotheses | P-Value | B | t-value | Results |
|---|---|---|---|---|
| H1a: TFL → GP | 0.499 | 0.047 | 0.676 | Not Supported |
| H1b: TSL → GP | 0.201 | 0.099 | 1.280 | Not Supported |
| H2a: TFL → IC | 0.000 | 0.410 | 7.346 | Supported** |
| H2b: TSL → IC | 0.002 | 0.181 | 3.125 | Supported** |
| H3a: TFL → IC → GP | 0.000 | 0.201 | 4.893 | Supported** |
| H3b: TSL → IC → GP | 0.005 | 0.089 | 2.786 | Supported* |

Significant at $P^{**} < 0.01$, $P^* < 0.05$

**Table 7**
Effect size ($f^2$) matrix.

| Construct | Green Procurement | Innovation Capability |
|---|---|---|
| Innovation Capability | 0.374* | |
| Transformational Leadership | 0.000 | 0.183* |
| Transactional Leadership | 0.012 | 0.056 |

attributes associated with TFL and TSL. Nevertheless, a comparison of effect sizes showed that leadership style contributed more than 30% of GP, which may represent the influence of other types of emerging leadership styles and attributes, such as environmental leadership (Evans et al., 2015) or ethical leadership (Amisano & Anthony, 2017; Saleem, Qadeer, Mahmood, Ariza-Montes, & Han, 2020).

Our second set of hypotheses predicted that leadership style would have a positive impact on IC. We measured the degree of IC that the respondents perceived in their organization, encompassing, for example, the degree to which the organization supported the development of new ideas or information sharing. The results showed that both leadership styles (TFL and TSL) had a significant and positive effect on IC. These findings were not surprising, as leadership behavior is an essential factor in IC (Bel, 2010; Lee & Liu, 2008; Tang & Yeh, 2015). Effect size analyses supported these findings. They align with research that highlights that frugality that prioritizes the rigorous management of financial expenditures and use of resources yields a positive disposition from employees, reinforcing strategic goals of sustainable performance (Velasco Vizcaíno et al., 2021). Nevertheless, organizations should not neglect to enhance creativity in their leaders and promote organizational learning to improve IC. Our third set of hypotheses predicted that IC would mediate the relationship between leadership style and GP. The

findings supported these hypotheses, and when IC was introduced as a mediator between TFL and GP and between TSL and GP, a significant and positive effect was found for GP, indicating full mediation. These findings suggest that organizations can seek to improve IC by encouraging employees' creativity and participation to succeed in GP implantation. This idea is in line previous results (Lukoschek, Gerlach, Stock, & Xin, 2018) that found that leadership behaviors such as fostering idea generation and fostering idea realization can have a huge impact on organizational IC. These findings provided further support for the RBV and NRBV, as organizations can apply their innovative capabilities (intangible recourses) to ensure the advancement of sustainable initiatives such as GP, following the suggestion of Modi and Patel (2013). This is important, as it can advance understanding beyond direct effects, to provide details of how GP efforts take effect and can be sustained. Finally, to establish which leadership style is more effective for improving IC and GP in organizations in the UAE, we compared the effect sizes for the two leadership styles on IC and GP. The findings showed that the overall effect of TFL was more significant for both IC and GP. This is in line with the findings of previous studies (Bass et al., 2003; Choudhary et al., 2013; Mahdinezhad & Suandi, 2013) that have suggested that TFL encourages IC and organizational learning to a greater degree than TSL, thus improving overall organizational performance. Additionally, it was found that TSL has greater significance for IC in particular, which will require additional investigation and cross-checking with demographic factors, such as age, education, sector, and gender. Overall, these findings suggest that leaders who have the skill to motivate their employees and embrace organizational change are more likely to have success in improving IC in their organizations and implementing green initiatives.

### 5.1. Implications for theory

This study has several theoretical implications. To begin with, it is among the first studies to assess the impact of leadership style (TFL and TSL) on GP and evaluate the mediation impact of IC on the relationship between leadership style and GP. Although there is a rich body of literature on leadership style, IC, and GP, research that integrates the three constructs is rare. Second, this study extends the ability to examine possible internal drivers for GP using RBV and NRBV, showing that TFL and TSL may not be crucial resources (Lentjušenkova & Lapina, 2016), as has been suggested in the literature on the implementation of

environmental initiatives (Dubey et al., 2015; Nadeem et al., 2017; Meso & Smith, 2000; Nagel, 2000). Hence, this study complements the growing body of knowledge proposing potential new directions in the study of other leadership styles, such as environmental leadership, ethical leadership, and innovative leadership, in the context of environmental studies and sustainable development. Third, theories such as RBV and NRBV may not be well suited to look at leadership attributes or innovation as an independent resource because resources and skills are currently more dynamic and agile and each resource and leadership attribute must complement the others to ensure success (Lentjušenkova & Lapina, 2016); thus, other RBV extensions, such as resource orchestration theory (ROT), could be better suited to investigate this context in the future (Hitt, Duane Ireland, Sirmon, & Trahms, 2011; Sirmon, Hitt, Ireland, & Gilbert, 2011). Finally, this study concluded that IC, another intangible resource, is able to form positive employee perceptions of organizational initiatives, which could engender better outcomes for environmental initiatives. Thus, our study contributes to the emerging literature on leadership style by advancing the theoretical understanding of IC in relation to GP.

### 5.2. Implications for practice

This study also has several practical implications that stem from the increased global interest in innovation and sustainability from both strategic and operational perspectives. Although this study was conducted in the context of the UAE, its findings and implication can inform practice in many governments and other organizations, including businesses. First, from a strategic view, for organizations that are seeking to increase the implementation of GP, this study suggests a pursuit of innovation and idea-sharing strategies (bottom-up) be followed instead of expecting solutions to come from leadership. Organizations cannot assume that what worked in other contexts will also work for GP. Second, this study finds that the qualities of being open and conducive to learning, that is, where IC is strongly present, are significantly correlated to the implementation of GP in organizations. Hence, organizations should invest in their IC and, specifically, check whether their employees perceive a high degree of innovativeness before implementing any green initiative. Finally, the study proposes not only a combination of leadership skills required for future leaders and managers but also the conditions under which they may lead to superior firm IC and better GP outcome. Hence, our study suggests that other leadership attributes and skills, such as environmental knowledge and attitudes, commitment to change, and innovation management may serve as a guide for human resource and training departments during their career and recruitment planning decisions for future and green projects implementation, ultimately fostering better utilization of IC of the organization.

### 6. Limitations and suggestions for future research

Although this study produced several encouraging results, it is important to recognize that its current findings include limitations that suggest that additional empirical research would be useful. First, this study was constrained by the relatively small size of its sample, at 213 individuals working in dedicated procurement roles in the public sector. Future work that can access a larger sample drawn from both the public

and private sector would be useful as a comparison term. Second, this study only examined TFL, TSL, and IC. It may be profitable to pursue investigation of other variables not included in this study, such as those of organizational culture, ethical leadership, leader–member exchange, pro-environmental behavior, support for innovation, and so on. Future studies should investigate these variables in particular. The third limitation of this study was bound up with the measurement of the four dimensions of TSL, following Dai et al. (2013). In this study, one of four items was removed to improve reliability, but a three-item scale may be considered insufficient to measure TSL in a larger-scale study. Therefore, future research may consider using a different scale for TSL. Finally, this study only measured the perceived degree of the different variables, including the implementation of GP and IC. We thus only know how frequently procurers think they implemented GP but not whether they actually succeeded in doing so. More research that utilizes actual procurement data would illuminate this question, coupled with research which explores multiple stakeholder perceptions.

### 7. Conclusion

Our findings, drawn from a UAE population, indicated that TFL attributes such as a shared vision, communication, setting high performance outlooks, encouraging collaboration amongst employees to realize collective goals, providing appropriate role modeling, stimulating new perspectives and ideas, and improving employees' relationship were not found to be effective for promoting GP. Further, TSL attributes, such as contingent reward behavior, were also not found to be a practical factor for promoting GP. Nevertheless, IC was seen as an effective resource for improving GP in organizations, regardless of leadership style, indicating that there are multiple ways to foster and develop innovative capability. Although studying leadership and innovation for sustainable development has gained momentum in recent years, it requires large-scale practice and innovation in the procurement function to enhance GP. On the innovation side, organizations must focus on promoting innovation in all levels of the organization and creating an innovation system where ideas are cherished and properly investigated and utilized. Similarly, with respect to leadership, organizations should focus on allowing managers and leaders to practice their leadership duties freely to develop their technical and relational knowledge to make proper GP decisions. Both public and private organizations can get the most out of leaders' skills and IC to achieve higher environmental performance. Given the significance of GP in the service of sustainability, such factors are too critical to ignore.

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### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. Construct measurement instrument

| Construct | Source | Measures | |
|---|---|---|---|
| Green procurement | Hasselbalch et al. (2014) 10 items | GR1 | My firm is practicing GP now |
| | | GR2 | My firm should be practicing more GP (–) |
| | | GR3 | My firm has a clear strategy on GP. |
| | | GR4 | Our procurement handbook contains a GP section |

*(continued )*

| Construct | Source | Measures | |
|-----------|--------|----------|--|
| | | GR5 | Our contracts consist of GP criteria |
| | | GR6 | Lifecycle costing is used in the GP evaluation |
| | | GR7 | GP means costly procurement (–) |
| | | GR8 | My firm is ready to pay more to carry out GP |
| | | GR9 | Implementing GP will harm the relationship with suppliers (–) |
| | | GR10 | My firm validates suppliers' reports on GP compliance. |
| Innovation capability | Kumar and Rose (2010) 5 items | IN1 | My firm has generated many innovative and valuable ideas |
| | | IN2 | My firm promotes an environment that is encouraging our capability to create innovative and valuable ideas |
| | | IN3 | My firm devotes a lot of time in creating innovative and valuable ideas |
| | | IN4 | My firm believes creating innovative and valuable ideas as being essential activities |
| | | IN5 | My firm actively generates innovative and valuable ideas |
| Transformational Leadership | Carless et al. (2000) 7 items | TF1 | My manager conveys a clear and positive vision of the future |
| | | TF2 | My manager regards employees as individuals, encourages and support their growth |
| | | TF3 | My manager gives support and acknowledgment to employees |
| | | TF4 | My manager nurtures participation, trust, and collaboration among team members |
| | | TF5 | My manager urges us to think about challenges in new ways and questions assumptions |
| | | TF6 | My manager is clear about his/her values and practices what is preached |
| | | TF7 | My manager inspires pride and respect in others and motivates us by being extremely competent |
| Transactional Leadership | Dai et al. (2013) 4 items | TS1 | My manager reprimands me, when I'm not capable of completing my work |
| | | TS2 | My manager precisely records all my mistakes |
| | | TS3 | My manager provides me what I want to exchange for my hard work |
| | | TS4 | My manager informs me that I can get exceptional rewards when I show good work performance |

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