

Chapter 9

THE DESIRABILITY AND FEASIBILITY OF DEVELOPING A SUSTAINABILITY INDEX FOR PUBLIC PROCUREMENT¹

Edward Schwerin, Eric Prier and Clifford McCue

I. INTRODUCTION

While interdisciplinary scholarship traditionally ignored the purchasing function (MacManus, 1992), scholars have come to recognize the importance of procurement as a strategic partner in establishing government policy (Tsai, 2017; D'Hollander & Axel, 2014). Nonetheless, the roles and responsibilities of public procurement practitioners are generally unknown, and when scholars take notice of procurement issues, their studies tend to focus on the private sector (Strupler & Wolter, 2017). However, there tend to be stark differences between organizational objectives in the public and private sectors (Johnson, et. al. 2003, Alford & Greve, 2017). For instance, the public sector is more likely to be concerned with issues such as equity and environmental justice while the private sector would tend to focus more on profitability and existing supply chain compatibilities, even when companies include corporate social responsibility as a part of their strategic agenda (for instance, see Vachon & Klassen, 2007). Given this situation, it is reasonable to expect differences not only in how these two sectors of the economy operate, but also, in the ways in which procurement practitioners think about what their respective organizations are doing - the priorities they have, the benefits to capture, and the ways in which they view their roles in carrying out their organizational objectives (Lundberg, Marklund, & Stromback, 2015; Steinfeld, McCue & Prier, 2016).

One increasingly important area where these differences might be observed is in sustainable public procurement (SPP) - especially how practitioners view its benefits, drivers, and resources. Considering these issues in SPP requires that in addition to up-front procurement

costs, government authorities must also consider environmental and social elements when procuring goods, services or works (Grandia, Steijn, & Kuipers, 2015). Further, successful SPP must be integrated throughout the entirety of the supply chain, and evaluation of all goods and services should consider the entire life-cycle costs of procured goods (Tsai, 2017). Indeed, studies of profit-driven organizations have examined sustainable purchasing in terms of management support, expected costs, standards and regulations, among other things (for example, see Berns et al., 2009; Giunipero, Hooker, & Denslow, 2012; and Nidumolu, Prahalad, & Rangaswami, 2009). For the public sector, studies tend to focus on describing the role of practitioners in sustainable development (e.g. Walker & Brammer, 2009; Thomas & Jackson, 2007; Swanson et al., 2005; Preuss, 2009), ranging from creating a city sustainability index (SI) that measures the social, economic and environmental aspects of cities relative to their overall sustainability efforts (Mori & Christodouloub, 2012), to the impact of sustainability on supplier relations management (Gelderman, Semeijn, & Bouma, 2015).

Although there is growing awareness that sustainability should be a critical component of corporate social responsibility, there remain significant challenges to sustainability in terms of how organizations procure their goods and services, and this may be more problematic in the public sector than the private sector due to the potential for governments choosing private provider "winners" in the market. This, however, has not been a concern in the private sector since recently, a number of these organizations have developed their own sustainability index, such as the Walmart Sustainability Index, the Dow Jones Sustainability Index, and the STOXX Sustainability index. Although there are many reasons for developing a sustainability index (SI), perhaps a major driver of an SI is the ability of suppliers and buyers to benchmark their own sustainability practices and identify key areas for improvement that can better promote sustainable practices.

For example, the Charter Institute of Purchasing and Supply, one of the world's largest professional associations dedicated to purchasing and supply management, recently developed an SI. The purpose of this sustainability index (CIPS-SI) was to create a consistent sustainability measurement to support purchasing, which in turn can create significant time and cost savings for both the supplier and buyer. From the standpoint of the supplier, having a central

mechanism that can be used to capture how sustainable a firm is (as well as its supply base), and not having to reproduce the data every time they submit a bid or proposal, can be an effective cost reduction strategy. Consider that according to a recent National Institute of Governmental Procurement White Paper (2014), firms often avoid submitting bids or proposals because of the complexity associated with the public sector procurement process. Specifically, the White Paper suggests that developing standards that can be used across governments could provide a mechanism to secure more responses, and thus generate additional benefits for the government.

From the perspective of the buyer (government), an SI could potentially shoulder the burden of having a consistent benchmark to compare one firm against another firm when evaluating tenders. That is, if an SI is developed that can capture the economic, environmental and social dimensions of sustainability, and this index is properly vetted, then buyers would no longer struggle with defining sustainability for each purchase. Say for example, a government wants to include a "living wage" component into its tendering requirements. Typically, this would be identified in the scope of work statement, and suppliers would have to address each component of the requirement. However, if there was a mechanism that could capture how firms accomplish living wages as part of an SI, then the buyer would only have to examine the SI to determine if the supplier satisfies that requirement. Although this would seem like a relatively straightforward approach to reducing the costs associated with demonstrating sustainability in each purchase, a number of issues associated with creating and utilizing a generalized index remain.

The purpose of this study is to identify public sector procurement practitioner's beliefs and attitudes towards SPP and weigh the merits of developing a sustainability index in the public sector. It is anticipated that an SI could potentially address some of their primary concerns expressed for why governments either actively engage in SPP, or why they do not. The article starts off by examining government's role in promoting sustainability, specifically from the vantage point of fiscal policy and its link to sustainability. Once government's central role in promoting sustainability is presented, the next section examines purchasing's role in securing sustainable goods and services, looking specifically at how purchasing becomes a vehicle to promote sustainability. This is followed by a discussion of the methods used, the

data collected, and the limitations associated with the design employed herein. The final section discusses the findings in the context of developing a public procurement sustainability index (PPSI), and the likelihood that a PPSI can be developed in the near term.

II. SUSTAINABILITY AND THE ROLE OF GOVERNMENT

The Brundtland Report (UN, 1987) finds that there is growing awareness that many environmental problems have a local origin, and that governments play a key role in promoting sustainability. Governments across the globe continue to promote sustainability (including environmental, economic, and social sustainability) either through external drivers such as using government's regulatory powers, or internally by how government uses its fiscal policy in terms of sustainability. According to the OECD (2015), governments across the globe spend between 5% and 50% of their domestic GDP through government procurement processes. In the U.S., approximately 15 - 20% of the nation's GDP is spent on goods and services by government (Steinfeld, McCue & Prier, 2016), while in the European Union government spend accounts for approximately 15% of GDP (European Commission, 2017). Obviously, the sheer size of government's spending power can be a major driver of sustainability. From a fiscal policy perspective, governments can either spend more on certain types of goods and services that promote sustainability (demand-side economics), or reduce taxes for businesses that meet some sustainable criteria (supply-side economics), or, as has been witnessed since the Brundtland Report, government can do neither or both.

Demand-side economists suggest that targeted spending is, ultimately more effective than tax cuts when promoting sustainability (Nidumolu, Prahalad, & Rangaswami, 2009). Since government influences sustainability by its spending decisions, the procurement process becomes the linchpin to accomplish those goals. According to Gelderman, Semeijn, and Bouma (2015, 67), "little is known about the way local government utilizes the procurement function to promote sustainability," and they posit that public procurement could have a substantial impact on promoting sustainability, given the sheer size of the public spend. Gelderman, Semeijn, and Bouma, further contend that public procurement should use its resources for sustainable development, and that despite the standing of the public sector and

public procurement, few studies have examined the role of local governments in promoting sustainable purchasing practices.

In order for public procurement to be considered sustainable it must specifically identify requirements, specifications and criteria that promote protecting the environment, supporting economic development, social justice concerns, such as minority participation, and social equity (Schwerin & Prier, 2013; also see Brammer & Walker, 2011). Commonly these three pillars associated with sustainable purchasing are also known as the "triple bottom line." Adopting sustainable principles, the public sector can signal industry that their current practices need to be modified, and the public sector can provide incentives to the manufacturing industry that use sustainable technologies and to encourage sustainable patterns of behavior.

Often, terms like "green growth", "environmentally preferable purchasing", "green public purchasing", and "sustainable public procurement" are used interchangeably, and that is done here also. Public procurement is defined as the "designated legal authority to advise, plan, obtain, deliver, and evaluate a government's expenditures on goods and services that are used to fulfill stated objectives, obligations, and activities in pursuit of desired policy outcomes" (Prier & McCue, 2009; also see Thai, 2002). This definition suggests that public procurement practitioners play a critical role identifying how governments sustainably allocate scarce resources in a just and equitable manner. Furthermore, although we agree with Green, Keller, and Wamsley (1993) that in terms of public procurement, what its practitioners do, and why, requires an understanding of its basis in fact and in law, we contend that an understanding of practitioner's motivations - how they understand what it is that they are doing or not doing is also important. This article helps to shed light on this critical link.

According to Prier and McCue (2009), there are three interrelated dimensions that public procurement practitioners must recognize including 1) the legal basis for practitioners' activities in discharging their responsibilities; 2) the organizational and structural boundaries of operative activities; and 3) the functional activities and intended outcomes of the practices used in the pursuit of governmental obligations. While the legal authority provides the basis for action of government, it also can prescribe specific procedures in how to do things or how to set up the institutions involved in sustainable

procurement. The organizational dimension connects and structures the authoritative basis for pursuing any sustainable procurement action by aligning the purposeful activities and the choices practitioners make in a specific context. The functional sustainable procurement activities consist of the practices used to fulfill governmental obligations, and this whole process operates within a particularized institutional environment.

Prier & McCue (2009) find that practitioners confront various decision criteria, and their decisions generate outputs that are thought to produce desired effects or consequences of government policy. Rules, regulations, and operating procedures are developed to ensure that best value for money is achieved by establishing fair and open competition. In essence, use of best practices legitimizes standardized procedures that can be helpful in aligning procurement practices in both public and private sectors. Furthermore, within these boundaries, the way public procurement practitioners think of sustainability issues in terms of their jobs becomes relevant in shaping the knowledge necessary to successfully discharge their duties in more sustainable ways.

There are at least three important reasons to pay attention to the link between practitioners' beliefs and attitudes about sustainability and their actions supporting SPP. The first is that public procurement can dominate national (and possibly international) markets due to the sheer size of government spend. As noted previously, public procurement often constitutes a large share of the economy and in general, and there is an inverse relationship of economy size (and thus level of economic development) with public procurement spend- the less developed a nation's economy, the greater the share of the economy devoted toward public procurement, and in some cases, this can easily exceed 50 percent of GDP (see ADB, 2011; Eurodad, 2009; IISD, 2007; and UNDP, 2010). Hence given the amount of money spent by government procurement practitioners (in both GDP percentage terms and in absolute monetary terms), and the reach of their dictates as measured by the wide variety of goods and services procured in the public space, the importance of public procurement is hard to dismiss (Preuss, 2009).

A second reason to pay attention to the area of sustainability in public sector purchasing is the potential for cost savings. Although many practitioners believe that green products cost more, they can

often cost the same or less (Tsai, 2017). For instance, recycled paper products typically match conventional paper in quality and costs. Moreover, there is mounting evidence that at least for some products, overall life-cycle costs for sustainable products can be less than those unsustainable items purchased when they were the cheapest option at the time of acquisition (Tsai, 2017). This is because the sustainable option can result in lower operating costs that can include maintenance and disposal costs (see Pricewaterhouse- Coopers, Significant & Ecofys, 2009).

A third reason why practitioners' attitudes toward sustainable public procurement and their decisions are important derives from the fact that their spend decisions are likely to be market drivers and thus create positive (or negative) ripple effects throughout society, not only in the areas of the environment, but also in social policy areas such as economic development, etc. (see Preuss, 2009; also see Schwerin & Prier, 2013). Performing as a catalyst in the market and leading by example, stakeholders of all kinds can become more aware of potential environmental and social impacts of utilizing sustainable products and services (Kjollerstrom, 2008). Indeed, substantial spillover effects have been seen in the U.S. in the past. For example, the shift to compliance with 'Energy star' standards for the majority of IT equipment on the market was a direct result of a decision by the U.S. Federal government to purchase only 'Energy star'-compliant IT equipment (Bosch, Kemperman, & Raes, 2012).

Through sustainable procurement, both public and private organizations can use their buying power to drive the market in favor of sustainability and base their choice of goods and services on 1) economic consideration such as best value for money; 2) environmental aspects such as the impacts on the environment that the product and/or service has over its whole life-cycle; as well as 3) social aspects, i.e., effects of procurement on societal issues such as poverty eradication, equity in the distribution of resources, labor conditions, and human rights (McCrudden, 2004). Given the importance of this issue, scholars have begun to investigate sustainability in public procurement within and across governments (for example, see especially Walker & Brammer, 2012; also see Bratt, et al., 2013; Goswami, Meher Diljun, & Srivastava, 2013; Lehtinen, 2013; Morgan & Sonnino, 2007; Preuss, 2009; Schwerin & Prier, 2013; Thomas & Jackson, 2007; Swanson et al., 2005; Walker &

Brammer, 2009a and 2009b; Walker & Preuss, 2008; and Warner & Ryall, 2001).

Having laid the case for sustainable public procurement, one may rightfully wonder: why aren't all goods and services procured in a sustainable way? One answer is because public procurement is conducted within a complex, nested environment, and this setting is replete with multiple stakeholders who often have conflicting goals (McCue & Prier, 2008; also see Loader, 2007). On top of competing interests is a significant chain of agency that promotes divided loyalties. This situation can make it difficult to hold individual actors accountable for their actions, even though procurement procedures are subject to transparent public scrutiny by citizens and taxpayers (Walker & Brammer, 2009a). In turn, numerous challenges remain to successful implementation of SPP, and these include the lack of tangible incentives and political support; the perception that green products cost more; the lack of legal expertise in applying environmental criteria; the lack of training, appropriate tools, and information; a dearth of cooperation between authorities and upper management; and limited established environmental criteria for products/services (Schwerin & Prier, 2013).

While the literature on the three pillars of sustainability have applications across different cultures, organizations, and circumstances, sustainable public procurement (SPP) as an investment process has historically revealed that environmental and social issues are typically treated as peripheral concerns for conducting operational spend in both the public and private sectors. Often sustainability management - whether in the environmental or social arena - has been framed as adding costs and as such, if sustainable purchasing happens at all, it may be thought to probably be driven primarily by guilt or regulation. But is this the case? Since there is little empirical research that directly investigates the importance that all three sustainability criteria may have on a public organization's procurement decisions, this study addresses this shortcoming in the literature.

III. PUBLIC PROCUREMENT SUSTAINABILITY INDEX

A sustainability index is an integrated or composite measure whose configuration utilizes a three-domain framework for choosing appropriate sustainability indicators. Anchored in the triple bottom line

framework of environmental, social, and economic pillars discussed herein, most sustainability "indexes" are, technically speaking, more commensurate with scales (see Scerri & James, 2010 for some common problems associated with developing single quantitative measures of sustainability). Nonetheless for the purposes examined herein, a sustainability index is a composite evaluation that summarizes the triple bottom line (TBL) component measures for the purpose of predicting SPP performance. Thus a good sustainability index provides a consistent and reliable framework to guide sustainable decision-making toward desired outcomes concerning issues dealing with the environment; social impacts; and economic well-being.

There are several exceptionally technical steps to constructing a proper sustainability index which include 1) deciding how broadly or specifically the appropriate criteria will be measured; 2) selecting the valid items that will be used; 3) identifying the variance of the item selection so that they reflect the range of desired predictive outcomes with respect to the associated pillars; and 4) maintaining unidimensional consistency - both within and across the three pillars. While it is generally true that the items should be strongly related to one another within each pillar, there is often multivariate overlap with other pillars and this common variance needs to be understood and validated. Moreover, the scoring method of integration and how it contributes to the final index score matters. Index scoring refers to the process of combining the index items into a single score, and how items and the three pillars are weighted can greatly affect total index scores. Then there are numerous problems associated with index item analysis and questions surrounding validation. Both of these exhibit difficulties - especially across three pillars.

Item analysis refers to how well each data point indicant that is used to construct the sustainability index both properly measures and then helps predict pillar and individual entity outcomes from the distinctive items used to compose the index. In addition, assessing the index is ideally done through external validation. At the index score level, this process would evaluate the linkages between the total index scores and how well the index score predicts "sustainable" organization behavior. However, external validation is always a *post hoc* process - one in which the parameter prediction value of the index can be estimated only after it has been constructed, utilized and then

measured against sustainability performance across a number of agencies of private firms.

The technical aspects described here point to a remarkably elaborate process associated with the proper development, testing, revision, and deployment of a sustainability index that entails tremendous sunk costs that may not be recoverable by those who would develop such an index nor by participating firms themselves. Moreover, there are surely strong free-rider incentives for firms who would consider committing to either developing and/or utilizing an SI, especially one whose verifiability and reliability are neither established nor known *ex ante*. Consider the time and expense of participating firms to locate and provide the required evidence and documentation of data provision for each index item that is required to fulfill all four practical steps previously outlined. Surely there are substantial sunk costs that minimize voluntary firm participation. What is more, the costs are likely contingent on firm size - the smaller the firm, the higher the unit costs of validation and continued participation. For all of these reasons, proper development and voluntary utilization of an SI is fraught with challenges.

IV. RESEARCH QUESTION AND METHODOLOGY

The goal of this study is to explore the state of sustainable public procurement (SPP) in the U.S. public sector to identify governmental sustainable purchasing practices and the value of development and utilization of a sustainability index to facilitate adopting SPP practices. To accomplish this, a survey instrument baselined and mapped some behavioral and attitudinal patterns of sustainability conditions across government work settings and practitioners themselves. The exploratory design of the research is intended to gain a better understanding of the state of government purchasing covering sustainability concerns and issues. Based on quantitative data from different levels of governments, the units of analyses are the procurement agency and/or the practitioner within the agency who was the respondent to a 2012² survey gathered from the National Institute of Governmental Procurement (NIGP), a member driven professional association with more than 16,000 members across the U.S. and Canada. An email was sent to the NIGP members on June 29th and again on July 9th informing them of the survey issuance. The survey was administered online using surveymonkey.com.

A total of 2,280 procurement practitioners were invited to participate in the survey. Out of those contacted, 340 (15%) completed the survey by the closing date, and after appropriate data-cleaning, there remained 337 usable responses. For some questions, respondents were provided open-ended response categories to qualify and provide more detailed answers than the close-ended options available. Consistent with most exploratory designs there are several challenges to using a sample pool based upon organizational affiliation, not least among them is the external validity or generalizability of the findings. Determination of the population of the study is difficult because no list of all procurement practitioners exists - let alone their characteristics, entity or agency affiliations, etc. Thus, a major assumption of the data is that they are comprised of appropriate cases of agencies and their respondents who are most likely to be knowledgeable of the facts and specifics concerning each question. A counterfactual assumption is that the average agency-respondents - when clustered into groups - typically reflect those who were excluded. Preliminary agency-respondent examination reveals a diverse range and representation of NIGP's membership across different levels, types, and size of governments and organizational architectures (as well as respondent job position), so the relative confidence of generalizing the results to other government agency settings - although it invites caution - also sufficiently contributes to knowledge to warrant scholarly consideration.

When appropriate, preliminary checks of variable distributions were made against those agency-respondents who were excluded from the analysis, and there did not appear to be any systematic bias between those who were included or excluded, and although there is no good way to deal with the issues associated with missing data, this has been adequately discussed elsewhere (see Tabachnick & Fidell, 2013, 62-72; also see Cohen & Cohen, 1975; and Rummel, 1970). It was elected to rely on the data available as opposed to imputing and extrapolating data that was not obtained, either through the intentional withholding of the data or due to other reasons for its absence. Hence the resulting analysis and findings rest upon firmer ground for the exploratory purposes herein.

The data analysis package used in this study was SPSS Version 23. Since there are statistics reported on unconditional responses and other statistics that are contingent upon other variables in order to

evaluate sustainability issues in the public sector, the number of respondents may vary across tables and tested hypotheses. Table 1 provides information on the characteristics of governments and the procurement positions that the agency-respondents held at the time of gathering the data.

Table 1 reports the distribution of agency-respondents by their respective job positions and four levels of government.³ Columns 1 through 3 in the table are non-managerial respondents while columns 4 and 5 are comprised of managerial job positions. From a total of 335 usable respondents, 69.8% (N=234) of the procurement positions are management while 31.2% (N=101) are either agent; buyer/specialist; or staff/other. Moreover, while the modal government type is the city/municipal category (32.2%; N=108), there is good variation across the four levels of government which enhances the robustness of any

TABLE 1
Agency-Respondents by Job Position and Level of Government

Level of Government	Job Position					Total
	(1)	(2)	(3)	(4)	(5)	
	Clerical/ Staff/Other	Buyer/ Contracting Specialist	Purchasing Agent	Purchasing Manager	CPO / Dir. Purchasing	
Ed. or Sp. District ^a	9.1% (9)	8.1% (8)	7.1% (7)	34.3% (34)	41.4% (41)	29.6% (99)
City ^b	8.3 (9)	13.0 (14)	18.5 (20)	33.3 (36)	26.9 (29)	32.2% (108)
County/ Regional	4.2 (3)	4.2 (3)	13.9 (10)	34.7 (25)	43.1 (31)	21.5% (72)
State/ Provincial ^c	7.1 (4)	21.4 (12)	3.6 (2)	37.5 (21)	30.4 (17)	16.7% (56)
Total	7.5% (25)	11.0% (37)	11.6% (39)	34.6% (116)	35.2% (118)	100% (335)

Notes: ^aThis category includes “other” throughout the analysis (N=5).

^bThis category includes towns, townships, and village throughout the analysis (N=3).

^cThis category includes “Federal agency” throughout the analysis (N=1).

conclusions. The distribution of respondents reflects other scholarship on public practitioners (for example, see Steinfeld, McCue & Prier, 2016).

To better understand respondents' working environments, Table 2 reports the distribution of the government levels broken down by the three types of procurement agency architectures under which the practitioners in this survey work. Data in the table shows that the largest group of practitioners operates under a centralized with delegated authority procurement system, and this is consistent with previous surveys of the NIGP membership (see Prier & McCue, 2014). The smallest group conducts procurement within a purely centralized regime, while a mix of decentralized with central review and centralized contracting with decentralized buying off established contracts comprises one-quarter of respondents.

TABLE 2
Agency-Respondents by Job Position and Level of Government

Level of Government	Agency Architecture			Total
	(1)	(2)	(3)	
	Decentralized (totally or with central review)	Centralized (with delegated authority)	Centralized (totally)	
Ed. or Sp. District ^a	17.3% (17)	67.3% (66)	15.3% (15)	29.3% (98)
City	34.3 (37)	61.1 (66)	4.6 (5)	32.3% (108)
County/ Regional	23.9 (17)	63.4 (45)	12.7 (9)	21.3% (71)
State/ Provincial	24.6 (14)	64.9 (37)	10.5 (6)	17.1% (57)
Total	25.4% (85)	64.1% (214)	10.5% (35)	100.0% (334)

V. FINDINGS

Since the analysis is focused on identifying governmental sustainable purchasing practices and the perceived value of development and utilization of a sustainability index, it is important to know the status of governments' strategic plans and policies for SPP, and these results are reported in Table 3. Not shown in the table is the fact that 7.0% (N=23) of respondents did not know the status of their agency's SPP plan or policy. Nonetheless, it is clear that there is wide

variation in the status of plans and policies across governments. As reported in columns 2 and 3, 65.1% of governments at all four levels have at least considered the strategic value of SPP plans in their procurement policies - whether they are in the development stage or already have a working plan in place. Moreover, having a procurement agency's SPP plan or policy is associated with government in the following way: the more diverse or higher the level of government, the more likely that a plan has already been adopted and in place and conversely, more specialized or lower level governments are associated with a higher likelihood of not having a plan, and this can be most easily seen in column 1 that reports that while four in ten (40.9%) of the lowest level of governments (education or special district) have no plan, only one in four (23.4%) of states lack a strategic SPP plan or policy.⁴

However, all may not appear to be rosy, because additional data suggests that on several fronts, practitioners in the public arena appear to have some difficulties in thinking about how to engage in SPP. For instance, consider the data in Table 4 that reports the knowledge about four instruments that are currently used to satisfy procurement SPP criteria broken out by job position. Since SPP engagement tends to reflect an organizationally strategic orientation, it is plausible to hypothesize that higher or more advanced job positions are associated with more familiarity of instruments that might be used to incorporate SPP criteria into procurement practices, yet the data revealed in Table 4 hint that this may not be the case.

TABLE 3
Agency Status of Strategic SPP Plan/Policy by Level of Government

Level of Government	Agency Status of Strategic SPP Plan/Policy			Total
	(1)	(2)	(3)	
	No Plan	Informal/Developing	Have Plan	
Education or Sp. District ^a	40.9% (36)	38.6% (34)	20.5% (18)	28.9% (88)
City	34.0 (34)	38.0 (38)	28.0 (28)	32.9% (100)
County/Regional	36.2 (25)	34.8 (24)	29.0 (20)	22.7% (69)
State/Provincial	23.4 (11)	38.3 (18)	38.3 (18)	15.5% (47)
Total	34.9% (106)	37.5% (114)	27.6% (84)	100.0% (304)

To begin, Table 4 provides the percentage of respondents who 'Don't know' whether a particular identified instrument is incorporated into SPP practices, and for 3 of the four SPP mechanisms, there is interesting variation across job positions. For instance, just looking at the total column on the right, one can see that one in five (19.1%)

TABLE 4
Instrumental Methods of SPP Criteria Incorporated into
Procurement Practices by Job Position

Instru- ments Used	Job Position					Total
	Clerical/ Staff/ Other	Buyer/ Contracting Specialist	Purchasing Agent	Purchasing Manager	CPO / Dir. Purchasing	
Financial/Contractual ^a						
No	22.7% (5)	12.5% (4)	24.3% (9)	30.8% (32)	24.8% (27)	25.3% (77)
Don't Know	22.7 (5)	21.9 (7)	32.4 (12)	14.4 (15)	17.4% (19)	19.1% (58)
Yes	54.5 (12)	65.6 (21)	43.2 (16)	54.8 (57)	57.8% (63)	55.6% (169)
Total	7.2% (22)	10.5% (32)	12.2% (37)	34.2% (104)	35.9% (109)	100.0% (304)
Regulations ^b						
No	31.8% (7)	15.6% (5)	29.7% (11)	32.7% (34)	25.2% (27)	27.8% (84)
Don't Know	27.3 (6)	25.0 (8)	40.5 (15)	17.3 (18)	20.6 (22)	22.8 (69)
Yes	40.9 (9)	59.4 (19)	29.7 (11)	50.0 (52)	54.2 (58)	49.3% (149)
Total	7.3% (22)	10.6% (32)	12.3% (37)	34.4% (104)	34.5% (107)	100.0% (302)
Communication/Information ^c						
No	9.1% (2)	6.3% (2)	15.8% (6)	21.7% (23)	6.3% (7)	12.9% (4)
Don't Know	27.3 (6)	15.6 (5)	28.9 (11)	11.3 (12)	17.1 (19)	17.2% (53)
Yes	63.6 (14)	78.1 (25)	55.3 (21)	67.0 (71)	76.6 (85)	69.9% (216)
Total	7.1% (22)	10.4% (32)	12.3% (38)	34.3% (106)	35.9% (111)	100.0% (309)
Education/Training ^d						
No	40.9% (9)	33.3% (11)	24.3% (9)	32.1% (34)	33.3% (37)	32.4% (100)
Don't Know	13.6 (3)	15.2 (5)	24.3 (9)	5.7 (6)	8.1 (9)	10.4 (32)
Yes	45.5 (10)	51.5 (17)	51.4 (19)	62.3 (66)	58.6 (65)	57.3 (177)
Total	7.1% (22)	10.70% (33)	12.2% (37)	34.3% (106)	35.9% (111)	100.0% (309)

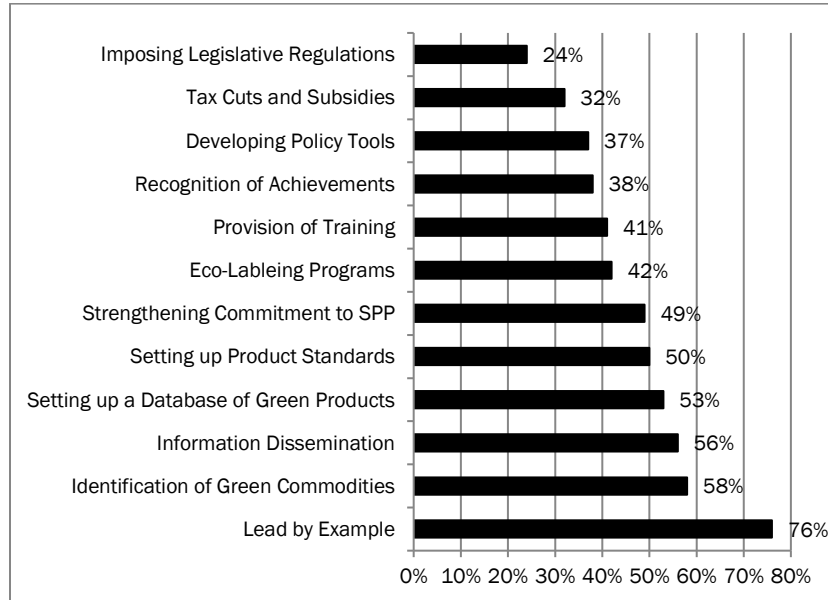
Notes: ^a p=.977; ^b p=.349; ^c p=.086; ^d p=.448.

practitioners is unaware if financial or contractual tools are used to incorporate SPP criteria into procurement practices. And while only one in ten respondents (10.4%) don't know about the status of education and training, one in four (24.3%) purchasing agents doesn't know about the incorporation of this instrument in SPP practices, and this approaches statistical significance at the $p = .086$ level. Nonetheless, majorities of respondents report that they use three of these SPP methods while nearly half (49.3%) use the fourth (regulations). While remaining cautious about the data, two things become clear from the table: 1) communication and information - something which tends to be an informal mechanism to incorporate SPP criteria into these procurement job practices - are the operational modality (69.9%) compared to using the other three instruments; and 2) of the four potential tools, formal governmental regulations are by a slight margin the least likely instrument to be used to incorporate SPP criteria into procurement practices across the different jobs.

The discussion to this point has examined the variation in sustainable purchasing practices across governments and job positions, and for the purposes of this paper, what remains to be investigated is the extent to which public practitioners look at adoption of SPP as a potential public policy tool. To assess this research question, practitioners were asked about the roles that government should play for SPP, and their answers are summarized in Figure 1.

What stands out in the figure is that three in four practitioners (76%) believe that government should lead by example - presumably to promote SPP. What is more, numerous cross-tabulations were conducted to see if there were differences across the twelve roles based on job positions or gender, and while there was no relationship to the role government should play in SPP based on job position, only two roles were found to be contingent on gender at the traditional $p = .05$ level (information dissemination $\chi^2 = 6.989$, $df = 1$, $p = .008$; and setting up product standards $\chi^2 = 4.761$, $df = 1$, $p = .029$). Although not directly related to the purpose of this study, further research could examine the role gender plays in promoting sustainable practices. Potentially, one might find that females are more likely to support a bigger role of government in sustainable practices, which may stem from the fact that women business owners maintain a protected status in many state and local government procurement policies.

FIGURE 1
Roles Government Should Play in Promoting, Guiding and Encouraging SPP (Total Respondents = 272)



To baseline practitioners' attitudes toward SPP, respondents were asked about some perceived benefits from sustainable public procurement along the three pillars comprising the triple bottom line. The pattern of responses indicates that 72% (N=203) of respondents believe sustainable purchasing practices often or always contribute a perceived benefit to the environmental pillar. Moreover, the social pillar is often or always perceived to benefit from SPP by 57.1% (N=160) of the respondents while only one-third (N=92) of respondents say SPP promotes financial benefits.

Evaluating the state of SPP in the U.S. also included exploring the kinds of resources that might help to implement SPP practices and policies, and results are reported in Table 5 in declining frequency of being selected. The top five resource choices are located at the top of the table. Overall, the results suggest that while green products are currently over-priced relative to more traditional products in the view of six in ten respondents, a sustainability index enabling buyers and

suppliers to obtain a cost-effective score for performance along the TBL would be a helpful resource for about half of the respondents. In addition, the desire for a sustainability index is buttressed by the current lack of knowledge and good information on performance, costs, impacts, and conservation principles suggested by the other resources listed at the top portion of Table 5.

A final step in assessing the state of SPP involved conducting a series of 52 separate cross tabulations that examined four factors (level of government; job position; procurement organizational

TABLE 5
Perceived Helpful Resources to Implement SPP Practices and Policies

Resources	Percent Selecting (Ns)
More competitive pricing for green products	59.6% (201)
A Sustainability Index that would enable buyers and suppliers to obtain a cost-effective score	49.6 (167) ^{abc}
More information on performance and cost of products	48.1 (162)
Better information on environmental impacts of products	42.7 (144)
New skills or knowledge for employees on principles of energy conservation, waste minimization	40.7 (137)
Information about specific actions to take	35.6 (120)
Better selection of green products	33.8 (114)
Codes/standards, legislation	30.9 (104)
Technical support (i.e. training and online Q&A)	23.7 (80) ^e
Government leadership	20.2 (68)
Free samples from manufacturers	18.7 (63)
Information technology	14.8 (50)
Recommendations from colleagues	13.1 (44) ^d
Other	5 (14)
None	4 (10)
Total Respondents	100% (274)

Notes: ^a Significant differences across level of government ($\chi^2=9.692$, df 3, $p=.021$).

^b Significant differences across job position ($\chi^2=15.017$, df 4, $p=.005$).

^c Significant differences across procurement agency architecture ($\chi^2=11.274$, df 2, $p=.004$).

^d Significant differences across level of government ($\chi^2=9.711$, df 3, $p=.021$).

^e Significant differences across job position ($\chi^2=11.075$, df 4, $p=.026$).

architecture; and gender) on the thirteen potential resources that might help to implement SPP practices and policies identified in Table 5. The data reveal that only two resources (technical support and recommendations from colleagues) were found to be statistically significant with one of the four factors (job position and level of government, respectively). However, a sustainability index was statistically associated with level of government; job position; and organizational architecture, and these results are summarized in Table 6 to clarify these relationships.

There are at least three striking features of the data in Table 6. First, it is clear that while slight majorities of the three lower levels of government think a sustainability index (SI) would be helpful, more than two-thirds of respondents working in state governments – those

TABLE 6
Desiring a Sustainability Index by Government, Agency, and Job Position

	Choosing a Sustainability Index		Total
	No	Yes	
Level of Government			
Education or Special District	43.4% (43)	56.6% (56)	29.5% (99)
City/Municipal	49.1 (53)	50.9 (55)	32.1% (108)
County/Regional	47.2 (34)	52.8 (38)	21.4% (72)
State/Provincial	68.4 (39)	31.6 (18)	17.0% (57)
Total	50.3% (169)	49.7% (167)	100.0% (336)
Procurement Agency Architecture			
Decentralized (total or with central review)	64.7% (55)	35.3% (30)	25.4% (85)
Centralized (with delegated authority)	43.5 (93)	56.5 (121)	64.1% (214)
Centralized (totally)	54.3 (19)	45.7 (16)	10.5% (35)
Total	50.0% (167)	50.0% (167)	100.0% (334)
Job Position			
Clerical Staff/Other	80.0% (20)	20.0% (5)	7.5% (25)
Buyer/Contracting Specialist	54.1 (20)	45.9 (17)	11.0% (37)
Purchasing Agent	61.5 (24)	38.5 (15)	11.6% (39)
Purchasing Manager	47.4 (55)	52.6 (61)	34.6% (116)
CPO/Purchasing Director	41.5 (49)	58.5 (69)	35.2% (118)
Total	50.1% (168)	49.9% (167)	100.0% (335)

governments with the broadest reach - believe that an SI would not be beneficial. Although it is only speculative at this point, it could be that the reach of government or the sheer expansion of the pool of vendors at the state level (compared to the lower governments) might be at the heart of the differences exhibited here. In other words, a more expansive pool of suppliers raises the transaction costs of index adoption. Or, perhaps, state procurement professionals believe an SI would not be beneficial because generally sustainable procurement practices are not on the political agenda of most state government legislatures (see for example, Ruhl, 1999).

A second highlight of the data in Table 6 is that respondents working within a centralized with delegated authority procurement agency architecture are the only group that comprise a majority favoring utilization of an SI. Although one might think that this might be due to the variation in governments that use the varying architectures, this is doubtful because the four levels of government are nearly uniform in their likelihoods of utilizing a centralized with delegated authority procurement structure (see Table 2).

A third point that is emphasized by the data is probably the most substantive, and that is the unmistakable pattern in choosing a sustainability index to help implement SPP practices and policies based on job position: the higher the job position one holds, the more favorable a respondent is toward desiring an SI. Consider that while only 20% of clerical staff thought that an index might be helpful, fully 58.5% of CPO or Purchasing Directors think it would be useful.

VI. DISCUSSION AND CONCLUSIONS

The analysis to this point has produced at least seven findings. First, although there is wide variation in the status of SPP strategic plans and policies across governments, it is evident that two-thirds of governments have at least considered the strategic value of SPP plans in their procurement policies, and the broader the reach and the more diverse goods and services offered by the government, the more likely that an SPP plan has already been adopted and is in place. Second, higher job positions are not associated with more familiarity of instruments that might be used to incorporate SPP criteria into procurement practices. Moreover, informal instruments such as communication and information tend to be slightly more important

than formalized instruments such as contracts, government regulations, and training.

Third, it is noteworthy that fully three-fourths of practitioners believe that government should lead by example to promote SPP, especially when it comes to sustainable purchasing practices that are thought to often or always contribute a perceived benefit to the environmental pillar. Fourth, a sustainability index enabling buyers and suppliers to obtain a cost-effective score for performance along the TBL would be a helpful resource for about half of the respondents, and this appears to be related to the current lack of good information on sustainability aspects concerning performance, costs, and impacts of procurement decisions. Fifth, while respondents working for state government with the broadest reach are not more likely to believe that an index would be beneficial, it is unknown at this time why this would be so. While it could be due to fear associated with increasing potential transaction costs with the larger relative size of the supplier pool at the state level compared to lower levels of government, an SI should help mitigate these transaction costs. Indeed, another factor may be involved, and that might be state legislative ideological aversion to sustainable practices, but this is left to future research to answer.⁵ Sixth, the organizational architecture within which procurement takes place seems to matter, because it was found that respondents working within a centralized with delegated authority procurement agency architecture are the only group that comprise a majority favoring utilization of a sustainability index. Seventh and finally, perceived efficacy of an SI matters based on one's job position - the higher the job position one holds in a public purchasing organization, the more favorable a respondent is toward desiring an SI.

Taken together, these findings suggest some utilitarian limits of a sustainability index in the public procurement space. This, however, does not mean that there is no functional practicality from its adoption, and this can be seen in the following manner. The perceived lack of good information on sustainable performance, costs, and impacts can be understood within a transactional framework whereby gaining information requires traditional search costs - often done through time-consuming market analyses. Because there are relatively high transaction costs when going green, practitioners are fairly consistent with this position as evidenced by their indications that an SI might be

helpful in lowering these costs, especially when it concerns the environmental pillar.

However, a lowering of transaction costs is somewhat inconsistent with the finding that practitioners working for governments with the broadest reach are the least likely to think an index would be beneficial. This could be due to individual differences in this set of respondents themselves, or due to something else. What is clear is that there are several apparent hurdles to deployment and adoption of an SI that are suggested by the survey findings. For one, the widespread belief that government should lead by example to promote the environmental pillar of SPP suggests a limited version of the utility of a TBL-based index. As a result, the potential adoption of an SI as a public policy tool that might steer the rest of society toward sustainability options appears to be limited at this time. But even if one assumes the adoption of an SI, the use of this index - while helping to systematize the procurement process to reduce transaction costs - could potentially enhance procurement efficiency through economic savings on the public side because on the margins, fewer practitioners would be needed to investigate the environmental market and gain information. However, the savings are likely to remain on the public side while concomitantly shifting additional costs to the private sector. This would happen because evidence used to document the private firm's sustainability practices is borne by the private vendor. This might help explain why only 49.3% of practitioners say their job position employs formal regulations as an instrument to achieve SPP outcomes.

Since overall the data show limited functionality for a TBL-based index, there are other challenges for wide adoption of a sustainability index anchored in three pillars. Consider the conceptual dynamics and lack of agreement on the purposes and utilitarian outcome of a TBL sustainability index. Recall that governments with broader reach are more likely to have adopted an SPP plan and thus think that an index would be beneficial. Again this is consistent with a transaction cost perspective, and this implies that lower levels of government are more limited in the scope of what they buy. Conceptually, lower levels of government are associated with more limited procurement scope in the following way: governments empowered to accomplish a wider range of programs and policies for citizens (e.g. states and provinces) will have a broader reach and scope than governments created for more specific tasks, such as special districts or public schools. Thus

the transactional cost utility of an SI is more limited at lower levels. Hence the targeted level at which the sustainability index is to perform becomes increasingly important, and this can include the level of the firm or institution, or as broadly as society and even globally.

So one could reasonably expect variation in how highly valued a TBL-based SI is, and the lack of uniform comparability across levels of government further suggests that there are also limitations to be expected across economic sectors of the economy. Note that this is not just a point about differences across the three pillars (one of which is economic) but instead highlights the multidimensional character of what is trying to be captured by a TBL-based sustainability index. Recall that only one-third (N=92) of respondents say SPP promotes financial benefits, and the obvious differential weighting across the three pillars suggests that an SI may be much more government specific than is recognized. If true, then even within each pillar, there may also be unidimensional differences that may be less-than-accommodative across different levels of government.

Then there are the concerns that arise when or if governments mandate the adoption and use of a TBL-based SI. If future public policy is to reflect practitioners' beliefs that government should lead by example to promote SPP, it is not only clear that formalized regulations would need to be drawn up, but what happens to the role of informal communication that is relied upon by 69.9% (N=216) of the practitioners? Should an additional regulatory rule be adopted that prohibits this informational channel in SPP decision-making - functioning much like a cone of silence? One can see how the hoped-for transaction cost reductions can rapidly fade or, at the least, how transaction costs get shifted - in this case to legislative bodies who would need to update and promulgate the rules and regulations under which practitioners operate when using a sustainability index. And it is not just legislators who would incur increased costs as the following example illustrates.

Private firms, in this case, the vendors and suppliers, would have substantial initial and on-going costs shifted in their direction if a TBL-based SI were to be adopted. The initial costs entail those firm's efforts to first locate and then provide the required evidence documenting the operationalized indicators of sustainability across the three pillars. Then there are questions associated with measurement and accuracy compliance that would need to address hedonic adjustments and time-

boundedness issues. In other words, because technological advances are sure to happen in the future which are likely to require index criteria adjustments, depending on what bases these inevitable adjustments will be made, the costs of producing and maintaining the index along with vendor updating via continual documentation are sure to raise the real costs of adopting a TBL-based sustainability index.

So in the end, one is left with the challenge of identifying a successful business model that can adequately address all of the issues outlined here. Indeed, if governments don't require an index incorporating sustainable criteria, it is difficult to see why private businesses would want to participate in such an endeavor if the result is lower prices and diminished revenues for established firms, perhaps through life-cycle cost reductions. For all of these reasons, it is little wonder that government-mandated use of a TBL-based sustainability index for public procurement practitioners is unlikely in the near future, because the evidence suggests that a sustainability index in the public arena may not be appropriate for much more than its potential utility in lowering transaction costs for some governments while substantively raising the costs of doing business with the government. Nonetheless, all of these issues - whether taken individually or in tandem with others - beg for additional future research to help governments and private sector actors support and strengthen the stakeholders they purport to serve and supply.

NOTES

1. An earlier version of this manuscript was presented at the 74th Annual Conference of the Midwest Political Science Association, April 7-10, 2016 Chicago, Illinois.
2. A potential limitation to the design of this study is the fact that the survey was administered in 2012. The assumption is that things might have changed in terms of the respondent's views, beliefs, and attitudes towards SPP since 2012. Although this may be true, and a limitation to any secondary data analysis, for the purpose of this study we relied on Steinfeld, McCue and Prier (2017) and Leiser, et. al. (2017) who contend that SPP beliefs, attitudes, and views of practitioners in the U.S. have remained relatively stable over the last decade.

3. The original dataset had nine levels of government, but easy reclassification recoding reduced this to four levels for ease of analysis.
4. This relationship is statistically significant at the $p=.025$ level. Somer's $d=.104$, asymptotic S.E.=.046, with approx. $T= 2.244$.
5. An additional explanation might be found in the public choice literature where established suppliers would be threatened by flattening the process through an SI thereby introducing competition and raising transaction costs for purchasers who would then need to consider additional buyer choices that may, in fact, breed diminishing marginal utility.

REFERENCES

- ADB (Asian Development Bank) (2011). "The Strategic Importance of Public Procurement." [Online]. Available at <http://adbprocurementforum.net/wp-content/uploads/SIPPBriefFINAL23Nov2011.pdf>. (Accessed February 17, 2014).
- Alford, J., & Greve, C. (2017). "Strategy in the Public and Private Sectors: Similarities, Differences and Changes." *Administrative Sciences*, 7(4): 1-17.
- Berns M., Townend, A., Khayat, Z., Balagopal, B., Reeves, M., Hoplins, M., & Kruschwitz, N. (2009). "The Business of Sustainability: What It Means to Managers Now." *MIT Sloan Management Review*, 51(1): 21-26.
- Bosch, M, Kemperman, M., & Raes, S. (2012). "Sustainable Procurement and International Financial Institutions." Paper Presented at the Seminar on Sustainable Public Procurement and Multilateral Development Banks, Washington, DC, March 22, 2012.
- Brammer, S. & Walker, H. (2011). "Sustainable Procurement in the Public Sector: An International Comparative Study." *International Journal of Operations & Production Management*, 31(4): 452-476.
- Bratt, C., Hallstedt, S., Robert, K., Broman, G., & Oldmark, J. (2013). "Assessment of Criteria Development for Public Procurement from a Strategic Sustainability Perspective." *Journal of Cleaner Production*, 52: 309-316.

- Cohen, J., & Cohen, P. (1975). *Applied Multiple Regression/Correlation Analysis for the Behavioural Sciences*. New York: Erlbaum.
- D'Hollander, D. & Marx, A. (2014). "Strengthening private certification systems through public regulation: The case of sustainable public procurement." *Sustainability Accounting, Management and Policy Journal*, 5(1): 2-21.
- Eurodad (the European Network on Debt and Development). (2009). "Procurement and Development Effectiveness: A Literature Review." [Online]. Available at http://eurodad.org/uploaded_files/whats_new/reports/literature_review_procurement_and_development_final.pdf. (Accessed on February 13, 2014).
- European Commission, (2017). "Public Procurement in a Nutshell: Why Does Public Procurement Matter in International Trade?" [Online]. Available at <http://ec.europa.eu/trade/policy/accessing-markets/public-procurement>. (Accessed on February 13, 2014).
- Gelderman, C. J., Semeijn, J., & Bouma, F. (2015). "Implementing Sustainability in Public Procurement: the Limited Role of Procurement Managers and Party-Political Executives." *Journal of Public Procurement*, 15(1): 66-92.
- Goswami, A., Meher Diljun, G., & Srivastava, N. (2013, July). "Engagement with Sustainability Concerns in Public Procurement in India: Why and How." The Energy and Resources Institute Policy Brief, Issue 8: New Delhi, India.
- Grandia, J., Steijn, B. & Kuipers, B. (2015). "It Is Not Easy Being Green: Increasing Sustainable Public Procurement Behavior." *The European Journal of Social Science Research*, 28(3): 243-260.
- Green, R. T., Keller, L. F., & Wamsley, G. L. (1993). "Reconstituting a Profession for American Public Administration." *Public Administration Review*, 53(6): 516-524.
- Giunipero, L.C., Hooker, R.E., & Denslow, D. (2012). "Purchasing and Supply Management Sustainability: Drivers and Barriers." *Journal of Purchasing & Supply Management*, 18(4): 258-269.
- IISD (International Institute for Sustainable Development). (2007). "State of Play in Sustainable Procurement." Winnipeg, Canada.

[Online]. Available at http://www.iisd.org/pdf/2007/state_procurement.pdf. (Accessed on February 13, 2014).

- Johnson, F., Leenders, M. & McCue, C. (2003). "A Comparison of Purchasing's Organizational Roles and Responsibilities in the Public and Private Sector." *Journal of Public Procurement*, 3(1): pp. 57-74.
- Kjollerstrom, M. (2008, August). "Public Procurement as a Tool for Promoting More Sustainable Consumption and Production Patterns." Sustainable Development Innovation Briefs, Issue 5: 1-12. [Online]. Available at http://esa.un.org/marrakechprocess/pdf!InnovationBriefs_no5.pdf. (Accessed on March 13, 2014).
- Lehtinen, U. (2012). "Sustainability and Local Food Procurement: A Case Study of Finnish Public Catering." *British Food Journal*, 114(8): 1053-1071.
- Loader, K. (2007). "The Challenge of Competitive Procurement: Value for Money versus Small Business Support." *Public Money & Management*, 25(7): 307-314.
- Lundberg, S., Marklund, P., & Stromback, E. (2015). "Is Environmental Policy by Public Procurement Effective?" *Public Finance Review*, 44(4): 478-499.
- MacManus, S. (1992). *Doing Business with Government: Federal, State, Local and Foreign Government Purchasing Practices for Every Business and Public Institution*. New York: Paragon House.
- McCrudden, C. (2004). "Using Public Procurement to Achieve Social Outcomes." *Natural Resources Forum*, 28(4): 257-267.
- McCue, C. & Prier, E. (2007). "Using Agency Theory to Model Cooperative Public Purchasing." In G. Piga & K. V. Thai (Eds), *Advancing Public Procurement: Practices, Innovation and Knowledge-sharing* (pp. 45-70). Boca Raton, FL: PrAcademics Press.
- Morgan, K., & Sonnino, R. (2007). "Empowering Consumers: The Creative Procurement of School Meals in Italy and the UK." *International Journal of Consumer Studies*, 31(1): 19-25.
- Mori, K., & Christodoulou, A. (2012). "Review of sustainability indices and indicators: Towards a new City Sustainability Index (CSI)." *Environmental Impact Assessment Review*, 32(1): 94-106,

- National Institute of Governmental Procurement. (2014). "We 'No Bid,' and I'll Tell You Why: Does the Procurement Process Always Result in the Best Bids? [Online]. Available at <http://www.nigp.org>. (Accessed April 24, 2017).
- Nidumolu, R., Prahalad, C.K., & Rangaswami, M.R. (2009). "Why Sustainability is Now the Key Driver of Innovation." *Harvard Business Review*, 87(9): 57-64.
- Nijaki, L.K., & Worrel, G. (2012). "Procurement for Sustainable Local Economic Development." *International Journal of Public Sector Management*, 25 (2): 133-153.
- OECD (2015), Government at a Glance 2015, Paris, France: Author. [Online]. Available at http://dx.doi.org/10.1787/gov_glance-2015-en. (Accessed on June 28, 2018).
- PricewaterhouseCoopers, Significant & Ecofys, (2009, January). *Collection of Statistical Information on Green Public Procurement in the EU: Report on Data Collection Results*. [Online]. Available at http://ec.europa.eu/environment/gpp/pdf/statistical_information.pdf. (Accessed June 28, 2018)
- Preuss, L. (2009). "Addressing Sustainable Development through Public Procurement: The Case of Local Government." *Supply Chain Management: An International Journal*, 14(3): 213-223.
- Prier, E., & McCue, C. P. (2009). "The Implications of a Muddled Definition of Public Procurement." *Journal of Public Procurement* 9(3&4): 326-370.
- Prier, E. & McCue, C. (2014). "Assessing SaaS-based e-procurement Across Different Levels of Government in the U.S." In L. V. Tavares (Ed.), *New Developments on E-Procurement* (pp. 95-116). Lisbon, Portugal: OPET. ISBN: 978-989-8747-04-4.
- Rasinski, K. A. (1989). "The Effect of Question Wording on Public Support for Government Spending." *Public Opinion Quarterly*, 53(3): 388-394.
- Ruhl, J. B. (1999). "The Metrics of Constitutional Amendments: And Why Proposed Environmental Quality Amendments Don't Measure Up." *Notre Dame Law Review*, 74(2): 245-281.
- Rummel, R. J. (1970). *Applied Factor Analysis*. Evanston, IL: Northwestern University Press.

- Scerri, A., & James, P. (2010). "Accounting for Sustainability: Combining Qualitative and Quantitative Research in Developing 'Indicators' of Sustainability." *International Journal of Social Research Methodology*, 13(1): 41-53.
- Schwerin, E., & Prier, E. (2013). "Rent-Seeking and Obstacles to Changing Environmental Practices and Sustainable Public Procurement in China." *Environmental Practice*, 15(3): 240-252.
- Steinfeld, J., McCue, C. & Prier, E. (2016). "Examining Professionalization in Public Procurement by Ranking Practitioner Job Positions According to Job Activities." *International Journal of Procurement Management*, 9(3): 328-353.
- Steinfeld, J., McCue, C. & Prier, E. (2017). "Professionalism and Social Responsibility in Procurement and Administration." *European Business Review*, 29(3): pp. 320-343.
- Swanson, M., Weissman, A., Davis, G., Socolof, M.L., & Davis, K. (2005). "Developing Priorities for Greener State Government Purchasing: A California Case Study." *Journal of Cleaner Production*, 13(7): 669-677.
- Tabachnick, B. G., & Fidell, L.S. (2013). *Using Multivariate Statistics* (6th ed.). New York: Pearson.
- Templeton, G. F. (2011). "A Two-Step Approach for Transforming Continuous Variables to Normal: Implications and Recommendations for IS Research." *Communications of the Association for Information Systems*, 28(1): Article 4. [Online]. Available at <http://aisel.aisnet.org/cais/vol28/iss1/4>.
- Thai, K. V. (2002). "Public Procurement Re-Examined." *Journal of Public Procurement*, 1: 9-50.
- Thomson, J., & Jackson, T. (2007). "Sustainable Procurement in Practice: Lessons from Local Government." *Journal of Environmental Planning and Management*, 50(3): 421-444.
- Tsai, WT. (2017). "Green Public Procurement and Green-mark Products Strategies for Mitigating Greenhouse Gas Emissions—Experience from Taiwan." *Mitigation and Adaptation Strategies for Global Change*, 22(5): 729-742.
- UN World Commission on Environment and Development. (1987). "Our Common Future, Report of the World Commission on Environment

and Development." (Published as Annex to General Assembly Document A/42/427, Development and International Co-operation: Environment, August 2, 1987). [Online]. Available at <http://www.un-documents.net/wced-ocf.htm>. (Accessed on March 14, 2014).

UNDP (United Nations Development Programme) (2010, October). *Public Procurement Capacity Development Guide*. Procurement Capacity Development Centre, Capacity Development Group, Bureau for Development Policy. [Online]. Available at <http://www.undp.org/content/dam/aplaws/publication/en/publications/capacity-development/undp-procurement-capacity-assessment-users-guide/Procurement%20Capacity%20Assessment%20Guide.pdf>. (Accessed March 9, 2014).

Vachon, S. & Klassen, R.D. (2007). "Supply Chain Management and Environmental Technologies: The Role of Integration." *International Journal of Production Research*, 45(2): 795-821.

Walker, H., & Brammer, S. (2012). "The Relationship between Sustainable Procurement and e-Procurement in the Public Sector." *International Journal of Production Economics*, 140: 256-268.

Walker, H. & Brammer, S., (2009a). "Sustainable Procurement in the United Kingdom Public Sector." *Supply Chain Management: An International Journal*, 14(2): 128-137.

Walker, H., Miemczyk, J., Johnsen, T., & Spencer, R. (2012). "Sustainable Procurement: Past, Present and Future." *Journal of Purchasing and Supply Management*, 18(4): 201-206.

Walker, H. & Phillips, W. (2009b). "Sustainable Procurement: Emerging Issues." *International Journal of Procurement Management*, 2(1): 41-61.

Walker, H., & Preuss, L. (2008), "Fostering Sustainability through Sourcing from Small Business: Public Sector Perspectives." *Journal of Cleaner Production*, 16: 1600-1609.

Warner, K.E. & Ryall, C, (2001). "Greener Purchasing Activities within UK Local Authorities." *Eco-management and Auditing*, 8(1): 36-45.