Sustainable procurement model: A strategic tool for responsible decision making

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Abstract
Procurement, a key organizational operation, has taken on greater strategic importance in the arena of sustainable development. However, fundamental procurement elements covering economic, social and environmental dimensions of sustainability are not well established. A model is developed and validated using content analysis of literature, industry standards, sustainability frameworks and company reports.

Keywords: Procurement, Sustainability, Content Analysis

Introduction
The ultimate goal of the corporate world to 'maximize profits' and to 'minimize costs' was mainly shouldered by two important factors: quality of products and customer satisfaction. Companies implemented quality management systems (QMS) to achieve this objective that largely focused on organizational structure, resources, policies, procedures and processes. The aim was to reduce waste, achieve operational efficiency and optimally utilize resources. Obligations towards environment and society were elusive concepts (McGee 1998). However, the Brundtland Report (1987) and UN Rio Earth Summit injected the term 'sustainable development' in the economic system. Consumers also pushed the companies to be more transparent about the entire value chain. This was supported by mass media pressure and legislation. Consequently, the concept of Triple Bottom Line (Elkington 1997), the Global Reporting Initiative (GRI 2002) guidelines, standards for social sustainability (AccountAbility 2002) and Dow Jones Sustainability Index (DJSI) provided reporting frameworks and further impressed upon the organizations to assess their sustainability performance. As a result of these efforts, sustainability evolved as a driving force for market capitalization and an important item on business agendas. Now organizations are rapidly including social and environmental aspects into their mission statements and operational procedures (Birkin et al. 2009). However, researchers are of the view that true sustainable development need to take its roots throughout the supply chain and extend beyond organizational boundaries (Green et al. 1996). Thus sustainability needs to be ingrained in each stage of the supply chain such as planning, procurement, production, warehousing, and transportation.

Sustainable Procurement

The most quoted definition of sustainability comes from the Brundtland Report (1987): "development that meets the needs of the present without compromising the ability of future generations to meet their needs." Researchers are continuously making efforts to instill sustainability into supply chain management. Carter and Rogers (2008) defined sustainable supply chain management (SSCM) as "the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains." The need to analyze inter-organizational processes accentuated the importance of procurement. Thus firms must work with their suppliers to reduce the negative environmental and societal impacts of poisonous ingredients, emissions of greenhouse gases (GHG), contamination of waterways and exploitation of low cost labor markets (Sharfman et al. 2009). According to practitioners, "sustainable procurement means taking into account economical, environmental and social impacts in buying choices. This includes optimizing price, quality, availability… but also environmental life-cycle impact and social aspects linked to product/services origin" (PwC 2010). Thus this paper will make an effort to answer the following research questions (RQ):

RQ1: How can procurement play a role in achieving sustainability objectives?
RQ2: What are basic constructs and elements of sustainable procurement?

These questions are answered by developing a theoretical model for sustainable procurement (SP). The model is based on constructs and elements identified through rigorous content analysis of academic literature and industry publications. The remainder of this paper presents the methodology; brief discussion on constructs and elements of SP; and a theoretical model for operationalizing SP in both public and private sector. *It must be noted that the terms 'procurement', 'purchasing' and 'sourcing' are used interchangeably in both academic literature and industry publications.* For this paper, 'procurement' will be considered as the over-arching concept that includes a range of different activities undertaken to ensure that economic, social and environmental value is obtained from the sourced goods and services, while 'purchasing/sourcing' will be considered as just one of the steps in procurement where supplier/vendor renders services or supplies goods in response to customer orders.

Methodology

Development of Sustainability Themes

Initially, key sustainability themes were developed through content analysis of high-level sustainability frameworks such as Cradle-to-Cradle, biomimicry, Life Cycle Analysis and The Natural Step (Shedroff 2009). This was done to provide a reasoned direction to further analysis of procurement literature. It was evident through coding, performed by using NVivo software, that these frameworks are diverse in terms of their strengths, weaknesses and application. However, they all focused on the same three dimensions of sustainability (economic, social and environment). Nodes (material containers), developed through various analytical techniques in NVivo (e.g., broad brush coding, word frequency query, tree maps etc.), revealed themes such as waste reduction, elimination of toxic materials, social fairness, corporate ethics, hazardous emissions, employee well being etc.

Development of Sustainable Procurement Themes

The thematic content analysis of procurement literature was based on inductive approach that emerged from Grounded Theory (Glaser and Strauss 1967). Free nodes were developed by using the 'high-level sustainability themes' identified earlier. These grew into tree nodes until data saturation was achieved. Mainly supply chain literature, white papers, industry publications, online magazines, books and benchmarking reports were used. This was a non-linear and iterative process based on 'constant review and comparison' and following the steps such as:

- Creation of free nodes (open coding)
- Selection of emergent themes based on thematic analysis of sustainability frameworks
- Coding (using emergent theme) or arranging data into categories
- Enhancement of coding structure/hierarchy
- Clustering of codes/nodes to form analytical taxonomies
- Identification of key sustainable procurement constructs and elements
- Evidence hunting to determine impact of elements on dimensions of sustainability
- Testing against GRI indicators and corporate sustainability reports

Reliability and Validity of Research

Anderson (2010) mentions that in qualitative research, "validity relates to the honesty and genuineness of the research data, while reliability relates to the reproducibility and stability of the data." In order to ensure validity of constructs and elements, triangulation is used. According to O'Donoghue (2003), triangulation is a "method of cross-checking data from multiple sources to search for regularities in the research data." The results (sustainable procurement constructs/elements) were compared with the most prevalent industry standard – Global Reporting Initiative (GRI 2011). Thus 'data triangulation' was applied which showed inconsistencies and spurred further analysis, coding, and re-coding of data and led to a valid model for sustainable procurement. In addition, results were also tested against annual sustainability reports of top 10 firms in the food sector to ascertain reliability. Again 'constant review and comparison' helped in developing a reliable taxonomy of constructs and elements.

Scope of the Research

The content analysis showed that each construct is a huge area of research in itself. Thus research study is only limited to the identification of market tested constructs and elements for a sustainable procurement (SP) model. It will not discuss techniques related to supplier selection, contract management, spend analysis, supplier assessment, e-procurement, etc. It will only outline major constructs and elements, and determine which dimension of sustainability is 'primarily impacted' by them.

Sustainable Procurement Constructs and Elements

The meta-constructs that broadly divided the analysis into two major categories are 'organizational outlook' and 'supplier outlook'. Each meta-construct has its own specific constructs and eventually each construct consists of pertinent elements.

The Organizational Outlook Constructs and Elements

The organizational outlook deals with the procurement purview, procurement policy, personnel training, procurement management system and procurement processes.

Procurement Organizational Purview Construct

Van Weele (1984), Easton et al. (2002) and Pop Sitar (2012) identified that in 1970s and 1980s procurement was considered as an administrative, commercial or logistics function. However sustainability objectives can only be achieved if strategic cross-dimensional role of procurement is realized in the companies. Content analysis identified three elements for this construct that accentuate its importance as a strategic function – **external environment scanning (EES), demand analysis (DA)** and **liaison with internal stakeholders (LIS)** (Sroufe 2006). To ensure sustainable products, procurement should be able to anticipate changes and upcoming trends in the external environment related to competitor moves, legal requirements, commodities pricing, cutting-edge technologies etc. This knowledge must be combined with expected future demand to reduce uncertainty of supply (Kruger 1997). In addition, procurement should liaison with marketing department in order to get consumer insight and also assist design department so that unsustainable materials could be eliminated at early stages of product development. Combing all the three elements lead to a procurement function with an extensive scope to achieve corporate sustainability objectives.

Procurement Policy Construct

This construct ensures that sustainable procurement has solid footing in the company through elements such as **procurement principles (PP), procurement guidelines (PG), procurement structure (PS) and procurement rules and procedures (PRP).** *Procurement principles* are usually related to high-level policies such as standpoint against any form of corruption (e.g., extortion or bribery); support for initiatives that could improve environmental quality; elimination of any kind of forced or child labor etc. (UN Global Compact 2011). These principles are usually realized through tactical *procurement guidelines* which might detail the processes related to spend analysis, stakeholder study, impact assessment, supply market examination, supplier management etc. (GWA 2011). *Procurement structure* forms the layout of the function within the organization. It usually covers centralization or decentralization decisions, an authorization system and identifies teams with roles and responsibilities (MAV 2011). Any layout can be adopted that supports open communication channels and fosters friendly discussions. Finally *procurement procedures* cover purchasing rules for various categories of materials (e.g., direct or indirect). Thus the procurement policy construct lays down the foundation for sustainable procurement within an organization.

Procurement Processes Construct

Dobler (1990, p.100) illustrated different steps in procurement, which can be broadly summarized, into elements such as **need analysis (NA), procurement plan (PP), purchasing (PCH)** and **procurement evaluation (PE)**. Initially, for any procurement, spend analysis and demand forecast is carried out to *identify the need*. This is followed by *business case development* which encompasses several steps such as supply market research, procurement approach, contract planning, finalization of terms and conditions (e.g., RFX documents) and funding approval. Afterwards tendering/bidding/e-auctions or simple supplier selection is done; services or goods are delivered by supplier; contract is continuously monitored; and finally payments are transacted to close the *purchasing process*. Later on, *procurement evaluation* is usually carried out to investigate the impact of procurement on firm's performance. All these steps in the procurement process from source-to-settle must be governed by procurement

principles, guidelines, rules and procedures that are aligned with corporate objectives of sustainability.

Personnel Training Construct

During the last four decades, procurement personnel were trained to achieve lowest possible prices with acceptable quality standards. Garrambone (1995, qtd. in Sroufe 2003) commented that "one of the biggest challenges for purchasing will be how to turn an individual accustomed to transactional purchasing into a skilled strategic sourcing professional'. The challenge is now more strenuous as sustainable mindset needs to be inculcated into procurement personnel. Content analysis revealed three elements for this construct – **strategic training (ST), operational training (OT)** and **general trainings (GT).** *Strategic training* should enable personnel to revamp and continuously improve the procurement principles and guidelines in such a way that organizational sustainability objectives are satisfied. Moreover, *operational training* should be focused on traditional areas such as communication skills, bookkeeping, negotiation techniques, regulatory compliance, environmental legislation, international human rights and labor standards. The output of these trainings should be a purchasing officer who could buy goods that not only satisfy the conventional cost and quality criteria but also support local economy, contribute to communal welfare and has minimum impact on environment. Furthermore, *general trainings* related to emotional intelligence, stress management and self-control should be a mandatory component of the annual training schedule.

Table 1: The Organizational Outlook Constructs and Elements

Meta-Constructs	SP Constructs	SP Elements	ENV	SOC	ECO
Organizational Outlook	Procurement Organizational Purview	External Environment Scanning (EES)			✓
		Demand Analysis (DA)			✓
		Liaison with Internal Stakeholders (LIS)	✓	✓	✓
	Procurement Policy	Procurement Principles (PP)	✓	✓	✓
		Procurement Guidelines (PG)	✓	✓	✓
		Procurement Structure (PS)		✓	✓
		Procurement Rules and Procedures (PRP)			✓
	Procurement Processes	Need Analysis (NA)			✓
		Procurement Plan (PP)	✓	✓	✓
		Purchasing (PCH)	✓	✓	✓
		Procurement Evaluation (PE)	✓	✓	✓
	Personnel Training	Strategic Training (ST)		✓	✓
		Operational Training (OT)		✓	✓
		General Trainings (GT)		✓	✓
	Procurement Management System	Standard Procurement System (SPS)			✓
		Electronic Procurement System (EPS)			✓

Procurement Management System Construct

The main objective of any computerized procurement system (PS) is to improve operational efficiency and transparency. The elements for this construct are – **standard procurement system (SPS)** and **electronic procurement system (EPS)** as both of them can support sustainability. The *standard system* automates requisitions, purchase orders, receipts and invoices with reporting and workflow management. All these tools can be very helpful to improve social and environmental performance. While *e-procurement* is an internet-based system where buyers access suppliers' catalogues, select materials, specify accounts for charging and purchasing orders are automatically created in the system. E-procurement was identified by Barua et al. (2001) as "…the most important element of e-business operational excellence for large corporations." Therefore, Organizations still using manual record-keeping books or excel should upgrade themselves to at least a basic procurement management system.

The Supplier Outlook Constructs and Elements

The supplier outlook covers supplier management, supplier workplace standards, supplier operations, supply base development and contract management.

Supplier Relationship Management Construct

Supplier relationship management (SRM) focuses on the most critical entity in the procurement process – suppliers. According to Gartner Inc., purchasing costs represent 30–65 percent of sales in most of the industries. It estimated that Fortune 500 companies spend about 45 cents on purchasing goods or services for each dollar made in revenue (2001, cited in PeopleSoft 2002). Content analysis highlighted the traditional elements such as **supplier selection (SS), supplier assessment (SA), supplier involvement (SI)** and **supplier development (SD).** *Supplier selection* is well researched and researchers have chalked out several methods based on price, quality, delivery, historical performance and production capacity. Recently, researchers have also started considering sustainability issues for supplier selection and assessment (Bai and Sarkis 2010). In addition, *supplier involvement* in new product development (NPD) is recognised as a key driver for achieving green and socially responsible products. The context analysis of the keyword 'supplier' and the related word trees showed that suppliers can help in designing products with environment friendly packaging and healthy functional ingredients (Lee and Kim 2011) at an affordable price. Moreover, *development of suppliers* is an area that clearly comes out in the content analysis of 'corporate sustainability reports'. Even though according to Bai and Sarkis (2010), 'investigation regarding sustainability and supplier development programs is virtually non-existent'. However, companies clearly reported in their annual reports that working with suppliers decreased their products' life cycle social and environmental burdens.

Supplier Workplace Standards Construct

This construct emphasizes on the implementation of elements such as **occupational health and safety (OHS), child or forced labor (CFL), workplace discrimination (WD), employee working hours (EWH), employee wages (EW) and freedom of association (FA)**. An organization can include them into its supplier selection and assessment criteria in addition to development programs. Generally *occupational health and safety* is concerned with workplace illness and injuries and covers all forms of unpaid or paid work in all environments. Literature does provide evidence that good OHS management improves productivity (Massey et al. 2006). In addition, International Labour Organization (ILO) Declarations do not allow any form of

workplace discrimination and child/forced labour. Thus both suppliers and the focal firm must comply with ILO Declarations. Moreover, employee wages and working hours should also be as per the market standards and *freedom of association* must be respected by both parties.

Supplier Operations Construct

This construct dictates that supplier operations should be based on elements such as **energy conservation (EC), water conservation (WC), reduction in emissions (RE), preservation of biodiversity (PB), waste reduction (WR), recyclable packaging (RP), traceability (TR)** and **specific industry requirements (SIR).** Energy should be consumed efficiently so that greenhouse gas (GHG) emissions could be reduced. Optimal combination of daylight and artificial lighting scheme should be employed as improved visibility has proven positive impact on workforce alertness and productivity (CarbonTrust 2007*). Water conservation* should be done through latest roofing technology, modern sanitation fixtures, drainage techniques, air-cooled compressors etc. It has ecological benefits such as reduction in distribution piping and lesser burden on municipal water supply (Gazeley 2004). In addition, content analysis of latest standards (GRI 2011) showed that biodiversity is integral to sustainability as it is important to both business and society. Organizations with greener settings have more motivated employees and about 8 percent higher property value as compared to those far away from green spaces (CABE 2005). Moreover, a very important factor accentuated by corporate sustainability reports is *recyclable packaging*. Furthermore, *traceability* is considered as a key to track down issues that hamper environmental and social sustainability. Thus suppliers must ensure that their entire production is traceable and also complaint to *specific industry requirements* which might include animal welfare, fair-trade recognition, ISO compliance etc., to achieve sustainability objectives.

Supply Base Development Construct

Supply base development may be defined as securing and ensuring supplies for the company through a range of supply options which can be used during normal operations or as a backup (Li 2011). Specific elements included in this construct are **pricing-quality-design (PQD), backup supplies (BS) and on-time deliveries (OTD).** Content analysis has shown that these three elements drive organizations to develop and safeguard their distinct supply bases. Researchers have thoroughly discussed various aspects of robust supply base management through optimal number of suppliers (Nam et al. 2011) and global supply chain adaptations (Liao et al. 2011). Companies are mainly looking for *competitive pricing, quality conformance, sustainable designs* and *backup suppliers* to prevent supply disruptions and ensure *on-time deliveries*. This will help to ensure economic sustainability of the firm.

Contract Management Construct

Almost 60-80 percent of all business-to-business deals/transactions are done through formal contracts. Global corporations have at least 20,000 to 40,000 contracts active at any given time. Research found that most of the enterprises poorly manage this important component of procurement (Aberdeen Group 2003). Content analysis also revealed high significance of this construct in operationalizing sustainability. Generally contract management includes **contract planning (CP), contract management practice (CMP)** and **post-contract evaluation (PCE).** *Contract planning* takes input from procurement planning and deals with specification development, contract length, role of sub-contractors, risks identification and mitigation strategy etc. While *contract management practice* focuses on execution phase and encompasses contract

mobilization; administration; managing relationships; contract monitoring; performance management; ensuring ethical practices and contract completion (CDFD 2012). Contract completion is followed by *post-evaluation* of actual versus planned specifications, timelines and benefits outlined in the planning phase. It is a vital element but usually overlooked by the companies. Content analysis has shown its great worth as it can help in continuous improvement of procurement policies and guidelines through lessons learned (EU 2011).

Table 2: The Supplier Outlook Constructs and Elements

Meta-Constructs	SP Constructs	SP Elements	ENV	SOC	ECO
Supplier Outlook	Supplier Relationship Management	Supplier Selection (SS)	✓	✓	✓
		Supplier Assessment (SA)	✓	✓	✓
		Supplier Involvement (SI)	✓	✓	✓
		Supplier Development (SD)	✓	✓	✓
	Supplier Workplace Standards	Occupational Health and Safety (OHS)		✓	✓
		Child or Forced Labor (CFL)		✓	✓
		Workplace Discrimination (WD)		✓	✓
		Employee Working Hours (EWH)		✓	✓
		Employee Wages (EW)		✓	✓
		Freedom of Association (FA)		✓	✓
	Supplier Operations	Energy Conservation (EC)	✓	✓	✓
		Water Conservation (WC)	✓	✓	✓
		Reduction in Emissions (RE)	✓	✓	✓
		Preservation of Biodiversity (PB)	✓	✓	✓
		Waste Reduction (WR)	✓	✓	✓
		Recyclable Packaging (RP)	✓	✓	✓
		Traceability (TR)	✓		✓
		Specific Industry Requirements (SIR)	✓	✓	✓
	Supply Base Development	Pricing-Quality-Design (PQD)	✓	✓	✓
		Backup Supplies (BS)			✓
		On-time Deliveries (OTD)			✓
	Contract Management	Contract Planning (CP)	✓	✓	✓
		Contract Management Practice (CMP)	✓	✓	✓
		Post-Contract Evaluation (PCE)	✓	✓	✓

Sustainable Procurement Model

As shown in Figure 1, there are ten constructs and 40 elements that make up the sustainability model. It is observed that about 55 percent of the elements have triple impact and 28 percent have double impact. Moreover, all the elements improve the economic value of the company in addition to social well-being or environmental quality.

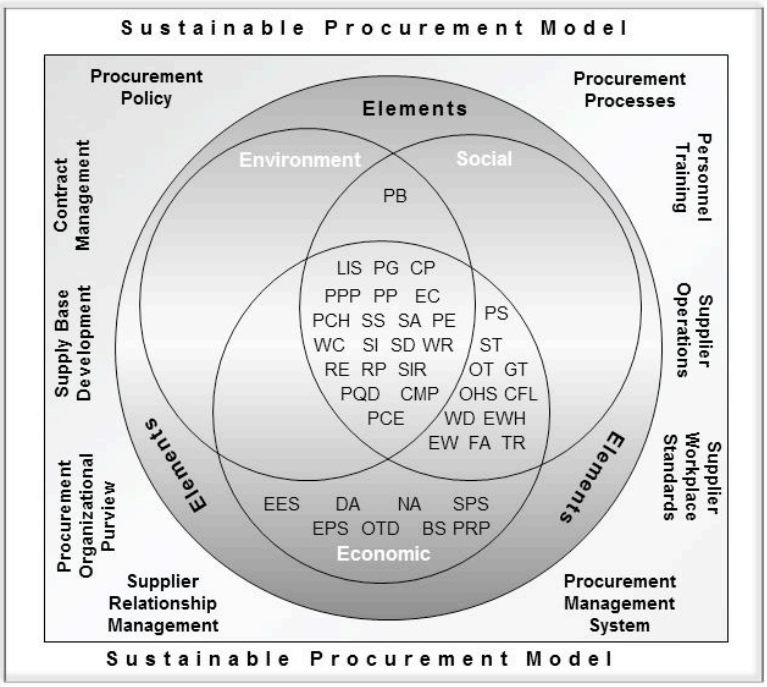

Figure 1: Sustainable Procurement Model

Conclusion

This piece of research is deeply embedded in academic literature and industry publications. The model has vital theoretical and practical implications. It clearly shows that initiatives to address social and environmental dimensions of sustainability have financial benefits. It can be applied by supply chain managers or chief procurement officers (CPOs) to evaluate the sustainability standards of their current procurement function. Also, the model developed may be used in empirical studies to test its impact on firm performance and customer satisfaction. Moreover, each element of the model can be translated into an operational guideline and be used as a roadmap to bring in efficiencies and contribute towards societal welfare and environmental preservation.

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