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Assessing Innovation in American Counties: Examining the Prevalence of Green Procurement

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FLORIDA STATE UNIVERSITY
COLLEGE OF SOCIAL SCIENCES AND PUBLIC POLICY

ASSESSING INNOVATION IN AMERICAN COUNTIES:
EXAMINING THE PREVALENCE OF GREEN PROCUREMENT

By

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Dedicated to Governor Reubin O'Donovan Askew, a true statesman and innovator

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ABSTRACT

Procurement is a vital activity of all levels of government. Technological innovations in public procurement such as purchasing cards (P-cards) and e-technology have made public procurement more efficient and have been oft-studied. However, social innovations, like environmentally preferable procurement (EPP), have not been widely examined for either their antecedents or outcomes. The purpose of this study is to assess how prevalent green procurement practices are in American counties and to try to identify some of the antecedents associated with environmentally preferable purchasing. One hundred and seventy four American counties were randomly selected based upon population and their websites were reviewed according to an index that recorded evidence of green purchasing practices, including having a written green purchasing policy, using eco-labels and/or green specifications in their bids, and whether or not they communicate a preference for green products to their vendors. This information was regressed against factors such as population, wealth, environmental interest group presence, membership in professional organizations, and whether or not the county has a sustainability office. The findings indicate that population, wealth, interest group presence, and having a sustainability office are all significantly and positively associated with green purchasing practices. The study also revealed that, while antecedents could be identified, the average county in this study had less than one item on the index. The implication is that there are still barriers to green purchasing practices that may only be fully understood through qualitative methods.

CHAPTER ONE

INTRODUCTION

Procurement professionals have generally had a very clear goal: procure needed resources while achieving the best quality for the best price. This would appear to be true in both the private sector as well as the public sector; the private sector pursues the best value in order to maximize profits to shareholders while the public sector seeks the best value because of stewardship obligations to taxpayers and increasingly limited dollars. Evaluation criteria such as price, performance, and durability have long been factors used to determine what exactly the best value is for a given product or service (Drumwright, 1994).

With the momentum of the environmental movement, however, consumers are demanding greener alternatives both in their personal consumption as well as from the private and public sectors. With this demand comes the addition of new, socially responsible evaluation criteria in procurement, such as the impacts of resource extraction and pollution externalities when manufacturing a product, the harmful effects of using a product, and the ability of a product to be recycled or repurposed rather than discarded after its use. Using these criteria in procurement decisions is often called environmentally preferable purchasing (EPP). According to the United States Environmental Protection Agency (EPA), environmentally preferable purchasing means “selecting products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose” (EPA, 2000). Environmentally preferable purchasing is also called ‘green’ procurement.

The approaches to green procurement, or EPP, often take the form of procuring products certified to meet environmental or energy efficiency standards (referred to as “eco-labeled”); in-

house product/service evaluations; third-party product/service evaluation; and supply chain initiatives (CEC, 2003). Organizations that have effectively embraced environmentally preferable purchasing regularly engage in practices such as: using green requirements and standards in contracts when procuring goods and services; selecting suppliers along the supply chain that show a commitment to environmental standards and performance; giving consideration to the total cost of ownership by using life-cycle assessment and total life-cycle costing tools; adopting voluntary standards; and increasing awareness across sectors (CEC, 2003).

Though EPP has been increasing in popularity, it has been slow in becoming institutionalized in many organizations' purchasing practices. In 2001, the National Institute of Governmental Purchasing (NIGP) conducted a survey of government procurement officers in the United States and Canada to identify whether they were engaging in green procurement practices. Though the respondents were public purchasing professionals, the results of the study speak to the challenges experienced in both the public and private sectors. The most oft-cited barriers to green purchasing efforts included price, costs of ownership, availability of products, and product performance (NIGP, 2001). Additionally, the level of centralization in the purchasing department of an organization and the inflexibility of the organizations' purchasing procedures/processes also limited engagement in green purchasing. While this survey is ten years old, the insights gained from it are still relevant today, as evidenced by a survey of large and medium-sized German companies belonging to the German Association of Materials Management, Purchasing and Logistics. This study identified hurdles to green procurement, including unavailability of green alternatives and pricing issues, that were similar to those of the NIGP survey (Guenther et al., 2010).

A major obstacle to environmentally sensitive purchasing is that 'green' products often seem more expensive due to a lack of multiple, high-quality competitors to drive prices down. However, many advocates of green purchasing believe that the huge purchasing power of governments will itself cause prices to come down (Habeck, 2003). The Commission for Environmental Cooperation (CEC) suggests that green government procurement can, because of the governments' buying power, stimulate innovative product development as well as stimulate business development and new product/service markets (CEC, 2003), thereby creating competition and lowering prices.

A major obstacle to developing a 'greener' economy is that private businesses must compete on price, and the externalities associated with non-green products they buy do not affect their profitability, so there is little incentive for private companies to use greener products (absent government regulations forcing them to do so.) If governments alone can create enough market pressure to bring down the prices of environmentally sensitive products to the point that businesses begin to buy them more frequently as well, an entire economy will become more environmentally sustainable without resorting as much to regulations as would otherwise be necessary. When governments and businesses adopt green procurement initiatives, they impact the supply chain and cause suppliers to also adopt green practices (Al Bawaba, 2010).

Best value approaches and life-cycle costing expands decision criteria beyond price alone to consider the environmental impacts of raw material extraction, costs of packaging and transporting a product, and the ultimate disposal of the product (Coggburn and Rahm, 2005).. Though the private sector understands the desirability of engaging in ethically and morally attractive behavior, they will only adopt these activities if doing so fits the established corporate goals or enhances stakeholder value; behaviors such as green procurement will only be adopted

if the outcomes can be tied to positive economic performance (Pava and Krausz, 1997). While private organizations are likely to engage in mitigating activities only when doing so enhances their economic performance or corporate reputation, some businesses have begun to recognize that green procurement can provide a competitive edge as well as minimize risk (Varmazis, 2008). The public sector, however, is not affected by bottom-lines in the same way that private businesses are, and governments have the responsibility to address societal and environmental externalities. For this reason, life-cycle approaches become all the more relevant to the public sector: governments can lessen or avoid negative environmental costs later by making better, cleaner decisions through the procurement process, thereby freeing up future resources.

Market forces and some environmentally motivated entrepreneurship is now resulting in more, better performing green alternatives to traditional, non-green products. The General Service Administration (GSA), the federal agency that helps federal agencies with purchasing and other support functions, has facilitated the greening of government procurement in several ways: by compiling comprehensive lists of products that meet federal guidelines for recycled content, energy efficiency, and paints and chemicals; by offering environmental management services to its federal customers; by assisting federal agencies in meeting their requirements for Comprehensive Procurement Guideline (CPG) items, or items that the EPA has identified as containing recycled content; and by publishing and continually updating a list of vendors on its online purchasing system that identifies which products have environmental attributes that are less detrimental to the environment, such as bio-based content, recycled content, energy efficient, water efficient, less toxic, reduced air pollutants, and non-ozone depleting (GSA, n.d.).

Organizations such as Energy Star, Green Seal, and Environmental Choice all evaluate and/or certify the performance of green products (Case, 2004a). This testing and evaluation of

environmental and performance factors provide procurement officers with ample information to make environmentally preferable purchasing choices. Initially green products were mostly janitorial supplies and recycled paper, but they have expanded rapidly to include such commodities as paints, computers, carpeting, hybrid cars, and even alternate energy sources. Increasing product availability diminishes the barriers to green procurement.

In addition to environmental benefits, green purchasing also creates cost benefits. Environmentally preferable products have been found to be less expensive than similar, equivalent traditional products, particularly those green products that are comprised of recycled material; they offer the added value of reduced waste and disposal costs; and even those green products that may be more expensive initially can produce cost savings in terms of maintenance, operations, and disposal (NASPO, n.d.) Because of the cost savings and the reduced negative environmental impact, many private companies around the world are embracing green procurement. In Japan, nine firms in the electric and telecommunications industry, including Sharp, Toshiba, Sony and Canon, worked together to develop a standard for the chemical threshold of parts and products they procure from other companies (Jiji Press English News Service, 2001). In 2001, Sharp also announced that by 2002 all of its plants outside of Japan would adopt the same green procurement policy that its domestic plants had adopted in 2000 (Jiji Press English News Service, 2001a). Like Sharp, Toshiba American Consumer Products, LLC. (Zubko, 2009) and Canon Middle East (Al Bawaba, 2010) have revamped their procurement guidelines to more carefully evaluate the materials and parts that they procure for use in their products. While some of the emphasis on reduced toxic materials can be traced back to the European Union's Restriction of Hazardous Substances banning certain hazardous materials/chemicals in products, a large part of the adoption of green standards and procurement

criteria is an effort to minimize the negative environmental impacts of their operations and to realize cost savings through buying greener products (Zubko, 2009).

In the United States, IBM and Herman Miller (Varmazis, 2008) have also made commitments to green procurement. IBM has not only instituted a sense of stewardship into all of its practices, but it has also realized cost benefits from doing so: in working with their suppliers of engineer-grade resins, they were able to introduce a recycled resin into the market that was less expensive and of better quality than the virgin resins that were previously used (Varmazis, 2008). Herman Miller, a maker of office furniture, wanted to ensure that its chairs could be recycled at the end of their life-cycle. To this end, the company asks all of its suppliers to assist with this endeavor by not using hazardous materials in their parts; the company opts not to use the suppliers that don't comply (Varmazis, 2008). As demonstrated, companies are becoming more environmentally conscious of the effects their operations have on the environment; they are engaging in green procurement and supply chain reforms in the effort to mitigate these effects and, in the process, are expanding the market for green products and profiting from growing consumer demands for these products.

Many governments are also adopting green procurement policies and practices. The Philippines and the United States are just two of the countries that have adopted green procurement policies. In 2004, President of the Philippines Gloria Macapagal Arroyo issued Executive Order 301, establishing a Green Procurement Program giving preference to companies that produce environmentally friendly products (Ng, 2004). In the United States, Presidents Carter, Clinton and Bush have mandated better, more environmentally sensitive purchasing practices. President Jimmy Carter signed the Resource Conservation and Recovery Act (RCRA) in 1976, requiring all federal agencies to develop an affirmative procurement program (APP) to

ensure that paper purchases contained at least 30 percent recycled content (Coggburn and Rahm, 2005). Beginning in 1993, President Clinton issued a series of Executive Orders (EO) to expand environmentally preferable purchasing practices in the federal government:

- Execute Order 12873 in 1993, Federal Acquisition, Recycling and Waste Prevention: required agencies to eliminate raw, or virgin, material requirements when possible, use recovered materials, consider life-cycle cost, recyclability, and ultimate disposal. This EO also created the Federal Environmental Executive within the EPA (Clinton, 1993).
- Executive Order 13101 in 1998, Greening the Government through Waste Prevention, Recycling, and Federal Acquisition: required agencies to amend their daily activities to identify waste prevention opportunities and were further directed to facilitate the development of a green marketplace by becoming customers (Clinton, 1998).
- Executive Order 13148 in 2000, Greening the Government through Leadership in Environmental Management: mandated head-of-agency buy-in by making heads of agencies responsible for fulfilling new green requirements (Clinton, 2000a).
- Executive Order 13149 in 2000, Greening the Government through Federal Fleet and Transportation Efficiency: required leadership to reduce petroleum consumption (Clinton, 2000b).
- Executive Order 13150 in 2000, Federal Workforce Transportation: authorized an exemption for employees who used public transportation (Clinton, 2000c).

President George W. Bush also issued an Executive Order designed to encourage green purchasing practices:

- Executive Order 13423 in 2007, Strengthening Federal Environmental, Energy, and Transportation Management: requires that acquisitions of goods and services use

sustainable environmental practices, that fleets of twenty or more motor vehicles use plug-in hybrid vehicles and reduce petroleum consumption while increasing non-petroleum-based consumption, and that electronic product purchases meet the standards established by the Electronic Product Environmental Assessment Tool (EPEAT) (Bush, 2007).

At the state level, Massachusetts and California have implemented environmental standards in their procurement processes. Massachusetts, under the leadership of Governor William Weld in 1993, established an EPP program that focused on the procurement of recycled products, including recycled paper and office supplies as well as plastic lumber benches and tables, recycled motor oil, and recycled traffic cones (Cogburn and Rahm, 2005). The state procures hybrid vehicles and environmentally preferable cleaning products and has also extended EPP into their bidding process: Massachusetts issued an RFP for computers in 2004 that contained environmental specifications such as reduced toxic materials, design for recycling, energy efficiency, recycled content, recycled or reduced packaging, and manufacturing take-back programs in their contract language (Asner, 2005).

Like Massachusetts, California is also active in advancing green procurement practices. In 2006, the state adopted an environmentally preferable carpet standard that establishes environmental requirements related to indoor air quality, hazardous-materials content, recycled- and bio-based content when procuring carpeting (Case, 2007). While there is a common misconception that greener products cost more, California is reportedly not incurring any additional costs for the environmentally preferable carpets and is actually realizing savings with regard to fewer employee sick days due to the indoor air pollution caused by traditional carpets (Case, 2007).

Local governments have also instituted changes in their procurement processes. Lee County, Florida has undertaken a fleet management program to identify and locate products to replace petroleum-based cleaners and certain automotive fluids (www.lee-county.com, n.d.). Lee County Fleet Management is the only Florida county to obtain 100 percent non-hazardous waste generating status. This attainment required comprehensive changes in the way the department conducted their procurement practices, including avoiding the purchase of products containing high levels of volatile organic compounds (VOC) and replacing the purchase of aerosol spray cans with refillable, air-pressurized dispensers (EPA, 2000).

On a much larger scale, cities such as San Jose, California or Chicago, Illinois have also implemented green procurement practices. In 2007, the City of San Jose revealed a 15-year plan to make San Jose greener. Many times, procurement aspects are part of a bigger and more comprehensive goal; one components of this comprehensive plan is to ensure that 100 percent of the public fleet vehicles are hybrids that run on alternative fuels (Cable, 2007a). Like San Jose, the City of Chicago's Department of Fleet Management entered into an \$8.75 million contract for hybrid Priuses, Camrys, and Highlanders from Toyota (Cable, 2007b).

Clearly, private companies and governments alike are recognizing and embracing the benefits of green procurement but the question remains as to why. Private companies may be satisfying corporate social responsibility and consumer demand, they create new markets for their goods, and can achieve cost savings through the use of EPP. Private organizations are likely to engage in mitigating activities when doing so enhances their economic performance or improves their corporate reputation. Some studies have also demonstrated that institutional determinants such as regulation, the monitoring activities of non-governmental organizations (NGOs) and interest groups, organizational norms, and open dialogue can also compel private

organizations to move beyond their goal of profit maximization to that of being a good corporate citizen. However, the strategies, motivations, and operating environments of private organizations are not those of public organizations. Public organizations do not generally focus on profit maximization and do not compete in a market system, financial and reputational advantages are not likely to entice public organizations to undertake oft-costly processes related to identifying environmentally negative by-products of their operations and rectifying them. Public procurement differs from private procurement in at least ten ways, including coping with obstacles such as legal restrictions, compliance with regulations, and diffusion of authority (Heinritz et al., 1991); because of these different organizational environments, public green procurement cannot be explained or understood in the same context as private green procurement.

Assuming that the budgets at every level of government are being more and more stressed, why do some governments' purchasing departments behave differently from others in the buying of green products? Different attitudes toward stewardship could be a factor. Aside from demands from some citizens to 'go green' and desires to be more efficient to avoid current costs, some public servants could believe they owe it to future generations to be good stewards. Many of the most pressing policy issues governments face revolve around questions of fairness and equity between generations: social security, health care, and the national deficit all have intergenerational impacts (Frederickson, 1994; Kotlikoff and Raffelhueschen, 1999). Because environmental protection is an attempt to preserve resources for the use of future generations, decisions regarding consumption and purchasing must be considered in an intergenerational context.

Supporting the development and institutionalization of green procurement serves future generations by ensuring not only that resources will still be available but also by minimizing the negative environmental impacts to which they will likely have to devote resources. Public purchasing officials have the ability to create policies and/or partake in behaviors that produce the equity that all public administrators are charged with providing. In addition to the moral obligation public purchasers have to consider intergenerational impacts, green procurement can also be considered an ethical requirement. From an ethical standpoint, the public purchaser must weigh the costs between going green or buying a cheaper product that is more environmentally harmful (Hunsaker, 2009).

While studying the determinants of green procurement at the national or state level would be valuable, this study centers on the purchasing activities of county governments. One reason for this is that county governments are able to respond to local pressures and conditions more readily than national or state governments. Counties are better able to take the interests of its citizenry and turn them into actions. Another reason that counties were selected for this study is that they are underrepresented in the public administration literature even though they provide fertile ground for observations and studies that are relevant to public administrators, such as financial management and policy. This study focuses on counties because counties can better assess their citizens' needs, move more quickly to address those needs, and are able to act on issues that the state may not have an active interest in attending to. Green procurement is one such issue; though the EPA has defined 'green' procurement and the use of eco-labels as prevalent and credible, many states do not have a formal, written green procurement policy.

What are the internal determinants that influence a county's decision to implement green procurement practices? While there are many examples and cases of green procurement in the

public sector, there are few empirical studies that can answer this question or speak to the prevalence of green procurement activities in the United States' local governments. This study addresses the question of which internal determinants impact the adoption of environmentally preferable purchasing by county governments in the United States. This study is timely, as green procurement has never been as prevalent or affordable as it is today, and fills multiple voids in the current innovation literature by using counties as the unit of analysis, by extending innovation adoption variables to public procurement, and by using an empirical approach rather than anecdotal case studies.

CHAPTER TWO

LITERATURE REVIEW

Why Study Public Procurement?

Public procurement differs from private procurement in many ways. These include coping with obstacles such as legal restrictions, compliance with regulations, and diffusion of authority (Thai, 2001; Heinritz et al., 1991). Public procurement also requires unique skills and knowledge related to policy, economics, and law (Thai, 2001) and government purchasers may be called upon to respond quickly in times of emergency and urgency (Gordon et al., 2000) during natural disasters like Hurricane Katrina (Snider and Rendon, 2008). Because private and public procurement professionals operate in different organizational environments, it becomes necessary to recognize public procurement as distinct from private procurement and develop insights that are uniquely suited for public organizations.

An Introduction to Government Procurement

Public purchasing has a long history as evidenced by studies that examine purchasing arrangements between governments and suppliers as far back as the 8th Century B.C. (Thai, 2001; Callender and Matthews, 2000). Purchasing is one of the oldest and most crucial activities in which governments engage. Faulty government procurement practices can have devastating effects. During the American Revolution, American troops received faulty equipment, experienced arms shortages, and some died due to malnutrition because Congress could not effectively and consistently procure basic items (Keeney, 2007).

In the U.S, local government procurement preceded that of state and federal governments, as services such as printing were required by colonial governments (Callender and

Matthews, 2000; Thai and Grimm, 2000). States were the first to organize purchasing into centralized units with personnel explicitly charged with carrying out purchasing activities (Thai and Grimm, 2000). The federal government began regulating the practice of public purchasing in the late 1700s with the passage of multiple procurement-related acts, thereby establishing purchasing as a legitimate government function (Prier and McCue, 2009; Callender and Matthews, 2000). Thus began the profession of public purchasing in the United States, a profession which has seen many changes in function and scope. While the formalization of public purchasing was initially regarded only as a means of ensuring accountability and fairness in contracting practices, it has broadened its reach by becoming a strategic partner in many governments. For these reasons, procurement is and has been a central component of the field of public administration, both abroad and within the United States and at every level of government.

Describing the Public Procurement Literature

The themes discussed below are important in understanding how public procurement has developed over time. These themes are also useful in thinking about how public procurement will continue to develop in the future. For purposes of this research, emphasis is placed on the following themes: ethics and accountability, professionalization and certification, centralization, and strategic procurement. These topics are discussed in order to demonstrate what the current procurement literature looks like and how green procurement fits into the broader procurement literature. The adoption of green procurement practices can be understood in light of these themes, making it necessary to provide at least a brief discussion of these topics.

Ethics and Accountability

Procurement is highly susceptible to fraud, waste, and abuse (Hunsaker, 2009; Thai, 2001; Thai and Grimm, 2000). In the late 1700s, the first individuals to be entrusted with the responsibility of purchasing goods or services on behalf of governments were commissaries who earned a percentage of the procurements (Callender and Matthews, 2000; Thai and Grimm, 2000). Because their pay increased when the price of the procurement increased, these purchasing representatives had little incentive to seek the best value for the lowest price and caused governmental purchasing to be expensive and largely inefficient. In order to reduce costs and the opportunity for fraud, the United States Congress established rules for government purchasing. These included prohibiting members of Congress from receiving benefits from contracts in the 1808 Act Concerning Public Contracts (Thai, 2001). Measures to improve competition were included in the Procurement Act of 1809 and the Civil Sundry Appropriations Act of 1861 (Thai and Grimm, 2000). The federal, state and local governments have continued to add regulations to their purchasing policies, including green procurement requirements, to seek better value for taxpayers and ensure that the public trust is not being betrayed. Public procurement is “one of the most legislated and regulated fields of government activities” (Prier and McCue, 2009).

The American Bar Association developed the 2000 Model Procurement Code for State and Local Governments (Hunsaker, 2009; Thai, 2001). The Code is intended to standardize procurement practices and directly addresses ethics in procurement by establishing a standard of conduct to guide procurement activities. The need to assure a sound ethical foundation for procurement has been of great concern to both scholars and practitioners. For example, Hunsaker’s (2009) suggestions on how to encourage ethical public procurement included

engaging in training and educational programs; holding membership in professional organizations like the National Institute of Governmental Purchasing (NIGP); and developing a strong moral compass that not only facilitates adherence to relevant purchasing laws but that allows for sound decision-making when gaps or lapses in law necessitate individual judgment and discretion. The moral compass, says Hunsaker, comes partly from always remembering first and foremost that it is “not your money.”

Public Procurement as a Profession

Establishing public purchasing as a true profession has been a continuing objective of many contributors to the purchasing literature. According to scholars such as Callender and Matthews (2000) and Gordon et al. (2000), professions can be described as groups with attributes such as a particular and unique knowledge-base, a sense of service, power of its domain, a code of ethics through which appropriate behavior is delineated, a formal organization to advance the profession, and a champion or advocate for the profession. These authors concede that some aspects of the field may not as yet be fully professionalized or that it might be against the public good if some of the criteria were fully satisfied (such as complete autonomy or totally standardized certification), but they do conclude that the field of public procurement is a profession.

In contrast, Prier et al. (2010) suggest that currently public procurement is not necessarily a profession, as there are no barriers-to-entry, such as licensure, that limit who may belong to the profession. Certification, they argue, could provide this barrier, thereby legitimizing the claim that public procurement is a profession. However, certification is not unanimously required in all government purchasing offices and not all certifications are the same. Without this required, standard certification, public purchasing is not a true profession.

Additionally, Prier and McCue (2009) find it difficult to accept public purchasing as a profession given its “muddled” definition and the lack of uniformity across state and local governments.

Without an agreed-upon and consistent definition of the field, there can be no set body of knowledge; without a common body of knowledge, public procurement cannot be considered a profession.

Certification

Central to the question of purchasing as a profession is the question of certification in public purchasing. All of the above-mentioned arguments for professionalism include certification or education and training through certifying bodies as fundamental to public purchasing as a profession. Within government purchasing, there are different types of certifications: national organizations such as the Universal Public Purchasing Certification Council (UPPCC), the National Institute of Governmental Purchasing (NIGP), the National Association of Purchasing Management (NAPM), and the National Contract Management Association (NCMA) all offer varying certification programs (Callender and Matthews, 2000). Some states, such as Florida, have required state-level purchasing certifications for purchasing agents, purchasing managers, contract managers, and contract negotiators (Prier et al., 2010). However, certification programs do not necessarily ensure that those who become certified actually possess the skills and knowledge they need to be competent and professional public purchasers. Additionally, some of the certification programs may stress innovation adoption, such as implementing green procurement policies, while others may choose to focus their program elsewhere.

Centralization vs. Decentralization

Discussions about the relative merits of centralized purchasing over decentralized purchasing, and vice versa, are prominent in the procurement literature. Following the establishment of city purchasing departments in the early 1900s, centralized purchasing became the common structure for government purchasing (Thai, 2001). Advantages of a centralized purchasing department include a controlled and compliant environment through regulations; a protocol for guiding purchasing decisions; diminished risk in procurement activities; and more efficient performance for many types of procurements (Schapper et al., 2006). However, there has been much debate about the merits of centralization and many governments have made attempts at reform whereby procurement activities become less centralized or devolved (Hunsaker, 2009; Schapper et al., 2006). Advantages of a decentralization of purchasing authority include increased flexibility and responsiveness to end users; facilitation of inter-departmental cooperation and collaboration; and granting purchasing managers authority to use their professional discretion in purchasing decisions (Thai and Grimm, 2000). Decentralization may also be a function of organizational growth whereby oversight diminishes as an agency grows bigger (Hunsaker, 2000). Additionally, decentralization makes the purchasing function less mechanical, more dynamic and innovative, and more professional by fostering skill development rather than demanding automated responses (Schapper et al., 2006).

Despite the appeal of decentralization, there are certainly risks associated with increased individual discretion. Transparency and accountability are paramount when using public money, making decentralization tenuous. For this reason, many purchasing departments are combining aspects of both centralized and decentralized management schemes to create hybrids (Hunsaker, 2009; Schapper, 2006). Schapper et al. (2006) specify three types of purchasing management and

explain where they typically fall in the centralization/decentralization conflict: strategic management, associated with broad reforms and policy issues, appears to somewhat necessitate a centralized position regarding contract design, specification, and regulation of process; performance management, associated with complex purchasing, sides more with a decentralized approach contract specifications, evaluation and regulation; and process management, related to simple, routine purchases, lends itself well to decentralized processes. However, a mix of procurement management styles may be generally preferred. A 2000 survey conducted by Florida Atlantic University showed that over half of the purchasing departments surveyed were using aspects of both the centralized and decentralized procedures (Hunsaker, 2009).

Procurement as Strategic/Policy Tools

Procurement has evolved from an emphasis on accomplishing rote activities and protocols to becoming a strategic partner with top managers and policy makers. Snider (2006), for example, speaks to the leadership role of the procurement professional in shaping organizational ends. The main argument in his study revolves around whether the field of procurement is merely a clerical/tactical function, beginning only once a need has been identified, or one in which procurement officials play an active leadership role in establishing organizational goals, promoting vision, and setting strategies (Snider, 2006). The study suggests the procurement function has moved out of the background and into the foreground for setting organizational goals. Purchasing departments are strategic partners in their organizations, resulting in efficiencies, when they are able to incorporate the organization's vision and goals into purchasing decisions Gordon et al. (2000). Public purchasers are able to make strategic contributions to their organizations related to improvements in quality and reductions in cost

(Callender and Matthews, 2000) as well as through efficiencies in cost, time, inventory, and use of human capital (Prier and McCue, 2009).

Public purchasing is also a policy tool. Some policies are designed to advance a political, economic, or social objective (Coggburn, 2004; McCrudden, 2004; Thai, 2001). These objectives aren't even necessarily local or regional: public procurement and contracting have been used to address national objectives related to labor standards and the civil rights movement in the United States, *apartheid* in South Africa, and religious discrimination in Northern Ireland (McCrudden, 2004). Policies such as these can often only be implemented through procurement activities because of their polarizing context and the inability of governments to move quickly or in unison to resolve them. The ability of government procurement and contracting in changing discriminatory status quos cannot be overstated; government procurement and contracting have been catalysts for implementing social changes, such as anti-discrimination and access for disadvantaged groups, that could likely not have been achieved as quickly or effectively by other means. Moreover, procurement professionals may be uniquely qualified to work with these types of policies because many of their procurement decisions are already made in an environment bound by rules where risk and uncertainty are common (Prier and McCue, 2009). Snider and Rendon (2008) examine public procurement as allocative public policies and even suggest that all manner of procurement decisions could be understood as "street-level policy", creating winners and losers in policy areas ranging from education to the environment to defense.

In addition to the wider social policies, many organizations use purchasing to establish and achieve organizational goals. Public purchasers view themselves as serving both strategic and policy roles (Prier and McCue, 2009). Citing the result of an NIGP survey conducted in 2004, Prier and McCue highlight the finding that the thinking of practitioners in 2004 was that

their function was largely that of a regulatory nature. However, when asked where the purchasing function will be in five years, over 50% of respondents suggested that procurement would be a strategic function, demonstrating a perceived shift from clerical and regulatory responsibilities to a more strategic role in the organization. Prier and McCue (2009) also suggest that purchasing decisions are policy tools in that purchasing outcomes affect policy decisions: buy-American mandates and requirements for using small and/or local businesses are just two examples. In 2003, the United States Congress passed the Services Acquisition Reform Act, providing a clearer definition of acquisition whereby they expanded the definition to include technical and management functions, thereby signaling a more strategic view of procurement (Prier and McCue, 2009). Public procurement is a policy tool, and the public purchaser will be involved in all levels of government decision-making, particularly when making the basic and common make vs. buy decisions as to whether or not to privatize.

Innovation Adoption and Public Procurement

An innovation is commonly accepted as an idea perceived as new; the innovation or program itself does not have to be new, just new to the individual, or in this study, county that is looking to adopt it (Gray, 1973; Walker, 1969). Walker's (1969) seminal study of innovation at the state level examines two questions: why some states adopt programs more readily than others, and how these new programs spread to other states. His study established a mechanism for looking at how innovative states were by examining how rapidly a state adopted various policies and assigning it an innovation score based thereon. Walker's (1969) study of innovation diffusion provides a good starting point: in line with his first question, this study seeks to understand why some counties, in terms of procurement, are more innovative than others. His

findings that larger, wealthier states with greater urban populations and higher average per capita income will be tested in this study to determine whether these same characteristics also play a role in innovation adoption at the county level. Gray (1973) also examined innovation adoption at the state level and echoes Walker's findings that innovative states are more likely to be affluent, but she also considers the importance of issue and timing. These two additional factors of issue and timing could potentially be very important to the adoption of technological and social innovations.

Innovation adoption, and the diffusion thereof, has been the focus of many studies in the public administration literature. A broad range of topics from taxation (Berry and Berry, 1992) to state lotteries (Berry and Berry, 1990) to tobacco control (Shipan and Volden, 2006; Studlar, 1999) to e-government (Tolbert et al., 2008) have evaluated the characteristics of innovation diffusion put forth by Walker (1969) and Gray (1973). Organizations have been shown to adopt an innovation because of internal determinants described as the political, economic and social attributes of the state (Berry and Berry, 1990). Additionally, Savage's study (1985b) speaks to the general study of innovation diffusion and outlines commonly used adopter characteristics, including: population size, industrialization, education, party competition, and pressure group activity. Communication and/or networks are also very important components of innovation adoption (Studlar, 1999; Savage, 1985a; Savage, 1985b; Gray, 1973; Walker, 1969). Communication is essential for spreading the awareness of problems as well as their solutions and how well those solutions have worked. Likewise, innovation has been the focus of environmental policy adoption both domestically (Matisoff, 2008) and abroad (Perkins and Neumayer, 2008; Busch and Jörgens, 2005).

Matisoff (2008) undertook a study to examine the diffusion of climate change and/or energy policy innovations using both the internal determinants model (state characteristics) and the state emulation model (whereby legislators look to the adoption activities of neighboring states for policy innovations). Ultimately, Matisoff (2008) concluded that internal determinants played a larger role in innovation adoption than the activities of neighboring states, that special interest groups impact the adoption of energy policy innovations, and that states with carbon-intensive industries will be less likely to adopt renewable energy policies. From an international perspective, Perkins and Neumayer (2008) examined the transnational linkages between countries that facilitate the diffusion of environmentally beneficial innovations. Their findings suggest that transnational information and communication networks are conducive to the diffusion of environmental innovations. Similarly, Busch and Jörgens, (2005) studied international diffusion of environmental policies, defined as “*the international spread of policy innovations driven by information flows rather than hierarchical or collective decision making within international institutions*” (Busch and Jörgens, 2005). The widespread adoption of voluntary programs without formal agreements in place is attributed to an early 1990’s UN Conference for Environment and Development (UNCED) recommendation in that “governments should adopt a national strategy for sustainable development” (Busch and Jörgens, 2005). The recommendation was a suggestion that countries develop a sustainability plan; it carried no requirement to do so and created no obligations. The recommendation, however, became a norm in the international community because of transnational communication networks.

An interesting paradox is how voluminous purchasing innovation studies are with regard to the private sector and how sparse they are with regard to the public sector. Within the private sector purchasing literature, innovation is a much-discussed topic. As far back as 1976, the

relationship between purchaser and innovation was being explored: Moguee et al. conducted a study of industrial innovation which ultimately found that the purchasing agent is crucial in bringing innovations into the purchasing process through their knowledge of alternatives and their role as a gatekeeper. Private sector innovation studies range from innovation in purchasing and supply management (Anonymous, 2007) to innovation vs. cost reduction (Godwin and Grove, 2005) to the importance of leadership buy-in (Ellinor, 2006). To be clear, private sector innovation studies are not all from the perspective of purchasing departments adopting innovations: the studies cover many different aspects, including innovations in purchasing, innovation in supply chain management, and the impact purchasing can have on overall firm innovativeness. Castaldi et al. (2011) interviewed Chief Purchasing Officers of twelve firms in the Netherlands to determine the links between the purchaser and strategic purchasing, ultimately finding that companies with high strategic purchasing scores have adopted innovations such as automated systems, are more focused on the long term, coordinate activities with other units, and have support from top management.

Like Castaldi et al., Luzzini and Ronchi (2011) studied seven innovative companies to determine how the structure of the companies' purchasing departments impact firm innovativeness. Their findings suggest purchasing departments with more skilled purchasing professionals are more likely to seek out innovation opportunities than departments that serve more of a traditionally clerical function; internal integration is imperative, including a wider scope of purchasing authority; and the purchasing departments with higher status/leadership support are more influential in making strategic purchasing decisions. Similar to the public purchasing literature, private sector purchasing has also examined e-procurement adoption (Brown, 2004; Chia and Al-Hawamdeh, 2002; Perrin, 2002; Attaran, 2001).

Perrin (2002) and Attaran (2001) describe various e-procurement innovations and provide suggestions for successful implementation, but there are also studies that look more to the determinants of innovation adoption. Chia and Al-Hawamdeh (2002) and Brown (2004) conducted surveys of organizations to gain insights into e-procurement adoption. Chia and Al-Hawamdeh (2002) studied a range of companies in Singapore and their use of the Internet as a procurement tool. The study does not include clear hypotheses or variables; however, the anecdotal findings suggest that availability of resources is a key determinant, as the majority of survey respondents had allocated millions of dollars to establish e-procurement in their organizations. One of the key barriers proposed by Chia and Al-Hawamdeh (2002) is competing priorities, indicating that high-level support may be necessary for implementing new procurement technologies.

In a more sophisticated study, Brown (2004) developed and tested hypotheses related to organizational adoption and implementation of e-procurement innovations. Brown (2004) surveyed 1200 purchasing professionals belonging to the Institute of Supply Management to assess e-procurement assimilation by organizations. He developed several constructs including top management support, organizational readiness (defined as the level of financial and technological resources available), and structural assurance of IT infrastructure to evaluate the organizations' usage of three electronic innovations. These three innovations were electronic catalog management, electronic order fulfillment, and electronic payment settlement systems. Brown (2004) ultimately found that top management support and organizational readiness, operationalized by level of financial resources, to be significant factors.

Public purchasing may not appear all that innovative given the perception that purchasing can be mechanical, clerical, and risk-averse. However, there have been developments over the

last thirty or so years that have greatly impacted, and arguably enhanced, public purchasing. Among the more noteworthy technological innovations in the field are the use of procurement cards (p-cards) and the adoption of electronic-procurement (e-procurement) systems; two of the more recent social innovations are the requirement that historically underutilized businesses (HUBs) be given better access to government contracts and the institutionalization of green procurement practices. Pressures related to technology use have reached the procurement professionals at all levels of government (Thai, 2001), as have the influences of social movements that demand better, more equitable and holistic purchasing strategies.

Technological Innovations: P-Cards and E-Procurement

P-cards and E-procurement are two technological innovations that are designed to promote timeliness and efficiency in the purchasing process. The use of technology is understood to not only facilitate efficiency and value for money but also provides faster information attainment and reduced transaction time (Callender and Matthews, 2002). It will continue to become increasingly important that purchasing offices adopt technology that will not only ease their processes but create efficiencies and cost savings. Several factors can influence a government's adoption and use of web technologies like e-procurement, such as professionalism and individual discretion to name two (Klay, et al., 2010), and programs of this nature often encounter a number of barriers including technical, political/organizational, legal, and financial (Coursey and Norris, 2008). Even though the implementation of technology innovations carries risks and costs, benefits related to cost avoidance, timeliness and customer satisfaction can be realized: Tolbert and Mossberger (2006) found that use of web based technology by local governments enhanced government-citizen relationships and increased citizen trust.

P-cards were first introduced in the federal government in 1982 by President Reagan's Executive Order 12,352, and later reinforced as part of President Clinton's National Performance Review in 1993 as a means of reducing the costs related to government procurement (Gupta and Palmer, 2008). The cards were purported to be more efficient than traditional methods of procuring goods and services for small purchases because they cut out paperwork and reduced transaction time with little risk of abuse. However, the use of p-cards was expanded to non-procurement personnel, opening the system to the potential for abuse. The Office of Management and Budget in 2002 responded to reports of widespread abuse by recommending that the cards be limited to only a few personnel; however, this may have been an overreaction, as the study conducted by Gupta and Palmer (2008) indicates that the amount of p-card abuse in the federal government is not significant and that the benefits of using the cards for small, common purchases under \$2,500 far outweigh the lost opportunity to cut transaction costs related to traditional procurement methods. Despite the apparent curtailment of p-card programs at the federal level, state and local governments (Daly and Buehner, 2003) often utilize p-card programs, thereby reducing some of the administrative costs associated with small, routine purchases and creating time efficiencies.

E-procurement is another technological innovation that has been adopted at all levels of government though mainly only studied at the state level (Moon, 2005; Reddick, 2004). According to Moon (2005), e-procurement is defined as "a comprehensive process in which governments use IT systems to establish agreements for the acquisition of products or services (contracting) or to purchase products or services in exchange for payments (purchasing)." Similarly, Reddick (2004) describes e-procurement systems as "any technology designed to facilitate the acquisition of goods by a commercial or government organization over the

Internet.” These systems can be very basic and merely provide information, or they can be highly sophisticated and facilitate most if not all procurement functions. Like p-cards, e-procurement systems can help governments cut down on purchasing transaction costs related to paperwork and timeliness with the added benefits of better control over employee spending and compliance, opportunities for a broader range of vendors, and better processes and workflows (Moon, 2005). However, as with the p-cards, some downsides to e-procurement require acknowledgement. The digital divide can create winners and losers in the e-procurement process: minority or small business owners may fall victim to the digital divide and be less capable than larger, more tech-savvy businesses to access and benefit from the e-procurement processes (Reddick, 2004; MacManus, 2002). Legal and privacy issues as well as level of sophistication, training and costs associated with the development, operation, and maintenance of the system must also be factored into any decision to develop an e-procurement system (Reddick, 2004). Like any innovation, a great deal of planning and a staunch commitment to the project are also required.

Social Innovations: CSR, Vendor Diversity and Green Procurement (EPP) in Businesses

While technological innovations may create better access and other positive externalities in addition to improving processes and promoting efficiency, it is not their original intent and therefore distinguishes them from social innovations. Social innovations are operationalized in this study as new programs or policies that carry impacts that reach beyond the organization to create positive externalities in the community. These innovations can be found both in the private and public sectors.

Corporate Social Responsibility (CSR) is one such social innovation found in the private sector, a component of which is green procurement. CSR in the business literature has multiple definitions but is generally understood to encompass principles of responsibility to society as

well as the firm (Hart, 1995; Pava and Krausz, 1997; Bansal and Roth, 2000; Garriga and Mele', 2004; Campbell, 2007). While much of the literature tends to focus on CSR as a way of creating wealth to its stakeholders (Hart, 1995; Pava and Krausz, 1997) some of the literature speaks to CSR as a social or ethical responsibility apart from strictly firm performance (Bansal and Roth, 2000; Garriga and Mele', 2004).

Within the strategic management literature, Hart (1995) took up Barney's (1991) resource-based view of the firm describing how firms gain competitive advantage and expanded it to a natural-resource-based view of the firm. In this view, the competitive advantage created by valuable and non-substitutable resources will only create long-term advantage if they are rooted in sustainable economic activity. He proposes three strategies for achieving a sustainable, natural-resource-based view of the firm, one of which is product stewardship. Product stewardship encompasses the entire life-cycle of the product, from material extraction to disposition and end-of-life decomposition. Hart (1995) suggests that product stewardship encourages firms to revisit their current product line to determine where environmental hazards can be reduced, redesign their existing products, and develop new products with lower life-cycle costs. In keeping with the desire of firms to gain or retain competitive advantage and in recognition that green markets are not necessarily likely to provide this, he clarifies that competitive "preemption" through exclusive access to limited resources and/or establishment of rules or standards that suit the firm's capabilities should become the new focus.

Like Hart, Pava and Krausz (1997) also view CSR activities in light of how they can serve the firm. Pava and Krausz (1997) suggest that it is only appropriate if a direct link between corporate behavior and societal ills can be shown. Shared consensus indicates how strongly corporate stakeholders agree that a societal ill is in fact present and caused by the organization,

requiring remediation. It is interesting to note that the authors do also use these criteria when looking for proactive programs, providing some acknowledgement of the desirability to engage in CSR behaviors; however, some CSR activities, while ethically and morally attractive, do not fit the established corporate goals or add to stakeholder value and therefore will only be acted upon if the outcomes can be tied to positive economic performance (Pava and Krausz, 1997). The main argument of their study indicates that financial considerations are of primary interest in the absence of a clear link between the organization and a social problem but that social responsibility must precede financial considerations where there is a clear link between corporate activities and social harm.

Although the economic performance of the firm is certainly a priority, some theories around CSR acknowledge that firms may opt to engage in ecologically sound activities for other, more altruistic reasons. Bansal and Roth (2000) conducted a qualitative study of firms to understand why companies “go green.” Their attempt to ferret out the motivations for ecological responsiveness involved interviews with multiple industries in the United Kingdom and Japan, two culturally diverse countries. The authors ultimately found that competitiveness (positive effect on long-term profitability), legitimation (appropriateness of actions and conformance to regulations, norms, and values), and ecological responsibility (concern a firm has for its social obligations and values). Within this third motivation, ecological responsibility, firms were found to redevelop land rather than develop new land; create a green product line while knowing it may be less profitable; replace retail and/or office products with recycled or ecologically benign substitutes (Bansal and Roth, 2000). They drew the conclusion that firms focused on competitiveness and legitimation showed a deep concern for self-interest, whereas firms motivated by ecological responsibility took a more holistic approach.

Garriga and Mele' (2004) also studied the approaches that firms might use to incorporate CSR into their organization and developed four classifications of CSR theories: (1) instrumental theories where wealth creation is a corporation's sole responsibility and social activities should only be accepted if they contribute to wealth creation; (2) political theories, where corporations accept social responsibilities as part of their political position or power; (3) integrative theories, where business should be responsive to social demands because it relies on society for its well-being and existence; and (4) ethical theories, where it understood that firms have an ethical responsibility inherent in their relationship with society (Garriga and Mele', 2004). The first two types of theories have been discussed previously and generally coincide with the sentiments described by Hart (1995) and Pava and Krausz (1997). The latter two types of theories, however, appear to fall in line with the ideals of stewardship and ethical responsibility, which I think more closely parallels the motivations of public sector organizations that adopt environmentally preferable purchasing activities. Within the integrative theories, a sub-set of theories actually suggest that public policy is a suitable guideline for private sector managerial behavior because public policy moves beyond law to reflect public opinion and emerging issues (Garriga and Mele', 2004). A sub-set of the ethical theories speaks specifically to sustainable development, in which green procurement plays a major role. Citing the Brundtland Report, the authors explain that sustainable development is catching on as a concept but that organizations must pick the activities in which to engage that will be more closely aligned with their circumstances.

Social Innovations: CSR, Vendor Diversity and Green Procurement (EPP) in Governments

Similar to the adoption of CSR in private organizations, socially responsible activities have also been adopted by public organizations. As mentioned previously, government procurement and contracting has been linked to social innovations beyond the organization,

encompassing national policy objectives such as anti-discrimination and fair access (McCrudden, 2004). Watson et al. (2003) explain that public purchasing has expanded to include not only an awareness of socially responsible purchasing but a desire to facilitate it through procurement processes. Two ways to foster socially responsible procurement practices are to implement vendor diversity programs and to adopt environmentally preferable purchasing strategies. Both of these innovations carry risks as well as benefits, but both allow a county to demonstrate its commitment to and stewardship of the community. According to Arrowsmith (2010), procurement may be the only viable option for instituting a social change.

Vendor diversity programs have been enacted in all levels of government in the United States, and many national governments have modeled similar procurement programs after those in the United States (McCrudden, 2004). Minority and women business enterprise (MWBE) programs provide businesses that have previously been under-represented in government procurements better access to government contracts. These programs strive to overcome barriers including discriminatory attitudes of organizations, information disparities on the part of the minority vendor with regard to how to find out about and compete for government business, and difficulties navigating the bureaucracy (Watson et al., 2003). One way that greater vendor diversity is achieved is through the use of set-asides or preferences for businesses operated by minorities, women, or other disadvantaged groups as part of contract terms (Arrowsmith, 2010). At the national level, these types of programs have been used in the wake of *apartheid* in South Africa and to overcome religious discrimination in Northern Ireland (McCrudden, 2004).

Environmentally preferable purchasing is another emerging social innovation. Green procurement, or EPP, has been gaining in popularity as both a personal and organizational consumption choice. Surveys have shown that 75 percent of consumers are influenced by the

environmental-friendliness of companies (Drumwright, 1994) and Webb, Mohr and Harris (2008) developed a scale of Socially Responsible Purchase and Disposal (SRPD) factors, revealing that consumers are likely to change their purchasing behavior based on factors such as a firm's corporate social responsibility performance. Likewise, private and public organizations are beginning to critically evaluate the benefits of EPP because of the growing demand by their clients that they do so. New, Green, and Morton (2002) note that the increasing use of environmental criteria in supplier selection and evaluation is driven primarily by consumer pressure. This consumer pressure is also believed to be one of the catalysts for the adoption of Environmental Management Systems (EMS), such as ISO 14000 series standards or the European Union's Eco-Management and Audit Scheme (EMAS), many of which include green purchasing components (Coggburn, 2004).

Procurement specialists and the purchasing function in general are instrumental in bringing about a solution to environmental issues (Zsidisin and Siferd, 2001; Case, 2004b). Despite the void of academic literature about public organizations' adoption of EPP, some practical examples of EPP adoption in the public sector showcase how some governments have been able to implement green purchasing practices, including strategies such as establishing price flexibility, adopting best value principles, modifying specifications in solicitations, and referencing environmental labeling and certification in solicitations (Case, 2004a).

Government purchasing ability to impact the marketplace and even create new green markets necessitates the examination of why some organizations adopt green procurement practices while others do not. In view of the considerable purchasing power of governments and their ability to affect the marketplace (New et al., 2002; Habeck, 2003; CEC, 2003), it becomes evident that the study of public purchasing is important in many respects. The possibility of ameliorating

environmental stress through the purchasing behaviors of governments is one of the most important aspects of public procurement, yet it has generally been neglected by scholars though McCrudden (2004) suggests that green procurement, or sustainable procurement, is becoming more interesting to the field of public procurement.

While there are a handful of studies related to environmental policy innovation and diffusion (Jørgens, 2001; Matisoff, 2008; Perkins and Neumayer, 2008), no studies have focused on how green procurement diffuses among states or local governments. Much of the focus on environmental policy adoption has been at the international, national or state level. In this context, scholars have addressed issues related to regulatory schemes, greenhouse gas reduction, and networks (Jørgens, 2001; Matisoff, 2008; Perkins and Neumayer, 2008). Studies of voluntary environmental management systems (EMSs) have also provided interesting insights as to how countries, industries, individual businesses, and local governments in Europe are lessening their carbon footprint (Emilsson and Hjelm 2004, 2005; Strasser, 2008). Green procurement, however, is not the focus of any of these studies. Many EMS programs, such as the ISO standards, do include a procurement component, but this particular aspect of EMS-adopting organizations has not been examined. Perhaps the most perplexing (and important) research question is: *Why do some public sector organizations go green while others do not?* That is the central question to be addressed in this study.

About This Study

Sustainability is becoming an increasingly important policy goal, and government activities, including procurement practices, are understood to play a role in achieving sustainability. As early as 1987, the Brundtland Commission, or World Commission on

Environment and Development (WCED), was bringing world leaders together to focus on sustainable development (World Commission on Environment and Development, 1987). The report issued by the Brundtland Commission, *Our Common Future*, speaks to sustainability strategies related to topics ranging from food security to energy and industry development. In the final chapter of the report, the Commission highlights institutional and legal changes that are needed, including changes related to incorporating environmental considerations into their decision making:

15. Central agencies and major sectoral ministries play key roles in national decision making. These agencies have the greatest influence on the form, character, and distribution of the impacts of economic activity on the environmental resource base. It is these agencies, through their policies and budgets, that determine whether the environmental resource base is enhanced or degraded and whether the planet will be able to support human and economic growth and change into the next century.

Additionally, the report also suggests a change to the way traditional goals, such as purchasing goals, are met that incorporates environmental impact considerations:

17. Environmental protection and sustainable development must be an integral part of the mandates of all agencies of governments, of international organizations, and of major private sector institutions. These must be made responsible and accountable for ensuring that their policies, programmes, and budgets encourage and support activities that are economically and ecologically sustainable both in the short and longer terms. They must be given a mandate to pursue their traditional goals in such a way that those goals are reinforced by a steady enhancement of the environmental resource base of their own national community and of the small planet we all share.

To this end, the European Union has been focusing efforts on greening public procurement in member countries since at least 2001. The Commission adopted in 2001 an environmental action programme designed to move green criteria into the procurement process (Business Europe, 2001). Since the introduction of this initiative, the Commission has carried out multiple studies, one of which sought to identify the prevalence of green public procurement

(GPP) in EU member states. In addition to studies, the EU has also set targets such as the 2008 Communication “Public Procurement for a Better Environment,” wherein a target of 50% of public procurements should be done in accordance with green procurement criteria (European Commission website). A subsequent study indicated that only about 26% of the 50% goal had been met but that there was an upward tick in the use of green criteria.

Sustainability is being viewed more and more as an imperative rather than a choice. Even if the international community had not begun to embrace sustainability, it could be argued that there exists a moral obligation on the part of policy makers to facilitate sustainability through their decision-making processes. Frederickson (1994) speaks to the need of being good stewards of resources on behalf of future generations, and a whole literature exists about environmental ethics, or human responsibility to nature and the remote future (Partridge, 1995). Blackstone (1973) attributed environmental crises not just to the obvious culprits such as dirty energy sources and chemicals that pollute waters and food, but rather the mistaken values and attitudes that suggest we have no obligation to future generations, that the “production of goods is more important than the people who use them.” He suggested a transformation in thinking, that we re-evaluate our fundamental values and how they are embodied in our social and political institutions. One such way is through the implementation of green procurement, making this study timely and necessary.

Counties have not generally been the focus of much of the public procurement literature, which seems short-sighted given that counties are generally able to respond to citizen demands and implement changes faster than states or countries. Additionally, counties can collectively, through their purchasing power, influence industry to achieve a socially desirable policy outcome (Klay and Sewell, 1996). In their study, Klay and Sewell (1996) described how local

police forces, seeking to procure non-lethal weapons for their communities, facilitated the expansion of the existing national defense technology market into the local government criminal justice market. The study utilized a communitarian framework, where government employees, as members of their community, are part of the public they serve and must, therefore, be conscientious stewards of the public's resources with a view towards future generations (Klay and Sewell, 1996). While this study did not speak to green procurement, it did speak to stewardship in procurement as well as to the collective strength of local government purchasing power. The communitarian framework and principles of stewardship certainly lend themselves to sustainable purchasing decisions in counties.

Variables and Hypotheses

Counties enjoy different levels of innovativeness. Similar to Walker (1969) and Gray (1973), this study is designed to explore what makes some counties more innovative than others. It does so in the context of environmentally preferable purchasing practices. Are there identifiable characteristics that make a county more likely to be innovative? A major assumption of the study is that variables that are associated with other types of innovation will also be associated with innovation in green procurement. The intent of this study is to determine the prevalence of this social innovation and will provide insights as to whether there are any particular characteristics that make a county more or less likely to adopt social innovations such as green purchasing practices.

The majority of the variables used in this study have been tested in prior innovation studies as well. Organizational size has been shown to be a factor in innovativeness. Population, for example, was tested in Walker's study of innovation diffusion among the American states

(1969). This study was among the first to illustrate the importance of population in innovation, demonstrating that states with greater urban populations were more likely to adopt innovations, likely because these areas would be centers of creativity and open to change (Walker, 1969). Of course, he was looking at legislative decision-making processes and formal policy adoption, making his study quite a bit different than this one. While he linked greater urban populations with greater representativeness in legislative decision-making leading to innovation adoption, this study looks only at whether or not population carries the same influence on county innovativeness when applied to green procurement practices.

With regard to the adoption of innovative environmental policies, Matisoff (2008) finds that demands of citizens are a key motivation for policy innovation. It stands to reason that more populous counties have the ability to create greater demand to local environmental conditions or concerns than counties with a lesser population. One of Matisoff's key findings was that citizens' demands are a very influential determinant of innovation adoption. To this end, Hypothesis 1 is as follows:

Hypothesis 1: County population is positively associated with green procurement practices.

Counties with greater populations are expected to have more green procurement practices.

Similar to population, wealth has been examined in the context of innovation. Walker (1969) and Gray (1973) both tested the influence wealth has on state innovation adoption. Walker's study indicated that states with slack resources were better able to adopt innovations, and Gray's study found that adopter states were wealthier and more competitive at the time of adoption. Additionally, Gray (1973) examines the "timeliness" of innovativeness, questioning whether innovativeness is stable or dependent on time and issue. This study does not

contemplate time or issue in this way, as it is not a diffusion study as such. However, this study does examine wealth, found to be significant by both Walker (1969) and Gray (1973), and its influence at the county level of innovativeness.

Specific to the procurement literature, Brown (2004) also found that financial resources were positively associated with e-procurement innovation assimilation in organizations. He found that organizational readiness, defined as the level and availability of fiscal and technological resources, was significant to e-procurement innovativeness. While his study was of organizations rather than counties, his findings may still be relevant here. Ergo, Hypothesis 2 suggests the following:

Hypothesis 2: Mean per capita income of county residents is positively associated with green procurement practices. A higher mean per capita income, indicating county affluence, should facilitate the adoption of green procurement.

Interest group activity has also been shown to influence innovativeness. Though the influence is unmistakable, the outcome can be a mixed bag. Savage (1985a and b) examined innovativeness by the states and determined that “issue fragility” could be a determining factor in whether or not a state adopts innovative policies. This idea of issue fragility can be understood thusly: an innovation, by nature of being new, runs the risk of creating organized opposition (Savage, 1985a). Considering the perceived cost and benefit issues inherent in green procurement, the risk of opposing interest group activity is very real. This point must be acknowledged, though it is not examined in this study.

Hypothesis 3: The number of environmental/pressure groups in a county is positively associated with green procurement practices. With regard to green procurement, the presence of environmental and/or sustainability interest groups should facilitate the adoption of green procurement activities.

Professionalism, or participation/membership in a communication network, has been demonstrated to facilitate innovativeness. In addition to his propositions regarding the impact interest groups can have on innovativeness, Savage (1985a) also suggests that communication networks are important for spreading awareness of new innovations and can serve to promote an innovation. Similarly, Lubell and Fulton (2007) found networks to be critical to the adoption of environmental policies. Their study looked specifically at local policy networks among orchard growers and local organizations in the context of best practices for watershed management. The study ultimately shows the impact the networks were able to have on the adoption of best practices, which can be construed as directly relevant to this study if it is accepted that sustainable procurement is a best practice.

Hypothesis 4a: Membership in a professional purchasing organization, such as the National Institute of Governmental Purchasers (NIGP), is positively associated with green procurement practices. Membership in a professional purchasing organization reflects membership in a communication network and should facilitate the diffusion of green procurement activities.

An additional measure of professionalism is the receipt of an award from a professional organization of peers. This variable has been used before: Klay et al. (2010) combined form of

government, planning for information technology, and receipt of the Government Finance Officers Association (GFOA) Distinguished Budget Presentation Award as a proxy for professionalism in their assessment of county use of e-technology. In their study, they found that population and, more importantly, professionalism were important factors in the counties with the higher levels of web services. To further test their finding, a professionalism measure capturing county receipt of a financial award for innovativeness is included in this study.

Hypothesis 4b: Receipt of a professional award for financial innovation, such as the Government Finance Officers Association (GFOA) Award of Excellence, is positively associated with green procurement practices. As stated above, membership in professional organizations should facilitate green procurement practices.

Unlike the other variables in this study, the influence of a sustainability office on county innovativeness has not been directly studied. What has been the focus of other studies, however, is the expansion of government-provided services. Counties are beginning to go beyond traditional and/or constitutional services like assessing property taxes, providing for public safety, and holding elections (Benton and Rigos, 1985; Cigler, 1990) to include health care services, educational services, recycling initiatives, and pollution control, among others (Duncombe, 1977; Schneider and Park, 1989; Benton, 2002). One likely reason for this expansion of services is because they reflect the preferences of the county's citizenry. Counties may have formed their sustainability offices as a direct result of the prevailing local ideological preferences (Lipsky, 1980). Counties with a sustainability office, at least on the surface, would indicate that the organization has institutionalized ideological change demanded by their

constituents, such as a green procurement policy. This may or may not reflect fiduciary efficiencies within the organization, but rather extends to include more far-reaching environmental and/or sustainability objectives.

Hypothesis 5: Counties with Sustainability Offices are positively associated with green procurement practices.

CHAPTER THREE

RESEARCH DESIGN

This chapter describes the research design for examining the sample counties for evidence of green procurement practices. Quantitative analysis was used in this study in an effort to demonstrate whether any particular county attributes are significant antecedents in county adoption of the green procurement innovation. This is not a topic that has been widely researched, giving this study merit and providing additional avenues for future research.

Design

This study examined the internal characteristics of counties in the United States relevant to their adoption of green procurement practices; accordingly, the unit of analysis for this study was counties. Of the more than three thousand counties in the United States, a stratified random sample based on population size was used to select a sample. The study design is cross-sectional for the year 2013. The websites of the counties in the sample were examined during February through April, and each website was examined for evidence of engaging in environmentally preferable purchasing. This is an appropriate method, as the sharing of county purchasing manuals online has become a common practice and, due to the nature of the information being sought, many counties are believed to be eager to demonstrate to their communities that they are developing greener purchasing practices. Studies of corporate social responsibility (CSR), for example, demonstrate that companies use their websites to communicate their CSR activities to their shareholders (Snider et al., 2003; Maignan and Ralston, 2002; Ersock and Leichty, 2000). Because green purchasing by counties can be conceived of similarly and is a CSR activity in

private companies, it is believed the county websites are used in much the same way, that those counties that are more engaged in green purchasing will promote it on their websites.

The counties included in this study were first stratified by population. A random selection was then undertaken based on population size groupings of small (under 50,000), medium (50,000 – 500,000), and large counties (500,000+). The initial sample size was 300 counties, 100 counties from each population group; however, the first group of counties, those with populations less than 50,000, was dropped when it was determined that the majority of these counties did not have purchasing departments and were, therefore, irrelevant to a study examining innovativeness of county purchasing departments. Of the 200 counties remaining in the study, data were collected for 174. Upon review of the county websites, it was determined that, for the 50,000 – 499,999 population range, three counties did not have active county websites, fifteen counties did not have purchasing departments or perform purchasing functions, and an additional three counties did not have any purchasing materials available online. For the 500,000+ population range, five counties did not have any purchasing materials available online. These twenty-six counties were excluded from the study and the remaining county websites were reviewed for the information included in the table below.

Table 1. Green Procurement Practices Index Items and Results

County Population Groupings	Observed a Green Procurement Policy	Observed Eco-Labels in RFPs	Observed Green Specs in RFPs	Preference for Green Products Communicated to Vendors
50,000 – 499,999 (79 counties included in study)	Yes: 18 No: 61	Yes: 1 No: 78	Yes: 3 No: 76	Yes: 4 No: 75
500,000 + (95 counties included in study)	Yes: 41 No: 54	Yes: 14 No: 81	Yes: 20 No: 75	Yes: 18 No: 77

One shortcoming of the study is that not all counties had active, relevant bids out at the time the websites were reviewed. Despite this fact, the data collection method undertaken in this study is still appropriate, as it represents a point in time. Many of the counties included in this study did have active bids and it would be impossible to ascertain a time when all of the counties might have an active, relevant bid. While this is a limitation, it should not diminish the findings or relevancy of this study.

Data Sources

Five publicly available sources of data were used to compile the dataset: (1) the 2010 Census, (2) county websites, (3) the National Center for Charitable Statistics (NCCS), (4) the membership directory for the National Institute of Governmental Purchasing (NIGP), and (5) the GFOA awards. The 2010 Census, the most current census, was used to ascertain county characteristics related to population and wealth. The county websites were examined to identify whether or not the county showed evidence of a green procurement policy. Evidence ranged from the presence of a written green procurement policy to green requirements in vendor solicitations to preferences for environmentally friendly products/services in solicitations.

Two additional reviewers also evaluated websites in order to address potential reliability issues. There were few discrepancies, mostly related to policy type, they were not material and were easily reconciled once the policy types were no longer reported (that item is dichotomous). Data related to environmental group presence in counties was collected from the NCCS. The NCCS counted 16,789 registered Environmental public charities filing Form 990, required for tax exempt organizations with gross receipts greater than or equal to \$50,000 (www.irs.gov/), in the spring of 2013; the sample of counties was compared to the organizations falling within

NTEE (National Taxonomy of Exempt Entities) category EN (Environment and Animals) to determine how many of them are in the selected counties. The NIGP membership directory was used to assess professionalism via membership in a professional communication network, and the Government Finance Officers Association (GFOA) awards was used as an indicator of innovation through professionalism. (The GFOA rewards innovation in public finance by giving an Award for Excellence.)

The Dependent Variable

The dependent variable in this study is *greenpractices*. This variable is an index based on a scorecard that was developed using four items that were weighted equally and used when reviewing each county's website for evidence of environmentally preferable purchasing practices (*policy + ecolabels + greenspecs + vendorcomm = greenpractices*). The four items included in the scorecard and used to evaluate the websites contained green purchasing components identified by the National Association of Counties (NACo), including the type, if any, of green purchasing policy that counties have in place; whether their request for proposals (RFPs) include Eco-label language such as Energy Star requirements; whether their RFPs include green criteria specifications such as "energy efficient," "low toxicity," "compostable," etc.; and whether they communicate green purchasing goals and/or requirements to vendors. The use of the NACo Green Purchasing Toolkit as a benchmark for green purchasing appears sound: though some of the counties in this study may not be members of NACo, the information is accessible to non-members and is intended specifically for county purchasing offices. Using the NACo Green Purchasing Toolkit, the following index was developed for evaluating county websites:

Table 2. Green Procurement Practices Index Example

County	Environmentally Preferable Purchasing Policy	RFPs include Eco-Label	RFPs include key words/ green specifications	Green goals communicated to vendors
County 1	Yes	No	Yes	No
County 2	No	No	No	No
County 3	No	Yes	Yes	Yes
County 4	Yes	No	Yes	Yes

The first field of the sample index in Table 2 indicates the county being evaluated. The other fields, developed from the NACo Toolkit, are as follows:

a) Environmentally Preferable Purchasing Policy (*policy*): this field was initially conceptualized as having six possible responses, based on the categorizations in the NACo Toolkit: (1) broad, meaning there is a policy establishing some green purchasing priorities; (2) specific, meaning the policy mandates particular products such as recycled content requirements; (3) mandated, meaning the policy requires all county purchases to meet specific green guidelines; (4) discretionary, meaning the policy allows flexibility and permits staff to use their judgment; (5) formally-accepted administrative procedure, meaning a clear process is established but it is not a formal policy; or (6) none, meaning there is no evidence of a green purchasing policy. However, once the review was underway, the policies were difficult to categorize – some of them contained specific requirements in some areas but had only suggestions in others, some banned Styrofoam but only required green products when the cost was not prohibitive, and so on. Due to the difficulty in clearly identifying which type of policy the county had, the response were revised to either yes, there was a policy of some sort, or no, there was no policy.

b) RFPs include Eco-Label (*ecolabels*): for this index item, the county websites were examined for their open bids section. Many counties listed their RFPs directly on their websites

while other used a regional purchasing system. Some of these systems could be searched without registration while others required registration in order to view open bids, such as the Rocky Mountain E-Purchasing system in the Colorado/western region. While an attempt was made to register with at least one of these regional systems, access was not given and, therefore, some counties' RFPs could not be reviewed for this index item or the following index item related to green specifications. Counties with no active RFPs, no relevant/green product or service RFPs, or unobservable RFPs because of registration requirements were coded 0, or no. Of the RFPs that could be observed, labels such as LED, EnergyStar, LEED Silver Standard, Green Seal standards, and Envirochemical Synergy requirements were observed. If any of these Eco-Labels were observed, the scorecard was marked yes.

c) RFPs include keywords and/or green specifications (*greenspecs*): for this index item, RFPs were reviewed for green words or specifications. Keywords such as zero VOC paint, recycled content, hybrid and electric automobiles, and biodegradable, among others, were all observed in county RFPs. As noted above, however, not all counties had active or relevant RFPs, and some RFPs could not be observed due to registration requirements. As for the *ecolabels* variable, these counties were coded 0. If any keywords indicating greenness were observed, the scorecard was marked yes.

d) Green goals communicated to vendors (*vendorcomm*): for this index item, websites were reviewed for any notice that was provided to vendors regarding a preference for green products and/or services. Many county websites had a "Doing Business" section, which included information for vendors about how to access RFPs, what kinds of products and/or services the county procures, and other helpful information. In some cases, these Doing Business sections demonstrated a preference for green products. In addition to the Doing Business website

sections, some counties included green preferences in their Standard Terms and Conditions to vendors while at least one county listed preferred “environmentally sound” products on their purchasing home page. Some counties also prepare vendor packets and brochures that included their green purchasing policy and/or recycled materials preference. If a county made clear their preference for green products, either through their purchasing homepage, in their standard terms and conditions, in information prepared specifically for vendors or individuals seeking to contract with the county, or some other way not noted above, the scorecard was marked yes.

The Independent Variables

This study included five independent variables: county population, county wealth, environmental/pressure group activity, professional networks, and the presence of a sustainability office. Population and wealth are common in the innovation literature (Walker, 1969; Gray, 1973) and were included in this study to control for prior outcomes of these variables in past studies in my examination of green procurement innovation adoption. Additionally, green products have been perceived as being more expensive than traditional products, suggesting that perhaps only wealthier counties could afford to adopt the green procurement practices. Environmental/pressure group activity has been viewed both as hindrance to and facilitator of innovation adoption (Matisoff, 2008). Professionalism was measured by two variables: membership in a professional purchasing organization and receipt of the Government Finance Officers Association (GFOA) Award of Excellence . Communication networks have been shown to encourage innovation adoption (Klay et al., 2010; Perkins and Neumayer, 2008; Busch and Jörgens, 2005; Studlar, 1999; Savage, 1985a; Savage, 1985b; Gray, 1973; Walker, 1969). The government purchasing community has a national network, the National Institute of

Governmental Purchasing, through which ethics and innovations in the field are spread. It was included in this study to determine whether membership could be shown to encourage adoption of the green procurement innovation. Receipt of a professional award has been used previously as a measure of professionalism (Klay et al., 2010) and was also included in this study. Finally, the presence of a sustainability office was included as a variable in this study. Environmentally preferable purchasing has been linked with promoting larger social change related to environmental issues (McCrudden, 2004; Case, 2004b; Zsidisin and Siferd, 2001), suggesting that counties that have established an office for the purpose of creating or maintaining sustainability may include at least some elements of green procurement practices in their sustainability goals. Each of the independent variables are discussed below.

1. **Population:** County population is the number of persons residing in a county. Data for county population was gathered from the latest census dataset (2010 U.S. Census). Population has historically been shown to be a factor in innovation adoption (Walker, 1969; Gray, 1973) and is, therefore, a common internal determinant in the innovation literature. The natural log was used due to a positive skew, which caused problems with the residuals (e.g. heteroskedasticity).

2. **Wealth:** The average wealth in a county is calculated as the mean per capita income of county residents. Data for mean per capita income are from the 2010 U.S. Census. Walker (1969) and Gray (1973), among others, have shown that states with slack resources are more likely to adopt innovations. A higher mean per capita income indicating county affluence is expected to facilitate the adoption of green procurement. Chia and Al-Hawamdeh (2002) and Brown (2004) also found that financial resources were positively associated with e-procurement innovation

assimilation in organizations. Like population, the natural log was used due to a positive skew, which caused problems with the residuals (e.g. heteroskedasticity).

3. **Number of Environmental Nonprofit Organizations:** This study used the number of environmental nonprofit organizations filing IRS Form 990 at the county level (*Envnonprf990*) using data from the National Center for Charitable Statistics (NCCS) dataset. Organizations filing IRS Form 990 were used instead of a count of all registered environmental nonprofits regardless of gross receipts. The thinking was that those organizations filing Form 990 could be viewed as more invested and active than those organizations that did not meet the minimum gross receipts for filing. The number of environmental nonprofits filing IRS Form 990 ranged from 1 to 400. The presence of environmental and/or sustainability interest groups is expected to facilitate the adoption of green procurement activities (Lubell and Fulton, 2007; Savage, 1985b).

4. **Professionalism:** County professionalism was measured by *Memnigp* and *Recgfoa*. Each county was recorded as either belonging to or not belonging to the National Institute of Governmental Purchasing (NIGP) (*memnigp*) as well as whether or not they have been a recipient of a Government Finance Officers Association (GFOA) Award of Excellence denoting innovation (*recgfoa*). Membership in a professional purchasing organization reflects membership in a communication network and should facilitate the diffusion of green procurement activities. Additionally, Klay et al. (2010) found professionalism was positively related to county innovativeness in the use of e-technology. This variable is coded as a dummy in this study, with 0 indicating neither membership in NIGP nor receipt of a GFOA Award of Excellence and 1 indicating membership or receipt of a GFOA Award of Excellence.

5. Sustainability Office: Each county was examined to determine whether or not they have within their institutional structure a Sustainability Office (*Susoffice*) or similar type of office intended to promote overarching environmental and/or sustainability goals. Environmentally preferable purchasing has been linked with promoting larger social change related to environmental issues (McCrudden, 2004; Case, 2004b; Zsidisin and Siferd, 2001), such as would be the expected domain of a Sustainability Office. In this study, this variable is coded as 0 if there is no sustainability or similar office established to promote overarching environmental goals and 1 if such an office was noted on the county websites.

Table 3. Independent Variables and Associated Hypotheses

Variable	Measurement	Hypotheses
County Population (<i>population</i>)	Interval: Number of people residing in the county	Hypothesis 1: County population is positively associated with green procurement practices.
Wealth (<i>wealth</i>)	Interval: Mean per capita income of county residents, measured in U.S. dollars	Hypothesis 2: Mean per capita income of county residents is positively associated with green procurement practices.
Environmental Group Presence (<i>envnonprf990</i>)	Interval: Number of environmental groups present in a county	Hypothesis 3: The number of environmental/pressure groups in a county is positively associated with green procurement practices..
Professionalism (Membership in NIGP or recipient of GFOA Award of Excellence) (<i>memnigp</i>) and (<i>recgfoa</i>)	Dichotomous: 0 = No 1 = Yes	Hypothesis 4a: Membership in a professional purchasing organization, such as NIGP, is positively associated with green procurement practices. Hypothesis 4b: Receipt of a professional award for financial innovation, such as the Government Finance Officers Association Award of Excellence, is positively associated with green procurement practices.
Sustainability Office (or similar office intended to promote larger environmental/sustainability goals) (<i>susoffice</i>)	Dichotomous: 0 = No 1 = Yes	Hypothesis 5: Counties with Sustainability Offices (or similar offices) are positively associated with green procurement practices.

Statistical Analysis

This research was conducted using regression analysis. Regression analysis was used to determine whether there was a relationship between the scorecard score (green procurement practices) and the independent variables discussed above. This methodology was selected to assess whether or not particular characteristics, such as population or presence of a sustainability office, have a direct effect on green procurement practices. The study uses Ordinary Least Squares (OLS) as well as Negative Binomial Regression.

CHAPTER FOUR
EMPIRICAL ANALYSIS

This chapter presents the findings of the statistical analysis of the relationships between the dependent variable, *greenpractices*, and the independent variables of *population*, *wealth*, *envnonprf990*, *memnigp*, *recgfoa*, and *susoffice*. The dependent variable is an index score; the independent variables reflecting population, wealth, and number of environmental activity groups are continuous, and the variables reflecting professionalism (membership in NIGP and receipt of the GFOA Award for Excellence) and presence of a sustainability office are dichotomous. Preliminary analysis revealed no missing values. Below is a table showing the descriptive statistics for the independent variables and the dependent variable.

Table 4: Descriptive Statistics

	Mean	Median	Std. Deviation	25 th percentile	75 th percentile	N
greenpractices	0.68	0.00	1.05	0.00	1.00	174
lnpopulation	12.91	13.19	0.50	11.93	13.67	174
lnwealth	10.24	10.23	0.28	10.10	10.39	174
envnonprf990	57.80	37.00	63.41	13.00	81.00	174
memnigp	0.60	1.00	n/a	0.00	1.00	174
recgfoa	0.11	0.00	n/a	0.00	0.00	174
susoffice	0.09	0.00	n/a	0.00	0.00	174

n/a - The standard deviation for a dichotomous variable has limited statistical meaning and thus is excluded.

Table 4 indicates that, on average, counties included in this study have less than one green procurement practice on the index. The average county has a population of about 700,000 and average per capita income is about \$29,000. On average, about 58 environmental nonprofit

groups are found in the average county. About 60% of counties are members of NIGP, while about 11% have received the GFOA award. Less than 10% of counties have a sustainability office.

Six counties in the study achieved the maximum score of 4.00 on the index: Alameda County, CA; San Joaquin County, CA; King County, WA; Union County, NJ; Allegheny County, PA; and Philadelphia County, PA. It is interesting to note that all of the top-scoring counties fall in coastal states, perhaps suggesting that their preference for green purchasing practices stems from local environmental concerns or desires for stewardship. Geographical regions have been oft-studied with regard to innovativeness, making this finding an interesting possibility for future studies.

The Scorecard: The Policies

The first item on the green practices index is whether or not the county was observed to have a formal (written) green procurement policy. Of the 174 counties in the study, 59 were observed to have policies. Though each of the six counties with index scores of 4.00 had a written environmentally preferable purchasing policy, the policies themselves varied from one county to another but generally fell into one of three groups: discretionary (Alameda and Union counties), broad (Philadelphia and Allegheny counties), and specific (King and San Joaquin counties). The counties with discretionary policies did not have strict requirements or standards for greener products but rather provided for quite a bit of flexibility in purchasing decisions. The counties with broad policies also require purchasers to use their judgment, but the policy did provide some guidelines in substituting products. For example, the policy for Allegheny County actually builds EPP into their evaluation criteria when scoring bids. This was very unique to this county, and, even more unique, they also included provisions for tie bids in which the tie is

awarded to the bidder with the most EPP. That the ties are not automatically awarded to the lowest bidder is an anomaly and truly innovative! The final group, those with specific green purchasing policies, had very clear requirements related to recyclability and energy efficiency. Whereas many counties stipulated a preference for green only when costs are equal or comparable, King County and San Joaquin County had no such caveats.

The Scorecard: The Use of Eco-labels in RFPs

The second item on the index score is whether or not the Requests for Proposals (RFPs) or bids include Eco-labels, stipulating a green product credential, standard, or similar. Of the 174 counties in the study, only 15 were observed to include Eco-labels in their RFPs. Four of the six top-scoring counties (Union, Philadelphia, Allegheny, and San Joaquin) had bids out for janitorial/cleaning services, and all of them contained labels such as Green Seal and Envirochemical. This finding is a bit expected: janitorial/cleaning supplies were some of the earlier types of green products. In the only example of piggyback contracting observed in counties in this study, where a county has opted to piggyback on another organization's existing contract, Allegheny County does not actually specify labels but rather requires cleaning supplies to meet US Communities stipulations for environmentally preferable products.

Two of the real stand-outs, though, are Philadelphia County and San Joaquin County. In Philadelphia County's bid for stationary, not only was the stationary required to be recycled or recovered content, the bidder was required to submit a certification sheet detailing the content of the recycled product. This could be an attempt to prevent "greenwashing" where vendors falsely present their goods as environmentally preferable when they are in fact traditional products. Other RFP requirements in some of Philadelphia County's other bids included green label program certification for vacuum cleaners and green seal certification or independent verification

of green seal attributes for janitorial products. San Joaquin also shows commitment to EPP by requiring in the general conditions of their contracts that the Carpet and Rug Institute's green label certification program for cleaning equipment.

The Scorecard: The Use of Keywords/Green Specifications in RFPs

The third item on the index was whether or not the county used keywords or green specifications in their bids. Of the 174 counties in the study, only 23 of them were observed to include this index item in their bids. Many of the janitorial bids used Eco-labels as well as additional green specifications, such as recycled paper products (paper towels, toilet paper, etc.). Some other types of green specifications that were observed were a requirement that laundry detergent be 100% biodegradable (Union County) and that automobiles being procured be electric (Alameda Count and King County).

Outside of these examples, the top index scorers did not have much to add in the way of innovation. Some of the other counties in the study, however, had some specifications that are really intriguing: Ventura County, CA, includes emission standards with their engine specifications; Collin County, TX, requires solar powered flashlights; San Francisco City and County, CA, banned the use of tropical hardwood and virgin redwood in their bids; Maricopa County, AZ, requires picnic tables to be made from recycled plastic; and Fairfax, VA, will not accept virgin paper in their gazette printing RFP. All of these counties are demonstrating the kind of innovative ways that green purchasing practices can be institutionalized.

The Scorecard: Preference for Green Products Communicated to Vendors

The final index item that comprises the dependent variable is whether or not the county was observed to communicate a preference for greener products to vendors. Upon review of the websites, it was clear that most if not all of the counties have a section dedicated to providing

information to vendors. In many cases, there was a tab that specifically said “Vendor Guide.” These tabs or links provided similar information from county to county: how to do business with the county, how to register to receive bid notifications or access bidding systems, how to submit bids, whether there were any workshops being held for specific RFPs, and so on.

Many counties in this study provided this type of information, but only 22 out of the 174 counties used their websites to convey to vendors their preference for green products. All six counties scoring 4.00 on vendor communication took similar approaches in communicating this preference to their vendors. Three of the counties (Alameda, Philadelphia, and San Joaquin) relayed their preference through the use of downloadable vendor brochures: Alameda County begins their vendor guide with information about their commitment to the environment; Philadelphia County has a Recycled Materials section on their vendor guide; and San Joaquin County includes their green purchasing policy as part of their brochure to vendors. Two of the counties (Union and Allegheny) communicate their preference to vendors via their websites instead of in a vendor brochure or guide: Union County voices their preference for “environmentally sound” products on their Purchasing homepage, and Allegheny County provides a website link for suppliers that includes recycled products under Preferred Products. Lastly, King County has a section in their Standard Terms and Conditions of their contracts that states bidders able to supply recycled and/or environmentally preferable materials are encouraged to offer them.

All of these scorecard items are important to the development of the dependent variable green procurement practices. All of these items are a means of implementing and institutionalizing environmentally preferable purchasing, either formally (as in a written policy) or informally through practice (including specifications or label requirements in RFPs).

Correlation Analysis

Correlation analysis between the index items comprising the dependent variable (policy, ecolabels, greenspecs, and vendorcomm) was conducted to show the relationship among the items. All of the items are moderately correlated, as would be expected because they are part of a cumulative index where the items are all intended to indicate green procurement practices. The correlation scoring highest at .666 is between ecolabels and greenspecs; this is not problematic, as the items do not approach 1.00, and both items are relevant to the index because they capture different types of green practices. Multicollinearity does not appear to be a large factor among the items in the index.

Table 5. Index Correlations

Pearson Correlation	policy	ecolabels	greenspecs	vendorcomm
policy	1.000			
ecolabels	.256**	1.000		
greenspecs	.366**	.666**	1.000	
vendorcomm	.458**	.253**	.260**	1.000

** . Correlation is significant at the 0.01 level.

Additionally, correlation analysis between the dependent variable and each of the independent variables was conducted in order to ascertain the direction of the relationship between the variables and to show whether there are any large correlations, indicating multicollinearity among the independent variables. The correlation matrix in the table below suggests that none of the independent variables are strongly correlated with the dependent variable, and none of the independent variables are strongly correlated with one another. The highest correlation (.725) is between *envnonprf990* and *lnpop*, which is not unexpected as larger populations would be needed in order to support multiple environmental groups.

Multicollinearity does not appear to be a large factor and will be addressed in the regression using variance inflation factors (VIF).

Table 6. Correlations

Pearson Correlation	green practices	lnpop	lnwealth	envnonprf990grp	memnigp	recgfoa	susoffice
greenpractices	1.000						
lnpop	.372***	1.000					
lnwealth	.291***	.372***	1.000				
envnonprf990	.383***	.725***	.399***	1.000			
memnigp	.171*	.471***	.337***	.238**	1.000		
recgfoa	.141	.327***	.207**	.239**	.171*	1.000	
susoffice	.230**	.219***	.036	.189*	.082	.024	1.000

***. Correlation is significant at the 0.001 level.

**. Correlation is significant at the 0.01 level.

*. Correlation is significant at the 0.05 level.

For the two continuous independent variables, scatterplots are helpful in examining the relationships between them and the dependent variable. The bivariate correlation between greenpractices and lnwealth is interesting. While the scatterplot below indicates that the majority of the counties falling around the mean (\$29,000 per capita income) scored low on the index, it also shows that the six counties scoring highest on the index (4.00) are actually pretty evenly split: one county (Allegheny) falls on the mean, two counties (Philadelphia and San Joaquin) fall below the mean (ranging between \$20,000 and \$25,000 per capita income) and three counties (Alameda, Union, and King) are above the mean (ranging between \$35,000 and \$40,000 per capita income). The expectation that the counties with the highest per capita income (\$45,000+) would score highest on the index is not demonstrated. Fairfax County, Va, has the highest per capita income ((\$50,145), yet it was observed to only have two of the four index items: an environmentally preferable purchasing policy and green specifications in RFPs. Additionally,

the counties scoring second highest on the index (3.00) are more likely to fall around the mean, with only one county (San Francisco) with a per capita income value between \$40,000 and \$50,000 scoring a 3.00.

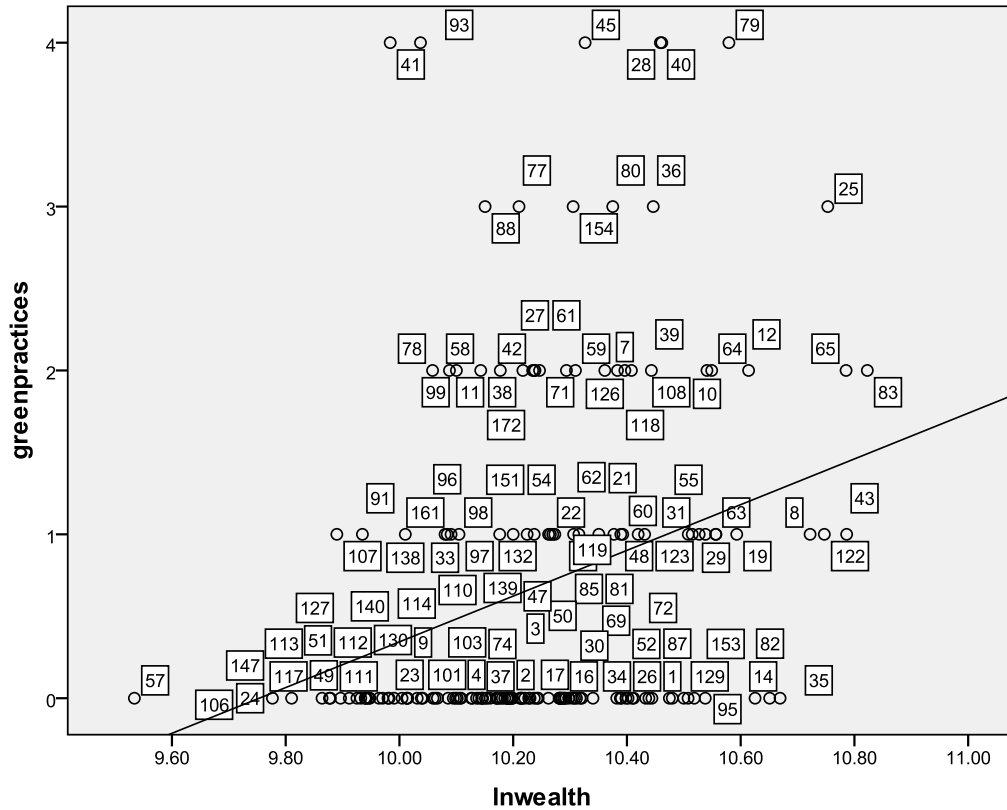


Figure 1. Bivariate Correlation: green practices index score and wealth

The bivariate correlation between greenpractices and envnonprf990 is also interesting. The expectation from the literature is that those counties with more environmental interest groups would score higher on the index. The scatterplot below, however, indicates that counties with fewer interest groups (San Joaquin has 19 and Union has 41) scored 4.00 on the index as often as those with a greater number of interest groups (Allegheny has 203 and King has 209). The counties with the greatest number of interest groups (Los Angeles has 353 and Cook has 400) were expected to score highly on the index, but neither county meeting this criterion scored higher than a 2.00 on the index.

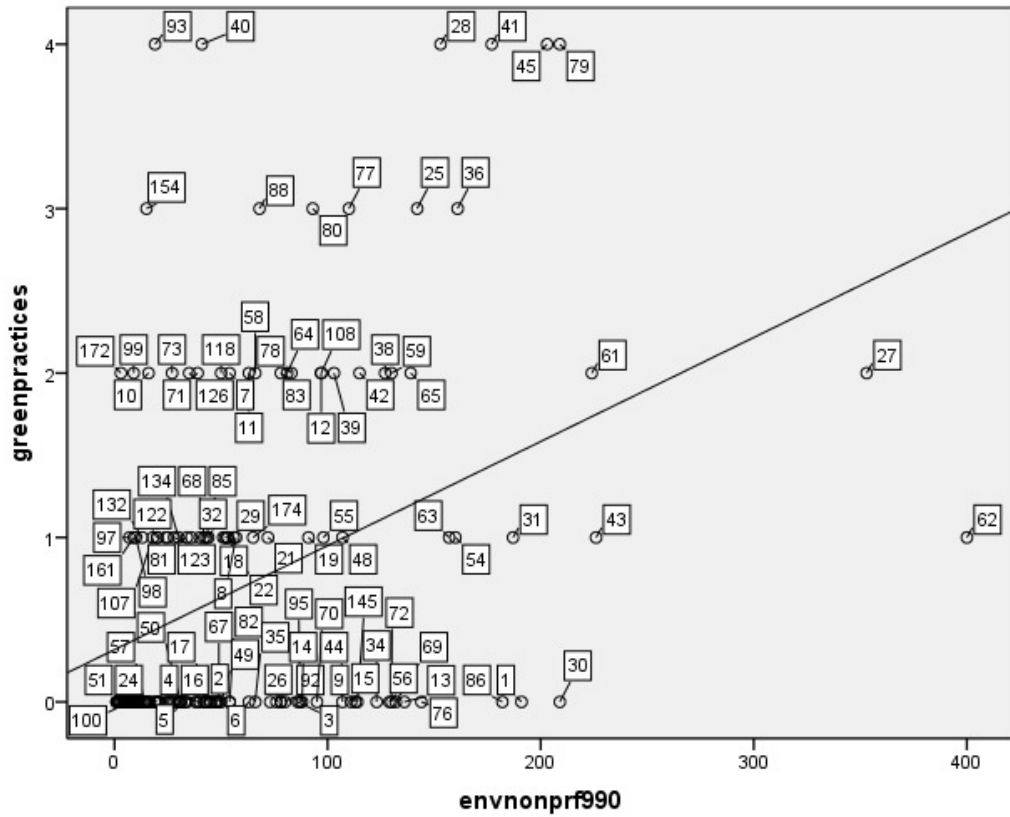


Figure 2. Bivariate Correlation: green practices index score and environmental nonprofits

Regression Analysis

Table 6 below presents the regression results. Using the F-test, we see that the model is significantly different from a model that predicts the mean outcome, 0.684, for the number of green procurement practices used by the average county. The overall model explains about twenty percent of the variation in the number of green procurement practices used by counties.

Table 7. Regression Results

	Coefficients	Standard Error	t	P>t*	Two-tailed	Beta
Inpop	0.155	0.108	1.44	0.076	0.152	0.162
Inwealth	0.779	0.376	2.08	0.020	0.040	0.163
envnonprf990	0.003	0.002	1.61	0.055	0.110	0.168
memnigp	-0.042	0.173	-0.24	0.403	0.806	-0.020
recgfoa	0.042	0.246	0.17	0.433	0.866	0.012
susoffice	0.563	0.266	2.12	0.018	0.036	0.151
constant	-9.487	3.991	-2.40	0.009	0.018	

N = 174

F = 7.19, prob>F = 0.0000

R-squared = 20.5%

* indicates p-value for one-tail t-test

The collinearity statistics provided below indicate that multicollinearity is not a factor within this analysis. All of the variables have a variance inflation factor (VIF) of less than 10 and tolerance value greater than 0.1 (Tabachnick & Fidell, 1989).

Table 8. Collinearity Statistics

VIF	Tolerance
2.659	.376
1.293	.773
2.291	.437
1.375	.727
1.133	.883
1.071	.934

A Negative Binomial Regression was also run because the index comprising the dependent variable represents a count. The results were very similar to the multiple regression analysis and can be found in Appendix A.

The results of the regression provide support for several of the hypothesized relationships. In the behavioral sciences, including public administration, common practice is to assess hypothesis testing at a p-value of .10 or less (McNabb, 2013). Using a significance level of 5%, *susoffice* and *lnwealth* are found to be significant; *envnonprf990* is just slightly higher at .055, indicating it does have a significant influence, though not quite at the .05 level. Using a significance level of 10%, population is found to have a positive relationship with the number of green procurement practices, a finding that provides support for hypothesis 1. A one percent increase in population increases the number of green procurement practices by 0.155. Given that the average county has about 0.68 green procurement practices, a one percent increase in population would lead to a 22% increase in the number of green procurement practices for the average county. These results are similar to Walker (1969) and Gray (1973) who found a positive effect of population on innovation adoption.

Changes in mean per capita income are positively related to green procurement practices. A one percent increase in mean per capita income increases the number of green procurement practices by about 0.78. Similar to Al-Hawamdeh (2002) and Brown (2004) who focused on e-procurement assimilation into organizations, the results of this analysis provide support for the influence of wealth regarding the number of green procurement practices used by a county.

The regression provides support for hypothesis 3, indicating that an increase of one environmental group within a county increases the number of green procurement practices by 0.003. While this is a very small effect, it is significant and aligns with the literature regarding the impact interest groups can have. While Matisoff (2008) determined that interest groups could either prevent or facilitate the adoption of innovations, this study suggests that in the context of

green procurement, interest groups could be viewed as having a positive impact on green purchasing practices.

Surprisingly, membership in professional organizations was not shown to have a significant impact on county green procurement practices. Neither measure of professionalism, membership in NIGP and/or being a recipient of the GFOA award of Excellence, was shown to have an effect on county green procurement. According to the literature, membership in professional organizations/communication networks is ideal for spreading innovations (Klay et al., 2010; Perkins and Neumayer, 2008; Busch and Jörgens, 2005; Studlar, 1999; Savage, 1985a; Savage, 1985b; Gray, 1973; Walker, 1969), yet this study did not find professionalism to be a significant predictor of county green purchasing practices. There are a number of possible explanations for this finding.

With regard to NIGP, green procurement may not yet be a priority for the organization. NIGP is a very valuable resource for public procurement officers, and it provides a great deal of educational information on an array of topics. The organization exists to ensure that public procurers are ethical, conduct their work with the highest level of integrity, and have access to resources that will help them perform their functions as efficiently as possible. However, while they do provide some guidance regarding sustainable procurement, it does not necessarily advocate for green procurement practices. One way membership in NIGP could advance county use of green procurement practices would be to add sustainable procurement to the NIGP Code of Ethics. Until the organization takes a firmer stance on green procurement, its members may be reluctant to implement environmentally preferable purchasing. Additionally, membership in a procurement organization does not necessarily indicate a desire to move toward green purchasing

practices but rather to stay abreast of industry laws or best practices regarding other facets of public procurement.

With regard to the GFOA Award for Excellence, this award focuses on innovations in financial management, including areas such as accounting, technology, investment management, and debt administration (gfoa.org). The award is not directly related to procurement activities, though purchasing is a large part of financial management. The counties included in this study receiving this award were singled out for improvements in areas such as reporting (Harris, TX), strategic management (Mecklenburg, NC), grants management (Los Angeles, CA), and employment benefits (Gwinnett, GA). These areas of financial management are mostly unrelated to procurement. However, one of the award recipients in this study was recognized for innovation in their Purchase-Card program, (Johnson, KS), demonstrating that the award does recognize purchasing innovations specifically. Despite this recognition, green purchasing is not a priority for this organization and the majority of its members likely are not using their membership in the GFOA to seek out purchasing innovations or best practices. One final remark about this particular hypothesis is that while many counties may be interested in implementing some green purchasing practices, the costs may be perceived as prohibitive or there may not be availability of products through their suppliers. Either way, participating in professional member networks and gaining information about green procurement does not appear to remove any barriers to actually implementing green procurement practices.

Concerning hypothesis 5, counties with a sustainability office have more green procurement practices than counties without this office. In fact, the difference in the number of green procurement practices between those with this office and those without is 0.56. While there is no prior literature that speaks directly to the presence of sustainability offices and their

impact on green purchasing practices, literature does suggest a link between environmentally preferable purchasing and larger social/environmental change (McCrudden, 2004; Case, 2004b; Zsidisin and Siferd, 2001). Review of county websites for this study demonstrates this link: counties with sustainability offices were using these offices for more than just purchasing, including more sustainable land use, recycling tips for consumers and recycling center locations, green building information for residents building or repairing homes, and responsible water use. It is likely that the counties establishing these offices were doing so in response to the prevailing ideology of the constituency or local political culture (Lipsky, 2008). Perhaps regardless of its origin, the presence of a sustainability office is indicative of an institutionalized commitment to environmental stewardship.

In summary, several hypotheses were supported in this study. As expected, population and wealth were found to be positively and significantly associated with green purchasing practices. Additionally, the presence of environmental interest groups and county sustainability offices were found to be positively and significantly associated with green purchasing practices. Professionalism, measured by membership in NIGP and receipt of the GFOA Award for Excellence, was not found to be significant in county use of green purchasing practices. This finding could be explained by a number of factors, including barriers to green purchasing such as cost, availability of green alternatives and/or suppliers, or simple lack of interest in environmentally preferable purchasing.

CHAPTER FIVE

CONCLUSION

The purpose of this study was to examine the purchasing activities of counties to determine (1) who is doing what with regard to environmentally preferable purchasing, and (2) are there particular attributes or characteristics of counties that have more fully adopted and implemented the environmentally preferable purchasing innovation. While there have been many empirical studies of innovativeness and adoption, they do not explore the green purchasing practices of counties. As sustainability gains more and more traction, the questions addressed by this study become increasingly important.

Green purchasing practices can be institutionalized through written codes or policies, or they can become part of the process in a more informal way through specifications in RFPs. This study found that of the 174 counties included in the study, a third had some kind of written policy for purchasing environmentally preferable products, fewer than 10% used eco-labels in their RFPs, 13% used green specifications in their RFPs, and almost 13% communicated to vendors a preference for environmentally preferable products. These items combined to make a greenpractices index, according to which most counties in the study scored a zero, meaning their purchasing practices did not contain any of the items on the index. However, 19% had one item, almost 13% had two items, and 3% had three items and four items. Clearly, many counties have still not implemented environmentally preferable purchasing practices; however, some counties have excelled at it: at least one county in the study actually banned all Styrofoam purchases while another banned the use of all virgin wood. It is interesting and exciting to see the kinds of measures some of the more innovative counties have taken.

With regard to the hypothesized relationships in the study, population, wealth, interest group presence, and sustainability offices were all found to influence county green purchasing practices. Not supported was the role of professional organizations, which is surprising given the literature. Another point of interest related to professionalism is that three of the six counties that scored the maximum of 4.00 on the green practices index are members of NIGP and three are not. This may indicate that there is a somewhat tenuous relationship between innovativeness and professionalism. However, it is entirely possible that membership in NIGP could facilitate the spread of green purchasing practices if sustainability and stewardship become a large part of the organization's mission. Currently, NIGP offers guidelines to sustainable procurement practices but does not include EPP in its code of ethics. The professionalism measure of GFOA Award for Excellence may not have provided any significance in this study because purchasers may not be the intended audience for this professional association as in NIGP. It is not a purchasing-specific organization and may be a poor measure of innovativeness in purchasing. Additionally, negative perceptions related to cost and performance of greener products may continue to prevent the spread of environmentally preferable purchasing. Follow-up interviews of the top index scorers might shed some additional light on the influence of professionalism on green procurement practices.

Another interesting possibility is the use of certification as a measure of professionalism. This measure was not included in this study, however, because the public sector is divided about certification requirements and does not have just one certifying body like the private sector. Additionally, the private sector has been a lot more active than the public sector in achieving ISO 14000 Certification (Handfield et al., 2002; Montabon et al., 2007). Private sector organizations have been adopting these voluntary standards as part of environmental management systems

(EMS), as have many governments in Europe (Strasser, 2008; Emilsson and Hjelm, 2004, 2005). Interestingly, companies desiring to conduct business with the European Union must comply with EU and country regulations related to electrical equipment and hazardous substances (Giunipero et al., 2012). Because American counties do not generally engage in commerce with foreign countries, local government adoption of ISO standards and attainment of ISO certification is not as salient as for private sector organizations.

The positive influence of county per capita wealth and green practices was supported, and some interesting outliers were noted. Looking at counties that have the highest index score, representing high use of green purchasing practices within this study, some counties in the study having a lower than average per capita income still scored at the top of the index. This is an exciting observation given that of the six counties that scored a 4.00, none of them were those counties with the highest level of wealth. It is encouraging that counties with wealth below the mean still scored the highest on the index, indicating that wealth does facilitate green purchasing practices but that it is not necessarily required for them. A closer, qualitative examination of these outlying counties is warranted. For example, San Joaquin County, California, scored a 4.00 on the index but has a per capita income that is lower than the mean of \$29,000. It would be interesting to look more closely at this county to determine how, in the presumed absence of slack resources, they have been able to implement green purchasing practices. Similarly, it would also be very interesting to look more closely at counties that have higher per capita income yet scored low on the index.

The impact sustainability offices have on county green procurement practices has not been studied. The finding that these offices do in fact influence green procurement practices is not only interesting, it also contributes to the procurement literature. This information could

perhaps be useful to counties looking for ways to use their sustainability offices as well as to procurement offices looking to promote the stewardship they are demonstrating through their procurement activities. The two offices could serve to reinforce one another, which could be another avenue of future research.

One shortcoming of the study is that not all counties had active bids out at the time the websites were reviewed. Unfortunately, this is not an issue that could be corrected in time for this particular study. A more thorough approach could have been to examine all of the bids over a year or two years' time, however this was not an option for this study. The study errs on the side of understating the prevalence of green purchasing practices, which is preferable to overstating the prevalence of green purchasing practices.

Policy Implications and Future Studies

Green procurement is a growing trend in both the public sector and the private sector. One of the distinguishing factors between the two sectors is that many times businesses will incorporate green procurement as a marketing strategy to appeal to consumers (Menon, 1997) or in response to financial incentives. However, green procurement has become a real topic of conversation in the private sector, particularly with regard to the supply chain literature. One meta-analysis (Giunipero et al., 2012) indicates that top management interest and regulatory compliance appear to be drivers of movements toward sustainable supply chain management; this sentiment seems to be echoed in the public sector, that much of the green procurement taking place is in response to federal or state laws regarding public procurement or as a result of a champion or policy entrepreneur. The private sector has also examined the competitive

advantage that can come from incorporating sustainability (Starik and Marcus, 2000), an aspect that may or may not be translatable to the public sector. Local governments may compete somewhat, but the nature of the competition is not comparable to market share that can be gained or lost due to the implementation of environmentally preferable practices.

This study has revealed that some counties are more engaged in green procurement practices than others and that, generally, population, wealth, interest group activity, and having a sustainability office are positively associated with green purchasing practices. What is left unexplored is how green procurement got its start in any of these counties. For those counties that were found to have written policies regarding environmentally preferable purchasing, it is unknown how those policies came to be. Was there a policy champion advocating for better stewardship of financial and environmental resources? Perhaps the county sits in a state that has aggressive purchasing or environmental stewardship policies. Maybe the citizens demanded greener ways of conducting public business. These are unknowns, making it difficult to identify how a county can begin to institutionalize green purchasing. Case studies would be an effective way to identify where green came from and how it became a purchasing priority.

Another observation from the data is that some of the counties that did not have a written policy, like Rock County, did show evidence of other green practices according to the index. Rock County, Wisconsin, did not have a written policy but did include green specifications in an observed active bid. This indicates that written policies are not necessarily required in order to implement green purchasing practices. Ventura County, California, as well as Milwaukee County, Wisconsin, and Miami-Dade County, Florida, also did not have a written policy, but eco-labels and green specifications were observed in their bids. This demonstrates that while a written policy may encourage green purchasing, actions can be taken in the absence of a policy.

Also, a policy may be ineffective in promoting green procurement if it is vague or merely suggestive. To this end, a future study could examine the policies from this study and observe how they have been implemented and to what result.

Ultimately, the study has shown that factors such as population and wealth are positively associated with green purchasing practices, but many populous and wealthy counties are not doing much in the way of green procurement. The average county in this study scored less than 1.00 on the index, indicating that green purchasing is not very prevalent in American counties. It remains to be seen what obstacles to environmentally preferable purchasing remain when the appropriate antecedents are present.

APPENDIX A

NEGATIVE BINOMIAL REGRESSION MODEL (NBRM)

Given that green practices in a county are measured by counting the number of practices, an alternative to the Least Squares regression is the Poisson regression model (PRM). The Poisson distribution was found to be inefficient due to the over dispersion of the data, so a Negative Binomial Regression Model (NBRM) was used. The results are below in Table 9:

Table 9: Negative Binomial Regression Results					
	Coefficient	Standard Error	z	P>z*	Percent Change
Natural log of Population	0.391	0.182	2.15	0.016	47.8
Natural Log of Mean Per Capita Income	1.444	0.503	2.87	0.002	323.7
Number of Environmental Groups	0.001	0.002	0.53	0.299	0.1
Indicator of Membership in NIGP	0.002	0.297	0.01	0.498	0.2
Indicator of Recipient of GFOA Award of Excellence	-0.025	0.248	-0.10	0.460	-2.5
Indicator of a Sustainability Office	0.621	0.254	2.45	0.007	86.1
Constant	-20.578	5.674	-3.63	0.000	
N = 174					
$\chi^2 = 43.86, Pr > \chi^2 = 0.000$					
Likelihood-ratio test of alpha=0: $\chi^2 = 5.11 Pr > \chi^2 = 0.012$					
* indicates p-value for one-tail t-test					

Looking at Table 9, for every 1% increase in the population the expected mean number of green practices in a county will rise by 47.8% to over one green practice per county. Looking at income, every 1% increase in mean county income per capita will lead to an expected mean number of green practices of 2.214. In addition, having a sustainability office increases the expected number of green practices by 86.1%, holding all other variables constant.

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BIOGRAPHICAL SKETCH

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