

# AN EMPIRICAL STUDY OF E-PROCUREMENT UTILIZATION AND KEY INDICATORS IN PUBLIC ORGANIZATIONS

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## ABSTRACT

E-procurement has been offered as a solution to address process-oriented issues with respect to organizational complexity, corruption, efficiency, and effectiveness. In this manner, e-procurement is perceived as a standard process tool, as opposed to a useful extension whereby management philosophy can be incorporated into the technical decision-making of public administrators. The problem with proposing e-procurement utilization as a solution to both standard process and decision-making challenges in public organizations is the difficulty in identifying linkages between e-procurement and management indicators. This empirical study analyzes results from the 2012 Universal Public Procurement Certification Council (UPPCC) job analysis in determining potential impacts of e-procurement utilization in public organizations. Findings implicate e-procurement as a valuable mechanism although there is evidence to suggest that e-procurement systems do not fully yield intended benefits.

## OVERVIEW

E-procurement has long been posited as a solution to managing complexities of sizeable organizations, mitigating corruption, and improving efficiency and effectiveness. [1] offer e-commerce and information technology (IT), known as *e-procurement*, as a viable course for alleviating tensions between management, accountability, and objectives such as those emanating from criteria of efficiency/effectiveness, conformance/regulation, and political agenda/business outcomes.

As defined in the public realm, e-procurement is the “use of the Internet-based inter-organizational information system, which automates and integrates any part of the procurement process in order to improve the efficiency and quality in public procurement, and to promote transparency and accountability in the wider public sector” [2]. However, in a study supported by the National Institute of Government Purchasing, [3] conclude that e-procurement systems over the past two decades have generated limited positive transformation due to lack of software innovation, hasty adoption of e-procurement during initial rollout phases, and institutions’ structural limitations. [4] also cite the legal issues of software agreements as they relate to e-commerce and procurement.

Despite technological impulses from the private sector [5], technological applications are still far-removed from the plethora of decision-actions inherent to the public manager. For example, [6] describe e-procurement systems as a useful monitoring tool and for the processing of big data but the information technology typically lacks a level of human inculcation that is required to contribute to resolution of policy issues. Other shortfalls of e-procurement can be attributed to the polarization of small and medium-sized firms due to efficient and centralized buying [7], mantras that are facilitated through electronic platforms. Increasingly, small and medium-sized firms are becoming price-takers, as they are unable to communicate or exert influence over microeconomic issues involving product/service supply and demand participants.

Despite questioning as to the purpose and substance of e-procurement systems, it still seems only logical to look to the implementation of e-procurement systems for the achievement of managing processes when organizational size and scope becomes daunting. In particular, when the goods/services being procured are large in number and variety, or if several inputs go into the demand function, e-procurement systems can fulfill the computing function as well as provide access to, or means of analysis for, market conditions in global or complex environments. In fact, [8] and [9] describe a new “quasi-paradigm” style of public management altogether, aimed at simplifying procedures *a la* new public management, called digital era governance. As the conduit, e-procurement can be viewed as an end-to-end solution that streamlines many diverse procurement inputs and processes throughout the organization [10].

While e-procurement can be presented as a tool to manage vast organization size, scope, and processes, issues of transparency and fraud surface among key considerations with implementing any IT system. Since user participation is remote, accountability may be lacking between the avenues connecting information on cyber interfaces and any transactions occurring offline. Notwithstanding e-procurement, public procurement must meet the basic principles of good governance: transparency, accountability, and integrity [11]. And, findings suggest that there are advantages to e-procurement systems when it comes to mitigating corruption. Through an 88% rate of confirmation in a telephone survey, [12] generate results indicating that there are perceived benefits of e-procurement from the standpoint of anti-corruption, more specifically with regard to information sharing, monitoring, tracking, and consistency in the bidding process. If request for proposals, bidding, tendering, and subsequent transactions must be routed through e-procurement systems, then there is a smaller window for informal communication and in many cases the web-based platform serves as the basis and precedential means of information sharing.

On the other hand, e-procurement systems have in some cases been thought to complicate efforts to reduce corruptive practices. [13] cite the obstacles to successful implementation of e-procurement to be concerns over security and confidentiality of data, reluctance of data sharing by trading partners, uncertainty over trust and commitment, and lack of adequate security measures – the same procurement issues that e-procurement is thought to address in the public organization. Also, ensuring comprehensive usage of e-procurement systems for the keeping and communicating of transactional data remains to be a challenge; otherwise market participants may be slow to adopt the new language of e-procurement. More specifically, the diverse peculiarity in the textual, visual, digital performance, and comprehensibility of e-procurement systems challenge overall accessibility [14], that otherwise serves to limit corruption through openness, transparency, and consistency.

Efficiency is also a main objective of the public procurement practitioner. Public procurement aims to satisfy requirements for goods, systems, and services in a timely and cost effective manner [15]. Efficiency has been reported to be an underlying objective in the design and outcome of e-procurement systems as well. The results obtained by [16] suggest that e-procurement is designed with the objective of increasing efficiency through rationalization and standardization processes. However, e-procurement systems are often used by civil servants but designed by information technology specialists, creating a passive utilization and economic orientation that focuses on results at the disregard of procedures [17].

Meanwhile, the objectives of the public sector and its procurement operations are wider than the singular objective of maximizing profit for a given entity [18] [19]. Such objectives involve the delivery of a wide range of public services, such as law and order, health, education, defense, transportation, the environment, and social services. As a result, an increasing recognition of the strategic role of public

procurement has emerged which applies cost saving functions to cover more general governmental objectives with respect to effectiveness [20].

[21] identify the benefits of e-procurement to be reducing cycle time, enhancing budgetary control, eliminating error, increasing productivity, lowering prices through market consolidation, and better information management. Utilization of automated purchasing systems for transaction processing and tracking as well as execution of multi-year contracts have long been common trends in procurement [22]. At one extreme, there are prescriptive and regulated structures, where executives or directors are heavily involved in the majority of the procurement process. At the other end, there are loosely guided approaches where responsibilities are devolved and procurement is viewed as a managerial function [23].

Towards achieving these ends, [24] predicted that e-commerce or e-business would free the procurement practitioner to focus on strategic, as opposed to *process* and ordering issues, indicating a dichotomy between e-procurement and management philosophical considerations. Ten years later, [25] implicates a more involved usage of e-procurement systems by identifying major obstacles to adopting and administering e-procurement systems such as the difficulty in calibrating managerial and philosophical strategies into platforms that can reflect and process the varying operational activities of public organizations. As a result, public procurement researchers are becoming increasingly more interested in identifying relationships between e-procurement utilization and the completion of process and management-oriented tasks, in addition to e-procurement's applications for managing large, complex organizations, mitigating corruption, and achieving goals related to efficiency and effectiveness.

The purpose of this research is to draw linkages between e-procurement utilization and organizational objectives in public procurement such as managing complexities, mitigating corruption, efficiency, effectiveness, and technical decision-making. A survey methodology is employed to determine whether or not there is a relationship between e-procurement systems utilization by public procurement practitioners and the performance/management of specific related job activities. The results indicate to what extent e-procurement is used as a tool to achieve organizational objectives and if e-procurement is in fact a facilitator of achieving these ends.

The empirical study first looks at e-procurement utilization across public organizations of various sizes to see if e-procurement systems are being implemented to manage size and scope issues, especially in cases when procurement departments are small in comparison to organization size. Similarly, e-procurement utilization is compared to survey respondents' perceived importance of standard processes so that it can be determined whether or not e-procurement is being used to address standard process issues, as the literature suggests, or if e-procurement may be utilized for other reasons.

Next, multiple linear regression analysis is incorporated to explore any connection between e-procurement utilization and corruption indicators. If there is a correlation between e-procurement utilization and mitigating corruption indicators, then it can be concluded that either e-procurement systems aid to reduce corruption or at least that e-procurement systems are being utilized by organizations that have had success in limiting corruption. The relationship between e-procurement utilization and survey respondents' perceived importance of particular efficiency/effectiveness indicators is also explored in similar fashion.

Lastly, e-procurement utilization and decision-making are studied to identify breakthroughs in the experiential that point to an inculcation of managerial factors into the design and usage of e-procurement

systems. This study concludes by presenting linkages between e-procurement utilization and technical decision-making. To achieve results from the qualitative analysis, surveyed procurement practitioners are classified by job titles into five groups: Chief Procurement Officer, Procurement Manager, Procurement Analyst, Buyer, and Procurement Assistant. Performance and/or management of select technical decision-making job activities at each job classification level will be compared to e-procurement utilization at each level in order to identify any relationship that exists between e-procurement utilization and technical, management-oriented decision-making.

In order to assess e-procurement utilization and the impact on job activities performed and managed in public procurement, secondary data is utilized that was generated by Prometric, Inc. when it conducted a job analysis for the Universal Public Procurement Certification Council (UPPCC) in 2012. The UPPCC is the primary certification body in the area of public procurement, offering the Certified Public Procurement Buyer (CPPB) and Certified Public Procurement Officer (CPPO) credentialing process for individuals who are able to satisfy the eligibility criteria and pass a certification examination. In 2006 and 2012 the UPPCC conducted a thorough job analysis of public procurement in an effort to provide a defensible, valid, and sound method to test public purchasing practitioners wishing to become certified as either a CPPB or CPPO. For the purpose of this study, the 2012 job analysis is being utilized for data collection and analysis.

## **FINDINGS**

It remains to be seen whether the potentials of e-procurement will be fully, or even remotely realized. In this empirical study, e-procurement usage is found to be constant across organizations of all sizes, although respondents from larger organizations view e-procurement to be slightly more important than respondents from smaller organizations. Furthermore, while public organizations that have more employees view e-procurement systems with increasing levels of importance, there is no clear indication that larger organizations more frequently utilize e-procurement systems.

Meanwhile it is possible that e-procurement systems are taking the place of traditional methods that are viewed by respondents to be standard processes. It can be seen that as organizations become larger there is less implementation of standard processes despite a constant belief that standard processes are important across organizations of all sizes. Yet, altogether, e-procurement utilization is consistent across organizations of all sizes at approximately 60% utilization, much lower than the 80% proportion reported for implementation of standard processes, indicating that numerous (about 20%) of public organizations likely implement standard processes using old-technology methods such as paper-based processing or verbal/informal communication.

Regarding e-procurement utilization's impact on mitigating corruption, the fact that seven of eight corruption indicators on the survey do not reflect a statistically significant relationship with e-procurement utilization indicates public procurement practitioners do not view e-procurement systems utilization as a conduit to protect against, or otherwise avoid corruptive practices. Instead, e-procurement systems may be implemented for purposes of achieving greater efficiency or effectiveness. A correlation between e-procurement utilization and supply chain management supports a notion that organizations that strive to be efficient and effective, through a management philosophy, also prefer to utilize e-procurement systems. Supply chain management is a generalizable indicator because it relates to many aspects of purchasing and provision of goods/services. Results of the multiple regression of e-procurement utilization on efficiency and effectiveness indicator variables show that e-procurement

systems are not fully utilized to address efficiency and effectiveness, despite e-procurement utilization's statistically significant relationship with measurement criteria.

Most importantly, with respect to addressing the recent literature presenting e-procurement as a potential managerial extension capable of human and philosophical inculcation by bridging the gap between practice and technology, public procurement practitioners reportedly performed and/or managed technical decision-making job activities with frequency that corresponds to a hierarchy of job classifications, as well as evidence of increasing e-procurement utilization while moving up the organizational structure. An index weighting was calculated to take a closer look at how practitioner roles and responsibilities within job classifications could impact both performance and management of technical decisions according to e-procurement utilization. Also, an index rating was calculated to identify any relationships between the level of technical decision-making and e-procurement utilization with respect to job classifications. It can be concluded that e-procurement may be important in enabling public sector practitioners to perform and manage technical decision-making job activities.

The implications of this study indicate that e-procurement utilization likely has a significantly positive impact on efficiency, effectiveness, and management of technical decision-making. However, corruption indicators do not correlate with e-procurement utilization indicating that literature suggesting security challenges to e-procurement, rather than e-procurement's potential advantages as a means of mitigating corruption, can be supported through empirical research.

E-procurement utilization is only moderately employed in public organizations, especially with respect to standard processes. Yet, empirical results suggest that senior-level managers such as CPO's and Procurement Managers utilize e-procurement to manage the complexities of large organizations, suggesting that large public organizations may consider adopting e-procurement practices. Additionally, research and development in the area of e-procurement and more broadly e-governance continues to be warranted in hopes of improving upon the benefits of e-procurement systems and how government can best provide goods and services. More specifically, identifying ways that managerial decision-making can be captured and programmed into IT systems is an area of research to pursue if the benefits of e-procurement are to be maximized.

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