Evaluation of the Use of E-Procurement System on Procurement Practices and Performance of Public Hospitals in Ghana

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ABSTRACT

The improvement in the importance of knowledge, technology complexity, globalization and the accessibility of digital computerized data innovations are driving this transformation. This has led to exponential growth of electronic business applications that are leading organizations to embark on huge investments in inventive technologies, to preserve their competitive advantage in a gradual dynamic marketplace. However, business investments of IT need to be the subject of appropriate appraisal and assessment. While the literature recommends the potential benefits of these adoption technologies; little has been written on the nature of the business case for e-procurement usage in the public hospitals. We evaluated the use of e-procurement system and procurement practices on the performance of public hospitals in Ghana. A bootstrapping technique with 500 subsamples was adopted to investigate the statistical significance of the parameters in our self-designed model. The inner model revealed that E-procurement system usage has a statistically significant positive effect on hospital procurement practice and hospital procurement performance which supports our hypotheses.

Keywords: Public hospital, Public procurement performance, smart PLS, procurement practice, e-procurement system usage

INTRODUCTION

The exponential growth of electronic business applications is leading organizations, irrespective of their size, to embark on huge investments in innovative technologies, to preserve their competitive advantage in a gradually dynamic marketplace. Across the world, competition has forced organizations towards the commitment to excellence in all areas. Attention to the quality of goods and practices, inventory levels, and workforce development has offered a competitive advantage for insightful organizations that are striving to take center stage, and therefore information sharing, communication, and trust have provided a key role in improving the performance of virtual initiatives and incorporated supply chains (Gunasekaran & Kobu, 2007). Web-Based e-procurement is one type of an inter-organizational system, and the goal of the system implementation is to streamline purchasing procedures and to improve competitive edge (Tai, Ho, & Wu, 2010). Measurements are important because if something can be estimated, it can be controlled, managed, and improved. Measurement of performance of any organization is significant, with a specific end goal to increase a competitive edge. The rigorous adoption of information technology within the organization business processes dates back to the 1960s with the initial application of EDI (electronic data interchange) protocols, followed by the fast diffusion of EFT (electronic funds transfer),
telemarketing, telebanking, telehealth systems, and e-procurement system utilization. The adoption of these systems at different levels of commercial relations between businesses has offered them the chance to gain considerable reductions of transactional costs along the logistics chains. The arrival of the e-Age over the previous years (Caridi, Cavalieri, Pirovano, & Diazzì, 2004) this certainly represents a further opportunity to enhance the productivity and effectiveness of organizational relations. The web and all the related online applications are not just cost-facilitator devices. Rather, unlike proprietary EDI systems, their focal envisaged property dwells on their open-source design and the likelihood to embrace not just the transactions processes but also the internal supply and planning processes of the organization along with a supply chain, without the need to adopt common operating systems or share the same databases. The application of information systems (IS) technology to facilitate this integration process is a method that continues to receive managerial consideration and, consequently, academic attention. Study on the influence and value of inter-organizational information systems, and particularly the utilization of electronic data exchange, has demonstrated that they are generally positive in enhancing the efficiency of business forms and the overall performance of organizations (Mukhopadhyay, Rajiv, & Srinivasan, 1997). While electronic data interchange (EDI), inter-organizational systems, e-commerce, e-sourcing, e-procurement, and e-auctions are all applications of IS that support supply chain management (Fiála, 2005; Kameshwaran, Narahari, Rosa, Kulkarni, & Tew, 2007; Kim, Hong, & You, 2015; Planing, 2015). The strategic role of supply has transformed because the business environment is constantly changing. The improvement in the importance of knowledge, technological complexity, globalization, and the accessibility of digital computerized data innovations are driving this transformation (Möller, Rajala, & Svahn, 2005). Current changes redefine the characteristics of business relationships, concepts, tools and strategic methods (Parolini, 1999). Businesses are forced to seek new business models and sources of competitive advantage, and, therefore, they are forming complex relationships and aiming for more efficient supply (Cousins & Spekman, 2003). Moreover, while the role of supply management has improved, the roles of supply decisions, supplier relationships, and purchasing function have also turned out to be more significant. According to (Chen, Paulraj, & Lado, 2004) e-procurement studies are particularly important because procurement is a single of the most critical functions of the supply chain. Regarding e-commerce, e-procurement is usually the beginning stage for some public teaching hospitals’ overall e-commerce strategy (Chang, Markatsoris, & Richards, 2004). One investigation shows hospitals spending less than 33% of their overall budget on procurement products and services (Gebauer & Schöber, 2006). The significance of the usage of e-business know-hows has been perceived broadly by organizations, and particularly in situations of centralization or horizontal cooperation, the significance of e-business innovations is significant business where the technologies can be viewed as enablers of horizontal cooperation, and as Johnson, Klassen, Leenders, and Awaytsheh (2007) have stated, there has been substantial managerial interest in opportunities to use e-business technologies in the supply chain to create economic gain in Ghanaian public teaching hospitals. In addition to achieving competitive advantage (Flynn, Huo, & Zhao, 2010) the exploitation of e-business technologies has become one of the primary conditions of doing transactions in public teaching hospitals. In an increasingly complex world of globalized trade with extended lead time, better risk and longer-term partnering, the integration of processes and methods in the supply chain and network require supporting information systems and technologies (Smart, 2008). Businesses have moved to Internet-based business to business (B2B) stages where exchanges are done efficiently and in a quick speed. The significance of implementing e-business innovations have developed significantly in business in general and in companies’ strategic and operational supply management as well. Even though overall adoption rates of e-procurement system usage is still relatively unknown (Hassan, Tretiakov, Whiddett, & Adon, 2014), most researchers agree that the full effect of e-procurement has not yet been realized and that the adoption and integration of e-procurement system usage into the business mainstream is occurring at a much slower pace than anticipated (Alshehri, 2012; Falk, 2005). Without a doubt, studies have demonstrated that one of the elements behind this improvement has been the advancement of the procurement function towards a more strategic role in supporting both corporate goals and supply chain objectives. The purchasing outlay about the price of goods sold averages 50% and may be as high as 80% (Van Weele, 2010), hence reduction in cost of bought-in goods and services have been a major focus in much of the merger and purchase activity through the 1990s and 2000s. Organizations recognize the potential for increasing both profits and stock values by aggregating the
buying power of recently-merged organizations and reducing spending with external suppliers to the business. This goal and other drivers within the function have led to greater recognition of the need for tools and technologies which can assist procurement experts in increasing their productivity and contribution to value creation. This disconnect is apparent in a recent study by (Gunasekaran & Ngai, 2008). According to (Ketikidis, Kontogeorgis, Stalidis, & Kaggelides, 2010), experts recognize benefits of e-procurement such as better coordination with suppliers, speedier transaction times, higher adaptability, better supplier integration, and lower costs (Theodosiou & Katsikea, 2012). If experts and employees understand the e-procurement system usage impact, why are they not being utilized? Quesada, González, Mueller, and Mueller (2010) has partially addressed this question by arguing that organizations hastens to roll onto the e-procurement bandwagon without fully understanding the inter-organizational collaboration and systems effects underlying these technology models, the investment needed to move the right information from trading partners to employees, and the difficulties of integrating these technologies with existing enterprise resource planning applications. Recognizing the managerial difficulties, operational dangers, and difficulty measuring incremental increases to profit inherent in implementing new and costly supply chain innovations. This paper aims to evaluate the use of e-procurement system and procurement practices on the performance of public hospitals in Ghana. All business investments of IT need to be the subject of appropriate appraisal and assessment, while the literature recommends potential advantages of these adoption technologies, little has been written on the nature of the business case for e-procurement usage in the public hospitals. For this research, ten large public hospitals were chosen for examination on how the usage of the e-procurement system influences the procurement function positively. The research further examines the procurement practices to assess factors which affect the current procurement activities. The study is structured as follows; is to present a review of the relevant literature, followed by a discussion of the methods used in the research. Furthermore, a conceptual model is presented, the hypotheses developed and tested. A summary of the key variables identified which leads us to make inferences on the outcomes and provide indications for further study.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Procurement is a core function in every organization. Traditionally the focus of procurement was restricted to efficient purchasing activities or was simply considered an administrative job. Reducing the cost of purchasing was considered as the key function of procurement. Globalization and dynamic market condition changed procurement as a strategic issue. These drives all organization to be more innovative and improving their services towards meeting rapidly changing customer requirement (Hong & Kwon, 2012). Barratt and Barratt (2011) further said that, it is a key area to focus, for the organizations to become cost effective and competitive in an environment characterized by increasing globally challenging and declining profit margins. Above all, few corporations such as automotive, textile and electronics, procurement cover 80% of the overall cost (Tsang et al., 2013). The role of procurement has turned out to be more demanding in savings, to assist in widening sustainable development, diversity and to improve service delivery (Loader, 2010). According to (Chan, 2003) procurement is the most critical function in the supply chain. This gives rise to organize procurement as an essential function and its significance in assessing its performance. Procurement became a strategic priority for firms with a specific end goal to accomplish competitive advantages. In today’s dynamic business environment procurement is seen as a critical business process concentrating on long-term value creation from the conventional concept of short-term cost minimization (Rendón & Rendón, 2016). The strategic importance of procurement has been reiterated frequently and is still one of the essential topics being made mention of in academic papers (Anuar, 2015; Edler & Georghiou, 2007). Saad, Kunhu, and Mohamed (2016) argue that the importance of giving procurement a strategic role in the organization and agree that achieving world-class status in procurement requires leadership and alignment of purchasing strategy with a business plan. While relatively fewer studies have analyzed procurement and its impact on different functional, firm or supply chain performance objectives (Rai, Patnayakuni, & Seth, 2006), constituents of the basic e-procurement model can be garnered from contributions in the literature at both the strategic and operational levels. The benchmarking process can offer a grave link in understanding the relationship between the components of the conceptual model see Figure 1, as described in the next sections.
2.1 E-PROCUREMENT SYSTEM USAGE

The procedure by which organizations incorporated technological innovations into existing schedules and utilized them all the time was seen as a paramount concern in literature. More than 20 years of study examining IT innovations, literature investigating organizational use of IT remains scant(Zhu & Kraemer, 2005) and to the best of our knowledge o IT use .is still limited(Barki, Titah, & Bozzo, 2007; Liang, Saraf, Hu, & Xue, 2007). Essentially, Internet innovations provide systematic ways of considerably reducing distinctive classes of exchange and communication costs. In that regard, the potential value of different electronic procurement (EP) types, such as electronic catalog systems, electronic auctions, intelligent agent applications, electronic marketplaces appears to be mostly undisputed(S. R. Croom, 2000; Smeltzer & Ruzicka, 2000). Min and Galle (1999) asserted that e-procurement system (referred to as EPS) is defined as the extended utilization of electronic system technologies and practices that facilitate electronic communication, information exchange, and transaction support via state or private organizations. Along these lines, researchers have suggested that e-procurement system usage is a critical construct that requires an investigation in detail and that the extent of technology use within major organizational processes itself can be treated as a critical measure of success(DeLone & McLean, 1992; Doll & Torkzadeh, 1998). In other words, the successful use of IT signifies an essential dimension of performance in firms(Armstrong & Sambamurthy, 1999).

According to Lankford (2004) companies that have successfully integrated the Internet into the management of the supply chain hold a competitive edge over those who have not. The expressions, e-Procurement, and e-Purchasing have been utilized synonymously in numerous jurisdictions in an attempt to demonstrate their inclusion in the e-Commerce revolution(MacManus, 2002), the term purchasing has a smaller extension. E-Procurement refers to the use of web-based information and communication technologies to carry out each or all phases of the procurement process including search, sourcing, transaction, request, receipt, and post-buy audit(S. R. Croom & Brandon-Jones, 2005). Equally, Tonkin (2003) observed that the e-procurement system is when the organization use of electronic techniques in every phase of the purchasing process from identification of requirements to payment, and potentially to contract management. However, e-Procurement Systems consists of the following, purchaser e-Procurement Systems, Supplier e-Procurement Systems, and web-based intermediaries. Also, e-procurement comprises of several types that focuses on one or various stages of the procurement process, for example, e-Tendering, e-Marketplace, e-Auction/Reverse Auction, and e-Catalogue/Purchasing; e-Procurement can be seen more comprehensively as an end-to-end arrangement that coordinates and streamlines numerous procurement processes throughout the organization. Although the initiation and accomplishment of e-Procurement are common, industry and academicians have shown that this ideal model is seldom accomplished and e-Procurement usage generally include a blend of different models. Hence, one of the extensive efforts of the government is the presentation and implementation of e-procurement to replace the conventional and traditional phrases of the procurement system. The need to accept e-procurement cannot be underscored given the way that public sector procurement is enormous and multifaceted, recording between 20% and 30% percent of total national output and traditionally attempts to meet numerous social and political objectives(Thai, 2001). To safeguard responsibility and transparency services, government procures goods and services to protect the public interest; they utilize a complex contractual system designed. Based on the literature, the authors claimed. In this context, it becomes critical to understand the effects of changing information technologies on e-procurement system usage, business performance, and the achievement of business goals. Previous literature has used the expression e-procurement to describe the use of the worldwide web on procurement tasks(Aman & Kasimin, 2011; Batenburg, 2007).

2.2 E-procurement in public hospital Practices (PPHPR)

Information and communication technologies make available ways of radically reducing different classes of transaction and communication costs in public teaching hospitals. In that regard, the potential value of separate electronic procurement (EP) forms, such as electronic catalog, dynamic auctions, intelligent
agent systems generally seem undisputed for suitability not only private but also the public organizations (hospitals) with the difficulty of assessing the purchasing requirements (Ozbilgin & Imamoğlu, 2011). Cost on public procurement, the purchases of products, services, and government works by the state and public utilities, constitute between 10% and 20% of a GDP. Hence, it is critical to guarantee that government agencies are implementing the best-accepted procedures. Public procurement is the purchasing of public goods, services, public works by government agencies and public utilities. Examples of procurement services include providing citizens with utilities such as electricity and telephone lines, making tutoring accessible to the general population and operating public hospitals (Costantino, Dybala, Janakiraman, OToole, & Smith, 2005). Moran and Odeh (2016) identified that the three best procurement practices were: to set up clear assessment and selection processes, ensure that the process is fair, open and transparent, value both technical concepts and cost in the selection process. These suggested best practices are in support with a recommendation (Muriro, 2015; Owens, Ahn, Shane, Strong, & Gransberg, 2012).

Notwithstanding the significance of effective procurement practices to government efficiency, very little is known about how procurement practices affect government spending. Efficient procurement practices, both non-governmental and public assume a crucial ingredient in modern economies as they guarantee a reduction of wasteful spending. Achieving such efficiency is an ambitious task, as procurement faces various difficulties, mainly because of the market structure, the legal framework and the political atmosphere that buyer’s face. Procurement practices are an arrangement of activities undertaken by an organization to advance for the effective administration of its supply chain (Cogburn, 2017). E-procurement are the managerial activities conducted to enhance the performance of the integrated supply chain. According to (Marshall, McCarthy, Claudy, & McGrath, 2017), procurement practices have been identified as customer orientation, strategic supplier partnership, level of information sharing, quality of information sharing, reverse logistics and knowledge management. Other authorities have considered procurement practices to be similar to the supply chain management practices which are the set of activities performed by an organization to encourage effective management of its supply chain (Jacobs, Chase, & Lummus, 2014); as the approaches applied in integration, managing, and coordination of supply, demand, and relationships so as to satisfy clients in a viable way (Wong, Boon-Itt, & Wong, 2011); as tangible activities/technologies that have a relevant role in the collaboration of a central firm with its suppliers and/or clients (Jabbour, Viana, & Jabbour, 2011); and as the approach to involve suppliers in decision making, encouraging information, sharing and looking for new ways to integrate upstream activities. As a consequence, it includes developing consumer contacts by consumer feedback to incorporate the downstream activities and conveying orders directly to customers (Estampe, Lamouri, Paris, & Brahim-Djelloul, 2013).

Generally, the classification for public procurement practices of an organization is that it entails the gathering of information, contacting suppliers, contracting, requisitioning, intelligence and analysis by public institutions (Anuar, 2015; Csáki & Adam, 2010). To ensure better sourcing decisions, these steps must be linked with one another. For example, the worldwide medical device industry, which is the most significant contributor to hospital expense, is evaluated to be around $210 billion in 2008 with a CAGR 8-10%, 2012 Espicom Business Intelligence (Intelligence, 2012). Thus, it is imperative for healthcare suppliers to manage medical device procurement more proficiently to achieve cost savings. To strengthen procurement efficiency and collective pricing power, hospitals have taken an interest in a cluster of a large number of buyers known as GPOs with their vendors. Public hospitals need to coordinate all of the activities involved in the process of purchasing products and services to achieve hospitals objective through procurement practices (A. Kumar, Ozdamar, & Peng Ng, 2005). With electronic procurement in full capacity, a virtual marketplace is made, and exchange of information occurs between the individuals of the supply chain, primarily the suppliers of the healthcare materials and pharmaceutical companies on one end and the hospitals on the other end. The e-procurement system platform encourages the strategic management measure of procurement decision-making by decreasing large amounts of administrative hours spent to process the orders. Order placement and fulfillment becomes more accurate (error-free) as manual processes are taken away. A body of research examined the influence of IT on procurement practices (PPR) revealed a positive relationship between the adoption of these technologies and improvements in PPR. Technological advances in information systems and information technologies can facilitate coordination in transporting firms, and this, thus, permits the virtual integration of the whole procurement practice. For instance, Prajogo, Chowdhury, Yeung, and
Cheng (2012) found a positive correlation between the acceptance of Information System (IS) technology and the level of SCM practices and organizational performance. Rahman (2015) established that e-procurement technology has a definite positive relationship with PPR in the healthcare sector. Prajogo and Olhager (2012) stated that IT is a critical component in the usage of control, involvement in the processes and logistics practices and also support the implementation of advanced methods in the purchasing function, with an ultimate objective of improvement in the organization. The following hypothesis is proposed:

**H1:** There is a positive relationship between E-procurement system use towards the achievement of improvements in the public procurement practices (PPPR) in hospitals.

Procurement performance encompasses all programs involved in obtaining material, transporting it, and moving it towards the production process; it contributes substantially to a company’s overall performance (Zenz, 1987). Furthermore, Anuar (2015) as cited in (Alsetoohy & Ayoun, 2018) defined procurement performance as the practices of the organization in gathering information, contacting suppliers for pre-contact requests, negotiating, and fulfilling of orders. The author also argued that the procurement performance is affected by poor procurement practices. The current study extends this argument by suggesting that the implementation of the e-procurement system usage of procurement practices in public hospitals would improve public hospital procurement performance. The literature supports this assumption. Gebauer, Beam, and Segev (1998) found a positive relationship between PPR and PP concerning cost, time, satisfaction, quality, stock, and value. Quesada et al. (2010) and Anuar (2015) found that procurement practice has a strong and positive influence on procurement performance. Additionally, the advanced purchasing practices improve the purchasing performance (Hirn, 2016). Hence, the following hypothesis is proposed:

**H2:** There is a positive relationship between the uses of the e-procurement system HPPR towards the achievement of improvements in the public hospital procurement performance.

### 2.3 E-procurement system usage and hospital procurement performance

Over the last decade, a fully integrated healthcare information technology (IT) has progressively been viewed as a primary lever for improving the quality, safety, and proficiency of health systems (Chaudhry et al., 2006). Several scholars, S. Kumar and Chang (2007), Talluri, Chung, and Narasimhan (2006), Knudsen (2003), Presutti Jr (2003) and Pan, Cheng, and Harrison (2002), recognize that the advent and growth of different types of IT including e-procurement has assumed an indispensable role in permitting supply chain individuals to achieve inter-firm coordination whilst incorporating business processes. As organizations look for improvement, the efficiency in the supply chain through increased involvement of ICT can be assumed as a vital tool for procurement process through its ability to help information sharing and lessening information handling time (Scarsi & Cepolina, 2016). Similarly, Vlosky, Fontenot, and Blalock (2015) observed that ICT influence is exhibited regarding, e.g., changes in relationships, inter-organizational changes, and performance. The many dimensions in which the procurement process can be communicated and the wide variety of factors in which the effect of ICT can be defined. As far as integration indicates that past research has been restricted to studying a couple of dimensions and variables relationships at once. The aspect of how to arrange and control the activity between the organizations in the supply chain, and how ICT influences the level of control integration in the supply chain is of great importance. Utilization of ICT in procurement help in coordination of business processes, both within the organization and between a purchaser and existing suppliers. For instance, electronic purchase-order systems, online catalogs and online linkages with providers to exchange information regarding fulfillment activities (Johnson et al., 2007).

Managers are attracted to the benefits of improved productivity, faster response times and overall perception of low risk in implementation (R. Kumar, Singh, & Shankar, 2015). Technological developments in information systems and information technologies can encourage coordination in transporting firms, and it permits the virtual integration of the whole procurement process. Managers have realized that the Information communication technology can enhance procurement decisions making by providing real-time information and enabling collaboration between trading partners. Technology provides tools to enable organization operations to continually purchase the best-value products and services, by employing unified web-based sourcing equipments and streamlined support for complex negotiations (Wu & Chuang, 2010). According to (Kinuthia & Abdallah, 2015), organization performance is closely linked to the performance of procurement and therefore it is
necessary to assure that procurement performs to the required levels so that the organization as a whole achieves high levels of operations. Ngunyi (2014) asserts that organization performance can be assessed by quality service and goods, fulfilling clients, market performance, service innovations, and employee and that organization performance can be evaluated by the following dimensions of performance; return on investment, the margin on sales, capacity utilization, customer satisfaction, and product quality. Similary, Richard, Devinney, Yip, and Johnson (2009) noted that the return on investment, sales and market growth, and profit are important factors that can be used to measure organizational performance. Baier, Hartmann, and Moser (2008) suggested that procurement practices, associated with competition capabilities of the firm, may have more significant effects on firm performance. According to (Yee-Loong Chong & Ooi, 2008), a good organized and executed procurement process will make it possible for companies to decrease their inventories, have better customer service, diminish costs as well as aid fast inventory turns. From the long-term perspective, a procurement process has been found to increase a company’s market share significantly. According to(KIOKO, 2017) , one of the tools for the firm’s competitiveness is strategic procurement which is seen to have a positive effect on the overall performance of the organization. Unlike conventional purchasing is driven by the desire to cut expenses of purchase, short-term profit improvement, transactional as opposed to relationship conduct with a stress on the need to cut down on prices. Strategic procurement planning, by contrast, assesses how the acquiring of products and services, which are made up of outsourcing of the whole processes, can convey better long-term investor’s value. It includes reducing the provider base, co-operative negotiation with providers, quality communication with providers, and developing long-term relationships with the best providers.

Nevertheless, these key procurement behaviors are related to better procurement performance. Albeit, the many documented benefits of the above mentioned IT applications of the public procurement process in public hospitals, these innovations are faced with a lot of challenges on the hospital’s procurement practices and hospitals procurement performance. Caridi et al. (2004) found out that in the past years, a strong disillusion has profoundly affected several organizations in the implementation of business to business (B2B) applications(e-procurement system). These drawbacks could be attributed mainly to unpreparedness to adoption and acquisition of these new systems, trusting that they would have acted as equipment for automating processes, rather than real opportunities for changing the business approach. Their added value can be immaterial and incomprehensively negative, if not accompanied by a thorough revision of the decision-making activities and the roles performed by the involved players. Other authors (Davenport & Brooks, 2004; Iansiti & Levien, 2004) also emphasized the drawbacks of EDI innovation as EDI software is hard to integrate with the other company legacy systems; catalog management is quite more difficult than it was previously expected; users have not found the new system so friendly and easy to use as it was earlier promised; the impact on the cultural and organizational changes of the company is not trivial and often exacerbated by a lack of redefinition of the tasks and the roles of the personnel involved; each division has adopted a different IT-based solution, thus generating a mosaic of applications not commonly interfaced.

The electronic procurement system could turn traditional hospital procurement to electronic to improve the coordination and management of all purchasing activities(Turban, King, Lee, Warkentin, & Chung, 2006). In conventional procurement, issues involving, for example, wasteful purchasing, repetitive and disengaged processes, non-strategic sourcing and maverick buying’s are frequent(Subramaniam & Shaw, 2004). This provides a challenge to the field of information systems. However, the problems can be adequately addressed by e-procurement solutions. In B2B, e-procurement is a focal capacity and has turned out to be a basic practice towards efficient and effective business performance(Neef, 2001). The B2B (business-to-business) medical e-business and information industry usually controls e-procurement techniques agrees to exciting and commonly beneficial relationships between producers and distributors providing the domestic and global healthcare supplier community. Automatic identification techniques and policies have enormously impacted these beneficial relationships. E-procurement firms utilized internet business tools that engage providers and suppliers to enhance operational proficiency and reduce supply costs in both suppliers driven and supplier-neutral environments. As far as the pharmaceutical businesses are concerned, e-procurement ordinarily takes into account electronic drug-inventory control, drug replenishment alerts, online purchase of medicines and related medical supplies, and reporting of current stock levels in a clinic and hospital setting. Extant studies found a positive
relationship between adopting new technologies in the procurement process and achieving higher procurement performance (PP), such as IT (Quesada et al., 2010), e-procurement technology (Anuar, 2015), and Michalisin, Kline, and Smith (2000) also found that a favorable reputation of e-procurement system usage in the health industry will be positively related with organizations performance. Based on this, the authors propose that:

H3: There is a positive relationship between adopting the usage of e-procurement system in the hospital procurement process and achieving higher hospital procurement performance.

3. Materials and Methods

3.1 Sampling

This study evaluates the usage of E-procurement system and procurement practices to enhance performance; thus, the unit of analysis is set at public organizational level. Accordingly, this study uses a sample of Ghana Public Teaching Hospitals using e-procurement, that is, the Internet is used as the medium of these transactions. The respondents are users who are senior executives (medical doctors), technical officers (Supply chain managers, Pharmacists, Procurement Specialists, Nurses), system analysts (Data Managers) and office support staff (Accountant, Health Administrator) for the public hospitals engaging in purchasing activities via e-procurement, because an in-depth understanding of the procurement process of their firm is required. The survey is conducted through Ghanaian teaching hospital institutions to achieve survey accuracy. Mainly, this study extracts samples of large Ghana Health Services engaging in purchasing activities via e-procurement system. We confirm these firms’ e-procurement usage via a telephonic interview and identify the persons in charge of the procurement activity at each hospital. This study requested for cooperation for conducting the survey questionnaires via the telephone with the respective procurement managers and then surveyed via the Internet. In case of missing data, we contacted respondents again to complete the questionnaire. The focus of this study was on ten regional public teaching hospitals spread across the country. The survey was sent to 1400 potential respondents and a total of 800, responses were successfully received and analyzed representing 57.1% response rate.

3.2 Measurement Tool

The construct of gathering information was assumed to consist of three items, searching for suppliers to contract purchases, searching for suitable good/service to order, and consulting references for good/service quality as identified by (Lewis-Faupel, Neggers, Olken, & Pande, 2016). For the status of supplier contract, three items were utilized, adapting from Hardy and Williams (2008), which capture the requesting quotation when contracting suppliers, requesting information when contracting and requesting bids when contracting. The items for contracting were adapted from (Eadie, Perera, & Heaney, 2011) which captures negotiating price with suppliers to develop a contract, negotiating quality standards with suppliers to develop a contract, negotiating customization possibilities with suppliers to develop a contract, negotiating delivery schedules with suppliers to develop a contract and negotiating final contract with suppliers to develop a contract. The items for the construct requisitioning are made up of approving orders when requisitioning orders, placing orders when requisitioning orders and processing suppliers invoices when requisitioning were assessed from (Lee, Lau, Ho, & Ho, 2009). Intelligence and analysis were measured with seven items based on the work of (Abu-ELSamen, Chakraborty, & Warren, 2010). The constructs all belong to hospital procurement practices (HPPR) (Gathering information, Supplier Construct, Contracting, Requisitioning, Intelligence/Analysis). Hospital procurement performance (HPP) contains the constructs explained below. The three items for internal performance were modified from (S. Croom & Johnston, 2003) and they capture reduce search costs, reduce inventories, reduce costs of materials/costs of providing services. Internal customer performance was measured by six items that include improving overall services quality to internal customers, improve reliability of information to internal customers, meet internal customer expectation, increase communication with suppliers, deliver on time products and services to internal customer and deliver on time information to internal customers (reports, updates) was sourced from (Won Lee, Kwon, & Severance, 2007). Whereas, the e-procurement performance is only made up of one construct i.e. E-procurement system usage utilized four items searching agent, selecting agent, ordering agent and analyzing agent were adapted from (Min & Galle, 1999). The scales for these items were measured by five-point Likert scales ranging from “1=strongly disagree” to “5= strongly agree”.

3.3 Instrument Validation

This research utilized the Smart partial least squares (Smart-PLS), one of the techniques in structural equation modeling for investigating the full structural model. PLS can identify and establish the
relationships among constructs in the structural model, as well as all constructs’ measurement model (Hair, Ringle, & Sarstedt, 2011). PLS has a strong advantage of being allowed to work with no distributional assumption about populations (Lowry & Gaskin, 2014). The other advantage of PLS faces with fewer restrictions on the scope of the study (Henseler et al., 2014). The PLS-SEM is considered a well-established technique for estimating path coefficients in structural models and has become common in many research such as e-business success factors (Haenlein, 2004), consumers intention to purchase online (Amaro & Duarte, 2015), healthcare (Avkiran, 2017) supply chain management research (Kaufmann & Gaekler, 2015) and operation management research (Peng & Lai, 2012). Henseler, Ringle, and Sarstedt (2015) claimed that it is widely held that PLS-SEM is more suitable for small sample size, prediction, and theory development, while CB-SEM is more appropriate for theory testing and confirmation. Based on this premise, our study hypotheses were tested by employing Smart PLS-SEM. The study adopted a Kolmogorov-Smirnov test to assess the normality of the data distribution. To ensure that this data is normally distributed, the significant value must be greater than 0.05. From our result, we had .200 which is higher than 0.05 indicating that our data is normally distributed (Razali & Wah, 2011) see Table 1.

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<td><strong>Dependable Variable</strong></td>
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The Bootstrapping (500 subsamples) and PLS algorithm techniques at the maximum number of iterations (300) established by (Ringle, Wende, & Will, 2011) were employed and found the significance levels of the proposed hypothesis. To validate the internal consistency of the constructs, the composite reliability was employed. The composite reliability values for the constructs in the model were all above the suggested threshold of 0.7 (Bagozzi & Yi, 1988; Fornell & Larcker, 1981) and thus supported the reliability of the measures. Convergent validity was supported by item factor loadings and average variance extracted (AVE) of the constructs. All items had a loading above the suggested value of 0.55 (Sosik, Kahai, & Piovoso, 2009), except for two irrelevant items (Requesting proposal when contracting suppliers and Negotiating delivery quantities with suppliers to develop a contract) were removed. As shown in Table 2, AVE values for all constructs were above the suggested threshold of 0.50 (Fornell & Larcker, 1981), except for contracting and intelligence/analysis variables. However, the low AVE values of these two constructs, the convergent validity is still adequate with the higher composite reliability of .74 and 0.85 according to (Fornell & Larcker, 1981). Moreover, all estimated standard loadings were significant at the 0.02 level, indicating good convergent validity. The highest Heterotrait-
Monotrait ratio of correlations (HTMT) was found to be (.64), which was below the threshold of .90 (Henseler et al., 2015) and the square root of the AVE is greater than the correlation coefficient involving the construct which established the discriminate validity shown in Table 2 above.

K. Kumar (2012) observed that the use of items from constructs to measure the latent variables in a structural model improves the degrees of freedom in the structural equation model and may cause challenges in model fit. Furthermore, the path coefficients of E-procurement system usage predicting the constructs of the PPR is 0.418 and between E-procurement system usage and PP’s constructs is 0.785 whereas PR and PP were 0.49 as shown in TABLE 3. Therefore, the average score of the items loaded under each construct was computed, and these scores were used as indicators for the corresponding construct (Mora-Monge et al., 2010), to simplify the model and investigate the hypotheses, we conducted the model fitness test and the results of our estimated model fit was 0.032 indicating a perfect fit model which is within the cutoff of SRMR = 0<.1. (Henseler, Hubona, & Ray, 2016); Goodness of Fit (GoF) = .59 >.36 (Hoffmann and Birnbrich, 2012). This technique of data analysis produces the same results as the second order technique in PLS.

The quality criteria for the $F^2$ values shown that the procurement practices and performance constructs have a significant effect of 0.291 and 0.216 on explaining the model in Table 3 below. The $Q^2$ values for both variables were recorded as .250; .312 respectively are more significant than zero, which indicates the path model’s predictive relevance for these constructs (Hair et al., 2014).

### Table 3 F Square ($F^2$) Quality Criteria

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Procurement Performance</th>
<th>Procurement Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-procurement System Usage</td>
<td>0.216</td>
<td>0.291</td>
</tr>
<tr>
<td>Procurement Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement Practices</td>
<td>1.629</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4 Path Coefficients (% values and P Values)

<table>
<thead>
<tr>
<th>Constructs Paths</th>
<th>Original PC Value</th>
<th>P Values</th>
<th>t- statistics O/STDEV</th>
<th>P Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Procurement System Usage→ Procurement Performance</td>
<td>0.539</td>
<td>0.035</td>
<td>3.782</td>
<td>0.035</td>
</tr>
<tr>
<td>E-Procurement System Usage→ Procurement Practices</td>
<td>0.672</td>
<td>0.015</td>
<td>6.315</td>
<td>0.015</td>
</tr>
<tr>
<td>Procurement Practices→ Procurement Performance</td>
<td>0.909</td>
<td>0.000</td>
<td>77.124</td>
<td>0.000</td>
</tr>
</tbody>
</table>

4. Results

4.1 Descriptive Analysis

Quite a large number of the respondents which are made up of undergraduate and postgraduate accounting for (60.4%) have educated themselves to a higher level of education, so this plays a significant role in their understanding to the application of e-procurement system. Concerning the knowledge of e-procurement system usage, the participating public teaching hospitals are intending to use e-procurement in health procurement as this tool has not been fully operational in all the TEN public teaching hospital in Ghana. Only a few, teaching hospitals which cannot be quantified in our study survey are in the process of installation and implementation. However, end users are the largest among the group with (45.2%) followed by supply chain managers. This shows that end users are involved with the daily operation of the e-procurement system. Of the respondents, 83.8% were female, and 16.2% were male. In our research, 30.6% of respondents have spent less than three years in the public hospital, whereas other respondents have also spent between 3 and 5 years accounting for 37.9% in the public teaching hospitals. Respondents representing 31.5% have occupied their position over a duration of 5 years. This could be attributed to the fact that e-procurement system use has not been diffused throughout the entire public hospital entities in Ghana.

4.2 Hypotheses testing

To test the proposed hypotheses, a bootstrapping technique with 500 subsamples was adopted to investigate the statistical significance of the parameters in the model (Esposito Vinzi, Chin, Henseler, & Wang, 2010). The coefficient of determination, $R^2$, is 0.836 for hospital procurement performance variable suggests that the two latent variables (E-procurement system usage and hospital procurement performance explains 83.6% of the variance in the hospital procurement performance. Additionally, the e-procurement system usage latent variable explains 34.4% ($R^2= .344$) of the hospital procurement practice. The inner model revealed that E-procurement system usage has a statistically significant positive effect on hospital procurement practice ($t= 6.315$, $P<0.015$) and hospital procurement performance ($t= 3.782$, $P<0.035$) which supports H1 and H3 respectively, presented in Figure 2. Furthermore, the results indicated that hospital procurement practice PPR has a positive relationship ($t= 77.124$, $P<0.00$) with hospital procurement performance PP, a result which supports H2 as presented in Table 4 and Figure 2.
contracting, requisitioning and intelligence and analysis will be employed in the hospital procurement practice. In our study, we found out that e-procurement system usage has a positive relationship with hospital procurement performance. This can be explained that the higher rate of utilization of e-procurement system will yield a lot of benefits to the organization resulting in improvement of hospital procurement performance. The above study leads us to conclude that E-Procurement system usage affects the organizational performance through increased efficiency, hospital supply chain management, increased sales performance and improved relationship development. With the implementation of the E-Procurement system, improved efficiency can be gained through reduced cost of materials purchased, reduced inventory levels and reduced transactional costs in hospital supply chain management. E-Procurement also leads to an increase in sales performance through increased profit margins, increased market share and increased revenue growth by reducing the cost of the product/services. Improved customer satisfaction can be obtained through E-Procurement system usage by providing the customers with customized products of high quality at a reduced price which is the underlying principle of every organization. The result of the hospital procurement practice has a positive relationship with hospital procurement performance, and this supports the findings of Quesada et al. (2010) and Mäkinen, Kähkönen, and Lintukangas (2010) that procurement practice has a positive and significant correlation with procurement performance. Lancioni, Smith, and Schau (2003) found out that, the increased flexibility in managing supply chains the IT has provided, has enabled logistics managers to introduce customization and integrate customers more deeply into their supply chain management systems. Roth (2001) reports on a study of e-Procurement system usage shows that top performers conduct more than 20% of their transactions online. The research demonstrates that the IT is used in a variety of procurement applications including communication with vendors, checking vendor price quotes and making purchasing from vendor catalogs. The IT has also enabled companies to set early warning damage systems, provide information on warranty agreements and assist in vendor negotiation. The most significant benefit of the IT for supply chain managers is in the provision of rapid, accurate and comprehensive information about every single step in their supply chain systems. Also, the IT has provided managers with the ability to be agile in managing their supply network and in so doing this will ensure long-term improvements in public

Figure 2, the composite, path coefficient and $R^2$ values of the various constructs in the conceptual model

5. Discussion
This study offers a literature framework that acknowledges the positive and significant relationships between e-procurement system usage for hospital procurement practices and hospital procurement performance according to (Quesada et al., 2010). The results of our current study show that e-procurement system adoption in the procurement of goods and services for public teaching hospitals could assist to overcome the current challenges and variability of goods/services demand in hospital procurement practices. This result established that using e-procurement system in the operation of hospital procurement practice requires employee’s effort in their search for organizational goods, works and services and trading partners, negotiating with trading partners and making requisition for purchases (Falahario, Sciancalepore, Costantino, & Pietroforte, 2012), and assessing trading partners performance with no inclusion of employees effort (Jayne & Dipboye, 2004), which improves the success of hospital procurement practices in public teaching hospitals (Figuera, Robinson, & Jakubowski, 2005). Also, top managers recommend that with the frequent use of e-procurement system in hospital procurement practices would lead to improvement in the procurement practices for the organization. These findings corroborate the work of (Benyoucef & Canbolat, 2007) who showed that Internet usage in public teaching hospital’s procurement enhanced the procurement practices in the area of searching and selecting trading partners procedure. This is in support of (Brynjolfsson & Hitt, 2000) who observed that the adoption of IS technology is positively correlated with the level of supply chain management practices and organizational performance. These characteristics such as gathering information, supplier contract,
procurement performance in the public teaching hospitals in Ghana. Finally, better communication and improved information sharing along with the supplier’s involvement in the organization’s planning and policy decisions leads the organization to have better relationship with trading partners and the entire public procurement process.

6. IMPLICATION

There has been a considerable amount of interest among researchers recently to examine deep and integrative use of IT in business processes, the relationships between such uses and their influence on performance(Bharadwaj, 2000; Kohli & Grover, 2008; Zott, Amit, & Massa, 2011). However, there is now a substantial body of literature on e-procurement to study alone web-based procurement, which creates voids for e-procurement system usage in the public teaching hospitals. Hence, this research fills this gap in the e-procurement literature by considering factors such as procurement practices and procurement performance. This research examines the impact of e-procurement system usage on hospital procurement practice and hospital procurement performance in the healthcare organizational setting. This research makes significant theoretical contributions based on measurement models of e-procurement system usage, procurement practice and procurement performance. These constructs were validated and tested for reliability to ensure ways of evaluating procurement measures in the healthcare industry environment. The findings of the factor analysis of this study offer top managers with the most significant important e-procurement system usage in various ways such as sourcing, order and as an analysis tool in the teaching hospital procurement which could serve as a reference point for other hospitals who intends to adopt e-procurement system in hospital procurement. The research finding shows that e-procurement system usage has a significant positive relationship with hospital procurement practice. Hence, top managers should pay more attention to the use of e-procurement in the case of hospital procurement practice by looking at these indicators gathering information, supplier contract, contracting, requisitioning, intelligence and analysis. This could be done by updating the IT infrastructure in hospitals and offering employees with training programs so they could become skillful in the procurement practice. Employing the e-procurement system in these practices will improve the challenges that are inherent in the hospital procurement practice and the variability of goods/services which will later lead to the improvement of these practices.

Moreover, E-procurement system usage can simplify and abridge tasks implementation intelligently in hospital procurement practice to improve hospital procurement performance acceptance. Hence, top managers should by every means necessary consider e-procurement system usage as a way of continually improving hospital procurement practice and trading partner relationship. E-procurement system could assist top managers to make an online negotiation process more convenient and profitable for trading partners and hospitals. E-procurement system also could appeal to the hospital top manager’s attention to negotiations and decisions that need to be taken immediately to avoid unnecessary time delay and cost of labor. This research recommends that hospital top managers must take a second look at, in assessing E-procurement system usage, not just an operating system that provides immediate organizational benefits but rather e-procurement assist firms to gain competitive advantages in dynamic and turbulent business environment.

The result of this research shows that e-procurement system usage has a statistically significant positive relationship with health procurement performance. This study offers a robust empirical indication of e-procurement system benefits, as perceived by participating managers in the survey, in hospital procurement performance, the measurable indicators are internal performance, supplier-related performance, and internal customer performance. The yet to be adopted of e-procurement system in teaching hospitals should take immediate steps that are geared towards transiting to use e-procurement system in hospital procurement to derive its benefits. Concerning the internal and external customer performance at hospital procurement performance, top managers should improve their employees’ skills to be technology knowhow compliant to realize e-procurement system usage effects in hospital procurement performance. This will occur through encouraging and sending employees to IT-related seminars and workshops in hospital supply chain management and providing continuous training programs to hospital staffs’ before e-procurement system application. Concerning the supplier-related performance, hospital top managers should encourage their trading partners to adopt and use e-procurement system to take full advantage of e-procurement system benefits and strengthen and improve the business relationship through the common organization. Finally, the positive relationship of the hospital procurement practice and hospital procurement performance will coerce hospital top managers to enhance the use of the hospital procurement practice and available resources
to keep the improvements in hospital procurement performance. Top managers should recognize that improving the hospital procurement performance is as a result of the integration and coordination of e-procurement system applications and hospital procurement practices, which should be managed in a judicious way along with hospital's resources. The e-procurement system usage will help hospitals to meet the organizational needs of their staff as well as trading partners.

7. LIMITATION OF THE STUDY
The current research has potential limitations that should be taken into consideration. First, this study was performed at the operational level of hospital procurement practice in that e-procurement system usage is still in the early stages. Future research could investigate the role of e-procurement system usage at the strategic level of hospital procurement practice and examine the effect of e-procurement system usage on the entities procurement practices. Second, the scope of this study is somewhat narrow as it explored the impact of e-procurement system usage on procurement practice and procurement performance within the public hospital environment. Future research may shed light on the effect of e-procurement system usage on the supply chain management of the entire public hospitals in Ghana. Third, sampling is not randomized to cover all government hospitals, which leads to limited generalizability. Finally, to enhance generalizability, future studies could repeat this study with more diverse samples.

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