ROLE OF PUBLIC E-PROCUREMENT TECHNOLOGY TO REDUCE CORRUPTION IN GOVERNMENT PROCUREMENT

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ABSTRACT. This paper explores the potential of public e-procurement technologies to reduce corruption in the public procurement process. It analyses the risk factors of corruption in the government procurement processes such as in project planning, product design and documentation, tender process, contract awards, and accounting and auditing. It assesses different cases of various developing countries and emerging economies with a specific focus on the potential of public e-procurement to transparency and accountability. The results indicate that anti-corruption

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capabilities of public e-procurement, particularly the automation and audit trail capabilities can potentially increase the transparency and accountability of the government procurement process.

INTRODUCTION

Most developing and developed countries' governments would like to implement public e-procurement technology in such a way, as to enhance transparency and accountability in government procurement processes. The basic principle of the government procurement is straightforward: to acquire the right item at the right time with the right price. The process should be open, objective and transparent. However, corruption in public procurement processes leads to problems such as lack of accountability and transparency, lack of political control and auditing, weak professionalization of the bureaucracy and many more. To overcome these concerns relating to corruption in the government procurement, information and communication technology (ICT) can play an important role to reduce corruption by promoting good governance (Bertot,Jaeger & Grimes, 2010), enhancing relationships between government employees and citizens tracking activities, monitoring and controlling the government employees and reducing potentiality of corrupt behaviours. ICT enabled technology especially public e-procurement plays an important role for minimizing the risk of corruption in public procurement processes (OECD, 2008).

LITERATURE REVIEW

Burton (2005) believes that public procurement is the central instrument to assist the efficient management of public resources. It supports the works and services of the government and can cover all acquisitions, including stationery, furniture, temporary office staff as complex and high cost areas such as construction project, aircraft carriers, and other private financial initiative projects. A United Nations (1999) report argued that public procurement is a

government business system which is concerned about the government procurement process such as preparing project specification, requesting, receiving and evaluating bids, awarding contract and payment.

Public procurement processes have different phases and each phase has a risk of corruption. Matechak (2002) identified three main phases of procurement process which include procurement planning and budgeting, procurement solicitation, and contract award and performance. Szymanski (2007) proposes the five stages of procurement process: procurement planning and needs assessment, product design and documentation, tender process, contract award and implementation, and accounting and audit. identification of the risk of corruption came from the lack of transparency, limited access to information, and lack of accountability and control at each stage. Ware et al. (2012) view procurement as the four stages of project identification and design: advertising, prequalification, bid document preparation, and submission of bids; bid evaluation, post-qualification and award of contract; and contract performance, administration and supervision.

Corruption in public procurement has been prevalent throughout the world and is more in developing countries. It has negative effects on the wide range of public level including local, regional, and national (Ampratwum, 2008). Most importantly, it influences the public competence and wealth in a country, increase government operation cost, corrodes the social structure and trust in government, distorts the composition of the government expendecture on different services includes education, health, operation and maintainance. Therefore, it is a deadly socio-economic problem, which is widespread especially in the developing world.

Public e-procurement has been defined as the use of information and communication technology such as internet / web based system by governments in conducting their procurement relationship with

bidders for the acquisition of goods, works, services and other consulting services required by the public sectors (Davila,Gupta & Palmer, 2003; Leipold et al., 2004). It has been defined as an inter-organizational information system, which automatizes any part of the procurement process in order to improve efficiency, quality, and transparency in government procurement (Vaidya, 2007). Currently there are different types of E-procurement systems available in the market such as e-market, e-MRO, e-sourcing, e-tendering, e-ordering and e-exchange (De Boer et al. 2002). Each type of system is built for special purpose and has its own specific functionality and characteristics. The most common e-procurement systems are in Table 1 including their explanation.

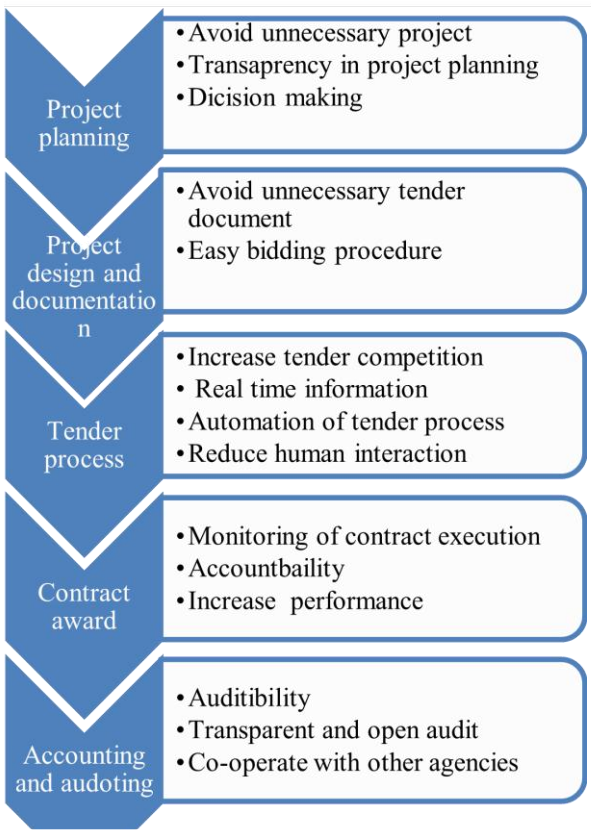
TABLE 1

Types of e-procurement system

E-procurement system	Description	Authors(S) & Year
e-Informing	Gathering and distributing purchasing information both from and to internal and external parties using internet technology.	(Boer,Harink & Heijboer, 2001; De Boer,Harink & Heijboer, 2002; Essig & Arnold, 2001)
e-Sourcing	Process of identifying new suppliers for specific categories of purchasing requirements using internet technology.	(De Boer et al., 2002; Fuks,Kawa & Wieczerzycki, 2009; Knudsen, 2003)
e-Tendering	The process of sending requests for information and prices to suppliers and receiving the response using internet technology.	(Betts et al., 2010; De Boer et al., 2002)
e-Reverse auctioning	Internet based reverse auction technology which focuses on the price of the goods and services auctioned.	(Carter et al., 2004; Teich,Wallenius & Wallenius, 1999)
e-MRO and Web based ERP	The process of creating and approving purchasing requestions, placing purchase orders and receiving the goods or services ordered via a software system based on internet technology , e-MRO deals with indirect items (MRO) , web-based ERP deals with product-related items.	(Bruno et al., 2005; De Boer et al., 2002; Fink, 2006; Gunasekaran et al., 2009)
e-Ordering	The use of Internet to facilitate operational purchasing process, including ordering (requisitioning), order approval, order receipt and payment process.	(Harink, 2003; Reunis,Santema & Harink, 2006)
e-Markets	E-markets are meeting venues for	(Block & Neumann, 2008;

	component suppliers and purchasers, who use exchange mechanism to electronically support the procurement process.	Fuks et al., 2009)
e-Intelligence	Management information system with spend analysis tools	(Eakin, 2003; Harink, 2003)
e-Contract Management	The use of information technology for improving the efficiency and effectiveness of contracting processes of companies.	(Angelov & Grefen, 2008; Yang & Zhang, 2009)

Figure 1: Anti-corruption role of e-procurement in procurement process



Source: Szymanski (2007) and e-procurement role

Factors of anti-corruption capability of public e-procurement in public procurement processes

Figure 1procurement processes and anti-corruption role of e-procurement in each stage. Procurement planning is the first phase of procurement process used by the

government or private companies, which relate the plan of purchasing activity for specific periods. It is the process of reviewing the existing procurement process, identifying the present and future needs, and effective way of procuring goods and services (Basheka, 2009). Government wants processes that are more transparent and accountable. But, different issues such as unjustified or hidden procurement planning, lack of need assessments, political pressure, lack of monitoring capacity of government, inconsistent cost estimate (Ware et al., 2012) are always there to create the corruption in developing countries.

In developing countries, there are more chances of corruption in planning phase rather than developed countries. For example, sometimes the minister, government, or the senior officer may plan the unwanted project for their private benefit. They may disclose confidential information; or add extra requirements of the project. To address those issues, public e-procurement can play an anti-corruption role to reduce the risk of corruption. The public or bidders can view and monitor all the procurement activities through the e-procurement government web portal. Public e-procurement helps to disclose all the procurement related information. The government officer or procurement officer cannot easily hide confidential information to others. All the project technical specifications are posted in e-procurement web-portal so the officers or planning level officers cannot easily add extra specification for their private benefit.

Product design and documentation is the second phase of public procurement processes, which is related to technical specification to the product or project. Sometimes, procurement or government officers design the project and technical specification in a favour of a particular supplier. In some cases they design an unnecessary complicated tender to hide corruption. Public e-procurement system can play an important role to provide all the project specification into web portal, so that all the bidders can view and evaluate all the project specification, and they can compliance with standard document.

Tendering and contract awarding is one of the most vulnerable stages of public procurement process where most corruption occurs in developing countries (Mc Pheraon & Mac Searraigh, 2007). It is a serious problem in developing countries; for example, In Nepal, most of the government contracting processes use paper-based systems, which offers greater potential for corrupt behaviour (Bhattarai, 2011). The tendency is that the potential contractors, who use their coercive power, get the contract. In some situations, other contractors simply are not able to submit tender document because of perceived coercive threatening from other influential contractors. Government officers can be involved indirectly and abuse their official power for their private benefits. This eventually leads to institutional corruption in public procurement where parties with vested interests have opportunities to 'play' their roles in public procurement for their own benefits. The accounting and auditing phase is also a vulnerable area for corruption. Audits are not regularly and systematically performed which makes it harder to detect corruption. Government audit reporting mechanisms are not clear, are dependent, and lack co-operation with other relevant agencies and institution to ensure transparent and effective flow of information for the audit.

To overcome these problems, public e-procurement can play an important role for minimizing the risk of corruption in public procurement process (OECD, 2008). It improves the transparency and integrity in public service such as tendering, sourcing, ordering, and auctioning. E-procurement has been recognised internationally as an important instrument for checking corruption and in misuse of power (Sohail & Cavill, 2008). Pictet and Bollinger (2008) pointed out that public e-procurement helps to fight against corruption by reducing face-to-face interaction where most requests for bribes take place. , Shahkooh, Saghafi & Abdollahi (2008) study concluded that governments are trying to find solutions for reducing corruption in public agencies. Electronic government is one kind of solution to the problems of corruption which removes the opportunities for arbitrary actions. It helps to reduce cartels, collusions, and riggings to the bidders where public procurement is politically influenced like Nepal, Bangladesh, Iraq, Sudan, and Myanmar. In many of the corrupt

countries, public bids are awarded without fair competition (Thai et al. 2005).

Recently many least developed countries have focused on e-procurement systems as a key tool to reduce the corruption by opening competition in government procurement processes to the public. There are many case studies in developing and developed countries of the use of public e-procurement system for reducing the risk of corruption. For example, e-procurement systems implemented in Korea (South), Singapore, New Zealand, Denmark, India (Andra Pradesh), and Mexico are some examples that demonstrate the innovative use of information technology to prevent and control corruption in public procurement (OECD 2005). The existing literature has identified the various benefits of using public e-procurement in the public sector. Some of the benefits are as follows:

- E-procurement can centralize data in order to improve audit and analysis (Gupta,Jha & Gupta, 2009).
- E-procurement eliminates the direct human interaction on bidding and other work and services, corruption is decreased significantly, and internal efficiency increase in government departments (Ndou, 2004).
- From an e-procurement system, government can monitor all the works and services more easily and efficiently (Aman & Kasimin, 2011; Kaliannan & Awang, 2009).
- E-procurement system provides better status monitoring and tracking of applications.
- It increases transparency in works and services and improves better interaction between supplier and vendors and citizens through online system (Adebiyi,Ayo & Adebiyi Marion, 2010).
- Online bidding system automatically reduces the cartel, collusion and riggings among the bidders (Pathak et al., 2006).

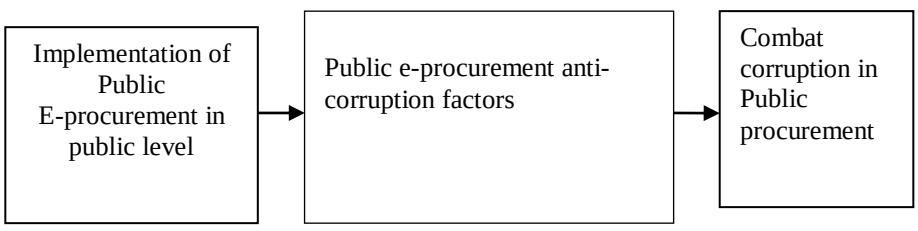
Adoption of e-procurement system may help all the countries to improve transparency and efficiency, reduce cost, better decision-

making, supplier performance monitoring, and quality of service and so on.

Based on the potential of public e-procurement technology anti-corruption factors, the figure 2 below presents a conceptual framework. This framework shows three important areas: implementation of public e-procurement in public level, public e-procurement anti-corruption factors, and combat corruption in public procurement. Implementation of public e-procurement technology plays a vital role to reduce corruption in public procurement. The most important perceived anti-corruption factors of public e-procurement technology are: real time access procurement information, automation of procurement system, more completion in public tendering, reduces human interference in public tendering, transparency, efficiency, quality, and accountability in public procurement. Developed countries have already implemented and practiced e-procurement in public and private levels. For example, Singapore, Australia, New Zealand, UK, USA, Denmark, and Japan, have already materialized public e-procurement and received many perceived benefits of e-procurement performance in public and private sectors. In the context of developing countries, adoption of e-procurement in government level is in a preliminary stage. Some of the developing countries' governments already have e-procurement and others are in a piloting phase. Some governments have a position of 'wait and see' for e-procurement performance. The appendix below shows the fifty countries' public e-procurement implementation results or expected outcome in public level.

FIGURE 2

A Conceptual Framework



Source: Original figure

METHODS

Sekharan (1992, p. 37) defined literature survey as "the documentation of a comprehensive review of the published and unpublished work from secondary sources data in the areas of specific interest to the researcher". This study used a literature survey of public e-procurement anti-corruption factors based on previous books, academic publications, and countries' public procurement assessments reports including ADB, World Bank, and OECD. This research used fifty countries' as cases to report on the role of public e-procurement technology for reducing corruption in public procurement. The following anti-corruption factors (Table II) were used to the fifty countries' case examples public e-procurement.

TABLE II

Public e-procurement anti-corruption factors

S.No.	Anti-corruption factors	Some key references
1	Avoid unnecessary purchase / project	(Achterstraat, 2011)
2	Real time access information or real time bidding	(Ndou, 2004)
3	Automation of procurement process	(Henriksen & Mahnke, 2005)
4	Increase competition among the bidders or suppliers	(Hanna, 2010; IMF, 2010; Mahmood, 2010; Thai, 2001)
5	Reduce human intervention in bidding process	(Khanapuri et al., 2011; Magrini, 2006)
6	Standardization enactment (More consistency in procurement phase)	(UN, 2006; Zhang & Yang, 2011)
7	Monitoring and tracking application	(Achterstraat, 2011; ADB, 2010a; OECD, 2011b)

8	Efficient and secure document transmission	(AG, 2005; Chang, 2011; Hanna, 2010; Zhang & Yang, 2011)
9	Managerial control and collaboration	(Henriksen & Mahnke, 2005)
10	Transparency and accountability	(Croom & Brandon-Jones, 2005; Panda,Sahu & Gupta, 2010; Pathak et al., 2009; Vaidya et al., 2006)
11	Make a procurement process faster and easier	(Hanna, 2010)
12	Obtain the best quality / price ratio	(Kaliannan,Raman & Dorasamy, 2009; Lee,Oh & Kwon, 2008)

The Table III matrix was developed based on the above twelve public e-procurement anti-corruption factors. Fifty countries' case examples were selected randomly from United Nations member list database. The study has taken different case examples of various developed countries and emerging economies (Developing Countries) with specific focus on the contribution of public e-procurement to transparency and accountability.

TABLE III

Fifty countries' public e-procurement performance or expected outcome matrix

E-procurement anti-corruption factors	Australia	Bahrain	Bangladesh	Belgium	Bhutan	Brazil	Canada	Chile	China	Costa Rica	Cyprus	Czech Republic	Denmark	Fiji	Finland	France	Germany	Ghana	Greece	Hong Kong	Hungary	India (IP)	Indonesia	Iran	Ireland
1	X																						X		X
2	X				X			X	X									X				X	X		X
3		X		X		X	X	X					X		X							X			
4		X	X						X	X	X	X						X				X		X	
5		X	X		X												X			X		X			
6	X		X				X		X	X			X		X							X	X		X
7	X				X									X	X										
8		X		X					X				X	X	X		X	X		X					
9	X																								
10	X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X		X	X	X		X
11																									
12			X				X					X		X				X		X		X	X	X	X

E-procurement anti-corruption factors	Italy	Japan	Korea south	Macau	Malaysia	Maldives	Mexico	Mongolia	Morocco	Nepal	Netherlands	New Zealand	Nigeria	Norway	Pakistan	Peru	Philippine	Singapore	Sri Lanka	South Africa	Thailand	Turkey	U.K.	USA	Vietnam
1	X									X															
2			X									X		X			X	X		X	X		X	X	
3		X	X		X		X					X	X												
4	X			X	X	X	X						X	X				X				X			X
5										X										X					X
6		X	X						X		X					X		X	X					
7					X			X	X			X	X						X				X	X	
8			X								X	X	X					X				X			
9					X								X				X		X						
10	X	X	X	X	X	X	X	X	X	X		X				X	X	X		X	X		X	X	X
11			X												X	X		X					X		
12	X	X			X				X			X			X	X						X			

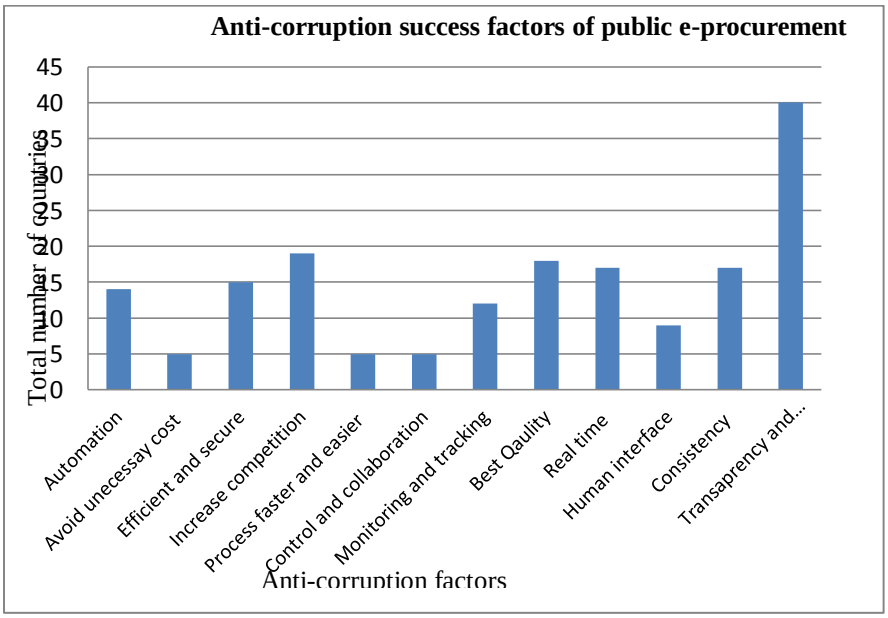
RESULTS

Table III depicts how the public e-procurement technology performance can help to reduce corruption in government work and services. Figure 3 illustrates the result of anti-corruption success factors based on the Table III matrix. The studies found that out of fifty countries' 40 countries were focused on public e-procurement to increase transparency and accountability in public procurement. Most of the developed and developing countries' government agenda is to make transparent and accountable governments. For example,

developed countries like Singapore, Denmark, Japan, and Australia implemented e-procurement with greater level of success and had greater level of transparent public procurement process. Korean government's e-procurement system is the best example and highly adopted by international community including Hong Kong, Vietnam, Pakistan, and Sir Lanka. It helps the government for all the procurement activities in an effective way to support transparency and accountability (Joongi, 2006). The Government of Andra Pradesh (India) is another example for how the government provides different kinds of procurement activities such as tendering, contract awards in a transparent manner and reduces the opportunities for corrupt parties (Bikshapathi et al., 2006). The results indicate that the transparency and accountability are the most effective deterrents to corruption in public procurement.

FIGURE 3

Anti-corruption success factors of public e-procurement



Nineteen countries' governments focus on how e-procurement helps to increase competition among the bidders and suppliers in public

procurement process. For example, the republic of Bangladesh has introducing National e-Government Procurement (e-GP) in public tenders to eliminate corruption and collusive bidding practises to ensure transparency and increase competition among the bidders (Mahmood, 2010). Mahmood argued that if the government implement e-GP system this could save public money and erase the political power in public bidding process. In Nigeria, the e-GP system has lead Nigerian public sectors to increase competition among bidders in public projects and ultimately government can better select actual bidders. The e-GP system helps to the Nigerian government to eliminate the associated bottlenecks with existing system (Adebiyi et al., 2010). E-procurement technology performance of other countries like Bahrain, Norway, Italy, Singapore, Turkey, India, and Malaysia indicate that e-procurement helps to increase competition among bidders in public work and services. As a result, it helps the government to get the actual bidders at the right government project.

Eighteen countries' governments were obtaining best quality and price ratio after implementing public e-procurement technology. This factor has important contribution to reduce corruption in public procurement. For example, Turkey introduces e-procurement project in 2002 and its main objective was to achieve efficiency and regulate government procurement to obtain the best quality and performance among bidders (Bayraktar et al., 2009). Other countries' government such as Peru, Pakistan, New Zealand, Italy, Fiji, and Hong Kong (China) obtain best quality of governance by implementing e-procurement in government level.

Consistency in procurement process and accessing real time information through e-procurement are important anti-corruption factors. These two factors were found in seventeen countries including Australia, Singapore, South Korea, India (AP), Indonesia, China, and Ireland. For example, the Singapore government using GeBIZ on-stop e-procurement portal which enhance transparency in government procurement, easy access to information, increase procurement efficiency, global reach among the bidders and suppliers, and increase more competition among bidders (GeBIZ, 2005). The Costa Rican Government adopted The Korean online e-procurement system called Mer-Link, which allows public agencies to acquire goods and services through an electronic platform. The main implementation benefits of this system are to make more consistency

in procurement process, more visibility into procurement process, and secure document transmission (Guadamuz & Jiménez, 2009). Accessing real time information through e-procurement is another important factor to control corruption in government procurement. In seventeen countries, governments used real time bidding information through e-procurement. As a result, e-procurement helps to mitigate the asymmetric information problems by increasing access to information between government and bidders (Xinzhang & Yonggang, 2011).

Efficiency in document transmission and automation of procurement process are key elements to reduce corruption in government procurement. Fifteen countries' focus on e-procurement helped increase efficiency in document transmission and reduce more chances of corruption. Fourteen countries were focused on increased automation in the procurement process. Twelve countries' result indicated that government and bidders could monitor and track bidding information through e-procurement system. Nine countries' government e-procurement implementation benefits result indicated that e-procurement helped to reduce human interference in bidding process and avoided unnecessary physical threat to the other bidders in tendering process. These similar results were investigated by Liao, Cheng, Liao and Cheng (2003). Online bidding procedure helps the companies with fair competition opportunities, enhances efficiency in military procurement, and reduces the opportunity for human interference in bidding procedure. The study found that five countries' governments were focused on public e-procurement to increase managerial control and collaboration among bidders, to make procurement process faster and easier, and reduce unnecessary hidden cost.

DISCUSSION

This paper aims to develop a better understanding of the potential of public e-procurement for reducing corruption in public procurement. This study analyses fifty countries' e-procurement experiences drawn from the literature on different key anti-corruption factors. Transparency and accountability are the central key anti-corruption factors of public e-procurement systems. Most of the countries' main aim of implementing e-procurement is to make more transparent and accountable government. The main reason of the e-procurement

system is to provide the government more openness, availability and accessibility of procurement information to the public that increases the flow of public information, increase trust and satisfaction, and better accountability. It increases more competition among the bidders in government procurement. Increase competition among bidders in government procurement has led to reduce the chances of risk of corruption. In this issues, Bhattarai (2011) argued that bidders often mobilize the vigilantes and use physical forces to discourse competition and secure public contract. More competition in public bidding provide the government with low-priced, high quality contrasts, to provide equal opportunities to all bidding firms, and fight corruption (Soudry, 2004). Using public e-procurement governments can get the best quality of work and services. Thai(2001), pointing out the main goal of procurement, includes quality, punctuality, cost minimizing business, financial and technical risks, maximizing competition, and maintain integrity. In the similar view, MacManus (2002) listing out a successful procurement system generates best quality economic value, minimizes the burden on administrative resources, and encourage competition.

Literature survey results have confirmed that making consistency in government procurement is another important anti-corruption factor of e-procurement that provides equal opportunities to all bidders so that they can attend to public institutions, regardless the company size (Vaidya & Neupane, 2011). Bidders can have access to government bid information at their suitable time via a 24/7 service that bidders do not have to travel any more to submit a bid in paper, avoid physical attacks on bidder on their way to submit the paper bid, and save a lot of time. Accessing real time information is directly linked to transparency. Other anti-corruption factors of e-procurement are efficient and secure document transmission, automation in public works and services, monitoring and tracking bidding application, make a procurement process faster and easier, avoid unnecessary human interference in bidding, and managerial control and collaboration with other partners. In conclusion, public e-procurement is the best anti-corruption tool to minimize corruption in public and private organization (Iqbal & Seo, 2008) and internationally recognised important instrument for checking corruption and misuse of power (Sohail & Cavill, 2008). Especially for least developed countries, it is a great potential tool to reform government bureaucracy and should be a commitment to implement e-procurement.

The main limitation of this study is this study has used the published case examples of various developed and developing countries. Some of the key information cannot be verified because some government agencies only highlight their success factors but not their weakness and failures. Therefore, this study has generalized information based on available sources. Hence, future opportunities in this area could be researcher could use rigorous methodologies such as field studies or can be a telephone interviews covering more countries and analytical technique for future research

CONCLUSION

This study has used fifty countries' as published case examples to explore the role of public e-procurement technology in reducing corruption in public procurement. The study examined twelve anti-corruption factors of e-procurement in developed and emerging economies. The study found that transparency and accountability is the most important benefit from public e-procurement. Other benefits include increasing competition among bidders, best quality of work and services, and increasing more consistency in government procurement, which helps governments to reduce corruption in public procurement. Most importantly, the study finds that most of the developing countries' government missions and objectives of adopting e-procurement technology are to increase transparency, accountability, real time access information, and increase competition among bidders, which ultimately reduces corruption in public procurement.

The republic of Korea's e-procurement system has generated significant benefits and has achieved most of the objective. The main characteristics of this system processes the entire procurement procedure through the four major e-procurement subsystem such as e-bidding, e-contracting , e-payment, and the online shopping Mall. In year 2010, over 60% of Korea's total public procurement (124 billion USD) was conducted through e-procurement system (Chang, 2011). Therefore, it is highly adopted by international community including Costa Rica, Hong Kong, Vietnam, Pakistan, and Sir Lanka for public procurement reform. Similarly, The Government of Andra Pradesh (India) is another best example of how the government provides different work and services through e-procurement and reduces the opportunities for corrupt parties. Furthermore, other countries like Singapore, Denmark, New Zealand, and Australia fulfill most of the objective with greater level of success

and had greater level of transparent and accountable public procurement process. As a conclusion, other countries can learn the opportunities of public e-procurement including transparency and accountability in public procurement, public access to procurement information, minimize face-to-face contact, consistency in procurement, monitoring and tracing and many more. Although there are some obstacles implementing public procurement system such as existing procurement process, political / user resistance to adopt the new system, changing bidders relations. Hence, proper e-procurement management processes can help to overcome these problems. Therefore, this study will help the public procurement practitioners and government agency for the better understanding of the role of public e-procurement to reduce corruption in government procurement.

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REFERENCES

Achterstraat, P (2011), *Compliance Review Report - Procurement Reform of e-Procurement and e-Tendering*, The Legislative Council Parliament House, Sydney NSW 2000, [On-line]. Available at http://www.audit.nsw.gov.au/ArticleDocuments/190/03_Vol_1_2011_Compliance_Review.pdf.aspx?Embed=Y. [Retrieved January 5, 2012]

ADB (2010a), *(Asian Development Bank) Technical Assistance Report, Republic of Indonesia: Streangthing National Public Procurement Process*, Manila.

ADB (2010b), *(African Development Bank) Public Administration Reform Support Programme - Phase IV (PARAP IV), Kingdom of Morocco*.

Adebiyi, AA, Ayo, CK & Adebiyi Marion, O (2010), 'Development of Electronic Government Procurement (e-GP) System for Nigeria Public Sector', *International Journal of Electrical & Computer Sciences IJECS-IJENS*, 10 (6):74-84.

AG (2005), *(Australian Government) Case Studies on E-procurement Implementations Italy, New South Wales, New Zealand Scotland, Western Australia*, Attorney-General's Department,Canberra, Australia, [On-line]. Available at http://www.finance.gov.au/publications/e-procurement-research-reports/docs/Case_Studies_on_E-procurement_Implementations.pdf. [Retrieved October 10, 2011]

Agrawal, N (2007), *Strengthening Governance Through Innovation use of ICT- A case study of e-Procurement Project of Andhra Pradesh, Government of India.* [on-line]. Available at http://www.napsipag-research.com/pdf/namrata.pdf. [Retrieved March 10, 2010]

Almeida, AdS & Smith, S (2004), *Public-private Partnership in Brazil*, School of Business and Public Management, Institute of Brazilian Business and Public Management Issues.

Aman, A & Kasimin, H (2011), 'E-procurement implementation: a case of Malaysia government', *Transforming Government: People, Process and Policy*, 5 (4): 330-44.

Ampratwum, EF 2008, 'The fight against corruption and its implications for development in developing and transition economies', *Journal of Money Laundering Control*,11(1):76-87.

Angelov, S & Grefen, P (2008), 'An e-contracting reference architecture', *Journal of Systems and Software*, 81(11):1816-44.

Anonymous (2010), *Government promotes e-bidding*. [On-line]. Avilable at http://vietnamnews.vnagency.com.vn/Economy/203965/Government-promotes-e-bidding.html. [Retrieved Janaury 10, 2012]

Assar, S & Boughzala, I (2008), 'Empirical evaluation of public e-procurement platforms in France', *International Journal of Value Chain Management*, 2 (1): 90-108.

Atashak, M & Mahzadeh, P (2008), 'E-government Status in Iran (TAKFA plan case study)', *World Applied Sciences Journal*, 4 (2): 12-20.

Basheka, BC (2009), 'Procurement planning and local governance in Uganda: a factor analysis approach', *International Journal of Procurement Management*, 2 (2): 191-209.

Bayraktar, E, Demirbag, M, Koh, S, Tatoglu, E & Zaim, H (2009), 'A causal analysis of the impact of information systems and supply chain management practices on operational performance: evidence from manufacturing SMEs in Turkey', *International Journal of Production Economics*, 122 (1): 133-49.

Beauvallet, G, Boughzala, Y & Assar, S. (2010), 'E-procurement, from project to practice: Empirical evidence from the French public sector', in GB Beauvallet, Y. Assar, S. (ed.), *Practical studies in E-government: Best Practices from Around the World*, Springer, London,1 (0): 13-28.

Bertot, JC, Jaeger, PT & Grimes, JM (2010), 'Using ICTs to create a culture of transparency: E-government and social media as

openness and anti-corruption tools for societies', *Government Information Quarterly*, 27 (3): 264-71.

Betts, M, Black, P, Christensen, SA, Dawson, E, Du, R, Duncan, W, Foo, E & Nieto, G (2010), 'Towards secure and legal e-tendering', *Journal of Information Technology in Construction*, 11(0): 89-102.

Bhattarai, P, (2011), 'Curbing Procurement Corruption', *Voices Against Corruption*. [On-line]. Available at http://voices-against-corruption.ning.com/profiles/blogs/curbing-procurement-corruption. [Retrieved May 10, 2011]

Bikshapathi, K, RamaRaju, P, Bhatnagar, S & Ahmedabad, I (2006), 'E-Procurement in Government of Andhra Pradesh, India', *Washington, DC: World Bank. Retrieved April*, 10 (0): 2010.

Block, C & Neumann, D (2008), 'A decision support system for choosing market mechanisms in e-procurement', *Negotiation, Auctions, and Market Engineering*, 2(n.d.): 44-57.

Boer, L, Harink, J & Heijboer, G (2001), *A model for assessing the impact of electronic procurement forms*, In: 10th International Annual IPSERA Conference, 8-11 April 2001,Jönköping, Sweden.

Bof, F & Previtali, P (2007), 'Organisational pre-conditions for e-procurement in governments: The Italian experience in the public health care sector', *The electronic journal of e-Government*, 5 (1): 1-10.

Bohorquez, E (2009), *E-procurement in Mexico: Can information Systems build trust and improve governance?* [On-line]. Availabe at www.etransform.org/.../eduardo%20e-procurment%20in%20Mexico. [Retrieved January 31, 2012]

Bruno, G, Esposito, E, Mastroianni, M & Vellutino, D (2005), 'Analysis of public e-procurement web site accessibility', *Journal of Public Procurement*, 5(3):344.

Burton, R. (2005), 'Improving Integrity in Public Procurement: The Role of Transparency and Accountability', in *Fighting Corruption and Promoting Integrity in Public Procurement*, OECD Publishing, pp. 23–8.

Carter, CR, Kaufmann, L, Beall, S, Carter, PL, Hendrick, TE & Petersen, KJ (2004), 'Reverse auctions--grounded theory from the buyer and supplier perspective', *Transportation Research-Part E the Logistics and Transportation Review*, 40(3):229-54.

Chang, HL, Wang, K & Chiu, I (2008), 'Business-IT fit in e-procurement systems: evidence from high-technology firms in China', *Information Systems Journal*, 18 (4): 381-404.

Chang, K-s (2011), *Enhancing Transparency through e-Procurement*, Public Procurement Service (PPS) The Republic of Korea. [On-line]. Available at www.oecd.org/dataoecd/47/30/49311011.pdf. [Retrieved February 12, 2012]

Chvalkovská, J & Skuhrovec, J (2010), *Measuring transparency in public spending: Case of Czech Public e-Procurement Information System*, IES Working Paper: 11/2010, Institute of Economic Studies,Faculty of Social Sciences,Charles University in Prague.

Croom, S & Brandon-Jones, A (2007), 'Impact of e-procurement: Experiences from implementation in the UK public sector', *Journal of Purchasing and Supply Management*, 13 (4): 294-303.

Croom, SR & Brandon-Jones, A (2005), 'KEY ISSUES IN E-PROCUREMENT: PROCUREMENT IMPLEMENTATION AND OPERATION IN THE PUBLIC SECTOR', *Journal of Public Procurement*, 5 (3): 367-87.

Davila, A, Gupta, M & Palmer, R (2003), 'Moving Procurement Systems to the Internet::: the Adoption and Use of E-Procurement Technology Models', *European Management Journal*, 21(1): 11-23.

De Almeida, MO (2006), *ROLE OF ICT IN DIMINISHING COLLUSION IN PROCUREMENT*, INTERNATIONAL PUBLIC PROCUREMENT 21-23 September 2006,Rome, Italy.

De Boer, L, Harink, J & Heijboer, G (2002), 'A conceptual model for assessing the impact of electronic procurement', *European Journal of Purchasing & Supply Management*,8(1):25-33.

Eadie, R, Perera, S & Heaney, G (2011), 'Analysis of the Use of e-procurement in the Public and Private Sectors of the UK Construction Industry', *Journal of Information Technology in Construction (ITCon)*, 16 (0): 669-86, http://www.itcon.org/2011/39.

Eakin, D (2003), 'Measuring e-procurement benefits', *Summit: Canada's magazine on public sector purchasing, United Kingdom.*

EC (2009), *(European Commission) Bringing Together and Accelerating eGovernment Research in the EU* ICT for Government and Public Services Unit DG Information Society and Media European Commission, Brussels.

eGovernment factsheets, (2007), eGovernment in the Netherlands, Version 8.0, European Commission.

EPA (2004), *(Environmentally Preferable Purchasing Program) Buying Green Online Greening Government E-Procurement of Office Supplies* EPA 742-R-04-001, United States Pollution Prevention and Environmental Protection and Toxics, USA.

Essig, M & Arnold, U (2001), 'Electronic Procurement in Supply Chain Management: An Information Economics Based Analysis of Electronic Markets', *Journal of Supply Chain Management*, 37(4):43-9.

eTenders Public Procurement (The website for Irish Public Tenders) (2012). [On-line]. Available at http://www.etenders.gov.ie/sitehelp/Help_access.aspx. [Retrieved February 2, 2012]

Fink, D (2006), 'Value decomposition of e-commerce performance', *Benchmarking: An International Journal*, 13(1/2):81-92.

Fuks, K, Kawa, A & Wieczerzycki, W (2009), 'Improved E-sourcing Strategy with Multi-agent Swarms', paper presented to Computational Intelligence for Modelling Control & Automation, International Conference on 10-12 December 2009,Viena.

GeBIZ (2005), *About Us :: GeBIZ.* [On-line]. Available at http://www.gebiz.gov.sg/. [Retrieved May 2011]

Giacalone, P, Manduchi, I & Gobbi, R (2006), 'E-procurement at work: A pratical experience in Italy', paper presented to International Public Procurement Conference Proceedings, 21-23 September 2006, Rome, Italy.

GovHK:E-procurement (2011). [On-line].Available at http://www.gov.hk/en/theme/eprocurement/eppp/. [Retrieved January 6, 2011]

Gozel, KA (2009), *E-procurement in Turkey*, Electronic Public Procurement (ePP) in South-Eastern Europe, Internatioanl Workshop February 26, Athens, Greece.

Guadamuz, RM & Jiménez, VP (2009), *Korean Contribution to Costa Rican ICT Development*, National Council for Scientific and Technological Research, Costa Rica, Seoul.

Gunasekaran, A & Ngai, EWT (2008), 'Adoption of e-procurement in Hong Kong: An empirical research', *International Journal of Production Economics*, 113 (1):159-75.

Gupta, S, Jha, B & Gupta, H (2009), 'E-Procurement: A Developing Country Perspective: A Study on New Trends Concerned with Developing Countries', *AIUB Journal of Business and Economics*, 122 (1): 161-75.

Hanna, NK (2010), *Transforming government and building the information society: challenges and opportunities for the developing world*, Springer Verlag.

Harink, JHA. (2003), 'Internet technology to purchase, PhD thesis', University of Twente, Netherland.

Hazeem, H (2010), *Bahrain eGovernment Program*, Workshop on Building Trust and Confidence in Arabic e-Services 25-27 May, 2010, Beirut, Lebanon.

Henriksen, HZ & Mahnke, V (2005), 'E-procurement adoption in the danish public sector', *Scandinavian Journal of Information Systems*, 17 (2): 5-26.

IMF (2010), *(International Monetary Fund) Maldives: Public Financial Management—Performance Report*, 10/137 Washington, D.C. USA.

Iqbal, M & Seo, J (2008), 'E-governance as an anti corruption tool: Korean cases', *Korean Loacl Information*, 11 (2): 51-78.

Janowski, T (2004), *Electronic Government*, The United Nations University International Institute for Software Technology (UNU-IIST). [On-line]. Available at http://www.emacao.gov.mo/documents/15/slides1.pdf. [Retrieved January 28, 2012]

Joia, LA & Zamot, F (2002), 'Internet-based reverse auctions by the Brazilian government', *The Electronic Journal of Information Systems in Developing Countries*,9 (6): 1-12.

Joongi, K, *National Integrity Systems:Transparency International Country Study Report: Republic of Korea (*2006), Transparency International Secretariat Alt Moabit 96, 10559 Berlin, Germany.

Kaliannan, M & Awang, H (2009), 'ICT to enhance administrative performance: a case study from Malaysia', *International Journal of Business and Management*, 3(5): 78.

Kaliannan, M, Awang, H & Raman, M (2007), *Technology adoption in the public sector: an exploratory study of e-government in Malaysia*, ACM, Macao, China, 978-1-59593-822-0.

Kaliannan, M, Raman, M & Dorasamy, M (2009), 'E-procurement adoption in the malaysian public sector: organizational perspectives', paper presented to Enterprise Distributed Object Computing Conference Workshops, Auckland, 1-4 September 2009.

Kawanai, Y (2011), *Public Procurement System in Japan*, Construction Information Center, Japan. [On-line]. Available at http://www.scribd.com/fullscreen/75448430?access_key=key-2nlxf33gf0jbdimycnd2. [Retrieved January 20,2012]

Khanapuri, VB, Nayak, S, Soni, P, Sharma, S & Soni, M (2011), 'Framework to Overcome Challenges of Implementation of E-procurement in Indian Context', paper presented to International

Conference on Technology and Business Management, Dubai, March 28-30, 2011.

Kim, K-S (2003), 'Public Procurement Service of Korea', paper presented to UN Public Service Awards on Innovations and Quality in Governments, Mexico City, Mexico, 5 November 2003.

Knudsen, D (2003), 'Aligning corporate strategy, procurement strategy and e-procurement tools', *International Journal of Physical Distribution & Logistics Management*,33(8):720-34.

Larraín, CO (2000), *"Chile's Government Procurement E-System", World Bank Group, Governance & Public Sector Reform Sites, E-Government, Washington, DC, USA, December 14*.

Latka, L (2011), *Government procurement in Canada*, Government of Canada. [On-line]. Avilable at http://export.gov/canada/doingbusinessincanada/governmentprocurementincanada/index.asp. [Retrieved January 10, 2012]

Lee, J, Oh, K-T & Kwon, HY (2008), *Striving for transparency and efficiency in e-government: procurement reform through e-procurement*, ACM, Cairo, Egypt, 978-1-60558-386-0.

Leipold, K, Klemow, J, Holloway, F & Vaidya, K (2004), 'The World Bank e-procurement for the selection of consultants: Challenges and lessons learned', *Journal of Public Procurement*, 4(3): 319-39.

Liao, SH, Cheng, CH, Liao, WB & Chen, I (2003), 'A web-based architecture for implementing electronic procurement in military organisations', *Technovation*, 23 (6): 521-32.

MacManus, SA (2002), 'Understanding the incremental nature of e-procurement implementation at the state and local levels', *Journal of Public Procurement*, 2 (1): 5-28.

Magrini, P (2006), *Transparency in e-procurement: the Italian Perspective*, 1st HIGH level seminar on e-procurement 30 –31 January 2006 Naples, Italy. [On-line]. Avilable at http://www.oecd.org/dataoecd/57/31/36238443.pdf. [Retrieved February 10, 2012]

Mahmood, SAI (2010), 'Public procurement and corruption in Bangladesh confronting the challenges and opportunities', *Journal of public administration and policy research*, 2 (6): 103-11.

Mai, L (2011), *e-GP Functonalities and Integration to Other E-governance System*. [On-line]. Available at http://www.scribd.com/fullscreen/75448729?access_key=key-q929w1cmgeu4q2d2j46. [Retrieved February 13, 2012]

Makinen, J, Kahkonen, AK & Lintukangas, K (2011), 'E-procurement as a key success factor in cooperative purchasing', *International Journal of Procurement Management*, 4 (1): 56-71.

Matechak, JP (2002), 'Fighting Corruption in Public Procurement', *Center for International Privat Enterprise CIPE. Feature Service Articles. Retrieved February*,12 (2004): 1047–55.

Mc Pheraon, C & Mac Searraigh, S. (2007), 'Corruption in the petroleum sector', in SP J. Edgardo (ed.), *The Many Faces of Corruption*, World Bank Publications, Washington, D.C.

McDermont, D (2006), *Electronic Government Procurement (e-GP) Readiness Assessment -Final Report Banagledesh*, Central Procurement Technical Unit (CPTU), Implementation Monitoring and Evaluation Division, Ministry of Planning, Government of the People's Republic of Bangladesh and The World Bank.

Minoru, K (2005), *Japanese E-procurement in Construction Sector*, International Conference on E-Procurement Seoul, Korea 20-25 June 2005.

Ndou, V (2004), 'E-government for developing countries: opportunities and challenges', *The Electronic Journal of Information Systems in Developing Countries*,18 (1):1-24.

Nortey, E, Appiah, RE, Vanderpuye, Y & Bondzi, TK (2011), 'Enhancing transparency in public procurement ', *Public Procurement Authority: Electronic Bulletin*, 2 (6):1-7.

NSW Government Procurement (2012). [On-line]. Available at http://www.nswprocurement.com.au/about-us.aspx. [Retrieved February 5, 2012]

OECD (2011a), *Government at a Glance 2011 Country Note: GREECE*. [On-line]. Available at www.oecd.org/gov/indicators/govataglance. [Retrieved February 6, 2012]

OECD(2011b), *Government at a Glance 2011 Country Note: Finland* OECD. [On-line]. Avilable at http://www.oecd.org/dataoecd/60/25/47876433.pdf. [Retrieved January 24, 2012].

OECD (2011c), *Government at a Glance 2011 Country Note: HUNGARY*, OECD publication. [On-line]. Avilable at http://www.oecd.org/dataoecd/59/63/48214236.pdf. [Retrieved February 12, 2012]

OECD, A (2008), *FIGHTING BRIBERY IN PUBLIC PROCUREMENT IN ASIA-PACIFIC*. [On-line]. Available at http://www.etransform.org/gti/sites/etransform.org/files/Documents/bribery.pdf. [RetrievedJuly 21, 2011]

Onur, İ, Özcan, R & Taş, B (2008), 'Public Procurement Auctions and Competition in Turkey', *Review of Industrial Organization*, pp. 1-17, DOI: 0.1007/s11151-011-9299-3.

Panda, P, Sahu, G & Gupta, P (2010), 'Promoting Transparency and Efficiency in Public Procurement: E-Procurement Initiatives by Government of India', paper presented to 7th International Conference on E-procurement (ICEG) 2010, 20-24 Apr 2010, IIM Banglore, India.

Pathak, R, Prasad, R, Singh, G, Naz, R & Smith, R (2006), *Exploloring the Potential of e-Goverance Applications for Reducing Corruption: The Case of the Indian Public Sector.[On-line]. Available at* http://www.napsipag.org/PDF/Reducing_Corruption.pdf. [Retrieved December 15,2011]

Pathak, RD, Naz, R, Rahman, MH, Smith, RFI & Agarwal, KN (2009), 'E-governance to cut corruption in public service delivery: a case study of Fiji', *Intl Journal of Public Administration*, 32 (5): 415-37.

Peru Country Procurement Assessment Report (CPAR) (2005), World Bank and the inter-American Development Bank, Peru.

Pictet, J & Bollinger, D (2008), 'Extended use of the cards procedure as a simple elicitation technique for MAVT. Application to public procurement in Switzerland', *European Journal of Operational Research*, vol. 185, no. 3, pp. 1300-7.

PPPD (2011), *(Public Procurement Policy Unit Division) Ministry of Finance, Royal Governmetn of Bhutan, Asia and the Pacific Regional Conference on Electronic Government Procurement 22-24 November 2011*, Bali, Indonesia

Reunis, MRB, Santema, SC & Harink, JHA (2006), 'Increasing e-ordering adoption: A case study', *Journal of Purchasing and Supply Management*, 12 (6):322-31.

Sekharan, U (1992), *Research Methods (2nd ed.)*, John Wiley and Sons Inc., New York.

Siemens and time.lex, (2010), Study on the evaluation of hte Action Plan for the implementation of the legal framework for electronic procurement (Phase II) Country Profiles, European Commission Internal market Directorate-General, Brussels.

Sohail, M & Cavill, S (2008), 'Accountability to prevent corruption in construction projects', *Journal of Construction Engineering and Management*, 134 (9): 729-38.

Soudry, O (2004), 'Promoting Economy: Electronic reverse auctions under the Ec directives on public procurement', *Journal of Public Procurement*, 4 (3): 340-74.

Sungmai, C (nd), *Benefits of e-GP, Procurement Reform and e-GP Strategic Planning*, Office of Public Procurement Mnagement, Thailand. [On-line]. Available at http://www.scribd.com/fullscreen/75447993?access_key=key-1d0rll278nfsoa15rv4z. [Retrieved January 19, 2012]

Szymansk, S (2007), *How to Fight Corruption Effectively in Public Procurement in SEE Countries*, Paris, France.

Takach, GS (2008), *E-procurement e-performance*, Canada's magazine on public sector purchasing. [On-line]. Available at

http://www.summitconnects.com/Articles_Columns/PDF_Documents/w11_03_06.pdf. [Retrieved January 5, 2012]

Tas, BKO, Ozcan, R & Onur, I (2008), 'Public Procurement Auctions and Competition in Turkey', *Working Papers:08-14,TOBB University of Economics and Technology, Department of Economics, Turkey*,

Teich, J, Wallenius, H & Wallenius, J (1999), 'Multiple-issue auction and market algorithms for the worldwide web', *Decision support systems*,26(1):49-66.

Thai, KV (2001), 'Public procurement re-examined', *Journal of Public Procurement*, 1 (1): 9-50.

Thai, KV & Drabkin, DA (2007), 'US Federal government procurement: structure, process and current issues', *Public Procurement: International Case and Commentary, Routledge, London.*

Thai, KV & Piga, G. (2007), 'Advancing Public Procurement: Practices, Innovation, and Knowledge Sharing', in PrAcademics Press.

TRPPD (2011), *(Treasury of the Republic – Public Procurement Directorate) Cyprus E-procurement System*. [On-line]. Avilable at www.pep-online.at/BC/CMDownload.aspx?content...id. [Retrieved January 24, 2012]

UN (1999), 'Procurement Reforms: Resolution / Adopted by the General Assembly (A/ RES/54/866)',

UN(2006), *(United Nations) E-procurement: economic and social commission for Asia and the Pacific Asian Development Bank Institute Public Procurement Service of the Republic of Korea*, United Nations publication, Thailand.

Vaidya, K & Hyde, M (2011), 'Inter-organisational information systems assimilation: an empirical evaluation in light of the diffusion of innovation theory', *International Journal of Business Information Systems*, 7 (3): 247-68.

Vaidya, K & Neupane, A (2011), *The potential of Electronic Procurement and other tools to combat corruption in Public Procurement in Nepal*, Non-Resident Nepali Association Australia

51-61 South Street, Granville NSW 2142, Australia, 16th July 2011.

Vaidya, K, Sajeev, A & Callender, G (2006), 'Critical factors that influence e-procurement implementation success in the public sector', *Journal of Public Procurement*, 6 (1/2): 70.

Van Greunen, D, Herselman, M & Van Niekerk, J (2010), 'Implementation of regulation-based e-procurement in the Eastern Cape provincial administration', *African Journal of Business Management*, 4 (17):3655-65.

Ware, GT, Moss, S, Campos, JE & Noone, GP. (2012), 'Corruption in Procurement ', in A Graycar & R Smith (eds), *Handbook of Global Research and Practice in Corruption*, illustrated edn, Edward Elgar Publishing, UK.

Wheatley, M (2009), *Facilitating e-procurement*, Stockholm, Sweden.[On-line]. Available at http://www.efficientpurchasing.com/?id=2951&cid=6780. [Retrieved November 1,2011]

Wirtz, B, Lütje, S & Schierz, PG (2009), 'An Empirical Analysis of the Acceptance of E-Procurement in the German Public Sector', *International Journal of Public Administration*, 33 (1): 26-42.

Xinzhang, C & Yonggang, W (2011), 'E-government, government procurement and the development of e-Commerce: Korean experience and its implications', paper presented to E -Business and E -Government (ICEE), International Conference on, Shanghai, China, 6-8 May 2011.

Yang, J & Zhang, RY (2009), 'The Research and Analysis of E-procurement for Iron and Steel Enterprises', *2009 International Conference on Information Management, Innovation Management and Industrial Engineering, Vol 2, Proceedings*, pp. 3-6.

Zhang, H & Yang, J (2011), 'Research on Application of E-Tender in China', paper presented to Internet Technology and Applications (iTAP), 2011 International Conference on, 16-18 Aug. 2011.

Country	Case / description	Objective	Results / Expected outcomes	References
Australia	NSW Government procurement	The NSW government	-Monitoring and tracking	(*NSW Government*

Appendix:

Table of case studies and the specification of their respective objective, results and references

		procurement web portal provides easy access to wide range of procurement information	application -Real time access information -Transparency and accountability, Managerial control and collaboration	*Procurement* 2012; Vaidya & Hyde, 2011; Vaidya et al., 2006)
Bahrain	The Kingdom of Bahrain used eGovernment portal www.baharain.bh for complete integration of all services for the citizens.	Better service delivery, improved transaction, more efficient and enhanced transparency	Efficient and transparent	(Hazeem, 2010)
Bangladesh	The Republic of Bangladesh used a National e-Government Procurement (e-GP) portal and operated by Central Procurement Unit. Procurement guideline is being introduced in 2006.	Promote transparency and accountability Value for money Fair, transparent, and non-discriminatory manner	-Increase competition among bidders -Reduce physical barriers in tendering process -Improve quality -Increase transparency and accountability	(Mahmood, 2010; McDermont, 2006)
Belgium	Belgian federal public procurement was launched in 2008. (www.publicprocurement.be)	The main aim of this portal provides the entrance of e-procurement tools as e-Notification, e-tendering, and e-Catalogue. Administration simplification, modernization of the public administration	Efficiency in procurement activities, transparency	(*Siemens and time.lex*, 2010)
Bhutan	Bhutan has started national e-procurement system in September	Governance accountability integrity	Openness and transparency, Efficiency,	(PPPD, 2011)

	2005 with the assists of World Bank and other donor agencies.	public confidence, efficiency informed management, value for money, modernization of management architecture	Value for money resource management , More consistency in procurement phase, Results-based monitoring and evaluation system established	
Brazil	Brazil's Comprasnet, a web based system was launched in year 2000, which has over one thousand governments departments as a users of the system.	The main aim was to make the procurement process uniform without centralising the buying process of the federal organization. Reduce procurement cost Increase number of government suppliers and more transparency	Automation of procurement process Transparency and accountability	(Almeida & Smith, 2004; Joia & Zamot, 2002)
Canada	The Canadian government is one of the largest purchasing entities in the world, buying in excess of US $ 20 billion worth of goods and services every year from thousand of suppliers. e.g. electronic tendering service (MERX)	The main aim is to govern by online namely iGovernment	Automation of procurement process, standardization enactment, obtain best quality	(Latka, 2011; Takach, 2008)
Chile	Chile's government procurement system- is an e-procurement system used by the Chilean government to buy or purchase goods from the private business sectors.	Efficient government purchasing	Increase transparency, reduce corruption, auditing, access real time information	(Larraín, 2000) (Ndou, 2004)
China	In year 2000, the Ministry of Finance built the website of China Government Procurement and year 2005, they	Increase efficiency, transparency	Promote transparency Standardization procurement	(Chang,Wang & Chiu, 2008; Zhang & Yang, 2011)

	developed procurement system. Both central and local government established e-procurement system		system Time and errors reduction on payments	
Costa Rica	The Costa Rican Government officially launched procurement system project in order to automate its public purchases in 2009. This new system, called Mer-Link (On-Line Market), which allow Costa Rican public agencies to acquire goods and services through an electronic platform.	Ensure transparency and efficiency	More visibility into procurement process (transparency), more customers, secure document, simplification of procedures, more consistency in procurement process	(Chang, 2011)
Cyprus	Republic of Cyprus used e-PS web based e-procurement portal. The e-procurement system of Cyprus was also awarded the Good Practice Label in the framework of the 4th Europe eGovernment Awards 2009. E-Procurement System web portal of Cyprus is www.eprocurement.gov.cy	Collaborative e-procurement environment, electronic and automated environments of tenders	Transparency, the automatic and simultaneous notification to all tenders , non discrimination	(TRPPD, 2011)
Czech Republic	Czech public e-procurement information system is accessible on http://www.centralniadresa.cz.	Greater openness and accountability of public institutions	Achieving greater transparency, Efficiency in tax administration , minimize risk of fraud, Corruption and mismanagement of public funds in order to ensure fairness and equitable treatment of potential suppliers	(Chvalkovská & Skuhrovec, 2010)
Denmark	Denmark is the first country to have embarked on e-procurement in Europe. It established the public procurement Portal	The main aim of this portal is to provide efficiency in	Automation of public procurement, more transparent	(Henriksen & Mahnke, 2005)

	(DOIP) in 2002 by Gatetrade.net.	public purchase of goods and service.	and more efficient, less chance of corruption	
Fiji	Decentralized public administrative departments under the Ministry of Finance operate the government procurement system in Fiji. Procurement system was developed in year 2005.	The main aim of Fiji government has to improve for more efficient, effective, and transparent procuremen t system.	Curb corruption and increase efficiency, transparency and accountability	(Pathak et al., 2009)
Finland	Hansel Ltd. is the Finnish Governments Central Procurement Unit established to improve the effectiveness of public purchasing in Finland.	Tendering, ordering, logistics managemen t	Efficiency, Standardizatio n enactment, automation of procurement process, tracking of outcomes of contract	(Makinen,Kahkon en & Lintukangas, 2011; OECD, 2011b)
France	French government adopt public e-procurement in 2005.	Virtualisatio n of procuremen ts contracts	Transparency and accountability, efficiency	(Assar & Boughzala, 2008; Beauvallet,Boughz ala & Assar, 2010)
Germany	The German federal eprocurement platform is E-Vergabe (created in 2001)	Transparent and non-discriminato ry public procuremen t, electronic tenders publish and notification, and electronic bids	More transparent, friendly and less vulnerable to corruption, more efficient by eliminating bureaucratic barriers	(EC, 2009; Wirtz,Lütje & Schierz, 2009)
Ghana	Ghana established public procurement act (PPA) in 2003. It is a multipurpose web site (www.ppaghana.org)	Information on contract awards, tender notice, procuremen t manuals and other documents	Open and fair competition, increased compliance with procurement policy, public access to procurement information, less opportunity for corrupt, collusive fraudulent and coercive practices,	(Nortey et al., 2011)

			transparency and efficiency	
Greece	The Greece government implemented eProcurement system by the Ministry of Development, Department of Commerce in 2006 and is supported by the operational programme for the the information society (OPIS).	The main aim is to transparenc y, non-discriminati on, qual treatment to all bidders, and mutual recognition	Adequate degree of transparency in entire public procurement cycle	(OECD, 2011a)
Hong Kong (China)	Hong Kong Government lunched e-procurement in 30 September 2009 (www.gov.hk) and have announced following services E-submission, E-catalogue, invitation for Quotation, Purchase order, Account management.	One-stop portal, user friendly, internet-based, transaction cost, easier access, and paper less transaction	Improve efficiency and effectiveness, improve quality and accessibility of procurement information, reduce human errors, and reduce transaction cost and price.	(Gunasekaran & Ngai, 2008) (*GovHK:E-procurement* 2011)
Hungary	The Hungarian government lunched electronic procurement government decree in 2007 and provides several procurement related services (www.kozbeszerzes.hu)	Tender registration, e-notification, e-submission, e-awards	Achieving greater transparency, minimise fraud and corruption, ensure fairness and equitable treatment of potential suppliers	(*Siemens and time.lex*, 2010; OECD, 2011c)
India (IP)	Government of Andhra Pradesh has implemented e-procurement since year 2000.	All procuremen t process has conducted centrally from a single unit. Download bid information and bill quantities free of cost anywhere and at any time from the internet.	Eliminate briber (Client) who provide corruption fees to the government officers Increase competition Prevention of cartel formation Standardise procurement process Equal opportunity to all vendors	(Agrawal, 2007; Bikshapathi et al., 2006) (Pathak et al., 2006)

Indonesia	Procurement reform in Indonesia was initiated in 1999. The key objective was to enhance transparency and reduce chances of budget leakage.	Enhance transparency and fair competition	Transparency and efficiency in public procurement, standardized procurement process, avoid unnecessary cost	(ADB, 2010a)
Iran	Iran development and use of information and communication technology plan by management and planning organization in the year 2000.	Automating public and private organization, real time information, increase efficiency and effectiveness	Increase competition, obtain the best price, automation of planning and budgeting system	(Atashak & Mahzadeh, 2008)
Italy	The main e-procurement platform of Italy is the public procurement portal Acquisti in Rate, which was initiated in 2000. (URL: http://www.acquistinretepa.it)	Obtain savings and a bigger efficiency in Italian Public Administration	Public service quality, Transparency in all purchasing producers, increase competition among suppliers	(Bof & Previtali, 2007; Giacalone,Manduchi & Gobbi, 2006)
Ireland	Irish government developed eTenders.gov.ie portal by Department of finance.	Publish tenders notices and procurement related information on government. To improve government service, promote competition among bidders, to promote auditibility	Huge financial saving, introduce streamlined processes, reduce unnecessary non value task, service quality, transparency and automation of procurement process	(*eTenders Public Procurement (The website for Irish Public Tenders)* 2012)
Japan	Japanese e-bidding system for public procurement was developed and carried out from 2001 (Central and Local government)	For improve public procurement system, competitive bidding, automating awarding to lowest bids	Reduce time, cost and labour, ensured transparency and accountability in public work procedure, improved work efficiency,	(Kawanai, 2011; Minoru, 2005)

			electronic authentication	
Korea (South)	Korea begins e-procurement system in 2002. The system uses single windows for public works and services.	This system helps to the government for all procurement activities in an effective way to support transparency and accountability. Electronic tendering , e-sourcing, e-service auctions, e-informing, e-market	Better transparency and accountability, government service more open, and reduce bribery.	(Joongi, 2006; Kim, 2003)
Macau	e-Macao	Efficiency, customer focus, policy outcomes, public reforms, citizen engagement	Transparency, accountability, competitiveness in cross agency service delivery	(Janowski, 2004)
Malaysia	The electronic procurement system (e-Perolehan) was officially launched in 1999 as one of the electronic government Flagship projects	Automate and streamline procurement process, improves the quality of service, Vender management, catalogue management, e-tendering	Public monitoring, increase competition among the bidders or suppliers; monitoring and tracking application; transparency and accountability, obtain best quality and price ratio.	(Aman & Kasimin, 2011; Kaliannan,Awang & Raman, 2007)
Maldives	Maldives established Central Procurement Office (CPO) under the Ministry of Finance and Treasury	Formulate Procurement policy, procurement audit, Procurement capacity development and training	Efficiency in procurement, guaranteeing the transparency and fairness of the leading to improved competition, value for money	(IMF, 2010)

Mexico	Mexico government start e-procurement (Compranet) in 2001. It becomes a central tool for anti-corruption.	It constitutes an information, transaction and interaction bridge between citizens and the Mexican government.	Increase transparency, automation of public procurement process, increase competition among bidders	(Bohorquez, 2009)
Mongolia	Digitalization of procurement activities (www.e-procurement.mn) in 2000 (public procurement law enacted.	Bid notices and results, procurement related laws, procedure, and regulation.	Monitoring, enhanced transparency	(UN, 2006)
Morocco	The government of Morocco lunched online public procurement management portal.	Streamline procedures and improve public services through e-Government /e-procurement	Reduce the periods for completing customs operations as the management cost, enhance transparency, strengthen Morocco's regional integration through trade promotion	(ADB, 2010b)
Nepal	In Nepal, public e-procurement system has significantly improved in recent years. For good example, Department of roads (DoR), under Ministry of Physical Planning and Works using e-bidding for civil works procurement since five years back (December 2007).	Improve service for civil works Submit bids through e-submission Use internet access for tender information	Increase transparency Non-discrimination Equality of access Open competition Solve 80% problems that crop up during the submission of tenders manually	(Bhattarai, 2011)
Netherlands	Netherlands government used TenderNed portal site (www.tenderned.nl). All the government departments (central government, provinces, and municipalities) can use a common national e-	The overall objective is to make all the government information available on the internet	Efficiency in electronic tax return, standardization of procurement process, enhances	(*eGovernment factsheets*, 2007)

	procurement infrastructure (operated on mid of 2006)	and most importantly automatically publishes contract notice.	transparency and accountability.	
New Zealand	New Zealand used GoProcure portal for all public sector work and services such as quotation and tender. All quotation and tender are posted on this portal.	The main objective of this portal is to process efficiencies in requisitioning, and approving, purchasing and accounts payable, improve buying practise, simplify the process of dealing with government, and reduce cost for government by providing single interface for supplying to government.	Process automation, Increase efficiencies in government works and services, Better forecasting and accounting efficiencies	AG 2005
Nigeria	The public procurement Act 2007 puts the Nigeria in the league of countries with legislation on how Public funds would be expended. Prior to now, Nigeria was among the few African Countries without legislation on public procurement	Automate and streamline procurement process, Vender management, catalogue management, e-tendering, Value for money, transparency, competition	The e-GP system leads in Nigerian public sector in order to improve transparency and accountability, monitoring, and control, fair selection of bidders, reduce cost of transaction, and increase efficiency.	(Adebiyi et al., 2010)
Norway	In late 2004, the Norwegian government initiated a procurement processes for renewal of the existing tender notification services. Norway was one of the first European countries to	Renewal of the existing tender notification services.	procurement efficiency, making tender process faster and easier, Better quality and prices, free and fair	(Wheatley, 2009)

	use the internet for procurement. It is used www.ehandel.no e-procurement protal		competition	
Pakistan	Pakistan Central procurement Authority (PPRA) has functioning science 2002.	Post tenders, evaluations, and contract awards, standardized tender document	Increase consistency in procurement, Transparency and accountability, obtain best quality	(Lee et al., 2008)
Peru	The government of Peru has implemented eGP system.	The main objective of the Government of Peru promotes efficient, effective and transparent public administration	Increase transparency, Reduce corruption, speed transaction	(*Peru Country Procurement Assessment Report (CPAR)* 2005; De Almeida, 2006) (Hanna, 2010)
Philippine	Philippine electronic procurement system –is an Internet-based Electronic Procurement System conceived to make more efficient and transparent the government procurement process	Efficient government purchasing	Increased transparency; cost reduction for government, information availability and accessibility, reduction of information asymmetry, more choices and information for purchase decision – making	(Ndou, 2004)
Singapore	The Singapore government uses GeBIZ on-stop e-procurement portal. All public services such as quotations and tenders are posted on GeBIZ.	The main objective of the GeBIZ system is to open and make transparent procurement.	Enhance transparency in government procurement, compliance to government procurement policies and guideline, global reach to among the bidders and suppliers, value for money increase in	(GeBIZ, 2005)

			procurement efficiency, easy access to information, increase competition among the bidders,	
Sri Lanka	Sri Lanka public procurement agency assigned to Department of Public Finance, Ministry of Finance and Planning	Formulate, develop, review, and monitor the system and procedure in order to maintain transparency and accountability in financial management	Standardized bidding processes, Management control, Monitoring and tracking application	(UN, 2006)
South Africa	South African government implemented integrated financial management system (IFMS) project.	The main aim is to enhance integrity and effectiveness of expenditure management and performance reporting in order to ensure effective service delivery	Real time access bidding information, reduce human interference, transparency and accountability	(Van Greunen,Herselman & Van Niekerk, 2010)
Thailand	Thai government developed e-procurement system in 2004.	Transparency / disclosure, accountability and fairness competition (e-Auction, e-Bidding, e-Market)	Transparency and efficiency, convenience and equal of business opportunities, to improve procurement policy, and real time access information	(Lee et al., 2008; Sungmai, nd)
Turkey	Turkey electronic procurement established in year 2002. Public Procurement Platform Citizen Transactions http://vatandas.ihale.gov.	To achieve efficiency and regulate government procurement	Increase competition among bidders, Obtain the best performance	(Bayraktar et al., 2009; Gozel, 2009; Onur,Özcan & Taş, 2008; Tas,Ozcan & Onur, 2008)

	tr/		among bidders	
U.K	The national e-Procurement Project (NePP) was launched in 2002.	Stand alone, shared or integrated software tools	Transparency in sourcing and supply processes, greater knowledge sharing with suppliers, enhanced status of purchasing function	(Croom & Brandon-Jones, 2007; Eadie,Perera & Heaney, 2011)
U.S.A.	The US government procurement initiative is Integrated Acquisition Environment (IAE).	to create a single web-based portal for government acquisition, used by government and private sector	Greater access information, to eliminate redundancy, real time access information, monitoring and tracking application	(EPA, 2004; Thai & Drabkin, 2007; Thai & Piga, 2007)
VietNam	The pilot e-procurement system was built from 2009 under the Korean Government grant (Lunched in 2010)	Main functionalities are supplier registration, buyer registration, information services, e-bidding, e-notification, e-quoting system	Operation efficiency, transparency, and fight corruption during the bidding process, increase the efficiency of public investment projects	(Anonymous, 2010; Mai, 2011)