An Insight of Government e-Procurement System and Performance in Construction Industry: Case Studies of Thailand e-Auctions and Indonesian e-Bidding Practices

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Background

Procurement is a strategic factor for successful completion of a public work project. Due to its importance, government attempts to enhance its procurement system particularly public works projects. By incorporating the use of internet, government hopes to establish an open, fair, transparent, and efficient environment in procurement process.

In recent years, many governments have increasingly incorporated the use of Information and Communication Technologies (ICTs) into their procurement systems given to various advantages offered by e-Procurement (eP) and also in respond to the demand of an open, fair, transparent, and efficient environment for procurement. Distinctively from several observed countries i.e., Japan and Southeast Asian countries, Thailand government applies e-Auctions into the country’s procurement system in 2005. Thailand e-Auctions is carried out either in Reverse Auction (RA) form (whenever the PQ stage remains more than 3 qualified bidders) or Sealed Bid Auction (SBA) form (should the PQ remains less than 3 qualified bidders). Most of the case, Reverse Auction is often used in Thailand government eP. Just about the same period, Surabaya City Government (Indonesia) started the use of online bidding in the form of sealed bid bidding. Thailand e-Auctions and Surabaya eP System have several similarities, such as both are developing countries, both previously used competitive bidding method, and both implemented eP in the same period.

Depart from the common purposes such as efficiency, transparency, non-discrimination, and accountability, the practice of government eP system varies from one country to another, given the different policies and laws which have to be complied with. The differences in laws and policies affect the eP method selection and the procedure of eP practice. Therefore the problems in and the outcomes of eP implementation will vary as well from one country to another.

Problem Statement and Research Objectives

A comparative study and performance evaluation between eP practices will be a useful learning tool and constructive reference to the other nation to establish or enhance its eP system. This research presents a comparative study and performance evaluation between Thailand e-Auctions and Indonesian e-Bidding where both eP systems were newly established but different method selection from one to another. Study about challenges and issues in preparing the e-procurement implementation is very limited. The preparation stage is very critical in determining how successful the eP implementation. Therefore this study try to fill the gap by providing a framework on government eP that covers pre-implementation stage, implementation stage, and output evaluation towards eP improvement.

This research aims to provide an in-depth knowledge about two different online bidding systems for government eP, to investigate the procurement outcomes and users’ perspectives and preferences on government eP and to propose a framework for government eP system.

System Comparison of Indonesian e-Bidding and Thailand e-Auctions Practices

- E-procurement Purposes
  The Government of Thailand aims to promote transparency, fair dealing, efficiency, and Value for Money (VFM) with the e-Auctions while Surabaya eP aims at efficiency, transparent, and accountable. Both e-Auctions and Surabaya eP offer higher process transparency than conventional procurement methods. Bidders are able to witness the whole procurement stages. The ease and speed in delivering information through internet and its vast coverage enhance the efficiency of the procurement process. Moreover, the usage of internet as publication media enables the bidders to access and stay updated the same and with recent information, respectively. Without compromising the quality of work, lower price can be derived as a result of higher and open competition. Thus the goal VFM can be secured by running the e-Auctions.

- Bidding System
  As in conventional bidding method, Thailand and Indonesia use sealed bid method. This method is easy to conduct and confidentiality is absolutely maintained. Bidder cannot know his opponents or their bid prices. If the bidders know each other, an arrangement may be agreed among them. Sealed bid method can be performed in either single action or multiple action type. Indonesia and Thailand are practicing single action type. In addition, Thailand is practicing multiple action
method as well where resulted bid price may be lower than using single action type.

Reverse Auction is said an effective method to save more government budget. Bidders are given chance to change their bids downward frequently within a specific period. The result may be much lower than the fair price. A greater and more explicit price competition in reverse auction yields a lower price. Since the price may go very low compared to fair price, the quality may be reduced or compromised, thus resulting in quality concerns associated with e-Auctions bidding. Therefore to anticipate the quality issue, the Government of Thailand, emphasizes the prequalification stage to keep the qualified bidders. This means the project owner only needs to get the price from the e-Auction process. The project owner is suggested to develop realistic pricing expectation by considering current price and forecasted market condition.

- Service Provider (SP)
Indonesia uses government agency (in house) SP while Thailand prefers using private company. There are trend that using government agency is cheaper to contractors since there are no registration fee. All operations and maintenance cost of the electronic SPs are at the government cost.

Thailand employs private companies as the electronic SPs and the winner pays a premium as a percentage of the winning price to the company. Thailand tries to outsource the owner’s or bidding committee’s job to the company to increase effectiveness of the process by reducing the workload of the bidding committee. However, the owner must spend some time in selecting the prospective electronic SPs and propose the result to the head of the procuring entity; this lengthens the bidding duration.

Private SP is a solution in switching government role to the other private sector. The interference between bidders and committee may be reduced by maintain professionalism of the SP. Computer system and infrastructure can be provided in remote areas through this service for a relatively low fee. Premium fee to the SP is fair; however, the cost at last will go to the project owner as bidders may include this fee in their bids.

- Bid Documents Distribution and Bid Submission
Thai contractors are still preparing paper based bid proposals. If they obtain the bid documents in electronic format which at times are large in quantity and so will the file size be when transferred via internet, they will still have to print it out. This will cost them more time and money. Therefore, they prefer to spend more in obtaining the bid documents in hardcopy form rather than do the redundant work. This practice contradicts with the expected e-procurement process where document distribution is preferred in electronic file format than in paper-based. Electronic documents distribution is cheaper and reduces the time to obtain as compared to providing hardcopies. Moreover, electronic distribution avoids direct contact between bidding committee and bidders and among bidders.

Indonesia tries to avoid this direct contact by providing all information including drawings and specifications available in the website. All documents are converted into PDF files so that the size is smaller. Moreover, there is no additional fee in obtaining these documents since the committee does not have to produce a hardcopy of all documents.

Similar to bid obtaining, preparation of paperwork for bid submission is an additional cost. The possibility of direct contact is also larger when the bidders have to submit their bids directly to the owner’s or bidding committee’s office. Time and place obstacles are some other factors bidders should consider. Thailand is practicing this method. Technical documents are submitted in form of hardcopy. Meanwhile, Indonesia is practicing electronic submission for all bid documents. All documents are converted into PDF file format and uploaded to the server. However, because of the absence of ICT laws in Indonesia, a hardcopy of documents shall also be submitted to support the digital format ones because the existing laws have not covered the use of digital format as legal evidence. Currently, ICT laws are discussed in Senate to address this redundant work.

- Bidding Process
In Thailand only bidders qualified in technical document evaluation are eligible to proceed to submit their bid price by e-bidding. This method ensures that the prospective winner is always eligible. In contrast, Indonesia allows all bidders to submit technical document and bid price at the same time in the case of post-qualification. The lowest bidder may not be always eligible to be awarded the contract. e-Bidding process can be held in a specific place, so called bidding office, or can be accessible from any internet connection.

Thailand sets its e-Auctions at bidding offices. This requires bidders to come to bidding office at specific time. Thus, time and place may become obstacles of bidders joining e-bidding. Indonesia allows bidders to submit their bid from any internet connection. Monitoring process in the latter system is more difficult than the former. Therefore, the software shall have log system to monitor all events during bidding period.

Construction Procurement Outcomes and Its Features in Surabaya e-Procurement System (SePS)

Two of SePS objectives are to enhance government procurement effectiveness and efficiency and to create a fair dealing environment for suppliers. Studies about economical achievement of SePS are still limited. Such a study will help government to identify and improve its knowledge on the economic potential of SePS and its features including bidding characteristics. This paper presents the economical achievement of SePS and its features i.e., bidding characteristics, generally from 2005 to 2008. Data was collected from SePS Center representing all the sectors of Surabaya city government procurement. The collected data consists of evaluation report from each procurement round throughout the year and the output of procurement activities.

SePS encompasses various types of procurement object that come from various agencies under Surabaya city government jurisdiction. In SePS, the procurement
object has been categorized into five types, namely: goods/supplies, construction service, consultancy service, non-construction service, and other services. It is found that the construction service has been the most procured and accounts for the largest amount of budget in each year. SePS which in correspond to government regulation, has been supportive towards small medium-sized companies. The regulation aims to give chances to small-medium sized companies in participating in e-Procurement and securing the projects. The finding reveals that the winning companies of SePS have been dominated by small medium-sized companies in all years. Furthermore, it breaks the negative connotation that stating the e-Procurement will greatly benefit big-sized companies.

Online technologies offer temporal and geographical conveniences, reduced cost of contact, instant feedback, more privacy, and cost saving of using electronic format documents. The use of internet in SePS enables all interested companies in accessing and participating in procurement process as long as the internet connection available. Those interested companies are not only from local area (Surabaya city) but from neighboring areas and other surrounding cities as well. The findings show that the winning companies are not only from Surabaya city but some are from outside Surabaya it is still in a small number as compared to local companies. This shows that SePS gives equal chances for both locals and nonnative companies to participate and secure the projects. Furthermore, this fact breaks the negative connotation that stating the e-Procurement will greatly disadvantage local companies. The internet opens more opportunity for either new or current suppliers, local or nonnative suppliers.

Finding on budget saving shows that non-small scale projects shows higher budget saving percentage than small scale projects, except in 2008. Sanitary-related projects have higher total budget saving percentage than road-related projects, except in 2007. Others-related projects tend to have higher budget saving percentage than communication-related projects, except in 2006. Among the three major types project, building has the lowest budget saving percentage than road and sanitary-related projects. Non-small scale projects show a significant higher average of budget saving than small scale projects, except in 2006.

The findings demonstrate that the average of budget saving percentage tend to increase as budget increases. Road has the highest project value whereas building is second highest. Interestingly, even in Sealed Bid Auction where there is no visible price competition, it is shown that as number of bidders increases, the average budget saving percentage increases as well.

Building category has the highest number of bidders whereas road is the second highest. The high number of bidders implies in certain category imply that much bidders are interested in participating in that category. It is found that building category is the most participated project procurement.

Exploratory of Government’s and Contractors’ Perspectives and Preferences

Thailand government has implemented e-Auctions since 2005. Through the years of implementation, it is essential to address whether the practice has met its objectives, its latest practice, and obtaining the users’ perspectives and preferences. Such study will help the government to made improvements. This paper present an update information on e-Auctions current practice as well as an exploratory of government’s and contractors’ perspectives and preferences on Thailand e-Auction practice after has been implemented for a half decade. A questionnaire-based survey on current practice was conducted. About 40 and 35 respondents respectively represent contractors and Project Owners (POs) have participated in the survey.

Majority of the contractors are from medium and big sized companies, means that majority of the respondents have accessed to medium and large projects which are have to be procured under e-Auctions scheme. Most of the contractors have more than 10 years experience in Thailand construction industry, means that most of them have experienced all schemes of procurement and participated for many years. About 50% of the contractors are from outside Bangkok. Consequently, they may find it difficult to commute to Bangkok in getting the bidding news (if it is posted at government offices), obtaining bid documents, submitting technical documents, and joining the bidding process when it is held at specific places somewhere in Bangkok.

When assessing the computer and internet literacy, both contractors and POs have high literacy. Majority of the contractors (92%) use internet in daily basis whereas 71.43% of POs use internet in daily basis. The findings show that about 30.4% (the highest) of the contractors use the internet for email/Attachment/Exchange documents. Whereas only 17.6% (3rd highest) of the contractors are using internet for Bidding/Procurement/Contracting activities. This result gives an indication that contractors have utilized ICT in their business communication and finding business information. Moreover, a Bidding/Procurement/Contracting activities through the internet is not widely used.

The findings reveal that government and contractors have different evaluation towards current e-Auctions’ performances that cover transparency, fair dealing, efficiency, and value for money. From 100 as the maximum evaluation score, POs value the current efficiency as much as 66.29 and 69.71 for VFM. Widely accessed Invitation to Bid and efficient outsource SP are the main reason for efficiency and VFM. The contractors evaluate the current transparency, fair dealing, and efficiency as much as 52, 56, and 54 respectively. Lack of transparency in technical evaluation, bidding process, and winner selection become the reason for this low evaluation score. Low score of efficiency is due to paper based practice and direct meeting instead of electronic form and internet practices.

The findings reveal that contractors have an opposite preference with POs on bidding method. Sealed Bid Auction (SBA) has been preferred by the contractors
whereas POs prefer to exercise Reverse Auctions (RA). Contractors’ preference on SBA is due to its primary driver in the procurement which are profits and businesses sustainable. Through SBA where is no visible price competition, contractors can conveniently submit the price with certain good profit. Whereas for POs have VFM as primary driver in the procurement. RA offers high and visible price competition that lead to lower price to secure certain qualities.

The qualities of work have been found to be the most frequently affected by winning price among the three parameters of contractors’ performance in projects. Project completion is the second most frequently affected performance and followed by contractors’ responsiveness on government claims. Majority of the POs do not have the lowest price threshold, thus there would be a great possibility the bidding process yield a very low winning price. Majority of the POs have a moderate range of acceptable percentage of winning price to OEP as much as 70%-80% and 80%-90% of OEP.

Both contractors and POs share the same perspective and preference on SP. They prefer outsource SP over in house and highly value outsource SP’s efficiency. Both are agree that outsource SP offers better services, well prepared, efficient work, more neutral, and transparent. Majority of POs apply both bidders’ feedbacks and internal organization’s criteria to evaluate SP’s performance.

In disseminating the invitation to bid, posted information on government website has been found as the preferable practice by both POs and contractors over the other media. Unpredictably, under the online bidding context, both contractors and POs are still and prefer to exercise the distributing and obtaining bid documents and submitting and receiving technical document in traditional fashion (i.e., paper based). As for POs, hardcopy provides records or evidences to control the number of interested bidders. For contractors, hardcopy provides more valid evidences, avoiding mistakes, shown in details, precise, and practical. The findings show that contractors have much more readiness than POs should the method of preparing the bid proposal and evaluating the technical documents shifted to softcopy/ electronic form. Electronic format remains traceability evidence and legality issues due to the lack of ICT laws.

Majority of POs find that PQ criteria and its process are useful to secure the qualified bidders in technical evaluation stage. The lack of transparency in technical evaluation process has been acknowledged by contractors, particularly in the scoring system and unclear reasons.

Both contractors and POs have positively addressed the sufficiency and usefulness of bidding training in preparing the bidders to smoothly get through the bidding process. Given to the current practice of bidding process (i.e., held at specific places), more than half of the contractors find it difficult to join the process. Majority of the contractors prefer to access and join the e-Auctions system from any available internet access rather than to come at specific places. On the other hand, majority of POs prefer to hold the e-Auctions at specific places to provide fair connection to e-Auctions system and also to allow bidding committee to monitor the process. The transparency and fairness in bidding process as well as winner selection have been averagely addressed by contractors.

Most of e-Auctions’ features such as transparency, fair dealing, high competition, bidding process’ prompt result, and traceable are found to be advantageous for contractors. Through e-Auctions, Thailand government has shown their efforts to enhance their procurement system and in providing a conducive environment for contractors. Government also has gained a much more budget saving for about 10% to 20% off the standard price as an immediate effect of price competition. Several bidding stages which are still carried out in paper based/ traditional fashion instead of using electronic communication and data exchange have hindered both contractors and POs from achieving extensive time and cost savings. Standard price which have been used as reference in bidding process is found most of the time to be not reasonable from contractors’ viewpoint and the government is expected to review and establish a reasonable standard price. The government pointed out that screening process of PQ stage should be improved to get more qualified bidders and a careful review of the bids should be carried out to ensure it meet the specified quality, service, and other value adding considerations.

Proposed Framework on Government E-Procurement

Multitude challenges in introducing and implementing e-Procurement (eP) were identified through an extensive literature reviews and our findings in previous chapters. Proposed method of e-Bidding was adopted from the best practice resulted from comparative study of Thailand e-Auctions and Surabaya eP System (Indonesia). Through Chapter IV and V, an output evaluation is essential to be carried out to assess the system performance and address barriers in implementing the eP process. The output evaluation should be basis in improving the eP system. Figure 1 shows the proposed framework for government eP which cover three stages, as discussed below:

- Pre-implementation

  Government Leadership

Government holds executive power and therefore the government will be in the front line in any changes in the country. When the government set some directive policies, all efforts such as regulations (legislations), reorganization, and development (both in infrastructures and human resources) will be directed to correspond with the policies. Moreover, government sets the regulations regarding uses of electronic media in bidding processes. The government as the regulator also prepares related laws and policies in order to prevent problems and disputes related to online bidding practices.
Knowledge dissemination and increasing awareness of potential benefits and opportunities

Lack of eP knowledge and no real business benefits being identified have been identified as barriers against the adoption of eP. Organizational and human issues have also been highlighted as key factors affecting the use of technologies in the construction sector. It is pointed out that awareness also contributes to the successful development and deployment of an eP system. For not being able to know, aware, recognize, and identify the potential benefits and opportunities that are offered by eP will impede the adoption of eP both in government and contractors side. Therefore the knowledge dissemination and increasing awareness of potential benefits and opportunities to both government and contractors are essentially required and regular public eP information dissemination programs need to be held, which in turn will help fuel users’ uptake.

Innovative policies and legal framework

As this study witnessed from both case studies, especially Thailand e-Auctions where both government and contractors are technologically and human resources-wise feasible to run all the bidding stages in electronic format but partly due to lack of legal framework, have chosen to exercise some of the bidding stages in paper-based manner. Several laws and regulations can be then issued to support online bidding implementation. The absence of ICT laws is a common problem found from the fact finding. ICT laws shall regulate that an electronic format document is valid, reliable, and sufficient as alternative evidence apart from paper-based documents. These laws are important since for fully practicing online bidding, all documents shall be in the electronic file formats.

Human Resources

Lack of technical expertise has been identified as barrier against the adoption of eP. Capacity building and institutional change contribute to the successful development and deployment of an eP system. It is pointed out that there is immense need for trained technical staff with ICT support skills, such as programming, network development and maintenance, website development and maintenance skills, database administrator skills, etc., to support the increased use of and dependency upon ICT both in the workplace and for workers on project sites.

As the users, building both government’s and contractors’ technological expertise through bidding education and training are essentially required. The government shall make sure that the officers running online bidding are capable and credible. The capability includes troubleshooting of the system. And understanding of bidding processes according to the existing laws or regulations. The officers shall be credible so that the confidentiality of information and the fairness of bidding process can be maintained. The readiness of contractors’ manpower is also government responsibility. Therefore, introduction and trainings shall be held for contractors joining bidding so that the problems in operating online bidding can be avoided.

Technological Infrastructures

eP requires infrastructure development. It is pointed out that technology also contributes to the successful development and deployment of an eP system. At pre-implementation stage, the government shall estimate its resources to run the online bidding system. Two resources are considered in this discussion: infrastructure and software. The government shall make sure that the infrastructures are sufficient and
economically feasible to support online bidding implementation. Infrastructures are related to availability of internet connection, whereby the bidders are connected to the owner. When the internet connection availability is not sufficient or the sufficiency is not even among areas in the country, the government may select to hold the online bidding processes in a bidding office. Bidding office may be set at the owner’s office or any other places that are easy to be reached and reasonable to maintain competitiveness of the bidders. In terms of software for running online bidding, the government may have two alternatives: develop its own software or hire an outsource company to prepare the software.

**Security and Confidentiality**

There are issues that related to security and confidentiality in the eP implementation. Several researchers have proposed and introduced solutions to overcome the security and confidentiality issues in eP implementation. The first issue is confidentiality where the use of IT as information transferring is very sensitive with confidentiality issues as the information may be leak or hacked by other parties. This may have serious impact such company loss and mistrust. This is concerned that confidential documents such as drawing, bill of quantity, tender documents, even contract award are subjects to be theft or disclosed. The second issue is insecurity in electronic transactions. In the past, protecting computer was a simple action by not allowing physical access to the computer. Yet, shared system and networking which are commonly used nowadays make easy to virus, Trojan, and hacker to get access to the system. Hence this has created difficulties in controlling access to a computer which contains confidential information and hence putting the integrity of the information at risk.

**Standardization**

Three reasons are explained for the standardization of e-Procurement. First, standards are needed to standardize the independent procurement processes in ministries and local governments. Standardization enables the creation of one Application Service Provider and reduces customizing costs. Second, every transaction should be processed by e-documents with digital signatures. Public procurement requires a signed document for producing the evidence because it is related to financial works. End-to-end security and document exchange are needed for documentary evidence. Third, is the need for a linkage service with external systems. Public procurement is a complicated process which must be linked with other systems, such as Internet banking for e-payment or data sharing with business licenses. Therefore, all linkage should be based on a common platform that ensures mutual compatibility between the different systems. Furthermore, server-to-server security is needed for documentary evidence. As such, having a standard electronic exchange format that allows all parties involved in an electronic tender process to access one system only via the Internet, saves both time and money, eliminates transcription errors and increases speed of bid analysis.

- Output Evaluation towards Continuous Improvement

An output evaluation of the e-procurement system is proposed. The output of e-procurement system can be categorized into two, namely project-related output and implementation performance-related output. Project-related output covers output that associated with the project procurement (i.e., winning price) and the project itself such as cost, quality, time, safety, and other parameters. Implementation performance-related output covers several objectives of e-procurement implementation such as transparency, fair dealing, efficiency, value for money, and also barriers found in the e-procurement process.

Worth to note that the project procurement yields a certain winning price but whether the project could be delivered in comply with specified quality and time within this winning price is still questionable at the time of contract signing. The real cost, quality, and time will be reflected by the time of project handover. Due to the procurement mechanism, the winning price is often considered very low and the quality of work is doubted. Therefore the two output (i.e., from project procurement and project handover) should be compared and evaluated. Project Owners can reflects on the project output and take some measurement whether the standard price or OEP which is used a reference price is still reasonable or should a lower price limitation be employed to avoid the very low winning price that might affect the project output (time, cost, quality, etc.).

Contractors’ performances also should be evaluated by scoring system at the time of project handover. The scoring system will be very useful to encourage contractor to perform as best as they could and finally to shape their competitiveness. The scoring system should be followed up by incorporating the score into bidding evaluation criteria. The score reflects the contractors’ past performances and will be one of the criteria used in bidding evaluation. This way, the contractors will be more concern about their performances in each project since their performances will affect their chance in securing future projects.

Implementation performance-related output or procurement process-related output evaluates how the e-procurement process was carried out. The evaluation identify whether the conducted process meets its e-procurement objectives also identify the faced issues or barriers in the process. The findings of this evaluation should be very useful in improving the e-procurement system implementation. It is also essential to address the root causes of these issues or barriers whether the solution will be applied in pre-implementation or implementation stage.

**Conclusions**

This study provides an in-depth knowledge about two different bidding systems for government eP also investigates the economical features on government eP. Identification of users’ perspectives and preferences on government eP were carried out in this research. A framework on government eP has been proposed for government reference in establishing eP and for continuous improvement.