E-AUCTIONS FOR GOVERNMENT PROCUREMENT: A LESSON LEARNED IN THAILAND

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The practice of e-procurement as the government procurement system varies from one country to another. Depart from the common purposes such as efficiency, transparency, non-discrimination, and accountability, countries may run their procurement systems differently. Some countries may run their e-procurement system successfully with some notes in their practice, some may still face barriers, and others may only partly implement e-procurement. Trial and error may not be an effective method of learning, thus it is essential to learn from other countries' experience in running e-procurement.

This paper presents a distinct practice of government e-procurement, namely e-Auctions, as used by the government of Thailand. The government of Thailand runs two types of e-Auctions: Reverse Auction and Sealed Bid auction, which result in lower prices due to the higher price competition. Contrary to the common practice of e-procurement, the Thai government, with some rationales, runs the bid documents obtaining manually as well as qualification and technical documents submission and holding the e-Auctions at bidding office. The advantages and disadvantages of Thai e-Auctions practice are presented in this paper as well as improvements that have to be made for successful of e-Auctions. The lessons learned from Thai e-Auctions practice is expected to be a constructive reference in establishing e-procurement system.

Key Words : *government procurement, bidding, e-auctions*

1. BACKGROUND

Public works investment, either in constructing new or maintaining existing infrastructures, is part of annual government expenditure. Due to the large amounts of investment on public works, its procurement often becomes the target of collusion. Therefore an efficient, transparent, and accountable procurement system is eminently required. Regardless of the country's state of development i.e., either developed or developing country, the government always attempts to enhance its procurement system particularly in construction projects. These attempts drive the usage of electronic in government procurement system. By incorporating the use of the internet, online

procurement (e-procurement) establishes an open, fair, transparent, and efficient environment for government procurement. Moreover it enhances the procurement process and reduces the possibility of collusion.

Some countries may run its e-procurement system successfully with some notes in its practice, some may still face barriers, and others may partly implement the e-procurement. Learning from trials and errors may not be effective; therefore it is essential to learn from other countries' experience in running the e-procurement. The lessons learned from other practices are expected to be constructive references in establishing an e-procurement system.

Unlike several observed countries i.e., Japan and Southeast Asia countries, the Government of Thailand applies e-Auctions as the national e-procurement practice. As stated in the national e-procurement website (www.gprocurement.go.th), the Government of Thailand aims to promote transparency, fair dealing, efficiency, and value for money with the e-Auctions.

The Thailand Government runs the e-Auctions in two types, namely: Reverse Auction and Sealed Bid Auction. As implied by the name, Reverse Auction runs everything in reverse order and this applies to Sealed Bid Auction as well. The sellers bid instead of the buyers and the prices are bid down instead of up[1]. In Reverse Auction, the owner reveals the submitted bid prices during the process to the qualified bidders aiming to get lower price. Qualified bidders are given chance to change their bids downward frequently within a specific period. The winner seems to be drawn from the lowest bid (i.e., only considering price factor)[1]. The result may be much lower than the fair price. Whilst in Sealed Bid Auction, qualified bidders submit their prices without being known by or knowing the prices of their opponents. After the bid period is closed, the owner opens the submitted prices and announces the winner. In other word, confidentiality of bid prices are maintained until the bid period is due. It is pointed out that reverse auction and sealed bid auction differ in their degree of price visibility[1]. Full price visibility to bidders is offered in reverse auction, while sealed bid auction has no price visibility. The differences between these two e-Auctions are clearly described through this paper.

2. RESEARCH OBJECTIVES AND METHODOLOGY

This paper aims to answer the questions on how the Thai Government runs e-Auctions and what lessons can be drawn from this e-procurement practice. The current practice of e-Auctions as the Thailand Government procurement system is presented here. In advance, current procurement system of Thailand Government is briefly reviewed. The involved parties and their roles within government e-Auctions are explained prior presenting the practice of e-Auctions. Learning from the Thailand Government e-Auctions practice, advantages and disadvantages are identified and subsequently discussed to propose potential improvements in government e-Auctions practice.

Data collection was performed mainly by interviewing the involved parties and by reviewing literatures as well. Interviews were conducted from July to August 2005 and addressed to three involved parties in government e-Auctions practice. The three involved parties are the government bodies at the Ministry level (as the regulator) and at the Department level (as the user or project owner), the government agencies or private companies which provide services for online bidding (so called the Service Providers (SP)), and the contractors. The government's perspectives on the advantages and disadvantages of using online bidding compared to the conventional method, the procedure of online bidding at all stages (i.e., bidding invitation, document distribution, document submission, as well as winner selection and contract award), experiences of implementing online bidding in the initial stage, and laws and policies related to collusion practices in public projects were obtained by interviewing the government entities. Service Providers were interviewed to obtain information regarding the advantages and disadvantages of implementing and utilizing of online bidding from their perspective, systems and procedures which are used in online bidding utilization in all stages, and the required training and development of the system and software. By interviewing the contractors, the advantages and disadvantages of joining in online bidding from their perspective and the required preparation in joining the online bidding process were obtained. The results are presented and analyzed subsequently in the following sections.

3. CURRENT PROCUREMENT SYSTEM IN THAILAND

The government Thailand started implementing e-Auctions six years ago when the Minister of Finance issued a Regulation on December 9, 2002 regulating government offices to use electronic system in their procurement activities. At that time, the regulation was valid only for government offices

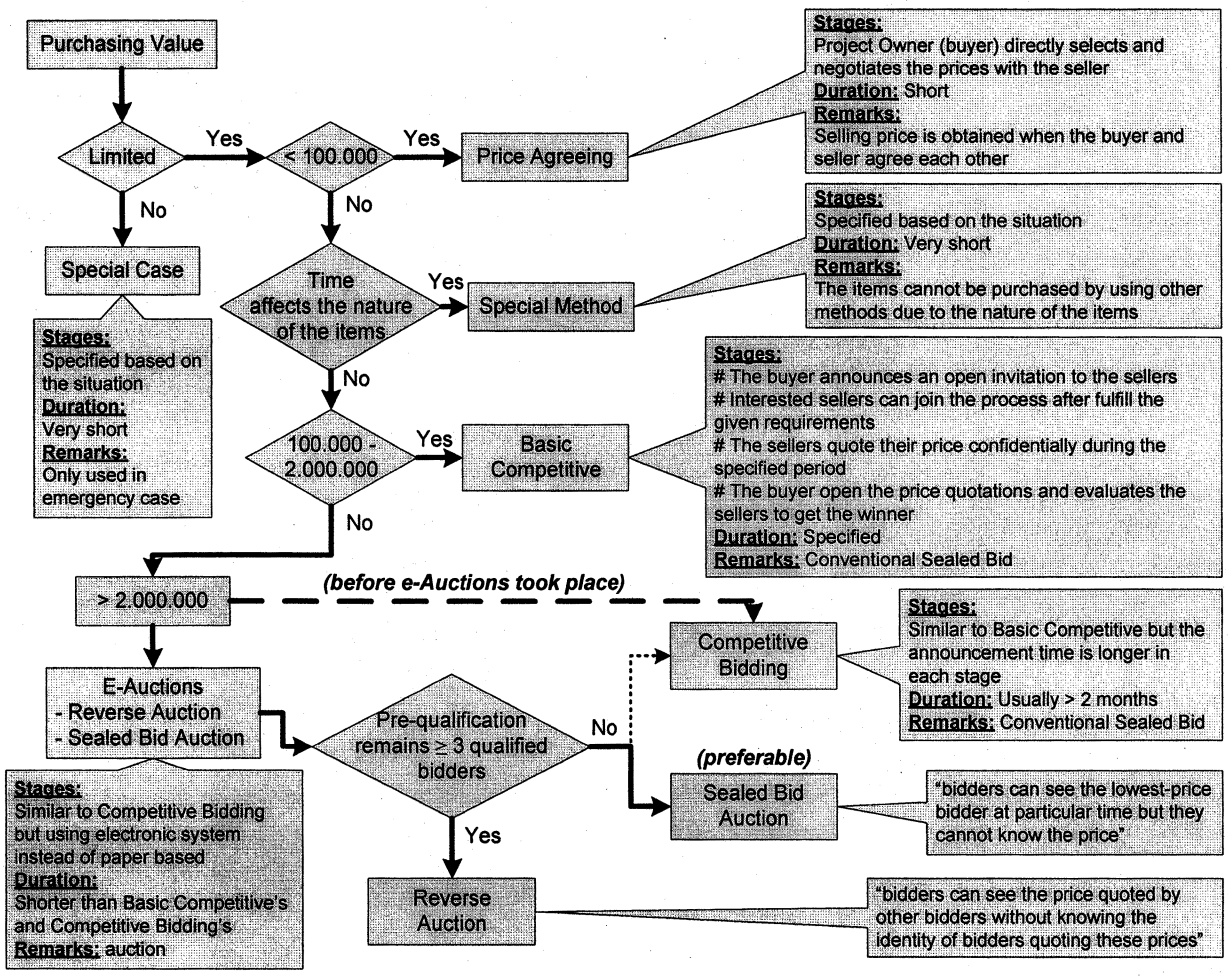

Fig.1 Current procurement system of Thailand Government

within the Bangkok Metropolitan Area. This regulation was replaced with a new Memorandum dated on January 21, 2004. Later, on January 13, 2005, the Minister of Finance issued another Regulation that every purchase over 2 Million Baht has to be handled by an electronic system of procurement called e-auctions.

The last regulation added one more type of procurement to the system in Thailand. Previously, there were five methods that were commonly used for procurement purposes. The six methods in government procurement system are described in **Fig.1**.

As shown in the figure above, the methods are categorized by purchasing value and several methods are used under particular conditions. Before e-Auctions were introduced, when the purchasing value would be than 2 Million Baht, government offices were obliged to use the Competitive Bidding Method. The competitive bidding method is alternatively used when the prequalification stage in e-Auctions remains 2 qualified sellers.

4. THE INVOLVED PARTIES AND THEIR ROLES IN E-AUCTIONS

As described in **Fig.2**, there are three parties that are directly involved in the e-Auctions process: the Government at the department level as the project owner, the Service Provider, and the contractors as bidders. Apart from these three parties, other parties may take part in the e-Auctions process, such as the Government at the ministry level represented by a committee; the Office of Procurement Management; and the Consultant Company.

The Government at the ministry level acts as a regulator of the e-Auctions process. The Thai Government prepares the regulation and guidelines of e-Auctions applications in Thailand. A committee, as shown in **Fig.2**, has been formed to represent the Thai Government in handling the application of the electronic procurement (e-procurement) system including the qualification and selection of the Service Provider. This committee has responsibilities to set the regulations and conditions of using the

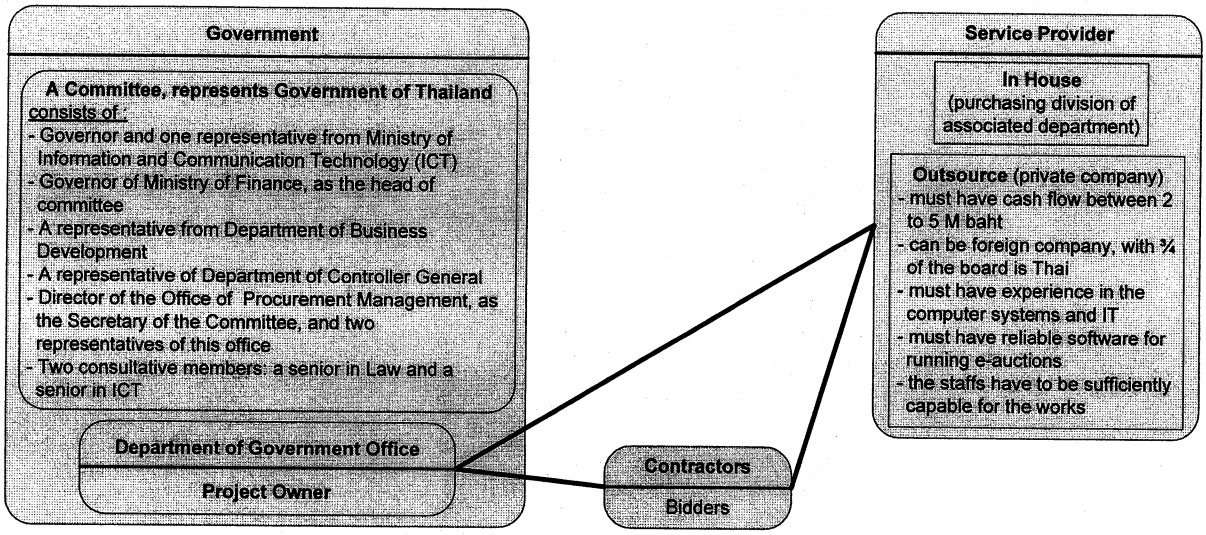

Fig.2 The involved parties within government e-Auctions in Thailand

e-procurement system by the Service Providers, to set the conditions of using Service Providers in the e-procurement system, to qualify, select and register the eligible Service Providers, to monitor and evaluate System Provider performance, and to give consideration and approval to the government office for using or not using the e-procurement system.

Nowadays, this committee hires a Thai Consultant Company to devise a standard for evaluating Service Providers. The criteria for evaluation are in discussion between the Consultant Company and the Office of Procurement Management with approval from the Ministry of Finance. Some criteria that are applied in Service Provider qualifications are shown in **Fig.2**. The Government of Thailand prefers using private Service Providers although using an outsource Service Provider is an option for the Department of Government Office. This increases competitiveness between Service Providers.

5. HOW IS THAILAND RUNNING THE E-AUCTIONS

(1) Preparations prior to e-auctions process

Fig.3 shows the bidding procedures of e-Auctions at all stages for both government and contractor sides. In detail, these stages must be followed by all departments if they want to use the e-procurement system. First, the government office, as the project owner, prepares detail information of the bidding by e-procurement system and it is decided whether a private Service Provider is to be employed. Internally, the purchasing division in the department forms a bidding committee consisting of one chairman (at least level-6 officer) and two members (at least level-3 officers). In case that the project owner does not want to use a Service Provider, this committee is responsible for the preparation of the required staff, software, system, and all equipment which must comply with the regulations issued by the Office of Procurement Management. A bidding office should be prepared and at least furnished with telephone lines (at least 3 lines), fax machines, computers with Windows XP Professional, Internet Explorer 6, modem 56 kbps, printer, LCD Projector, UPS, and other equipment. These are all subject to the Office of Procurement Management approval.

If the government office wants to use services from a Service Provider, the committee is responsible for selecting a System Provider from nominated list provided by Office of Procurement Management. Notices to the selected System Provider are then required. The committee has to prepare all contract documents between the three parties: the owner, the bidders, and the System Provider. The selected Service Provider has to prepare all of systems and equipment at the place specified by the committee. This committee is entitled to decide whether to continue using e-Auction or Competitive Bidding method in case there are only two bidders passing the prequalification, or whether to cancel the bidding or to negotiate in case there is only one bidder passing the prequalification stage.

The Invitation to Bid is then announced by the bidding committee electronically on the government website (www.gprocurement.go.th) and the project owner's website as well as paper based announcement on the announcement board of the project owner's office and the Office of Procurement Management. The project objective, criteria for prequalification, technical information, samples of agreement, bonds for the project, and invited bidders are specified in the Invitation to Bidders. A period of

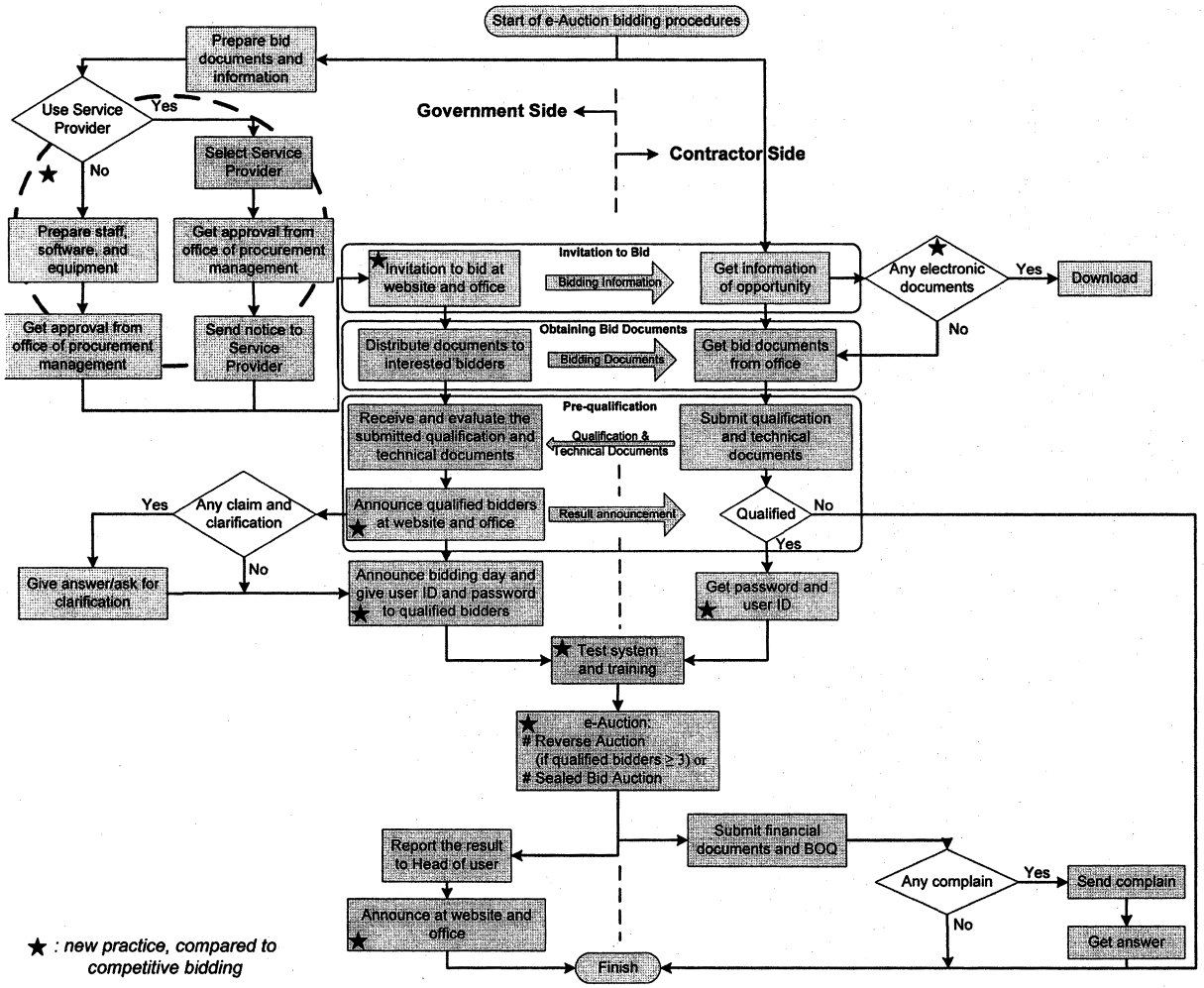

Fig.3 Bidding procedures in e-Auctions at government and contractor sides, Thailand practice

more than seven working days is provided for the interested bidders to come to the committee's office and obtain the bid documents. All of the bid documents have to be completely filled in and returned back to the committee within a period of not less than five working days.

The bidding committee then examines all of the technical specifications and selects the qualified bidders who pass the criteria. These short-listed bidders must be reported to the head of department and the head of purchasing division of this office. The bidding committee has to announce the qualified bidders at the owner's office and also the website of the government (www.gprocurement.go.th). Moreover, the committee also has to inform the unqualified bidders and give reasons for their failure.

While waiting for the bidding day, the bidding committee may ask the qualified bidders for detailed explanation if needed. The unqualified bidders are also given rights to ask and claim for their failure only if they want to get information.

The Service Provider has to announce the training service to the qualified bidders. He also has to give the User ID and Password to qualified bidders at least one day before the bidding day. The bidding committee and the qualified bidders have a chance to test the system to prevent technical problems on the bidding day.

The bidding committee should announce the date, time, place, duration, and conditions of the bidding process. The committee also announces the starting price or the selling price from the owner. The committee and the Service Provider decide whether the bidding will use Reverse Auction or Sealed Bid Auction. They can also decide whether using Sealed Bid Auction or Competitive Bidding method in case there are only two bidders passing the prequalification. In case the bidding process is held at a bidding office, the committee should send one member of the committee to observe the bidding process at the bidding office.

(2) E-auctions process

There are two methods used for purchasing by electronic system: Reverse Auction and Sealed Bid Auction. These two methods have to be used for procurement with a purchase value of more than 2 Million Baht, or if the owner wants to use this electronic system. In Reverse Auction, basically the bidders can see the prices quoted by other bidders without knowing the identity of bidders quoting these prices. The Reverse Auction is used when there are more than two bidders quote the prices. In Sealed Bid Auction, the bidders can see the lowest-price bidder at particular time but they cannot know the price. The Sealed Bid Auction is applied as an auction method when there are only two bidders competing against each other. The below table describes the attributes of these two auction methods.

As shown in **Table 1**, sealed bid auction can be carried out in two ways: one action and multiple action. One action sealed bid auction means that bidders only submit their bid once without being known by or knowing the prices of their opponents. While in multiple action, bidders are given a second chance to revise their bids and submit at the second round. The lowest bid in the first round is announced as the ceiling price for the second round. Thus, bidders can only submit the same or lower bid at the second round. But for reverse auction, bidders are allowed to bid downward frequently within a specified minimum sequential bid amount until no further downward bids are received. The minimum sequential bid amount is specified in advance and depends either on the project size or suggestion of the Service Provider.

(3) Post e-auctions process

The project is then awarded to the lowest price bidder. Lowest price bidders should immediately submit the financial documents and bill of quantities (BOQ) to the committee within a period of less than 24 hours. Subsequently, the bidding committee summarizes the result, reports the winner and its price to the Head of Department of the owner and announces the winner at the web site of the owner's office. A report of the Service Provider's performance is also has to be sent by the committee to the Office of Procurement Management for evaluation purpose. The report consists of the winner,

Table 1 The attributes of reverse auction and sealed bid auction

	Type of Auctions	
Descriptions	**Reverse Auction**	**Sealed Bid Auction**
Selling price	< the allocated budget	< the allocated budget
Type of proposing the price	frequently	o Single action o Multiple action
Minimum sequential decreasing bid amount	Depends either on the project size or suggestion of Service Provider	N/A
Bidding duration	There are two cases of bidding period: • If extension is given, time extension ≤ 60 minutes • If no time extension is given, the total time ≤ 6 hours The extension is given in 5 minutes basis	No time extension Duration ≤ 6 hours
Shown information on **committee**'s computer screen	• Time • Code of the bidders • Log file of the processes • Lowest price during the bidding period • Remaining time • Final situation of the processes	• Time • Code of the bidder • Lowest price • Remaining time • Final situation
Shown information on **bidders'** computer screens	• Time • Bidding detail, owner, items offered, selling price or starting price • Log file of the bidder • Lowest price • Remaining time	• Time • Detail of price • The lowest bidder • Remaining time
Time extension in the case of emergency	5 minutes	5 minutes
	while bidders have to send fax or price confirmation letter	

Table 2 The premium rate and transportation rate of Service Provide services

Budget (Baht)	Premium Rate (Baht)
< 2,000,000	<6,000 /project
2,000,000 to <10,000,000	<0.4% or < 10,000 /project
10,000,000 to < 25,000,000	<0.15% or <20,000 /project
≥ 25,000,000	<0.1% or <30,000 /project
Distance (Km)	Transportation Fee (Baht)
< 150	free
151 to 250 (7 provinces)	<2,500
251 to 500 (16 provinces)	<5,000
>500 (33 provinces)	<10,000

its price, differences between starting price and winner price in percentage, and the name of the Service Provider. This report can be sent electronically and will also be reported to the Cabinet.

These phenomena exist in the practice of the electronic procurement system. Several divisions under a Department can combine their items to be offered in one bidding. However, when the winner has been obtained, the contract must be signed separately. If there is any government office that cannot follow this regulation and wants to use another method, this office must get an approval from the Office of Procurement Management.

The regulation also provides a guideline for the premium for the Service Providers. This premium is at the cost of the winner. It should be noted that the premium is only calculated and paid if the bidding obtains a winner. This premium is calculated by the Service Providers and comprises of two components: premium rate and transportation rate. **Table 2** shows the details of these two premium components.

6. LESSON LEARNED IN THAILAND

(1) E-procurement purpose

Most countries have similar purposes in using e-procurement. The common purposes are to increase transparency in bidding processes and also to save government budget as a result of lower bid prices. It is pointed out that an electronic government procurement system is required to render government procurement efficient, transparent, non-discrimination, and accountable[2]. Similarly, the Government of Thailand aims to promote transparency, fair dealing, efficiency, and value for money with the e-Auctions as its e-procurement system. Compared to conventional procurement methods, e-Auctions offer higher process transparency. Bidders are able to witness the whole procurement stages, from bidding invitation to winner announcement. 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 "value for money" can be secured by running the e-Auctions. More tangible and intangible advantages are presented in the following discussions.

(2) Bidding system

Thailand runs e-Auctions as the government procurement method whenever the purchasing value is more than 2 Million Bath. By using e-Auctions, the Government aims to conserve the government budget. Compared to Sealed Bid Auction, Reverse Auction is said to be an effective method to decrease government spending, as bidders are given chances 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. It is highlighted that the fast-paced, dynamic bidding, along with the need to respond quickly to competitors' bids yields tense negotiation and pressure on bidders to cut prices vigorously[1]. As previously mentioned, Thai government performs Sealed Bid Auctions in two ways: single action and multiple actions. Single action sealed bid actions is the same as competitive bidding method where bidders submit their bid once without being known by or knowing the prices of their opponents. Subsequently, the owner opens the submitted prices when the bid period is closed and announces the winner. Meanwhile in multiple action, bidders are given a second chance to revise their bids and submit during the second round. The lowest bid in the first round is announced as ceiling price for the second round. Thus, bidders can only submit the same bid as

the ceiling price or a lower bid at the second round. In this sense, compared to single action, lower price will be derived from a multiple action sealed bid auction.

As stated before, sealed bid auction is more preferred than competitive bidding whenever the prequalification stage results in less than 3 qualified bidders. This condition implies less competition between bidders and in addition, the nature of sealed bid auction i.e., the low degree of price visibility brings implicit price competition. In contrast, a greater number of qualified bidders and high degree of price visibility brings greater and more price competition in reverse auction which leads to a lower price.

Thailand is practicing e-Auctions in construction bidding while other countries are not due to the relatively high project value. Due to the possibility that the final price may be much lower than the fair price, the quality of the work may be reduced or compromised, thus resulting in quality concerns associated with e-Auctions bidding. It is noted that the objective of the online bidding process must be to obtain the best value and not purely the lowest price[3]. The best value outcomes cannot be possible achieved if the focus remains on the price. Therefore to anticipate the quality issue, the Government of Thailand, as the project owner 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[4]. Whenever the lowest bid is too low, the owner may not let award to the lowest bid. Owner may negotiate with this bidder to get reasonable price to prevent low quality of work.

(3) Registration practice

Thailand requires no special advance registration and uses one registration per project instead. Each qualified bidder is given a user ID and password to enter the online bidding processes. This system is useful in avoiding outsiders to hack into the system and disturb the bidding processes. The one time ID will be changed every time the bidder join bid processes; thus, confidentiality of this ID is higher as it is only known by the person authorized by the company. This practice of registration is one of several alternatives.

One time registration may be selected if the condition of the contractors and suppliers may not change for a relatively long period. This condition avoids misclassification of contractors or suppliers due to outdated information. However, this alternative may prevent the black-listed bidders to come and join with bidding process since the database still contains the records. Periodic registration may also be selected. However, this alternative may be subjected to black-listed bidders to change their information and register again as a credible company. Periodic registration is useful when the companies' conditions are dynamic and need to be updated frequently. Both these alternatives give a long period for a user to use a particular user ID and password which is confidential. If the user ID and password are known by outsiders, the outsiders may use it for improper purposes. The third alternative, temporary registration, has been applied in Thailand and gives the solution.

(4) Service Provider

Thailand employs private companies as the electronic service providers 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 service providers and propose the result to the head of the procuring entity; this lengthens the bidding duration.

Private Service Provider 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 service provider. Computer system and infrastructure can be provided in remote areas through this service for a relatively low fee. Premium fee to the service provider is fair; however, the cost at last will go to the project owner as bidders may include this fee in their bids.

(5) Invitation to bid

In e-Auctions practice, invitation to bid may be published on the website, in newspapers, on the public announcement boards, or a combination of them. Thailand publishes the invitation to bid in the newspaper in addition to announce it on the owner's website. Newspapers are still an effective media to publish invitation to bid because of their wide range of uses. However, advertising fees may be an additional cost to the government. Another alternative is by posting annoucements on the public or office's announcement boards. This alternative requires bidders to come to specific places which takes more time. When the availability of internet and public illiteracy of computer and internet are sufficient, an electronic invitation to bid is effective

to attract more bidders even from outside areas. In the construction industry, the internet has been popularly used in second place as a media in research and/or obtaining business information after its use for accessing emails[5]. In this regard, more bidders will be attracted and therefore the competitiveness is expected to increase. The process may yield the best among bidders, which benefits the owner.

(6) Bid documents distribution

The traditional bidding practice, which involves receiving, checking, copying, and distributing paper drawings, specifications, and a bill of quantities (BOQ), is time consuming and costly even for small construction projects[6]. On the contrary, e-procurement practice is advantageous to bidders since it may save cost and time in travelling from their bases to the office of the project owner or bidding committee to obtain or submit bid documents. Cost saving also exists as a result of using electronic format documents instead of paperwork. In order to get more benefit, bid documents shall be also estimated and evaluated in electronic file format instead of printing them into hardcopy which is an extra expense.

Nevertheless, Thailand is still practicing manual obtaining of documents even though small sizes of files and information may be downloaded directly from owner's website. This method opens a possibility of bidders to make direct contact with their prospective opponents. This contact may increase the possibility of collusion since bidders know their prospective opponents and can make arrangement in the way they prefer. This arrangement is usually not favorable for the owner. The Thai government, with some rationales, exercises this practice regardless all the drawbacks of manual obtaining of bid documents.

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.

Thai practice in obtaining bid documents shows that the established practice of e-procurement has to take into account the readiness of contractors in preparing bid proposals. Shifting the way in preparing bid proposals from paper based to electronic based may require initial investment in effort, time and money. However, this investment will be paid off since it generates greater savings in cost and time as illustrated above.

(7) Qualification and technical documents submission

Electronic qualification and technical documents submission has similar advantages to electronic bid distribution, e.g., avoid direct contact among bidders and between bidders and the bidding committee. Similar to bid obtaining, Thai is practicing manual qualification and technical documents submissions i.e., a hardcopy of the technical documents are submitted. The possibility of direct contact also increases when the bidders have to submit their bids directly to the owner's or the bidding committee's office. Time and place obstacles are some other factors bidders should consider. Thus, preparation of paperwork for bid submission requires extra effort and expenses.

Similarly to the Contractors' state of readiness in e-procurement, the bidding committee is still evaluating the submitted qualification and technical documents in paper based. The bidding committee prefers to receive a hardcopy of the required documents to reduce redundant work. The qualification stage is essential in securing the quality of qualified bidder since project owner only need to obtain the price from the e-Auction process. The bidding committee is advised to put great effort into identifying and pre-qualifying potential bidders, constructing comprehensive and complete invitation to bid and reviewing pre-bid submission[3]. Moreover, project owners are advised to establish prequalification criteria which might include financial stability, in-house expertise, historical performance, etc. The legal aspect of digital formatted documents is also critical in e-procurement. In the case of the absence of ICT laws, the digital documents must be supported by a hardcopy since the existing laws do not cover the use of digital format as legal evidence.

Evaluating the submitted qualification and technical documents in electronic file format is possible to be performed. Standardized electronic bid documents are required and subsequently distributed to the interested bidders. Whenever the standardized electronic qualification and technical documents are returned to the bidding committee, the electronic evaluation system will proceed with the evaluation

and result in the qualified bidders. This will bring greater efficiency and less error in the qualification stage. Many researchers have developed and proposed electronic selection methods for contractors and subcontractors. Recently, the sub-contractor selection process through web-based evaluation system called WEBSES was proposed[3]. This work indicates that all stages in e-procurement can be fully performed electronically and therefore an efficient, transparent, non-discrimination, and accountable procurement system can be accomplished.

(8) E-Auctions Process

Online technologies offer temporal and geographical conveniences, reduced cost of contact, instant feedback, and privacy which conventional procurement cannot offer. In the general practice of online bidding, bidders are able to join the bidding process online from anywhere at their convenience at a specified time. Different state of their accessing place i.e., internet connection speed due to the traffic, computer specifications, the electricity supply, etc may obstruct the communication to the bidding system. To overcome this issue and whenever the availability of internet connection is not sufficient, the bidding committee shall provide a bidding office where the bidders can sit in one office separated from each other and conduct their bids at the same time.

In contrast to general practice, Thailand sets its e-Auctions at bidding offices. This requires bidders to come to bidding office at a specific time. Thus, time and place may become obstacles of bidders joining e-auctions. Thailand government has good reasons for carrying out this practice. Even though Thailand has sufficient internet infrastructure (except in very remote areas), project owner prefers to hold the e-Auctions process at the bidding office which has been prepared with computers and a bidding system by the Service Provider. This practice ensures that all bidders are fairly connected to the e-Auctions system. As the main reason, this practice enables the bidding committee to monitor the e-Auctions process as an attempt to minimize the occurrence of bid collusion. As stated before, Thai government runs the bid documents distribution as well as qualification and technical documents submission manually which opens the possibility of bidders to make direct contact with their prospective opponents. Advance arrangements prior the bidding process can be made among the bidders which are not in favor of the owner. Therefore, the environment of bidding office shall be set to maintain fairness and confidentiality of bidders and their bids.

The characteristics of reverse auction and sealed bid auction processes (as shown in **Fig.1**) diminish the occurrence of bid collusion. These two methods result bids which may be much lower than the fair price, thus, more government budget can be conserved. Herein, the quality of work has been highlighted even though in Thailand the prospective winner is always eligible since only bidders qualified in the technical document evaluation are eligible to proceed to submit their bid price by e-bidding. Therefore monitoring is required at a higher level in order to maintain the quality of work that is not lower than what is stated in the design.

Table 3 Current practice of e-Auctions as Thailand government e-procurement system and recommendations (1)

	Stage	Current Practice	Advantage(+)/ Disadvantage(-)	Best Practice	Modification: Advantage(+) & Notes(*)
G	1. Bidding system	e-Auctions	+ save government budget - may be risk (quality issue)	e-Auctions	N/A
G	2. Service Provider	outsourcing	+ save resources to prepare e-bidding - need time to negotiate	outsourcing	N/A
G	3. Invitation to bid	Website and newspaper	+ accessed widely and easily + attract more bidders - do redundant works	Website and paper	N/A
B	4. Bidding Registration	Project based	+ high confidentiality + free registration fee	One time registration	+ well recorded historical performance + easy to be updated + can be linked to other entities (integrated)

G : Government side ***B : Bidders (contractor) side***

Table 3 Current practice of e-Auctions as Thailand government e-procurement system and recommendations (2)

	Stage	Current Practice	Advantage(+)/ Disadvantage(-)	Best Practice	Modification: Advantage(+) & Notes(*)
B	5. Obtaining bid documents	Manual	- need time and cost	Electronic file and standardized format	+ reduce cost for paperwork + eliminate time and place obstacles + avoid direct contact (prevent bid collusion) * require certain level of IT infrastructure
B	6. Submission of qualification and technical documents	Manual	- need time and cost	Electronic file and standardized format	+ reduce cost for paperwork + eliminate time and place obstacles + avoid direct contact + enable the automation in evaluation * require certain level of IT infrastructure
G	7. Technical evaluation	Manual	- need high responsibility	electronically	+ reduce cost for paperwork + time saving + reduce error * investment in system
G	8. Announcement of qualified bidders	Electronic	+ accessed widely and easily	Electronic	N/A
G	9. e-Bidding process	At bidding office	+ easy to control the bidders to minimize bid collusion - travelling cost and place obstacle	From any internet connection (only qualified bidder)	+ no need to prepare specific place and facilities + avoid direct contact + obtain eligible winner
B	10. Submission of bid price on e-Auctions	Electronic and paper	+ can obtain lower price - do redundant works	Electronic file format	+ reduce cost for paperwork + eliminate time and place obstacles + avoid direct contact * rely on digital format document, require supporting laws for legal aspect of digital document
G	11. Winner selection	Manual	+ can accommodate if there is problem - complain may arise if there is non-transparency	Manual	N/A
G	12. Winner announcement	Website and newspaper	+ accessed widely and easily	Website and newspaper	N/A

G : Government side ***B : Bidders (contractor) side***

Referring to **Table 1**, the e-Auctions processes are transparent and well documented. The information regarding the current state of bidding is displayed in each bidder's computer screen. This information enables bidders to observe the current bidding state as a form of transparency. The documentation of the e-Auctions process is useful for the process accountability. **Table 3** presents a summary of the

current e-Auctions practice in Thailand and recommendations for better practices.

The aforementioned facts (as shown in **Table 3**) of Thai government e-procurement practice reveals that partial involvement of electronic format in e-Auctions brings some extent of achievements which benefit both government and bidders. Manual bid documents obtaining as well as qualification and technical documents submission, and holding the e-Actions process at bidding office are distinct from the common practice of e-procurement. A comprehensive involvement of electronic format in e-Auctions will lead to greater efficiency and cost savings in Thai government e-procurement. By comparison, the Japanese government which has comprehensively implemented electronic format in its competitive bidding system, had expected 26 billion yen annually to be achieved as cost reductions in public works projects administrated by Ministry of Land, Infrastructure, and Transport for reducing bidders transfer and documentation preparation fees[8].

7. CONCLUSIONS

The government of Thailand has implemented e-Auction as the national e-procurement practice, unlike several observed countries such as Japan and Southeast Asia countries. The Thai government aims to promote transparency, fair dealing, efficiency, and value for money with the e-Auctions. The e-Auctions enable the conservation of the government budget as the result of lower bids due to greater and open price competition. A quality issue which is normally affected by the lower bids, has been secured by a tight prequalification process.

Thailand government has distinctively applied the e-procurement as their practice compared to the general e-procurement practice. These distinctive applications will be a useful learning tool for other countries that attempt to establish or even improve their e-procurement systems. Thai government prefers a private service provider to run the e-Auctions process rather than an in-house provider to enhance competitiveness and professionalism among service providers. Unlike the general practice of e-procurement, the Thai government prefers to run bid document obtaining and qualification and technical documents submission manually i.e., in hardcopy form. Thailand contractors and project owners are still preparing bid proposal and reviewing the submitted qualification and technical documents in paper based, respectively. This hinders the time and cost saving which is consequently derived from the use of electronic file format. Moreover, Thailand sets its e-Auctions at bidding office as strategy to minimize the occurrence of bid collusion regardless of the cost time and money to the bidders. Consequently, less efficiency and cost savings will be gained as the result of these practices. The Thai government conserves more government budget as the result of e-Auctions. The e-Auctions process drives down the price which results in a price that may be much lower than fair price. Greater efficiency and cost savings will be derived if the Thai government comprehensively implements electronic format in their e-Auctions system.

By implementing e-Auctions as the government procurement system, Thailand has achieved their objectives i.e., transparency, fair dealing, efficiency, and value for money to some extent. E-Auctions enable higher transparency and fair dealing compared to conventional procurement methods and the use of internet has enhanced the efficiency of the procurement process. The goal, "value for money", can be realized by lower price without compromising the quality of work. However, the Thai government cannot reap high efficiency and cost savings as the result of incomprehensive implementation of electronic format in its e-Auctions. But how much can the Thailand government save at this stage of e-procurement implementation with the e-Auction? Futher investigation is being carried out as our future work in responding to this question.

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