

CHAPTER II

LITERATURE REVIEW

2.1 General

The objective of this chapter is to give a better understanding about online bidding, including its definition, practice methods, differences with traditional bidding, as well as advantages and disadvantages discovered by previous research. However, as online tendering is quite new in construction industry domain, the review includes the case studies.

2.2 General Bidding Processes

Bidding is the early part of managing construction project. This stage is of importance because this part determines which contractor will take care of the project. As the contract awarded to a bonafide and responsible contractor, the project will run more smoothly rather than that to an unqualified contractor. FIDIC (1999) illustrates bidding period as a short period in the beginning of principal events during construction contracts, as shown in the figure below.

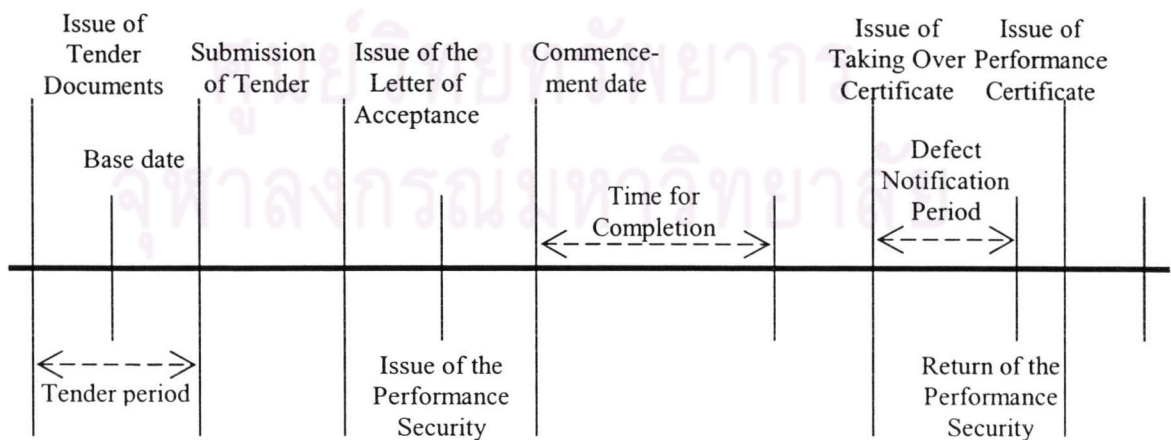


Figure 2.1 Typical sequence of principal events during contracts for construction (FIDIC, 1999)

Typically, these steps can be found in conventional bidding method.

1. Invitation to Bid

In this stage, the owner invites interested contractors or suppliers to give offer of products or services needed by the owner. This invitation can be found in terms of announcement both in paper or electronic media.

2. Obtaining Bid Documents

Interested contractors or suppliers are required to obtain bid documents from the specified issuing office, usually owner's or consultant's office. Bid Documents include Invitation to Bid, General Conditions, Special Conditions (if any), Drawings and Specifications, Blank form of Bill of Quantities, and other sample forms required by the owner (if any). Normally, the potential bidders need to pay some amount of money in obtaining such documents.

3. Pre-bid Meeting and Site Visit

Pre-bid meeting is held to address unclear issues concerning to the projects and bid documents. In this meeting, all these problems are clarified so that bidders have same perspective as the owner requires. Site visit may be held in order to find external factors which can affect the estimation of bidders about the way and method they will use.

4. Bid Submission

A bidder has to submit all of required documents on time to be considered joining the bidding processes. In conventional method, normally, technical documents are separated from price quotation. In the other method, technical documents are submitted prior to the submission of price quotation. A bidder must pass technical qualification before being able to quote his price. This process is commonly called as Pre-qualification stage. Other factors may also be considered in this stage, such as company profile, financial capability of the company, previous experiences in the similar projects, and projects in hand. These factors are placed in the consideration rather than only lowest price in awarding a contract.

5. Bid Evaluation

In this stage, the owner or owner's agent evaluates the submitted documents of all bidders and determines one bidder as the winner for this project. There are some

research on evaluation methods for winner selection in construction contract. However, usually, weighted scale to each factor considered in the evaluation. The highest score is the winner.

6. Winner Awarding and Contract Signing

Once the winner has been found, the owner or its agent announces the winner and gives a Notice of Award to the winner. Letter of Acceptance then is issued and contract is signed.

2.3 Online Bidding

2.3.1 Introduction

Online bidding is known by several names, including electronic bidding, electronic tendering, or simply e-Auctions (Construction Industry Council, 2004). The terms online bidding and e-Auctions are interchangeably used in the general, even though their meaning are literally different. Online bidding is a part of e-procurement, which is simply aspect of the procurement function support by various forms of electronic communication (Knudsen, 2002 quoted in Tonkin, 2003). The e-procurement has some forms in its application including:

- Electronic data interchange – inter-organizational information system using structured data exchange protocols often through value added networks,
- e-Mechanism for Request Order (e-MRO) – mechanism for ordering indirect items from an online catalogue,
- Enterprise resource planning – automation of procurement related workflows including auto faxing, auto-emailing or other forms of messaging directly with suppliers,
- Web-based enterprise resource planning – automated procurement workflows but web based,
- e-sourcing – way of identifying new sources of supply using Internet technologies,

- e-tendering – the process of inviting offers from suppliers and receiving their responses electronically,
- e-reverse auctioning – using Internet technologies bidders usually bid down the price of their offers against those of other bidders until no further down-ward bids are received,
- e-auction for disposals – using internet technologies for gathering and distributing procurement related information, and
- e-collaboration – collaborative procurement related planning and design using facilitating technologies

2.3.2 Online bidding processes

The online bidding processes are not extremely different with paper-based bidding. It enhances the usage of Internet technology instead of using paperwork. Even though the practices of online bidding are varies depending upon the products and services procured, Construction Industry Council (2004) described that the processes generally follows these stages.

1. Bidders are pre-qualified using the criteria expressed at the outset by the contracting authority such as government agency.
2. Pre-qualified bidders will be invited by the owners to submit a technical proposal containing everything (but not the price) and to participate in the auction on specific time.
3. Owner will provide software and training as necessary,
4. Owner will review the technical proposal and give weighting factor for each qualification. The weighting should be appropriate so that result of the review will avoid deciding winner only by price.
5. Online bidding is usually conducted by an IT service provider which provides all of the system and facilities related to bidding processes.
6. The bidding exercise will have a specified opening and closing time. Bids which are coming beyond closing time will not be recognized. However, if a new lower bid is received just before the scheduled closing time, the allocated bidding time may be extended.

7. The bidders' identities will be kept confidential during the event. Nevertheless, number of bidders are usually appeared on the screen. This information may be in a form of list of bidders with special codes to maintain confidentiality.
8. The owners may sometimes display an opening bid price to guide the bidders. From this point, all bids will progress downwards during the auction.
9. Normally, each bidder can submit more than one price, therefore new bid price will replace the previous one.
10. After closing time, each bidder will receive feedback on his ranking in relation to the other bidders,
11. The owner will have an opportunity to review the bids to ensure that quality, service, and other value adding considerations are met.
12. Once the review process has been carried out, the contract will be awarded to the successful bidder against the criteria that were established at the outset.

2.3.3 Advantages and disadvantages

Construction Industry Council (2004) presented that there has been a large amount of publicity generated in the press about the disadvantages of online bidding. With a few notable industry exceptions, the level of usage is still relatively low and therefore it is difficult to be definitive. Moreover, this research will discover more advantages and disadvantages of online bidding by conducting interviews to bidding parties in four Southeast Asian countries.

In its briefing note, Construction Industry Council (2004) described the advantage of online bidding as a method to standardize the procurement processes. By well managed computer system, information of preferred bidders can be obtained just in a single database. Online bidding makes possible for bidders to bid from anywhere and omits time and place obstacle of joining bidding. Consequently, online bidding is set to be easier for owner to monitor the bidders and to control bidders' submission. Through a computerized system, comparison of bids can be performed easier while confidence validity can be achieved. Online bidding enhances better efficiency in the processes, time reduction, as well as reduction of paperwork, postage, and

photocopying. Documents audit is easier in online bidding since all documents are kept in secure and well-managed directory.

Construction Industry Council (2004) also presented some disadvantages found in online bidding although they can be found in other procurement processes as follow.

1. Online bidding seems not to take into account the current innovative industry practices for procurement in the construction industry. The perception of online bidding is based upon lowest price rather than the best value initiative as set out in Re-thinking Construction. Consequently, the owner has to set the other criteria such as quality and performance against price.
2. The time pressure to submit a bid may lead to errors of judgment. Contract awarded under the online bidding may create disputes, and increase risk of claims more than those in traditional tendering processes.
3. When there is insufficient weighting, there may be a risk of price cutting by bidders, resulting in low quality of some products.
4. Jurisdictional issues have to be clarified.
5. The process can be lack of transparency as the owner has access to look at bid prices during bidding period while bidder is restricted only to know his price.
6. The process may discourage some suppliers to take part because of the perception that the process depends on low bid price.
7. Uninsured risks are greater since bidders may not be given opportunity to negotiate or discuss their contract terms before taking part in the online bidding.
8. There is a risk of ghost bidders' involvement.

2.3.4 Potential scope for improvement

Construction Industry Council (2004) emphasized that in order to gain online bidding successfully there must be an appropriate knowledge of online bidding for both owner and bidders. There are some improving procedures to achieve this aspect.

- Owners and the procurement advisors should put a great effort in identifying and pre-qualifying potential bidders, developing complete and

clear bidding terms and criteria for pre-qualification. The criteria include financial stability, in-house expertise, historical performance, etc.

- Qualified bidders should be trained on the methodology used for online bidding processes. This avoids potential and preferred bidders to be failed in bidding process due to technical problems.
- There should be an agreement in confidentiality between owner, potential bidders, and IT service provider to ensure the absence of claims and disputes after bidding.
- Transparency and openness in the processes should be maintained including weighting criteria and methodologies to be used.
- The owner should review and evaluate all bids at the end of bidding process and give consideration to the best value offered. In case that owner has reviewed all bids before price submission, it is not necessary to do so. He just needs to get price from the bidders and combines with the criteria reviewed before.
- The cost of running online bidding should be taken into account and should not be greater than benefits obtained from overall competition.
- The bidders should be remained that price submission will be conducted by online bidding; therefore no bidders change their mind for joining bidding.

2.4 Tendering Method in Online Bidding System

Despite Construction Industry Council (2004) claimed that the terms online bidding and e-Auctions are conversable, Stone (2000) categorized auctions into 8 types.

- English auction. This is the most common practice in the online auction. In this system, the seller announces a reserves price (i.e., low opening price) and decides a time period to bid. This price is increasing sequentially as the buyer bids higher against its opponents. The goods will be awarded to buyer who bids highest in the specified time period.

- Yankee auction. This practice is conducted when the multiple items are offered and everyone pays the actual bid price.
- First bid wins. As the name implies, the first bid on an item wins.
- Dutch auction. A Dutch auction is used to sell more than one item to multiple parties. Instead of listing each identical item, the seller can list the number of items and buyers can bid for the right to own one or more of the items. When the time is due, the lowest price wins bid for an item. The price is then applied to all identical items. Dutch auctions are the converse of English auctions because the auctioneer calls out an initial high price and then lowers the bid successively until some bidder accepts the current bid.
- Reserve auction. A reserve auction combines a low starting point with a higher reserve price. The low starting point is designed to initiate the auction.
- Sealed-bid auction. There are two types of sealed-bid auction, First-price bid and Second-price bid or Vickrey Auctions. First-price bid, also known as a reverse auction, potential buyers submit sealed bids and the exchange awards the item to the buyer who submits the highest bid. This method is commonly used by government in awarding procurement contracts. Second-price bid is not widely used in practice. This type of auction is thought to loosen up bidders since no one can win with a bid that is higher than second-highest bid.
- Continuous Double Auction (CDA). This method is common mechanism for organized exchanges, such as stock and commodity markets. When a new buy bid is processed, the auction checks whether the offered price would match the lowest existing sell bid. On detection of a match, the auction clears at the price of the existing bid, and generates a new price quote.
- Chronological Match Auction (CMA). CMA is a generalization of CDA that allows for non-immediate clearing. Thus, bids may be withdrawn within the clearing interval.

Among these bidding methods, Seal-bid auctions and online Reverse auctions are the most common used in tendering construction project. However, other methods can be conducted depending upon the bidding conditions and environment.

2.4.1 Sealed-bid method

In Sealed-bid method, similar to paper-based bidding, qualified suppliers submit their prices without known by or knowing the prices of opponents. After the bid period is closed, the owner opens the prices submitted and announces the winner. In other word, confidentiality of bid prices are maintained until the bid period is due. The bidding authority only shows the name of the bidder without showing the bid.

2.4.2 Reverse auction method

As the name implies, Reverse auction runs everything in reverse order. The sellers bid instead of buyers and the prices are bid down instead of up (Jap, 2003). In this method, the owner opens bid prices to the bidders aiming to get lower bid price. The winner seems to be drawn from the lowest bid (i.e., only considering price factor). This method is controversial as against Egan principles (1998). While Egan principles introduce partnering and re-engineering to increase the value of a project, Reverse auction seems to be cost oriented than value oriented.

Gabbard (2003) stated that Reverse auction may be not appropriate for many commodities or services. The products or services should meet these criteria to use Reverse auction for its bidding method.

- There are many qualified suppliers,
- The products offered are commodities or standardized products,
- It is a short term contract,
- Buyer is important to suppliers,
- There is excessive capacity of industry,
- Price is the key selection criterion,
- Buyer is fully committed to award the product based on results of reverse auction.

Gabbard (2003) determined the preparation keys to success Reverse auction as follows.

1. Introduce the uses of electronic tools in procurement organization by training. This avoids culture shock in the organization.
2. Prepare the Request for Purchase (RFP) which states bidding terms and award parameters clearly. This avoids complain and dispute after bidding process.
3. Prepare the specification or statement of work. This aims the precise price since bid price is the key of evaluation.
4. Prepare the suppliers who want to join with such bidding method. Furthermore, suppliers whose bad reputation in buying with unrealistic price should be avoided.
5. Develop realistic pricing expectation by considering current price and forecasted market condition.
6. Determine which Reverse auction format is the most appropriate. Generally, there are three formats of online Reverse auction.
 - a. Full service – the auction service provides electronic facilities and personnel to conduct auction along with all bidding stages.
 - b. Self service – the auction service provides only the electronic tools and a few technical supports. All of preparation must be conducted by owner's procurement staff.
 - c. Hybrid format – the auction service provides electronic facilities as well as personnel only for particular stage depending upon the contract between owner and auction service.

However, Gabbard (2003) concluded that Reverse auction may be failed due to misconceptions and mistakes such as:

1. Failure to analyze the supply market to ensure that the timing is right to conduct a Reverse auction.
2. Failure to understand suppliers' cost structure in analyzing their proposal.
3. Failure to recognize that the supplier relationship may be damaged by this process.

4. Obtaining prices which are too low to allow the suppliers to make a reasonable profit. This may result either winning supplier refuse the job award or winner accept the award with low quality of work.
5. If the lowest bid is too low, owners may not let award to the lowest bid. Owners may negotiate with this supplier to get reasonable price. However, repeatedly conducts this practice may damage the credibility of the owners and the auction processes.

2.5 Legal Challenges in Online Bidding

Ting and Wong (2003) considered that procurement in construction using online bidding should not be seen only as technology enhancement phenomenon. It also changes the conventional workflow and practices. By their research, Ting and Wong (2003) revealed that there are issues in online bidding related to legal aspects including lack of alignment in jurisdictions, legal liability, insecurity, confidentiality and service dependency.

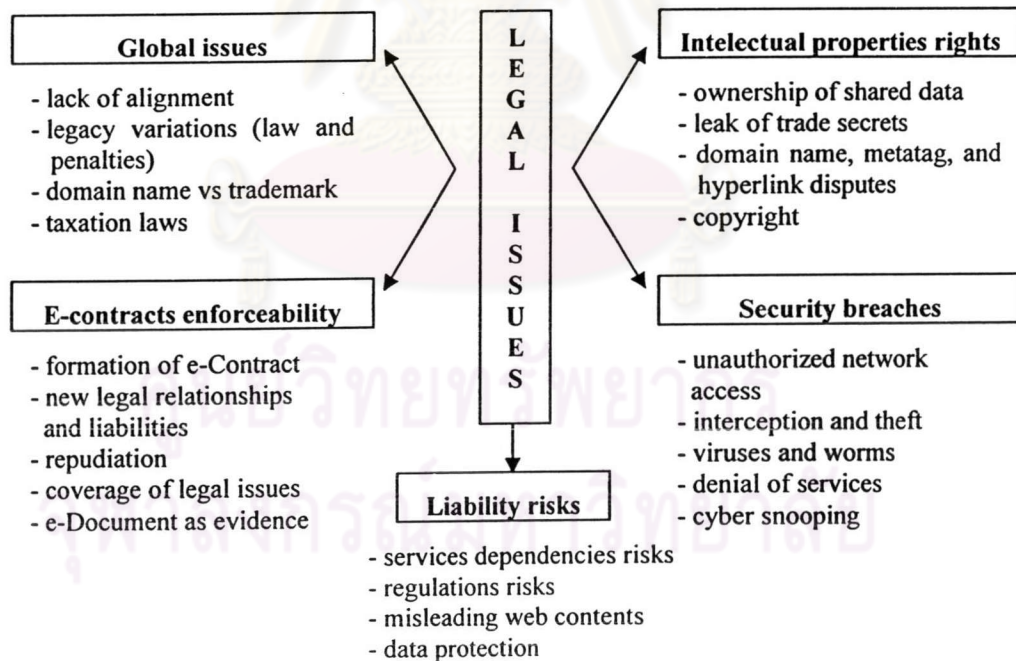


Figure 2.2 Potential legal issues of online bidding in the construction industry (Ting and Wong, 2003)

2.5.1 Lack of alignment in jurisdiction

One objective of performing online bidding is to eliminate the problem joining bidding due to distance and geographical manner. This means online bidding is multi-national or may be more, international. However, the policies and legacy systems are different among those countries. They employed different approach in constructing the policies and regulation. Thus, what is legal in one country may not be accepted in other countries. Inexperienced bidders may face problems in joining bidding overseas.

2.5.2 Confidentiality

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.

2.5.3 Legal liability

Legal liability is the duty of care and responsibilities one owes to another. One may be sued or have to pay some fine if one does not perform that duty of care. In some case, a service provider tries to protect himself by issuing specific clauses in his User Agreement by disclaiming any warranty and limiting his liabilities. Such one-sided clause may be unfair to the subscriber who paid for the service. Moreover, the validity of such clauses varies in different countries.

2.5.4 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.

2.5.5 Service dependency

The reduction of human intervention in online transaction has created fear to bidders in being rejected by the owners occasionally because the bid seems not to be authorized by the person claimed to be. Bidders may face technical problems when

submitting price, unluckily just a few times before closing period. Service provider may not accept claims in this case because, in fact, bidders can submit the price long time before the closing period.

2.6 e-Bidding in Southeast Asia

Review to e-bidding practices in Asia region was also conducted by searching information from internet. General information of Electronic Government Procurement (EGP) obtained from www.mdb-egp.org reveals that few countries in Asia have implemented electronic media in their bidding activities, namely, China, India, Malaysia, Republic of Korea, Singapore, and the Philippines. This website belongs to Multilateral Development Banks (MDB), a collaboration of Asian Development Bank, Inter-American Development Bank, and World Bank, which monitors application of electronic tools in government procurements. Tables below show summaries of EGP in three Southeast Asian countries in terms of general information, system characteristics, and system functions as of June 2005.



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จุฬาลงกรณ์มหาวิทยาลัย

**Table 2.1 General information of EGP in Southeast Asian countries
(MDB, 2005)**

| | Country | | |
|-----------------------------------|--|--|--|
| | <i>Malaysia</i> | <i>Singapore</i> | <i>The Philippines</i> |
| Department Name | Ministry of Finance | Ministry of Finance | Dept of Budget and Management, Procurement Service |
| Department Website Address | www.treasury.gov.my | www.mof.gov.sg | www.procurementservice.org |
| Level of Government | Central-Federal | Central-Federal | Central-Federal |
| e-GP Application Name | ePerolehan | GeBIZ | Government Electronic Procurement Service |
| e-GP Application Website Address | www.eperolehan.com.my | www.gebiz.gov.sg | www.procurement-service.net |
| Regulatory Body | N/A | Ministry of Finance | Government Procurement Policy Board |
| Regulatory Body Website Address | N/A | www.mof.gov.sg | www.procurementservice.org/gppb/home.htm |
| e-GP Legislation | N/A | Electronic Transactions Act (Chapter 88) | RA 9184, Executive Orders 40, 322, 262 |
| Legislation Document | N/A | statutes.agc.gov.sg | www.procurement-service.net/English/AboutEPS/AB_LearnMore.asp |
| National Framework | home.eperolehan.com.my/images/epframework_en.gif | www.gebiz.gov.sg | N/A |
| e-GP Strategy | N/A | N/A | N/A |
| Procurement Plan | N/A | www.gebiz.gov.sg | N/A |
| Usage level within Private Sector | 10 - 20% | N/A | N/A |
| Usage level within Public Sector | 0 - 10% | N/A | N/A |
| Government Mandated | Yes | Yes | Yes |

Note: N/A illustrates that there is no supporting information on the respective item.

**Table 2.2 System characteristics of EGP in Southeast Asian countries
(MDB, 2005)**

| | Country | | |
|---|-----------------|------------------|------------------------|
| | <i>Malaysia</i> | <i>Singapore</i> | <i>The Philippines</i> |
| Training for Buyers: | Yes | N/A | Yes |
| Training for Sellers | Yes | N/A | Yes |
| Volume of Transaction | 0 | 625 | 0 |
| Number of Registered Users- Buyers | 4288 | 139 | 2917 |
| Number of Registered Users- Sellers | 35000 | 8800 | 4829 |
| Ownership System | Private | Government | PPP |
| Ownership Code | Private | Government | PPP |
| Ownership Operation | Private | Government | PPP |
| Security | - | Other | N/A |
| Product Codification | - | National | N/A |
| Seller Additional Software requirements | No | Yes | No |
| Buyer Additional Software requirements | No | No | No |
| Transferred/Adopted in another jurisdiction | No | No | No |
| Jurisdiction 1 | N/A | N/A | N/A |
| Jurisdiction 1 Website | N/A | N/A | N/A |
| Jurisdiction 2 | N/A | N/A | N/A |
| Jurisdiction 2 Website | N/A | N/A | N/A |

Note: N/A illustrates that there is no supporting information on respective item.

Table 2.3 System functions of EGP in Southeast Asian countries (MDB, 2005)

| | Country | | |
|------------------------------|-----------------|------------------|------------------------|
| | <i>Malaysia</i> | <i>Singapore</i> | <i>The Philippines</i> |
| Early Bid Advice | Yes | Yes | No |
| Bid Advertising | Yes | Yes | Yes |
| Bid/Contract Award | Yes | Yes | Yes |
| Bid/Tender Document Download | Yes | Yes | Yes |
| Bid Addendum Notification | N/A | Yes | Yes |
| Bid Clarification | N/A | Yes | No |
| Electronic Bid Submission | N/A | Yes | No |
| Public Bid Opening | N/A | Yes | No |
| Bid Tracking | Yes | Yes | No |
| Bid Search | Yes | Yes | Yes |
| Digital Signature | Yes | Yes | No |
| Participation Fee | Yes | Yes | No |
| User Registration Required | Yes | Yes | Yes |
| Other | N/A | N/A | N/A |

Note: N/A illustrates that there is no supporting information on respective item.

2.7 Conclusions

Online bidding is an alternative to conduct bidding. It converts the way conventional bidding was performed (i.e., by paperwork) into electronic method. Online bidding is aimed to save government budget and also reduce paperwork cost of both owner and bidders. There are several tendering methods used in online bidding, though sealed-bid method and reverse auction method are most commonly used in online bidding.

Some obstacles have been found in implementation of online bidding. There are legal matters such as absence of laws as umbrella of implementation of online bidding, different bidding standards used in several countries, and reliability of using

electronic documents. In technical matters, confidentiality and security of information transferred via internet are emphasized. This information is subject to cyber crime.

Observing the Southeast Asian countries, there are differences in practicing online bidding. As presented in the Multilateral Development Banks (MDB) website, Singapore, Malaysia, and the Philippines are presented to have their own systems. Background of use of particular system, its advantages and obstacles, as well as its effectiveness and applicability compared to each other are still questionable. This research tries to address this question by conducting comparative study to Southeast Asian countries. It is expected that the results of the research can be used as information exchange among this countries. Moreover, a scheme is proposed in order to give a guideline for government to implement and operate online bidding.



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