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Procurement Selection Practices in Post Disaster Project Management: A Case Study in Banda Aceh, Indonesia

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Abstract

On the 26 December 2004, a great 9.2 earthquake jolted Aceh, Indonesia, followed up by an atrocious tsunami minutes later that wipe out some 200,000 lives in Aceh and thousands more across neighbouring countries. Millions of dollars worth of properties have been damaged and completely destroyed. Billions of dollars poured in, involving many Non-governmental organizations (NGOs) world wide to help out rebuilt affected areas. This study was carried out during the post disaster development phase involving several NGOs in the earthquake and tsunami stricken area in Aceh, Indonesia. The study focuses on the project management practice in adopting procurement method and its relation to the project performance during the reconstruction and rehabilitation period. The study involved five international NGOs that were actively participated in the reconstruction and rehabilitation projects in Aceh. Questionnaires were distributed to the employees for gathering information related to the study. Interviews were also carried out with project managers to verify relevant matters. Findings show that all the five international NGOs adopted the traditional procurement method. Factors influencing the choice of the procurement method were identified as timing, responsibility and the quality of work. The study also found that the chosen procurement method took longer time but it still employed by the five international NGOs due to the easiness of monitoring many projects that have to be completed on time.

Keywords

Post disaster development, Reconstruction and rehabilitation, Project management, Procurement method, Aceh, Indonesia

1. Introduction

Procurement methods for construction industry can be defined as the organizational structure adopted by client for the management of the design and construction of a building project (Masterman, 2002) It influences the definition of the tendering and contractual with parties involved such as consultants, contractors, subcontractors, and suppliers. The way in which the client and the various designers, contractors, and suppliers work together as a team is determined by the procurement path or strategy and between the project participants and the client comes in the forms of contract. Procurement has been used in many countries for procuring buildings. The purpose of procuring building construction is consisting of time, cost, and quality.

After Indonesia tsunami in 2004, the local government of Banda Aceh decided to reconstruct the destroyed areas. In this post disaster program the government categorized the stages into rehabilitation and reconstruction stages. The rehabilitation works refer to works that required for buildings with minor damages or those with structurally still sound and reconstruction works are required for those buildings that with major damages or structurally unsound. Many organizations from various countries involved in these stages. Therefore, some factors and parameters were considered in tandem with this regard. This research aimed to find the barriers, obstacles, and positive recommendations from different respondents who are involved in the rehabilitation and reconstruction of Aceh,

Indonesia. The paper provides an overview of procurement system in Aceh and the factors that influenced time overrun in rehabilitation and reconstruction of the buildings after tsunami 2004 in Aceh, Indonesia.

2. Background of Procurement Systems

According to Masterman (2002), a procurement system is the organizational structure adopted by client for the implementation, and at times eventual operation of a project. Meanwhile, building procurement system is a process by which a building is designed and constructed to suit a specific client.

Building procurement means that the client will received physical building and must pay for it. The capital investment includes cost of materials and components put in place plus human, machine and other construction resource used in construction. Functions costs are include maintenance and operating (Birrel, 1991).

According to Birrel (1991), the building clients' needs must be met as the heart of specific choice of procurement approaches for every future building project. This choice must determine objectively and carefully.

Procuring building comprises the brainstorming phase, feasibility studies, design process, contracting process, construction process, and commissioning process. The procedure of procurement has a lot of choices depending on the project and contract used. Each of the different methods that have been used in the industry is due to largely user familiarity, ease of application, recognition and reliability. New procurement system will be continually developed to meet new requirements and demands from clients, contractors, and professions (Ashworth, 1996).

The key of procurement is to identify the priorities in the objectives of the client and to plan a path. Procurement strategy is the most important decision to be made at the beginning of a project and have less effect on the overall outcome of the enterprise (Turner, 1990). The project procedure may be different but still have the same objectives for project completion. In traditional system, client who has a project constructed would invariably commission a designer, normally architect for building project. They must provide drawing and quantity surveyor make measurements and prices. For the past thirty years, there was a limited choice of available contract procurement methods. But since 1960s procedure and method of procurement has recharge and grew up until today.

Building client should considered procurement approach as managerial decision because it will have widespread long terms and short term effect either on the client and his future buildings as well as on both aspect. The major decision should be made by choosing one of the stated above procurement approach emergence.

3. Procurement Selection

Broadly there are two options available to any owner to get the project work done. Firstly is in house (referred to as direct control, direct labours, departmental work, or other terms). Secondly is using outside resource or outsourcing such as contract and contracting out (Carmichael, 2000). According to Ashworth (1996), to select the most appropriate procurement arrangements, one can adopt the following procedures:

- Identify the client's main objectives for the project and compare these with the contractual options, which might be available
- Decide on whether it is more appropriate to use a consultant or a contractor as the contract manager
- Choose between negotiation or a foam of competitive tendering

- Determine how the price will be calculated based on either measurement or cost reimbursement.

The factors such as size, design, cost, time quality risk, accountability, market situation, and financial procedures should be considered when choosing the procurement path. According to Turner (1990), the procurement route is appropriate to client priorities and overall balance of objectives for each project and should arise from those objectives and priorities. In addition, procurement assessment criterions (PAC) are used for procurement route deciding. These criterions defined as: timing, controllable variation, complexity, quality level, price certainly, competition, responsibility and risk avoidance. Regarding the research report of Faster Building for Industry, NEDO (1983), there are seven steps to successful building procurement:

1. Selecting an in-house project executive and outside resource
2. Appointment of a principal adviser
3. Care in deciding the client's requirement
4. Timing the project realistically
5. Selecting the procurement path
6. Choosing the organizations to work for the client
7. Designation a site or building for remodelling

Also, Love *et al.*, (2005) defined some criteria to establish a profile of the client requirement and preferences for the procurement methods such as: speed (during design and construction), certainty, flexibility in accommodating design changes, quality, complexity, risk allocation/avoidance, responsibility, and dispute and arbitration.

4. Procurement System Selection

According to Ashworth (1996), there are six major variables that should be considered in selecting procurement systems. The details of the variables were discussed bellow:

4.1 Consultants versus Constructors

Consultant or constructor has roles to supervise by client. The client choice is both of them to make project completion. In this case, procurement procedure approaches both of them to make problem solving. The client should consider factors such as single point responsibility, impartial advice, integration of design and construction, premier client interest, needs for inspection, payment, warranties, and overall costs of design and construction.

4.2 Competition versus Negotiation

Clients choose single firm or organization for running a project. Procurement earning project are according client that means they only invite firms or organizations, which are suitable for running this project, or open tender for all qualified firms and organization. Business relationship, early start on work, continuation contract, and state of the construction market, contractor specialization, financial arrangement, and geographical area are some factors should be considered in this regard.

4.3 Measurements versus Reimbursement

There are two ways for calculating the cost of construction: according of paying for the work against some predefined criteria or rules of measurements, and the alternative to reimburse the contractor the actual costs involved in construction and to use a system of reimbursement. Measurement contracts distribute both more risk and more incentive to the contractor to complete the works efficiently. Reimbursement contracts result in the contractor receiving only what is spent plus an agreed amount to cover profit. Some of the main points to be considered in making these choices are: cost forecast, contract sum, efficiency, price risk, cost control, and administration.

4.4 Traditional versus Alternatives

Currently, knowledge about procurement is extent and has lot of information. Actually it is beneficial for the realm of construction project because client can choose firms to run project by alternatives of procurement method. Traditional method has been review and improved because there has some variable to consider. These variable are: appropriate of the service provided, length of time from inception through to completion, project over running their contract periods, final costs being higher than expected, problem of quality control, mismatch between designer and construction, line of legal responsibility, and limitation on procurement advise are available.

4.5 Contract

According to Turner (1990), and Ashworth (1996), contract fall into two groups classified according to the form of the consideration from the owner to undertake. Consideration is something value given in return for something else. The consideration refers to the payment from the owner to contractor. **Fixed price** where the consideration either is a stipulated sum of money covering all the work or is a set of monetary rates covering the components of the work. **Prime cost contracts** where the contractor is paid the cost of the work together with an additional amount for the use of the contractor's services.

4.6 Tendering

Alexanderson and Hulten (2006) stated that competitive tenders have become an important tool for procuring authorities to increase competition between suppliers of products and services. Ideally, the most efficient firm would win a tender with a bid based upon realistic assumptions on costs and revenues. Various types of tendering are recommended with researchers such as open tendering, selective tendering, single tendering, negotiate tendering, extension contracts, and serial tendering. For more information, see Hoxley, 2007; Gelderman *et al.*, 2006.

5. Research Objective

The purpose of this research is to investigate the way in which NGOs in Aceh used to decide on a procurement method in the rehabilitation and reconstruction stage. This research gives overview about procurement used in Aceh at rehabilitation and reconstruction stage by some NGOs which their projects have finished or still in progress.

6. Methodology

The survey was conducted through structured questionnaires and interviews. The questionnaires were distributed to selected NGOs which focused on their top management level. The interviews were set to acquire information from the management level who knows about the procurement system adopted in their organizations. The project managers are the target respondents that have abilities to explain the procurement in Aceh during the rehabilitation and reconstruction stage. Five project managers from 5 NGOs were selected for interviews. The interviews were carried out in their offices and the whole of discussions were recorded. The Survey was conducted with 25 sets of questionnaires were sent out to a group of project team at random by postal mail and 19 sets (a respond rate of 76%) of surveys were returned during this period. A five-point Likert scale (ranging from 1 - do not agree, or not important to 5 - fully agree, or very important) was used in the questionnaire. Data collected were processed and analysed according to the appropriate analysis methods. The method of analysis in this research is mainly descriptive and the type of investigation is correlation study.

7. Data Analysis and Discussion

7.1 Overview on Case Study

The NGOs are private organizations of a charity, research institutions, educational nature with etc. that are concerned with a wide range of social, economic and environment issues. They may act on an international, national or local scale. Some raise fund from the public and from the governments to help funding the development projects in third world or to assist in disaster relief project. Others attempt to educate the public and campaign on major global issues or to lobby governments and international agencies to change public policies. Backgrounds of the NGOs selected for this research are as follows:

NGO A is dedicated to alleviating the poverty and suffering of the world's poorest. Their motto is "Whoever saved a life, it would be as if he saved the life of all mankind" (Qur'an 5:32). It is an independent NGO founded in the UK in 1984 by Dr Hany El Bana. This NGO has been working in Indonesia since 2000 and registered a field office in March 2003 to implemented relief and development projects. The existing based of NGO A is in Jakarta which allowed them to respond quickly to the tsunami.

Currently, NGO A is working in partnership with other aid agencies to resettle people in sustainable housing in Aceh. In the housing settlement, people have been provided with lively hood support and access to healthcare, education and clean water. Some of the projects that were undertaken by NGO A are built 8 schools and furnished, supplied a clean water, installed 214 latrines in 20 locations in Banda Aceh, built 354 houses and public works resource centre, built 1 hospital, 7 community health care centres, provided cash for work and many more.

NGO B: Since it was founded in 1950, the NGO B has grown into an essential part of Germany's defences against all sorts of danger. In 1953, NGO B became a federal agency and founded in the era of the cold war and division of Germany to maintain "public safety", among other tasks, has continued to develop since then in many aspects. Something that has remained constant since the beginning, however, is the actual guiding principle of the federal agency: the humanitarian idea which the operations by the volunteers are based on. Some of their projects in Aceh are the rehabilitation of the city council, rehabilitation of wells, upgrading of the spring in Glee Taron, reconstruction waterworks in Timur, housing at Meunasah Bak U, pipe line and roads in Leupung, rehabilitation/reconstruction of Hospital Zainal Abidin.

NGO C was founded in 1937 as development organization which working at grass roots level to improve children's lives in 46 countries. Some the project of NGO C in Aceh are shelter, schools, roads, water and sanitation, community hall, library, and training centre.

NGO D mission is to improve the lives of vulnerable people by mobilizing the power of humanity in Canada and around the world. The NGO D helps people affected by emergencies and disasters situations ranging from a house fire to a flood that disrupts an entire region of the country. Following the disaster, the NGO D works with the government and other humanitarian organizations to provide basic needs; such as food, clothing, shelter, first aid, emotional support and family reunification to the affected people. Some of the projects of NGO D in Aceh are water and sanitation in Lamno, housing in Kajhu, shelter in Leupung and access roads, shelter and housing in the devastated area.

NGO E has been actively involved in caring for refugees who fled their countries of origin to neutral Switzerland since 1986. During the various wars in Europe in the nineteenth and twentieth centuries, and above all the second war, the NGO E set up shelters for thousands of refugees, with particular emphasis on care for children. With the fall of the Iron Curtain in the heart of Europe and especially the growing influx of migrants from the south, the NGO E has had to find different ways of helping with refugees crises. Types of the NGO E project in Aceh are Orphan schools in Lamprit, public office building and roads in Lampineung, water sanitation and housing in Lampe Awee.

7.2 Respondent's Background

Table 1: Respondent's Background

	No. of Respondent	Percentages	Cumulative
Position in the organization			
Engineer	18	95	
Architect	1	5	100
Total	19	100	
Experiences of respondents in construction industry			
> 5 years	5	26	
5-10 years	5	26	52
10-15 years	5	26	78
< 15 years	4	22	100
Total	19	100	

7.3 The Influence Factors to Procurement Selection

Through the research finding, the author can identify factors influencing the type procurement selection. The respondents were asked in this matter according to the standard form of Faster Building for Industry (FBFI) NEDO (1983). Table 2 indicates the amount of importance factors in order to select procurement by the respondents' views. According to the Table 2, the most important factors in Aceh rehabilitation and reconstruction at the procurement stage are timing, responsibility, and quality.

Table 2: Percentage of Influence Factors to Procurement Selection

The influence factor	1	2	3	4	5
Timing	0.00	0.00	0.00	26.32	73.68
Controllable variation	0.00	0.00	10.53	52.63	36.84
Complexity	0.00	0.00	21.05	36.84	42.11
Quality	0.00	0.00	10.53	26.32	63.16
Price certainty	5.26	0.00	15.79	31.58	47.37
Competition	5.26	5.26	21.05	47.37	21.05
Responsibility	5.26	0.00	5.26	15.79	73.68
Risk avoidance	5.26	5.26	5.26	36.84	47.37

7.4 The Important of Procurement Process

In the study, majorities of respondents (84%) stated that the statement of NGOs must determine procurement methods before project is carrying out and the statement of NGOs must decide on the procurement decisions based on budget to prevent future problem of project abandon were the most importance process to be considered in procurement system.

7.5 The Consideration of Procurement Implementation

On the consideration of procurement implementation, it can be divided into four categories which are participation, approval, supervision and contractor performances. The *highest consideration* for participation is local community participation with 47% over the Reconstruction and Rehabilitation Body (BRR) and the local authority. For approval, the highest considerations were the community (21%) and the local authority (16%) for approval's the project over the BRR. In term of the supervision, the highest percentages are the Local Authority and the Community which is 42%. In addition, the contractors' performance is the highest consideration for the procurement implementation. The percentage is 74% that means the contractor has an important role in successfully implement the projects until completion.

7.6 Factors Influencing Time Overrun in the Rehabilitation and Reconstruction Project

It is found that, factors such parties involved, the procurement selection and the procurement implementation had affected on the schedule overrun of the rehabilitation and reconstruction stage in Aceh.

7.6.1 Parties involved

Based on the respondents' views, the contractors with 41% have the highest contribution to time overrun. Also, the community participation and NGO itself are the others parties that have essential effects on time overrun in Aceh rehabilitation and reconstruction stages as shown in the table .

Table 3: The Parties that Contribute to Schedule Overrun

	Parties	Frequency	Percentage
1	The NGOs	6	15.38
2	Contractors	16	41.03
3	Consultants	4	10.26
4	Local authority	4	10.26
5	BRR	2	5.13
6	Community participation	7	17.95
7	Others	0	0.00
	Total	39	100.00

7.6.2 Procurement selection factors

According to the survey, the duration of design and drawings by 28% was the most effective factor in time overrun during the procurement selection. Other factors such as selection of contractors and the decision on the project (20%) and approval from local authorities (14%), were also among factors that contributed to the time overrun in Aceh rehabilitation and reconstruction stages as shown in Table 4.

Table 4: The Factors that Contribute to Schedule Overrun in Procurement Selection

	Factors	Frequency	Percentage
1	Decision on the project	7	20
2	Approval from local authority	5	14
3	Approval from BRR	4	11
4	Choose consultant	2	6
5	Duration for design and drawings	10	28
6	Selection of contractors	7	20
7	Duration sign contract	1	3
8	Others	0	0
	Total	36	100

7.6.3 Procurement implementation factors

Table 5, shows the factors that contribute to time overrun during the procurement implementation in the rehabilitation and reconstruction stages in Aceh. The possibility of changes in initial design had the highest effect on time overrun with 16% of the respondents. Other factors such as unskilled workers, materials, location, and weather conditions were the other important factors in this regard. In addition, the respondents asked about the method of procurement in their companies. The result shows that all the NGOs used the traditional methods (Murray, 2008) of procurement in the companies.

Table 5: The Factors that Contribute to Time Overrun During Implementation

	Factors	Frequency	Percentage
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1	The possibility of changes in initial design	9	16
2	Completeness and timeless of project information	9	16
3	Build ability of design	5	9
4	Delay of payment from NGOs	0	0
5	Lack communication between parties	0	0
6	Number of sub contractor	2	4
7	Complexity	4	7
8	Location	6	10
9	Weather	6	10
10	Material	7	12
11	Regulation	1	2
12	The worker is community and unskilled	8	14
13	Others	1	2
	Total	58	100.00

8. Findings and Recommendations

According to the survey, among the most important factors in Aceh rehabilitation and reconstruction in procurement stage are timing, responsibility, and quality. The local authority, BRR, local community and contractors were involved in the implementation of the procurement method in term of participation, approval, supervision and implementation. These factors are necessary to guaranty the hand over of the projects to the client in accordance to the contract. In addition, it was stated that the procurement selection is a very important factor to deliver the project to the user. Local authorities, contractor, and community as main parties that contribute to the time overrun should be considered before the start of the procurement stage. Type of project and approval from local authorities are other factors that contributed to time overrun in procurement selection. In the procurement implementation, factors, which can cause possibility in changing the initial design, are location, material, weather, and the worker from the community. There are many methods of procurements that are available to be chosen from. However, the traditional method was preferred by the NGOs to procure the projects due to the ease and familiarity of implementation by the NGOs and local contractors even if it needs a long completion of time. The choice of procurement and the choice of contractors are in accordance to the previous experience and reports of the clients can help the companies to minimize the obstacles in rehabilitation and reconstruction stage in Aceh. Finally, the research also found the way in which the involvement factors affecting the time overrun in the rehabilitation and reconstruction projects, which were undertaken by five overseas NGOs. In addition to the above suggestions, followings are some recommendations that had been made by researchers for the NGOs to be considered for future improvement:

1. Consider other procurement methods as alternative to the traditional method that can influence management of NGOs in implementing reconstruction and rehabilitation projects;
2. Introduce and train on other procurement methods to the local contractors due to the fact that they only know traditional method;
3. Improve the pre-qualifying process that have taken so much times in the selection of capable contractors to carry out the project;
4. Consider the risk allocation to prevent the cost variation which may led to projects to be abandon; and
5. Improve the payment procedure where advance payment system was implemented for the entire past projects that have faced a lot of problems. This method provides a possibility for unreliable contractors to abscond with the money before completing the contract.

9. Research Limitations

This study was conducted on five NGOs involved in Aceh rehabilitation and reconstruction of the buildings after tsunami, 2004. Since the results are based on data collected from these five NGOs in Aceh, the possibilities for generalisations of the findings are limited. Therefore, the future comparative study can be conducted in other countries that have been affected by the tsunami such as Thailand, Sri Lanka and Southern India.

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