

CURRENT STATE OF CONSTRUCTION INDUSTRY PERFORMANCE IN INDONESIA, - CAN IT BE IMPROVED?

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As a developing country, Indonesia needs strong support from the construction industry to provide infrastructure. However, the growth in Indonesia's construction sector is running slower than at its peak growth in 2006 at 9%, and forecast growth in 2012 is 6.86% (BMI Report, 2009). Poor performance of the construction project is considered one of the main causes of slow development in the Indonesian construction industry.

Observations of real conditions of construction projects in Indonesia suggest that this poor performance is largely the result of many risks that were not anticipated in the implementation of projects. On the other hand, the price-based selection of awarded contractor in the procurement process results in less attention to contractor performance and contractor supply chain. Some other factors also contributed to poor performance, such as over budget, time delays, quality of construction product lower than the minimum requirement, frequent substitution of key personnel (often occurring several times) during project implementation, and difficulties related to accountability.

The objective of this paper is to identify the major root causes in poor performance of the construction industry in Indonesia, through field observation of in-progress projects. This analysis is a process approach (Kashiwagi; 2005a, Moon; 2007), which assumes that the problems related to process, with the hypothesis that the current construction process is inefficient, creates an adversarial environment and lacks performance information. The analysis of the problem pattern within and the causes of the existing conditions of the construction process are expected to provide valuable lessons which can be used as a basis for the development of a new framework for overall performance enhancement.

Key word: construction performance, process approach, procurement process, risk assessment, supply chain.

1. INTRODUCTION

Indonesia requires integrated support from good infrastructure to accelerate its development process. In fact, the development of the construction industry in Indonesia is running slowly: data indicates that the development of the construction sector will decline from 7.76% in 2008 to 5.79% in 2009¹.

Nowadays, many products of construction works in Indonesia perform poorly. One example is the connecting roads between provinces and cities (national road class). The national roads in South Sumatera Island and North Java Island are in bad condition at the present time though they have been repaired many times. Vehicles often

have difficulties travelling the roads, since there are many holes in the surface. These conditions have resulted in obstructions of economic transportation lines between cities and islands.

The poor performance of the Indonesian construction industry is due to inappropriate construction processes that lead to poor quality construction products (project results). Field studies were made here to identify the problems leading to poor performance under the existing conditions of the construction industry in Indonesia.

The purpose of the study is to examine the causes of the problem of poor performance in Indonesian construction projects through field observations of in-progress projects.

2. PROCESS APPROACH TO EVALUATE THE PERFORMANCE OF CONSTRUCTION INDUSTRY

The objective of performance measurement is to provide feedback about information on activities to meet owner (or user) expectations and strategic objectives². There are two ways to analyze the performance of construction works: by means of a project-result oriented approach and a process approach^{2,3}.

Nowadays, performance indicators are often focused on the results of a project and are rarely focused on processes. For this reason, it is difficult for project participants to know how well their project is running and to control the production process with only these terminal indicators³.

For example, Table 1 shows the percentage of the projects that did not finish on time and on budget, according to data records of project results of construction work services during three years of financial budget at a public university in Indonesia.

Table 1. Project performance of the university Logistics Center Unit, 2006-2009

No	Year	Project Number	Not on time	Not on budget
1	2006	94	20%	12%
2	2007	100	22%	17%
3	2008	101	17%	11%

Observation results indicated that the data does not reflect actual conditions. Some delayed projects that were not included in the data because of administrative complexity (e.g. the project organizer did not have time to prepare the documents needed for delay administration procedure). The data also does not provide clear information on the causes of each delay; thus, it is hard to use the data as an input for the next projects.

According to observations during construction work, there are several key variables that cause project delays, including design changes or design errors, delay of material supply, poor coordination and slow coordination of decision making, and problems related to low technical performance by contractor, i.e. low labor skill and project scheduling error.

The process approach assumes that the problems are inherent in the process. Performance measurement with this approach provides the necessary information for process control and enables the establishment of feasible goals. According to Moon³, who adopted TFV

(Transformation, Flow, and Value) theory from Koskela, the use of performance measures is strongly correlated to the necessity of improving process transparency in production management.

In addition, Bettis⁴ indicated that performance in industry is dependent on three components; industry characteristics, strategic decisions and risk (Fig. 1). Construction industry performance is also dependent on these components.

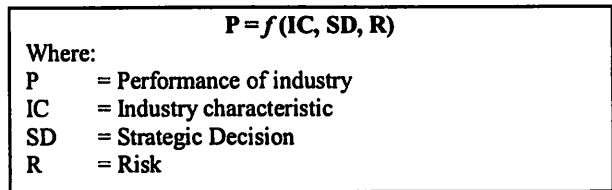


Fig. 1. The component that influence performance (Source : Richie, 2007)

On the other hand, characteristics of construction work along its life cycle are complex in the following sense (see Fig. 2): The life cycle of a construction project consists of various types and phases that are unique and involve various parties. This takes construction work into an environment that is constantly changing. Thus, 'change' is a defining characteristic and is almost inevitable. These characteristics put construction work at high risk under uncertain conditions.

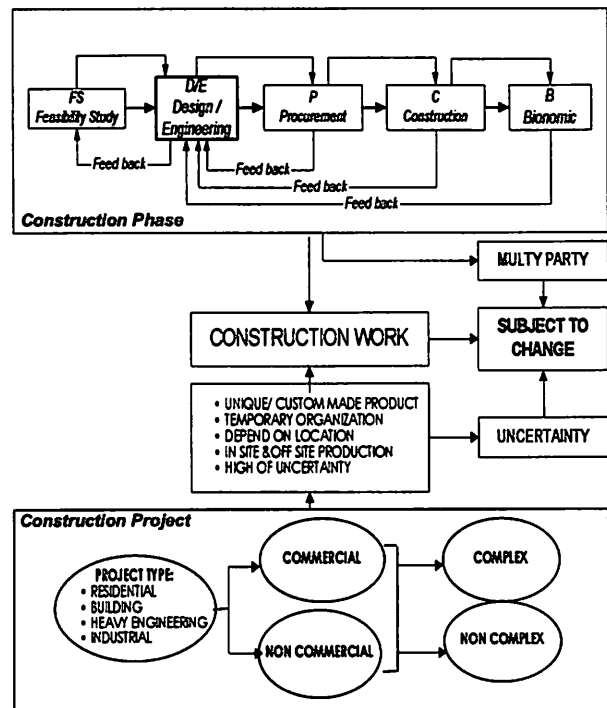


Fig. 2. Characteristics of construction work

Meanwhile, according to Mintzberg and Waters⁴, 'Strategic Decisions' are in essence an aggregation of a sequence of operations. Hence, strategic

decisions are related to the process, and the process approach is applicable to evaluation of the performance of industry. Therefore, the process approach will be used here in the following evaluation of construction process performance.

Based on the above explanation, the hypothesis here is that the construction 'process' can influence the performance of construction work or projects, which can in turn influence the performance of the construction industry.

3. METHODOLOGY

This study consists of three elements (Fig. 1); 1. a literature study related to process approach and performance indicators in the construction industry, 2. field observations of in-progress projects, conducted to obtain the patterns that cause the poor performance of construction project, and 3. analysis of information sources to identify root causes of the problem and their possible solutions to improve the performance of construction industry in Indonesia.

Observations during project progress focused on the chronological events and business phenomenon that occurred on-site practically. The study was continued with analysis of the causes and effects of existing phenomena, and the consequences to the performance of construction industry.

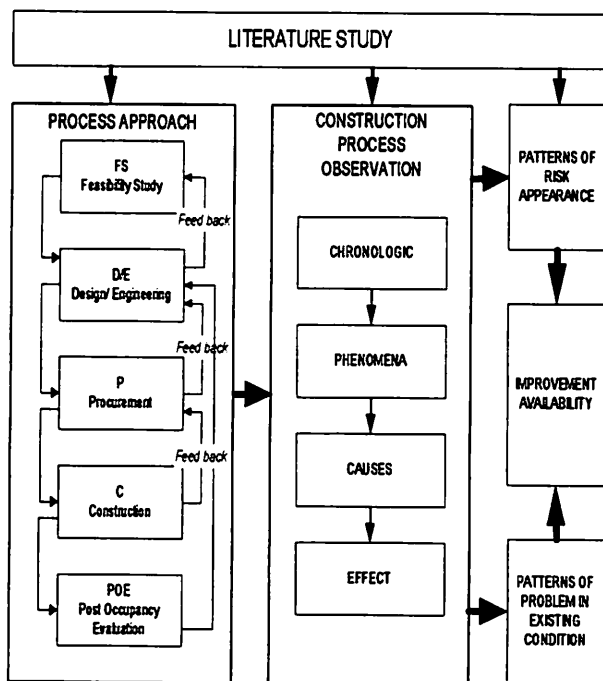


Fig. 3. Flow diagram of research methodology

The observations were made on two kinds of object study: 1. observations of a Logistic Center

Unit which conducts construction project of a public university in western Java during the fiscal years 2006, 2007 and 2008, and 2. observation of two projects ordered by the Public Work Division of a city in eastern Kalimantan during the same period. All of the projects observed, used public fund to carry out the construction work services (Table 2).

Table 2. The observation objects during the study

Observation Object	Year	Type of Project
A university logistic center unit	2006-2008	A campus center, and building and infrastructure maintenance
Public work division of local government	2006-2008	A hotel for national olympic event and sport facilities (foot ball stadium, gymnasium, and gliding field)

Observations of the Logistic Center Unit of a public university were conducted through direct involvement as a project manager and as a member of the procurement committee. Observations of local government projects were conducted through direct involvement in the projects as a design consultant team coordinator.

Verification of the observation data was conducted through discussion processes with other practitioners involved in the public work, such as owners, contractors, supervisors, consultants and users. Clarification, comparison, and opinion gathering were carried out during the verification process.

4. THE EXISTING CONDITIONS OF CONSTRUCTION PROCESS IN INDONESIA

As shown in Fig. 3, the general phases on the construction process consist of Feasibility Study (FS), Design and Engineering (D / E), Procurement (P), Construction (C), and Post Occupancy Evaluation in relation to Human Biologic and Economic (Bionomic). Empirical observation of construction phases has been conducted on the construction work services for facilities maintenance and infrastructure provision of a public university campus and on a public works division projects of a local government in eastern Kalimantan (Table 1). The observation results indicated existence of patterns on the project phase which are the cause of problem of poor performance in the construction project.

Based on construction phase observation and related to the research methodology, some problem patterns of construction project existing condition in Indonesia can be described as following explanation.

(1) Existing conditions of Feasibility Study (FS) phase

According to the projects observed, Feasibility Study is conducted to propose project budget. Some problem pattern can be seen clearly in the construction project of a hotel and sport facilities for national Olympic Games which lasted from 2006 until 2008. These projects are ordered by a local government in eastern Kalimantan.

The project observed indicated that problem started from requesting process for project budget by client to council of parliament. Most of the council members do not have background experience in construction field; thus, they have little capability to evaluate planning for using these funds. Moreover, the political and collusion atmosphere are stronger than atmosphere of making efforts to achieve a good performance on the project's results. This condition caused the emergence of additional transaction costs in the FS phase, especially for entertainment cost of approval process.

Additionally, the client has difficulties to define their requirement for the determination of funds because of inadequate human resource. As a result, the approval process occurs several times due to request for the additional works beyond the budget that has been set before. Fig. 4 shows an annual budget request pattern in the public hotel project that is worth IDR 80 billion (around ¥ 800 million).

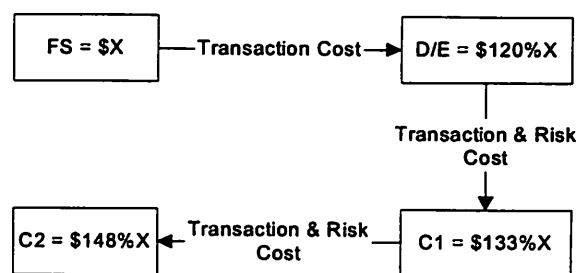


Fig. 4. An example of the approval process of project budget (Source: observation result of a project of local government, 2006-2008)

The budget change followed by change order of the work and resulted in time delay up to 40% longer than predetermined schedule, while the construction product has not finished perfectly when used. Based on the case observed, the chronological of the funds requesting process is explained in Table 3.

The transaction cost involved in negotiation among parties to do settlement or bargain, which include cost of searching and collating information, communicating with other interacting parties, drawing up and revising agreement or contracts, and reaching transaction settlement⁵. Therefore, the transaction intensity increases in budget determining process that causes an increase in transaction costs. On the other hand, the parties tend to find ways to legitimize the increasing transaction costs rather than try to improve efficiency of the transaction process

Table 3. The chronological of budget proposal in a project that observed

No	Chronologic	Phenomena	Cause	Effect
1	The initial funding proposal based on the Feasibility document and Preliminary Design phase	The proposal documents contain many risk and uncertainties	Do not enough time for determine owner/user requirement Less ability to evaluate the planning proposal Lack information about the real condition of the project	Allocated funds (\$ X) does not match the real needs of the project
2	1 st additional funds (at Detail Engineering Design Phase)	The DED documents different with preliminary design	There is a change in client demand and many unanticipated risks appear	Need 20% additional fund of the initial funding (total new budget \$ 120% X)
3	2 nd additional funds (at substructure construction phase)	Changes in the construction documents are significant	There are works addendum due to the difference between the real field condition and design document	Need 11% additional fund of the previous funding (total new budget \$ 133% X)
4	3 rd additional funds (at upper structure construction phase)	Changes of works item due to the low level of the constructability of design document	Some of works addendum due to risks that have not been anticipated in the award document and the low performance of contractors in achieving minimum requirement	Need 11% additional fund of the previous funding (total new budget \$ 148% X)
5	In every phases	There is a nuance of collusion	The of corruption culture is exist and the political conditions is unstable	There is an additional transaction costs, that become a burden on the project cost

Thus, according to project observed, Fig.3 indicated that the additional funding for completed project reached 48% of the initial budget that had been proposed on the preliminary design.

(2) Existing conditions of Design and Engineering (D/E) phase

Main activity in D/E phase is to produce design documents which are generally conducted by a third party (i.e. design consultant or other special teams) as owner representative. According to the projects observed, the phenomena of the real practice conditions indicated that the document of design and engineering is one of the main causes of construction project poor performance. The documents are considered to have some problems such as the following explanation.

The design document has a significant difference comparing with preliminary design document (e.g. due to significant change of volume of works or change of owner requirements of construction specifications), which is also required a budget change.

Observation of a hotel design for National Olympic event demonstrated that the owner requirements of room numbers and meeting room are larger than the number and capacity in preliminary design document. The implication is the project needed of additional construction budget and time for redesign.

On the other hand, almost all of projects observed has inadequate period for design process, because the need of project results is urgent, that cause inaccurate of owner requirement determination. The surveys, risk assessment, and value assessment are conducted based on inappropriate information. In the projects observed, incorrect data of size and shape of the project site was used because of time limitation on design process.

The design consultant can not conduct a suitable and detail site survey. For some cases, they only use data provided by owner, which is often contains minimum information. This situation leads to significant differences of information between design and real conditions because data is unclear or inaccurate.

Other example is a building project of campus center that was observed. There are 10 times differences in grading volume between design and actual conditions because of inappropriate information about land slope. It resulted in delay due to necessary of time for resurvey and redesign to obtain the accurate volume.

Additionally, Bill of Quantity (BoQ) error often occurred. The change order is necessary to achieve

the expected performance in construction projects. For example, according to observation of the hotel construction case, the building performs poorly due to error in calculating volume of sewage treatment plant. Thus, it needed change order to solve this problem.

The design consultants also have a little consideration in material supply system during the design process. It causes contractor difficult to fulfil the technical specification because of the contractors supply network are weak. A project observed showed that the specification of floor finishing material should be supplied from other island that lead to delay on material supply because of transportation problem.

All risks caused by the design errors during the construction process take by the owner which resulted in additional costs and delay of project completion.

(3) Existing conditions of Procurement (P) phase

All the procurement processes in Indonesia that use public funds should refer to the Presidential Decree number 80/2003. Therefore, most of the procurement process is only trying to accord with the Presidential Decree, especially for the project conducted by the local government.

The observation results and interviews to tender committee members indicated that the lowest price bidder tends to be awarded even if the evaluation system with multi-criteria had been applied. This situation occurs because of internal risk of being afraid of facing inspection process by the monetary auditor team rather than reaching best performance. This problem appeared because the difficulties in making accountable and responsible reason due to unavailability of good evaluation mechanism in the procurement process.

Since the procurement tends to be price-based, contractors only focus on the documents that are provided by the client, especially Bill of Quantity (BoQ) in bidding process. In the most of cases observed, bidding contractors did not pay attention to the technical specifications and only submitted bidding proposals based on BoQ. This condition implies that the information held by contractors on the project is minimal.

The observations result indicated that the contractors have less understanding of problems and risks that appeared in procurement documents during clarification process before awarded. Since the risk and uncertainty cause the change order, many work addendums occur throughout the construction process, which results in poor performance of project in terms of cost and time.

The observations also showed that contractors are awarded based on friendship relationship; thus, it causes another problem on construction project performance. Under such condition the procurement evaluation process does not run well, especially in the project conducted by local government.

Other phenomena that can be captured in the procurement process are the tendency of paying less attention to evaluation process of contractor supply chain system by owner. Some projects indicated that contractors do not have their supply chains at the time of the procurement phase and at the commencement of construction phase. Weakness in supply chain system makes delay of supply material. This is one of key variables that causes of delay in work and leads to additional cost.

(4) Existing conditions of Construction (C) phase

It is typically observed at construction phases that due to the urgent project needs by the owner and the weakness of contractor supply chain, the contractor often replaces the material with the lower specification during the construction process. Hoping that the project delay is minimized, the owner is forced to accept this situation because the pursued targets are completion of works. Some of the delays are not accommodated in the addendum clause of contract, due to the difficulty of administration procedure of contract addendum.

Another phenomenon related to difficulties of design issue is employment of many non-standardized work. As a result, many change orders occur during construction because the contractor has difficulties to do the work. Since the change order requires certain procedures and relates to various parties, this causes delay in the work to be completed.

Some difficulties of coordination process among the parties at construction phase also exist which resulted in slow of decision-making. One such example is the slow approval process of color and type of finishing. In some cases, a certain work has been approved by client but not approved by user, which resulted in delay of decision-making and work.

Other problem in the construction phase is labor problem. For example, the delay occurs due to desire of local workforce to join the project even if the workforces do not meet the standard capabilities required in the project, while the contractors who come from the other islands already have their own workers. Poor supply chain system of the contractors also lead to inefficient

labor management.

Other project showed that replacement of the Project Manager (PM) or a key person often occurred. In this situation the new PM has to collect the project condition information during in-progress project that causes time consumption. Sometimes the new PMs have to solve the problem without adequate information, which resulted in unsuitable solution. Nowadays, there is no comprehensive mechanism of evaluating the PM candidate during the procurement process in Indonesia.

In construction phase, the owner also has to spend budget for consultant supervision to assist the owner in ensuring that the required performance is achieved by the contractor. However, the owner is even forced to have expenditure to encourage contractors to provide the minimum services, not to deliver maximum benefit. Owner often should encourage the contractor performance that is actually contractor's responsibility. Owner takes all risk during the project running because the awarded contractor can not control the appearing risks. The owner is often forced to accept the unsatisfied construction result, such as shown in Fig.5.

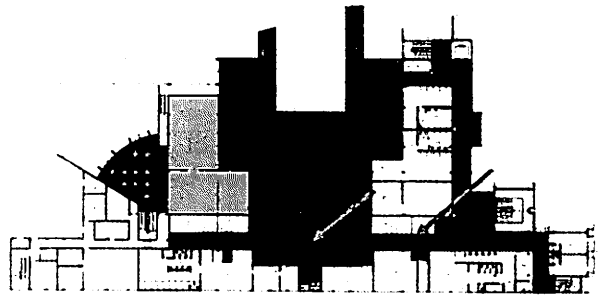


Fig. 5. Examples of errors due to the incorrect determination of bench marks by contractor, so that the "as line" of column shifted at the time of construction process, which resulted some columns stand in the middle of the building aisle (Source: RFD Studio Consultant).

(5) Existing conditions of Bionomic (B) phase

Post Occupancy Evaluation (POE) in the B phase shows that the results of poor performance of the project cause user's dissatisfaction. The resulting products of construction often encounter the following issue:

1. Can not be used properly: The users are not being able to use facility properly. For example, the roads were flooded at the raining time because the road drainage system could not work properly.
2. Do not provide added value: A large investment in a construction project does not produce results that can be used. For example, the gliding field construction that was built for

the national Olympic Games in 2008 could not be used by the athletes during the event due to inaccuracy data of the land survey and incorrect in determination of materials requirement for the field gliding base.

3. The operation period shorter than design objective. For example an education building complex for art department in the public university was planned to have service life (life cycle) for 25 years. However, only after 15 years the buildings were planned to be demolished because many parts of the buildings do not work anymore such as broken toilet systems and reverberation of meeting rooms.
4. High cost of maintenance: Since the quality of construction work is poor, it needed high cost to repair the product. For example, the local government must expend money every year to improve Sumatera road traffic because the roads can not bear the burden of the vehicle in accordance with the designed and construction performance. The repairing process obstructs the transportation flow that results in growth inhibition of economic development.

Therefore, many construction products provide less comfort for the user, which leads to low occupancy rate, high maintenance cost, shorter service life, and earlier demolition time. Thus, the investment for the projects can not thoroughly accelerate the area development.

5. ANALYSIS OF PROBLEMS AND POSSIBLE SOLUTIONS

Given appearing problem pattern, the analysis was conducted based on the theory of input-output-process to identify the cause of the problem during the construction process. According to TFV (Transformation, Flow, and Value) theory of Koskela, the construction process is viewed as a transformation of inputs to outputs⁶. Based on this theory, performance is represented as a function of output and input of the process (Fig. 6). In other words, the good process is required in the input delivery process to improve the performance output.

$$\text{Performance Output (PO)} = f(\text{Performance Input (PI), Process (PS)})$$

Fig. 6. The relation of input-output process and performance

According to observations result, Fig. 7 below shows the pattern of problems that appear during the construction process.

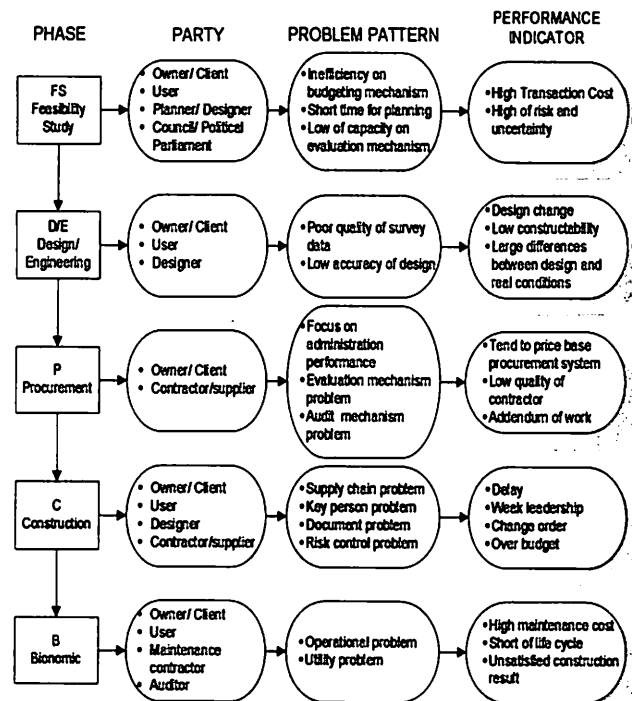


Fig. 7. The problem pattern during construction phases

The analysis of the problem pattern indicated some phenomena that cause the poor performance of construction project, which can be summarized as follows (Table 4):

1. Increasing of project costs due to increasing of transaction costs.
2. Many change orders due to poor quality of construction documents that require a certain procedure and involve various parties, which result in delay in completed work.
3. The contractor lacks risk information, because the procurement process tends to price based and the bidding document based on BoQ. Delay occurred because of uncontrolled risk and the rework.
4. The weakness of contractor supply chain due to procurement system without comprehensive evaluation process of supply chain system, which results in materials supply delayed.
5. The weakness of leadership due to inappropriate evaluation process of key person in the procurement process that cause replacement of key persons/ project managers often occurred during the construction process.
6. The difficulty for contractor to achieve the minimum requirement causes the quality of construction result is often lower than technical specification requirement.

According to the patterns that appear from the analysis (Fig. 7 and Table 4), each phase has problems that are related to the other problems in other phases.

Table 4. Problem pattern causes and effect on the existing condition of construction project in Indonesia

No	Input/ Existing	Cause of Problem	Effect	Output/ Result
1	Lack of adequate information in the project requirement determination	Inadequate human resource and strong of political and collusion atmosphere (FS phase)	Many transactions occur during the project process.	Every transaction requires a transaction cost and consume time.
2	Quality of construction document is not proper (D/E phase).	Short time available on design process, poor of data survey (D/E phase) At the time of procurement process , contractor does not assess the risks that appear on the bidding documents (P phase).	Many changes order occur due to the differences between the construction document and the real conditions in the field.	Delay due to change order procedures and additional works. Cost and time addendum.
3	Contractor Bidding Document based on Bill of Quantity (P phase).	Procurement processes tend to be 'Base Price Approach' because of pressure of the audit system (P phase).	Contractors lack of information about project risk. Contractors are trying to get additional work to improve the profit margin.	Delay occurred because of the risk that they do not control and the rework. Project budget increases.
4	The Contractors do not have system of supply chain management (C phase).	Owner does not make a comprehensive evaluation on the supply chain system at the time of the procurement process (P phase).	Supply of materials can not be delivered on time.	Delay due to poor supply system. Additional cost due to delay. Inefficient labor, waiting for material on site.
5	Replacement of key person during the project is repeatedly (C phase).	Evaluation of the key person at the time of procurement only based on Curriculum Vitae, paper bid document review only, without interview (P phase).	Key person does not have a strong commitment in completing project works. New key person does not have a comprehensive understanding of the project.	Owner is involved in the whole project and takes all the risk. Construction process is not supported by the strong leadership.
6	Contractor does not provide the best capability in implementing the project (B phase).	Owner does not have the performance information system that can be used to evaluate the performance at the time of procurement (P phase).	Decrease in the quality of the work under minimum specification requirement.	Construction products do not work properly. Short period of life cycle. High maintenance and operational cost.
7	Poor of relationship and slow of decision making (C phase)	Client relationship with various parties tends to be adversarial relationship (FS, D/E, P, C, B phases)	Each party tries to find their own advantage	Transaction costs increases, but not produce the optimum performance for construction

The interview results revealed that the poor performance of design document is a significant problem. Because the design phase is conducted within a short period, it is often difficult to evaluate completed design document during the Design/ Engineering phase. However, in the long run, it is indispensable to improve D/E phase to enhance construction project performance.

It is also difficult to evaluate the effect of the performance improvement of D/E phase, because most of the design problems appear during and after construction phase. In this condition, the risks caused by the design document problems should be minimized before the construction process.

The procurement is in a significant position in the project life cycle because it is in the middle of the whole construction process. The problems on the procurement process directly related to the problems on D/E phase and the C phase (Fig. 8). Therefore, improvement of the procurement phase is expected to reduce some of problems that arise in the previous phase and anticipate the risks that will appear in the next phase. The procurement phase is considered the first priority in development of a new framework for overall performance enhancement of construction process.

As shown in Fig. 7, the number of parties involved in the procurement phase is less than that in other phases; this characteristic is another advantage to start improvement from this phase.

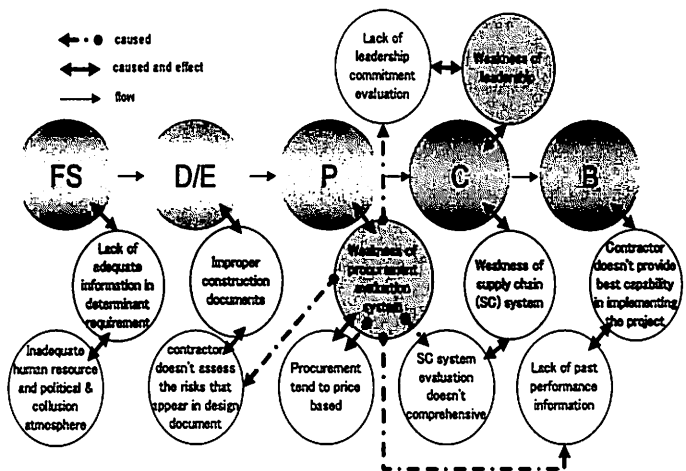


Fig. 8. Source of the problem in construction process

Given that procurement is the incision of three core phases in the construction project⁷ (Fig. 9), it indicated that the procurement process plays an important role in improving the performance of construction project.

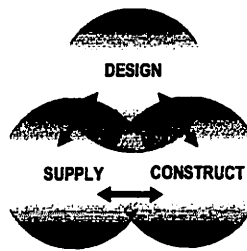


Fig. 9. Procurement as a core of construction process (adopted from NOA, 2005)

According to Nissen⁸, the failure in procurement process contributes to the decrease of management effectiveness become 50%, or even less, during construction process. Hence, the construction process needs to have strong attention in developing procurement system to improve the performance of the construction industry.

Additionally, characteristics of the construction industry are determined by supply and demand issues⁹. If the demand requires high performance, the supply will provide high performance and vice versa. In the construction industry the demand is represented by the procurement system. It is assumed that if the procurement system requires high performance, the contractor should provide high performance (Fig. 10).

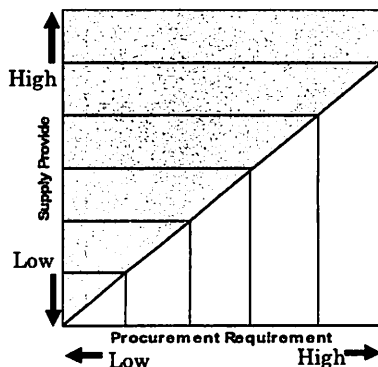


Fig. 10. Supply and Demand Issue in Construction

In improving the construction performance, the construction industry must replace the current procurement practices which are mainly focusing on price competitiveness. The procurement should not only focus on price competitiveness but also focus on quality of works and should promote the growth of contractors in the long run who have done quality works. Therefore, in the procurement process, the development of clear measurement of performance and sustainable improvement in quality and efficiency are needed.

The construction industry also needs to make fundamental change of the construction processes and remove the adversarial approach between client and other stakeholders¹⁰. Best practices of Japanese construction industry development indicated that during the high economic growth

period, the competences of the contractors have been significantly enhanced. Contractors with good performance had been promoted. As well, the industry built a “mutual relationship” of pursuing a common goal of good works rather than adversarial relationship between the parties¹¹.

Since the procurement process is a crucial point in achieving the high performance of construction work, the intensive efforts should be made to increase existing performance through a fundamental change in this phase.

6. THE ‘CHANGE’ TO IMPROVE THE PERFORMANCE OF CONSTRUCTION PROCESS

According to the analysis and the theories that have been explained, in developing new strategy to improve the construction performance, the procurement process supposes to be the main concern at the first stage. It is necessary to carry out some efforts to change the existing conditions of procurement phase that tends to be price-based. The ‘change’ is proposed through several steps; deconstructing the existing structure of the process of construction work, developing new framework, changing the procurement process paradigm and creating innovation. Following explanation describes the elaboration of the changing steps.

In accordance with the expected conditions, a proposed approach is used as shown in Fig. 11. The approach is focused on structural change of construction project phases in order to solve the problem appear in the existing condition. The focus of these changes is described as follows:

1. Integrate the project process, through extending the procurement process to the previous process (D/E) and the following process (C) aiming at reducing the risks that arise in the previous phases and anticipating the risks that will appear in the next phases.
2. Allocate the risk to the parties who are most able to control the risk by focusing on performance aiming at minimizing risk.
3. Early assessment of risk and value, before the project action (C phase), since the design document perform poorly and contain high risk under uncertainty condition.
4. Require effort to strengthen the supply chain through comprehensive procurement evaluation process.
5. Manage supported data of past performance in the procurement process, as feed back for the next evaluation process.
6. Need leadership commitment in all project phases that tend to be collective leadership.

7. Need a development of new procurement strategy that removes the adversarial relationship between the industry and clients.

The construction process is expected to be performed in a comprehensive manner by changing the project life cycle structure, and to become more integrated by removing adversarial culture. The change structure focuses on some elements, such as supply chain system, leadership commitment, risk and value assessment, and past performance evaluation aiming at minimizing the construction risk.

Fig. 12 shows the new framework of the proposed approach accordance with the objectives of the change proposed and difficulties that may be encountered in its implementation. One of key difficulty in implementation process is resistance of the parties involved with change process, thus, open mind and trust of each party is required in the propose framework. Goal of the change with the new framework is to achieve solutions that provide benefits to multi parties involved in construction process ('win-win' solutions).

Another effort to improve the performance is through the paradigm changes in the procurement process. This change process is related to the way of controlling the project. The existing condition indicated that the owner should encourage contractors to achieve the minimum requirements and takes all risks appeared during the construction process. The new paradigm is expected to encourage contractor to take responsibility in controlling risk.

The existing procurement process that tends to be price-based places the owner and the contractor on opposite sides with different objectives². The owner perceives a minimum level quality, and the contractor views the minimum requirement as a maximum level of quality. The new paradigm is expected to place the owner and the contractor to share the same objectives of achieving optimum benefit in project delivery process. Therefore, the change of procurement system will ensure that the best contractor who provides high performance with reasonable cost will be awarded. The risks that appeared in the construction process are responsibility of the most competent contractor.

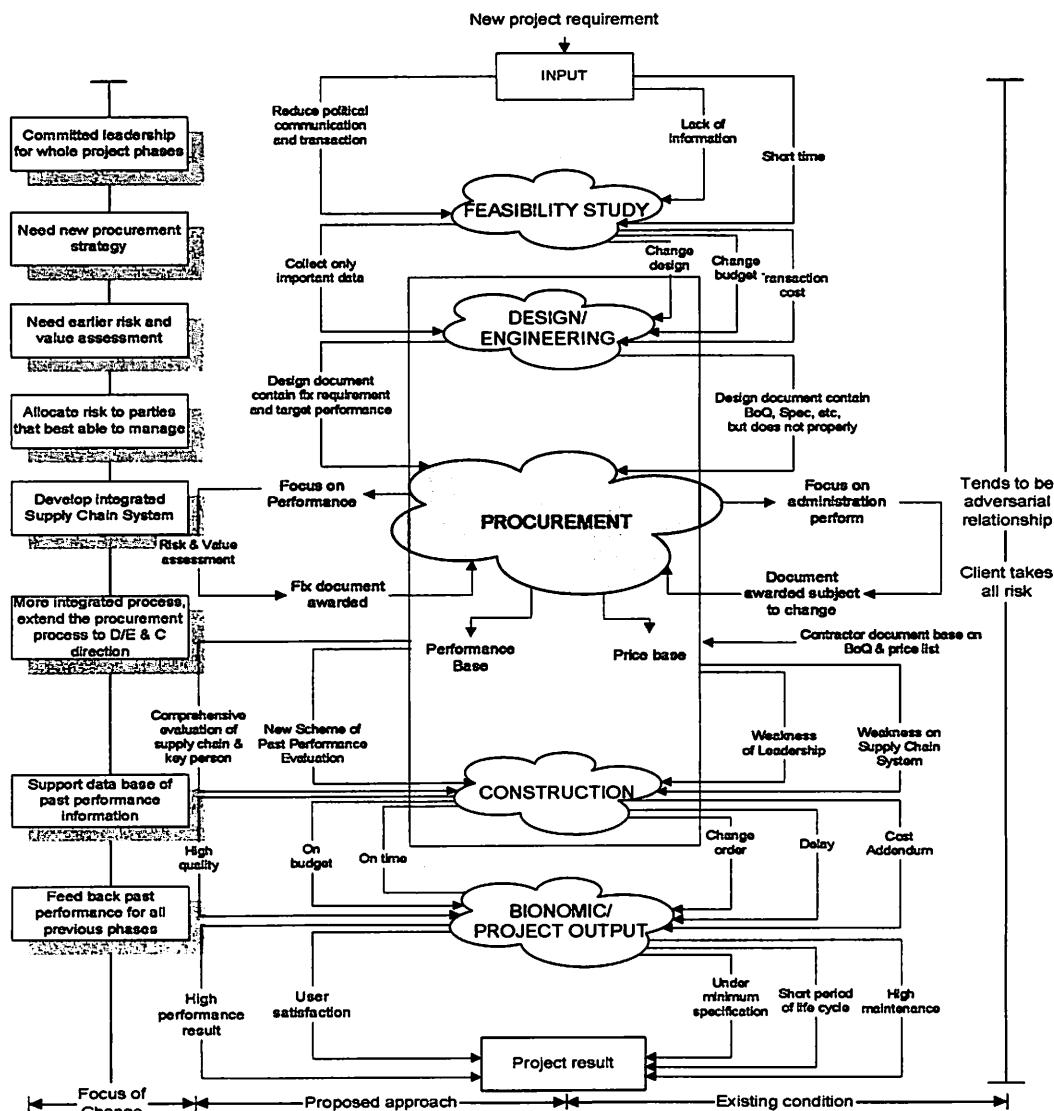


Fig. 11. Structural change in Indonesia construction existing condition to improve performance

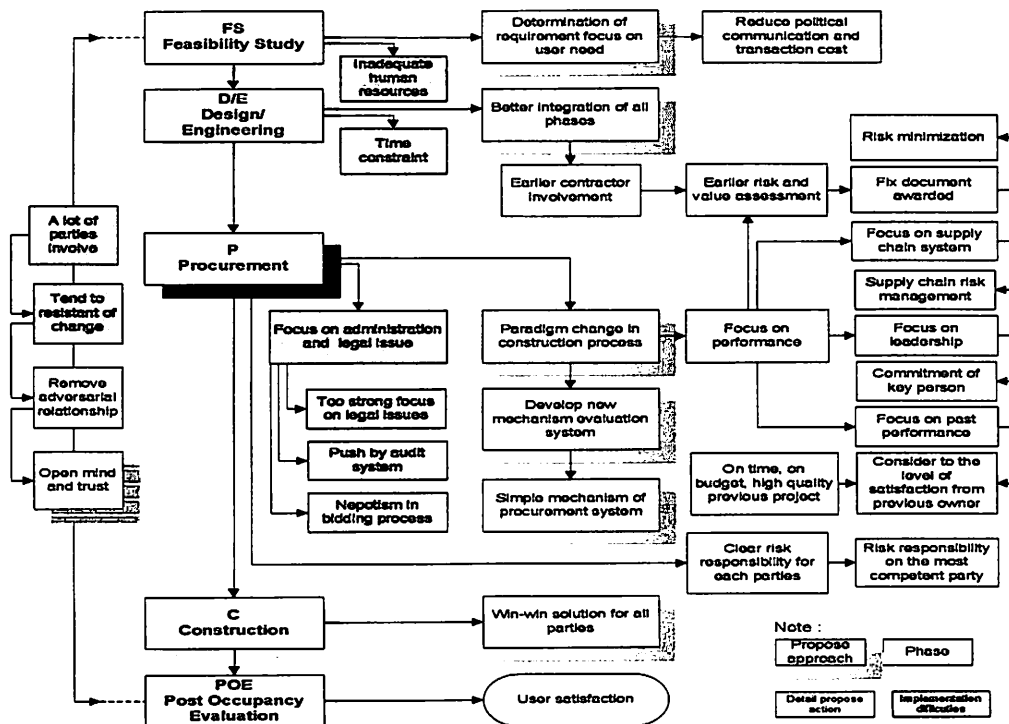


Fig. 12. The framework of performance based approach on the propose procurement process.

The procurement system must encourage the growth and the development of the contractor who has good performance. The stability of construction industry is expected to be realized, through increasing the construction performance in this manner.

Some efforts have been made to improve procurement process performance through evaluating and improving procurement systems funded by World Bank and ADB^{12, 13}. However, the results do not provide an encouraging improvement since main focus of the change is procedural, administrative, and legal issues.

Therefore, it is also necessary to create innovation in an effort to improve performance. The objective is to produce a model and tools that can be implemented. In every change, the related parties often resist and attempt to retain the existing patterns. Through the innovation, the information about the appropriate implementation strategy might be obtained, so that the direction of change will be in accordance with the expected objectives, specifically in strengthen the construction industry and its supply chain.

In developing innovations, it is required to remove the adversarial relationships that exist between parties. According to Egan¹⁰, adversarial culture and fragmentation of the different participants in most construction projects are the particular constraints on innovation within construction. The innovation is associated with the development of new relationships pattern through procurement strategy, which enables improved the performance of construction industry.

Fig. 14 shows the need for innovation in the new framework of structural change to improve performance in construction process.

7. CONCLUSION

To accelerate the speed of construction development process, some efforts are required to find solutions to the poor performance of construction industry. The problem pattern of project phases indicated that many factors cause the problem during the construction process. The analysis of the problem pattern and the theories suggest that focus on procurement phase should be the first priority to develop improvement strategy. Fundamental change on the procurement process is an important point in realizing the performance enhancement (Figs. 11, 12, 13, 14). The proposed change of existing condition is expected to provide optimum benefits for parties involved. Key points of the proposed change are integration process of project life cycle, and comprehensive procurement evaluation process that focus on developing comprehensive past performance evaluation process.

However, the change would bring difficulty and even resistance in the implementation, because the existing conditions have a strong influence on thinking and behavioural patterns of each party. Thus, the 'open mind', as well as 'trust', 'strong leadership' and 'simplified model of development' are required. It is also required to create innovation to ensure that the proposed strategy can be implemented.

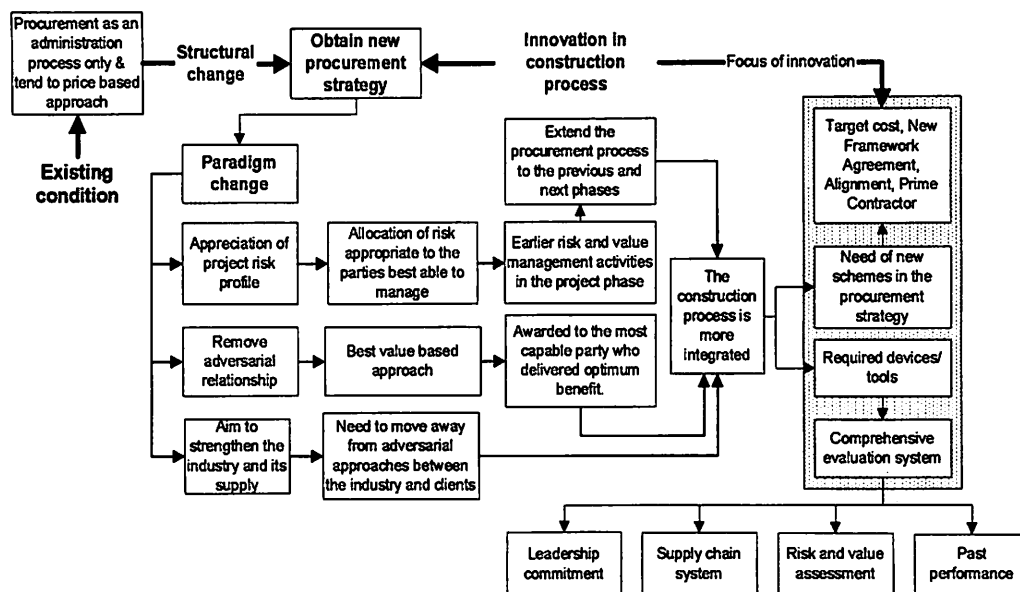


Fig. 14. Need of innovation on the new framework of procurement process change

The proposed solutions are hypotheses to solve the problem pattern identified in this study. Since all of the procurement process in Indonesia that uses public funds must comply with the same procedure, the Presidential Decree number 80/2006, some of the identified problem patterns possibly occur in other construction projects in Indonesia. Validation of the proposed solution is a necessary topic for future study.

This study needs to be continued with the development of technical mechanism as a tool that can be used in implemented the proposed solution. The tool must meet several criteria to be utilized effectively, which is simple, does not require complex technical skills, and can incorporate the characteristics of local conditions. The tool also needs to be tested and verified to ensure that it can be used the real practice condition.

In order to achieve performance improvement targets that provide the right direction and avoid negative influences in the direction of construction industry development, it is also necessary to learn from the success experiences of the developed countries.

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