EVALUATION STUDY ON EXISTING CONDITION OF INDONESIAN CONSTRUCTION INDUSTRY: HOW TO IMPROVE PERFORMANCE AND THE COMPETITIVENESS

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***ABSTRACT*:** The growth of construction industry in Indonesia is now running slowly, compared to other industries. This slow growth is caused by the industry's lack of efficiency. Such a drawback leads to inability of local construction companies to compete at international level. In the ever growing international competition the Indonesian construction industry must find ways to compete in an even competitive open global construction market.

The inefficiency occurs because the characteristic of construction projects are in the state of constant changes. This is assumed as source of problems in the Indonesian construction industry because it does not cope with the adverse effect of changes, which is often causing poor performance result such as high execution fund, project execution delay, conflict among parties, and at the end causing high level of inefficiency.

A profound study is needed to improve the efficiency of construction project delivery systems. To do this study, existing conditions of the construction industry in Indonesia should be evaluated first. Results of this evaluation expectantly can give a clearer figure of existing conditions of the construction industry in Indonesia and give direction in the next research to improve its performance and the competitiveness.

KEYWORDS: construction project, Indonesian construction industry, performance, improvement of competitiveness.

1. INTRODUCTION

As a developing country Indonesia needs a lot of development in the infrastructure field. Development of infrastructure requires strong support from the construction industry. Although the construction industry plays a very important role in national economic development at this time, however, the development of this industry is running very slowly when compared with other industries.

This slow in growth among others is caused by the industry's lack of efficiency; such poor performance result and drawback lead to inability of local construction companies to compete at international level.

In addition, other consequences arising from the poor performance are poor quality of infrastructure, which can not be utilized properly. This is preventing the development process in Indonesia. Therefore, the various efforts and strategies are needed to improve the performance and competitiveness in the construction industry so that it can accelerate the Indonesian development.

On the other side, the construction project has special characteristics such as generally high fragmented-level and full of uncertainty with a tight budget and time constraint, which results in the frequent changes in project construction.

Unfortunately, the construction projects in Indonesia often can not accommodate the changes. This is assumed as the source problems of construction industry in Indonesia because it does not cope with the adverse effect of changes, which is often causing poor performance result such as high execution fund, project execution delay, conflict among parties, and at the end causing high level of inefficiency. In the ever growing international competition, the Indonesian construction industry must find ways to compete in an even competitive open global construction market. Thus, they must improve their performance and ability to compete.

This paper is compiled as initial effort in studying existing conditions of Indonesian construction, which contains primary study on characteristics of the construction project and existing conditions of the construction industry in Indonesia and analysis of the results of previous research related to the existing conditions of construction project in Indonesia. Result of this study expectantly can give clearer figure of Indonesian construction industry development, and give direction in the next researches. In the future, next study will hopefully give significant contribution in the construction project efficiency improvement, and improving performance and competitiveness.

2. METHODOLOGY

Method of research is literature study from various sources such as literature reviews of project characteristics, construction projects in Indonesia, and existing conditions construction projects in Indonesia and theoretical studies related to the topic. Furthermore, the results of literature study are analyzed to obtain thoroughly figure of the development condition of construction project in Indonesia. Based on the analysis result, it is expected to find the specific issues that are the root of the problems in the construction industry in Indonesia. Finally, based on the identified issues, needs are clearly defined needs, and strategies are proposed to improve the performance and the competitiveness construction industry in Indonesia. The research methodology flow diagram is shown in figure 1.

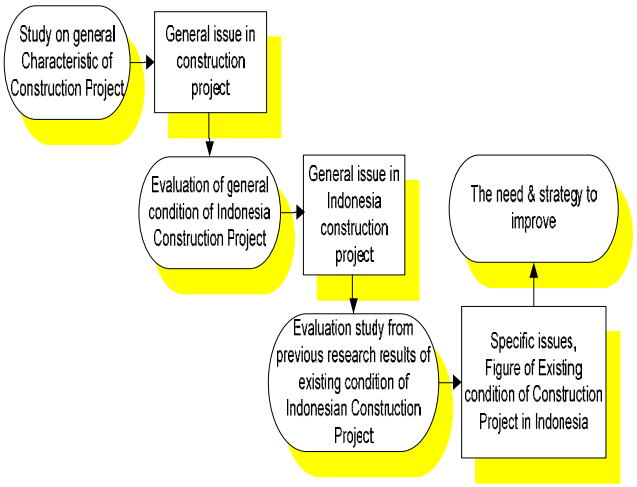

Fig. 1. Research Methodology Flow Diagram

3. GENERAL CHARACTERISTIC OF CONSTRUCTION INDUSTRY

To evaluate the condition of the construction industry in Indonesia required a good understanding of the characteristics of the construction industry. These characteristics will be used as a starting point to find the evaluation criteria that will be performed. Below is the description about the general characteristics of the project and construction industry.

Construction projects have a life cycle consisting of several phases. Various parties are involved in the project, and they have different responsibilities at each stage in the life cycle. More interfaces between parties are needed. These imply that the project has a high level of fragmentation in nature. This contributes to increasing complexity.

On the other side, spectrum coverage of construction project is very wide from the slow, certain, and simple construction project at one side, to the quick, uncertain, and complex projects at the other side

(Ballard & Howell, 1998). Complexity level of construction project (Maylor, 2003) is determined based on three dimensions: those are required resources complexity, technical complexity, and organizational complexity. Based on type, the construction project is classified into four categories (Hinze, 1993 and Gould, 1997): those are residential construction, building construction, heavy engineering construction, and industrial construction. Each category has specific characteristic according to the project typology.

Beside that, construction project has specific characteristics as follow:

- Unique product; different on each construction product (custom made product).
- Run by temporary organization; the organization will be disbanded by the end of the project.
- Its product depends on specific location or site, where the physical conditions (soil condition, water condition, etc.) and non-physical conditions (regulation, traffic condition, etc.) are always different.
- Prime production process is conducted in site (on-site production), which depends on climate and uncontrolled environment condition.

This can be concluded that the construction project consists of various categories of very unique nature so that the project owns very high uncertainty. In addition, the process itself consists of various phases, which is involving various parties (multi-party). This takes a construction project into the environment that continues to change, as Smith (1999) presented the following:

- Change is inherent in construction work.
- In all construction projects, 'change' is a defining characteristic and is almost inevitable.
- In construction project each of the three targets of cost, time and quality likely to be subject of risk and uncertainty.

From the explanation above, it can be concluded that the construction projects own a very complex characteristic (Figure 2), and have an important influence on the performance. It required efforts and specific strategies to handle problems and changes caused by these characteristics so that this industry can grow and develop well in Indonesia.

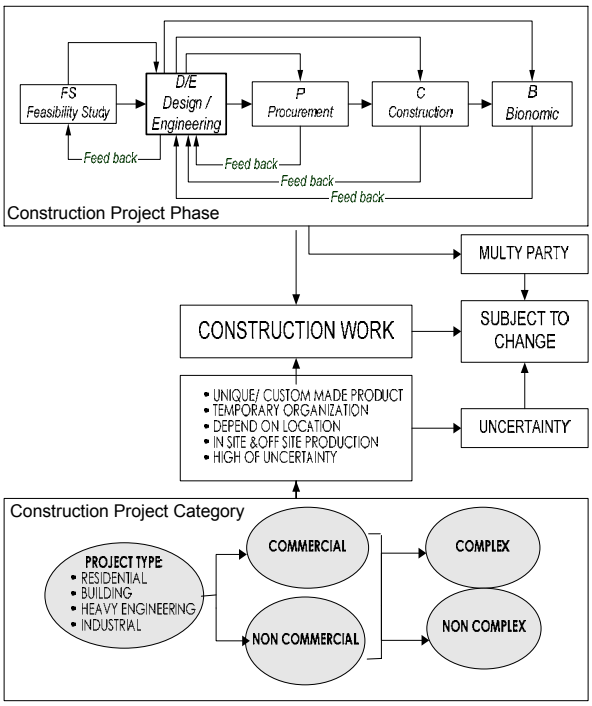

Fig. 2. General issue of construction project characteristic

Changes associated with risk, Bettis on Ritchie (2007) developed a model that links between risk, performance and industry characteristics as follows:

$$P = f(IC, SD, R)$$

Where:

P = Performance of industry
IC = Industry characteristic
SD = Strategic Decision
R = Risk

In other word, to obtain a good performance on the development of construction industry, it must be able to embrace change, considering the characteristics of the construction industry, and measure the information to have strategic decision making.

4. EVALUATION OF EXISTING CONDITION OF CONSTRUCTION INDUSTRY IN INDONESIA

As mentioned previously, the construction industry in Indonesian has played an important role in the national economy. In 2005, the industry's direct contribution to the gross national product was about 6%, and employed 7-8% of the country's labor forces. There are over 116,000 registered construction companies, while more than 99,000 among them are classified as small businesses (Sumardi et. al, 2007).

Based on data conducted by BCI Building & Construction Interchange Asia (2006) and The Indonesian Development of Construction Service Division (2006), most of service firms of construction in Indonesia are located in Java Island, for more than 50 % in all types of qualification (Big/B/Large, Middle/M/Medium, and Small/S business company). This condition resulted in a high level of competition between companies in Java Island. It requires companies in Java Island to have the ability to survive.

Spread of companies' qualification shows that more than 70 % of B business, 64% of M business, and more than 35% of S business are resided in Java Island. Based on this condition, it seems that most projects with high value are fought over by companies located in Java (especially the B qualification). Moreover, several regions outside Java have projects with high value, especially Kalimantan Island (Figure 3). Because B qualification companies are mostly located in Jakarta (Indonesia's capital city, in Java Island) and only the B qualification can get the high value project, the location of project and head office becomes different.

A special strategy is needed to control the regulation between site office and head office. This situation also gives opportunities to the local companies (almost small business company) in the regions to develop their shelves.

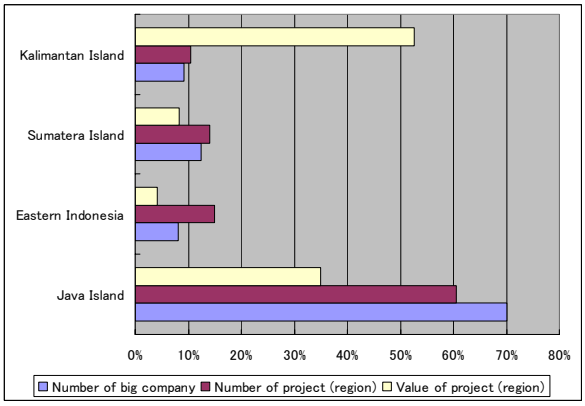

Fig. 3. Comparisons between the number of large companies and the value of the project in the Indonesian islands

Other data (BCI Indonesia, 2006) indicates that by the project type category, the residential project reaches the highest number of projects but that the project value is low. Hence, various projects in this category are executed by construction service firms with relatively small business company. The low project value and the high number of projects in this category need high efficiency to gain maximum result and well competition. On the other side, in the Industry and Infrastructure project category, even though the value is very high, its quantity is quite few. This condition triggers high level of competition (Figure 4).

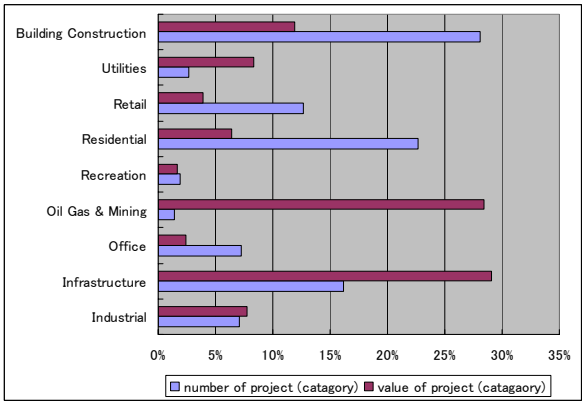

Fig. 4. Comparisons between the number of project type by category and the value of each project category in Indonesia

The data also indicates that one-year budget amount spent for concept and design phase, is larger than for construction phase (Figure 5). It is tendency to the lack of "integrated tectonically approach" (constructability) in totally project phases. This indicates less integration in the project life cycle, and the process of design and concept do not take a collaborative process to improve the level of constructability.

It also shows that the amount of budget for construction process very small compared with concept and design stage. This could implicate to the low quality of infrastructure products and the weakness of infrastructure support to the national development process.

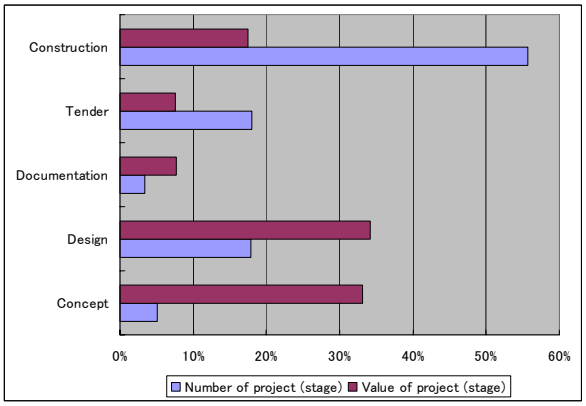

Fig. 5. Comparisons between the number of project stages and the value of the each project stages

Based on the results of the analysis on the data mentioned above, we can find the general issue of the construction project condition in Indonesia (Figure 6).

Figure 6 shows the main issues of the construction industry in Indonesia based on the characteristics:

- There is a need for specific strategies related to the relationship between the company business organization and the project site office and local small business company (e.g. as subcontractor) such as supply chain management system.
- Level of competition is very high especially in Java Island. Consequently it is necessary to increase the efficiency to improve the competitiveness.
- Construction industry in Indonesia is needed to focus on maximizing project outcomes and creating a good framework for developing a collaborative environment between the parties involved and to increase the level of project constructability.

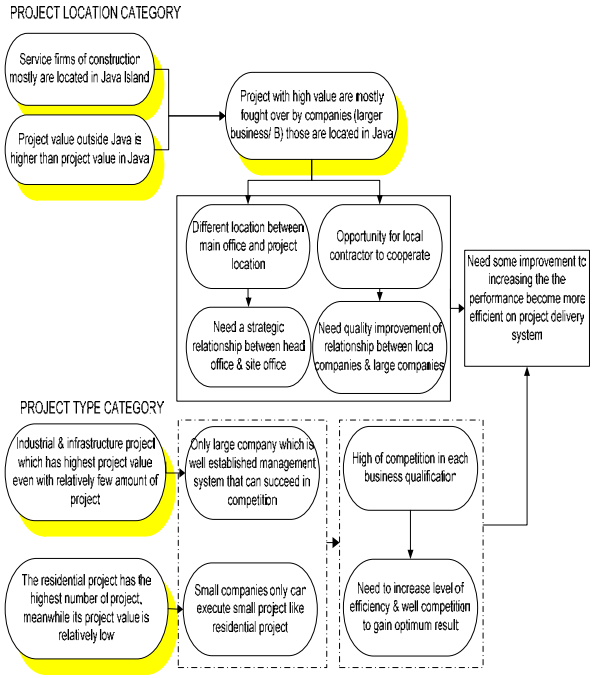

Fig. 6. General issue of Indonesian construction Industry existing condition

5. EVALUATION FROM PREVIOUS RESEARCH OF EXISTING CONDITION OF PROJECT DELIVERY SYSTEM IN INDONESIA

Based on the main issues related to the characteristics of Indonesian construction projects, it is found that the project delivery system is a critical part of the construction industry and that the system is not run efficiently.

Some research was conducted to evaluate some characteristics of Indonesian construction project

and construction industry related to the issues. Wood, et al, 2003 revealed that the delivery of major international engineering projects in Indonesia has often been frustrated by the lack of appropriate materials, the necessity to waste valuable resources on rework, absenteeism, interference and lack of the basic skills of workers. On the other side Kaming on Alwi et. al, 2003, investigated the performance and skill of Indonesian workforce compared with project target output. He indicated that 1) efficiency of working time is only 75% of percentage of working time to total time, 2) its output index is only 87% of percentage of actual output to target output, and 3) the skill index is 67% of the index which ranges from 0 – 100 given that 100 is excellent. This shows the performance of the construction process in Indonesia is very low and highly inefficient.

According to Alwi et al, 2003, the low level of performance in the Indonesian construction process is caused by the high level of waste. The waste is caused by some factor of the following; repair on finishing works, waiting for materials, delays in schedule, slow tradesmen, waste of raw materials on-site and lack of supervision. Meanwhile, the key variable of these factors are (Alwi et al, 2003):

- design changes,
- slowness in making decisions,
- lack of trades' skill,
- inappropriate construction methods,
- poor coordination among project participants, delay of material delivery to site and poor planning and scheduling

Therefore, most of Indonesian contractors are facing problems in relation to delays in schedule. Delay of project completion is a serious problem in Indonesian construction project. In a certain case, delays often contribute to costly dispute and adverse relationship amongst the project participants such as clients, consultants, contractors, sub-contractors and suppliers. The disputes often occur during the construction because the changes of the scope of the work at the time of construction often lead to the changes in the cost of implementation work and result in changes to the implementation of construction time.

Sukirno et al, 2007, said that the main causes of disputes on construction projects in Indonesia are:

- The external conditions (26.79%)
- The change of drawing document (21.43%)
- The condition of the field (19.64%)
- The change of technical specifications (16.07%)
- Other factors (16.07%)

This shows that the main cause of disputes in the construction process is the uncertainty and changes in the scope of work. The uncertainties are included in 'The external conditions' and 'The condition of the field' (total 46.43%), while the changes are included in 'The change of drawings document ' and 'The change of technical specifications' (total 37.5%). Other causes of error are among the cost estimates, professional ethics, the licensing and others. Those problems indicate that the construction industry in Indonesia is not ready to anticipate the changes and uncertainty, and this is a major cause of inefficiency in Indonesian construction industry.

According to Sakkal, 2005, the various relationships that occur at this time often can not anticipate the changes and uncertainty because the relationship between the parties in the process of construction is a traditional contract. Similarly in Indonesia, the contractual relationship between the parties on the construction project is a traditional pattern that does not embrace changes and uncertainty.

Studies on the relationship that occurred in the construction process in Indonesia have also been conducted. A research by Syachrani, 2004, indicates that the existing conditions of the relationship

between contractors and suppliers on Indonesian construction project are only 'transactional relationship', so that the role of suppliers in achieving the project goal is still limited.

This also happens in the relationship between contractors and owner, and the relationship is an antagonistic relation. Most of the construction industries seem resigned to the fact that there's no better way to conduct business. Therefore, they continue to experience the negative ramification of using traditional forms of relationship. They are very difficult to accept new concepts to improve performance and hard to adapt new idea.

Indonesian construction project have problematic issues with using traditional relationship. It is hard to focus on maximizing project outcomes and creating a good framework for developing collaborative environment between the parties involved.

In the other side, in the residential construction execution nowadays in Indonesia, the relationship represents short term contract for a lot of work packages (Sandra EF, 2006). This relationship is causing contractual links among developer and several contractors at the same time. This matter generates a number of supply chains at the same time in the near locations. This creates some supply chain network on the same resources. For that reason, each contractor has to conduct procurement, distribution, and storage, which at last increase execution fund of residential building construction. Short term relationship and a number of contractors at the same time increases inefficiency because the wide scale construction is not conducted by mass construction principles with central management. Amount of involved contractors in construction location and the absence of information flow in each contractor generate supply chain in each contractor through using each supplier and subcontractor. By this practice, a number of activities are handled by different parties

Related to supply chain approach, what is believed as one strategy to improve construction project productivity is to strengthen production unit (Vrijhoef, et.al, 2000) in which construction project context refers to contractor and subcontractor or supplier. Competition in construction world that happen nowadays, is not among companies anymore, but among supply chain network (Christopher, 1998). Efficient supply chain will give high competitiveness for the companies that are involved in the chain. Therefore, each company always tries to develop strong and trusted supply chain and to optimize the possible chain and benefit.

Early research of Indonesian construction project supply chain has been conducted by Susilawati (2005). But the research scope is limited to building construction project and the project that uses traditional delivery project system with high fragmentation. From the research, some influencing factors in forming network in construction industry in Indonesia are found. They are:

- Type and scale of project
- Contract method selection
- Project location
- Regulation of construction service procurement
- Organization structure and project management

On the other word, specific project characteristic is to form specific network and supply chain in construction project in Indonesia so that specific role of each involved parties are generated. However, from previous information, it is found that the construction industry in Indonesia do not have a good management ability which are constrained by the use of traditional relationship pattern, inadequate existing regulations in the procurement process, and many obstacles faced in the process of project delivery, etc.

Based on the above discussions, we can summarize some specific issues and problems of the inefficiency in Indonesia construction industry as the following (Figure 7):

- The production process in the construction industry in Indonesia is not run smoothly. This is indicated by a problem on project delivery system such as lack of appropriate material and the necessity to waste valuable resource on rework, etc
- Low skill index and experience of construction worker make the business resistance in conducting new concepts.
- Fragmentation in the project delivery process is still too enormous, and this is indicated by a disintegrated relationship between the various parties involved.
- Most of the relationship is going with the traditional patterns which cause lack of clear lines of communication and lack of good work relationship of not embracing change. This results in the project delay, waste and dispute caused during the construction, increase in antagonistic relationship. Most of these are due to an overall lack of trust of one another.
- Since the construction industry is in the 'change environment' and construction industry in Indonesia can not anticipate the changes, the risks that arise in the Indonesian construction industry are very high.

According to the specific issues above, the industry needs efforts and strategy to have good performance and high competitive power.

6. THE NEED AND STRATEGY TO IMPROVE THE PERFORMANCE AND COMPETITIVENESS

Based on the various explanations above-mentioned, the main problems in the construction industry in Indonesia are identified. The following needs and proposed some strategies are required to improve the performance and capabilities of the competitiveness in the construction industry based on the main problems that arise, which are:

- Promotion and development of techniques related to planning production process and work flow are needed. The strategies that can be done are to develop the Indonesian construction industry towards a more integrated network, such as the development of supply chain management system. Therefore, the industry needs to work on collaboratively network of interrelated processes structured to best project result.
- Development of new relationship pattern is needed to cope with the adverse of change and uncertainty such as relational contracting mechanism. This relationship must be supported by good systems of risk management and value engineering.
- Develop utilization support and an applicable model in the development of new concepts (or approach) is needed to change to better condition. The model should be simple, non-technical, and also suitable to the culture and political condition.
- Lessons are desirably learned from best practices in developed countries such as Japan.

A description of the problem and its efforts and strategies are summarized in Figure 7.

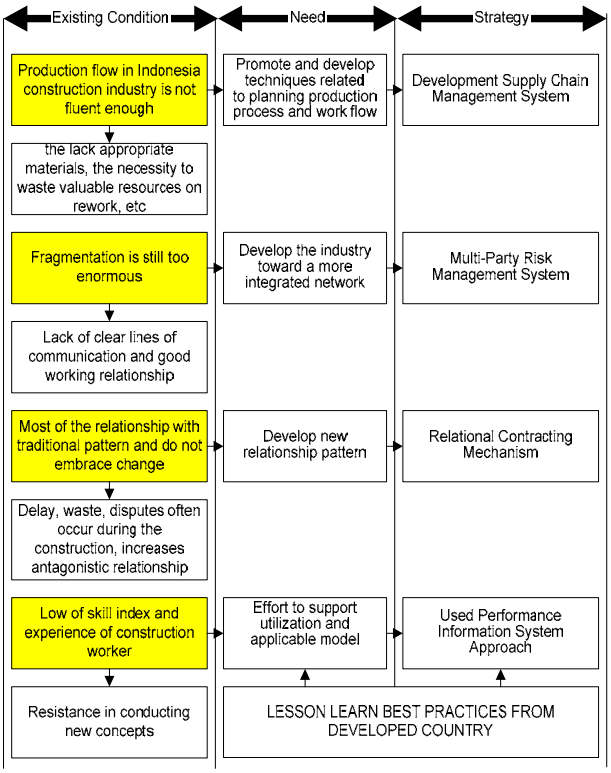

Fig. 7. The problem statement and the need of improvement effort to increase the performance and the competitiveness

7. CONCLUSIONS

To accelerate the development in Indonesia as a developing country required the support of infrastructure development that has a good performance. This can be achieved through improving the quality of the construction industry. Therefore, Indonesia needs to improve the performance of the construction industry because the current condition indicates that the industry is insufficient and has low performance and competitiveness.

The strategies proposed in the process of increasing efficiency and competitiveness is the development model of 'Supply Chain Risk Management System with Relational Contracts Mechanisms, using The Performance Information System Approach'.

The model used should be easy to use and simple but can accommodate a variety of risks and uncertainties caused by the characteristics of the construction project. The model should also be suitable to the culture and political condition.

Lessons are desirably learned from the best practices of Japan construction industry or other developed countries to help the model development process that actually can be implemented. In future, research needs to be done to develop the model.

REFERENCES

Alwi, Sugiharto et al, 2001. *Effect of Quality supervision on rework in The Indonesian Context*, Asia Pacific Building and Construction Management Journal 6:pp. 2-6, Copyright 2001 Chartered Institute of Building (Hong Kong).

Alwi, Sugiharto, 2003, *Factors Influencing Construction productivity in The Indonesian Context*. Proceedings The 5th EASTS Conference, Fukuoka, Japan.

Ballard, et. al, 1998. *What Kind of Production is Construction*, Proc. 6th Annual Conference of the International Group for Lean Construction.

BCI Building & Construction Interchange Asia, 2006. *Indonesian Construction Project Data*, BCI Indonesia Magazine, Ed.2006.

Christopher, M., 1998. *Logistics and Supply Chain Management,* Second Edition, Prentice Hall (book).

Vrijhoef, R. & Koskela, L., 2000. *Roles of Supply chain Management in Construction*. Proc., 7th Annual Conf. of the International Group for Lean Construction.

Ritchie, Bob, et. al, 2007. *Supply Chain Risk Management and Performance, A Guiding Framework for Future Development*, International Journal of Operation and Production Management, Vol. 27, No. 3, pp. 330-322, Emerald Group Publishing Limited.

Sakkal, Matthew, M, 2005. *Project Alliancing: A Relational Contracting Mechanism for Dynamic Project*, Lean Construction Journal Vol. 2, 1 April 2005, ISSN: 1555-1369.

Sandra, E.F., 2006. *Kajian Hubungan Kerja Antar Pihak Terlibat dalam Pelaksanaan Konstruksi Bangunan Perumahan*, Master Thesis, Civil Engineering, Bandung Institute of Technology.

Smith, N, J, 1999. *Managing Risk in construction Project*, First Edition, Blackwell Science (book).

Soemardi, B.W, et al, 2007. *Preliminary study on the Indonesia construction Industry Supply Chain System*. International Seminar Proceeding of ASEAN University Network/Southeast Asia Engineering Education Development Network (AUN/SEED), Bangkok Thailand.

Soekirno, P., et al, 2007. *The disputes in the Construction Project in Indonesia*, Reference Books, Construction, Industrial, Management, and Engineering, ITB Publisher, ISBN 979-3507-98-5

Susilawati, et al, 2007. *Study of Contracting Procurement by the construction of Building Projects*, Journal of Civil Engineering ITB Vol 13 No.3, July 2006, ISSN: 0853-2982.

Syachrani, et.al, 2004. *Model SistemEvaluasi Pemilihan Rantai Pemasok Beton Ready-Mix Sebagai mitra dengan Mempertimbangkan Aspek Negosiasi*, Proc. Seminar on 25 Year of Construction Management Education in Indonesia, TS 32-2.