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Contractor's Performance for Construction Project: A Review

M. R. Lee, Syuhaida Ismail, Mohammad Hussaini
Razak School of Engineering and Advanced Technology, Universiti Technologi Malaysia, Kuala Lumpur, Malaysia.

Abstract
This research aims to evaluate and improve the construction project management. A conceptual research framework was generally developed to perform a study of the project management performance from the contractor viewpoint. The success of construction projects is a fundamental issue for client. In the literature that deals with construction project success and causes of quality, time and cost overrun in the construction industry. Quality, time and cost are the three factors that play important roles in planning and controlling of construction projects. The project success is reflected by quality outputs standards, meeting time and budget objectives. The contractors are involved in this study to validate the research approach. It provides in key performance indicator (KPI) which can be evaluate and measure potential contractors as well as their capacity by requesting these indices. The finding can help construction firms to learn from the best practices of other and carry out continuous improvement. The research methodology has general use thus it may be applied to other contractors with minor modifications.
***Keywords*—**Housing construction project, Contractor's performance

I. INTRODUCTION

Contractor performance can be defined by the level and quality of projects delivered to clients. It has been a common practice however to select the least cost bidder among competing contractors to perform the job. Predicting the performance of construction firms in such a situation is indispensable in order to ensure quality and guarantee international standards. Inefficient management of construction project can result in low performance and productivity. Therefore, it is important for contractors and construction firms to be familiar with the method leading to evaluate the performance of the construction project (Love & Li 2000)

Poor performance such as low quality, time delays and cost overrun are not uncommon in construction project (Lo et al., 2006). Frimpong et al., (2003) suggested that time delays and cost overruns arise primarily as a result of payment difficulties, poor contractor management, material procurement problems, poor technical ability, and escalation of material prices. On the other hand, some researchers have analyzed the major causes of quality defects, one of which Atkinson (1999) identified as human effort and another of which Love & Li (2000) described as poor workmanship. These studies also contributed to the identification of quality, time and cost as the three most important indicators to measure construction project performance. Conversely this may not ensure quality which is an indispensable measure in project delivery. Predicting the performance of the contractor is highly important for both the contractor and the owner.

Quality performance is defined as the totality of features required by a product or services to satisfy a given need, or fitness for purpose (Parfitt & Sanvido 1993). In other words, the emphasis of quality in construction industry is on the ability to conform to established requirements. Requirements are the established characteristics of a product, process or service as specified in the contractual agreement and a characteristic is any specification or property that defines the nature of those products, processes or services, which are determined initially by the client. In order to achieve a completed project that meets the owner's quality expectations, all parties to a project must acquire an understanding of those expectations, incorporate them into the contract price and other contract documents to the extended possible, and commit in good faith to carry them out (Ganaway, 2006).

Time performance is very important for construction projects to be completed on time, as the clients, users, stakeholders and the general public usually looks at project success from the macro view where their first criterion for project success appeared to be the completion time (Lim & Mohamed 2000). Salter & Torbett (2003) mentioned that time variance is one of the techniques for assessing project performance in construction projects. The element of time could indicate to project managers that the project was not running as smoothly as scheduled.

Furthermore, the ensuring timely delivery of projects is one of the important needs of clients of the construction industry. Construction time can be regarded as the elapsed period from the commencement of site works to the completion and handover of a building to the client. The construction time of a building is usually specified before the commencement of construction. Construction time can also be deduced from the client's brief or derived by the construction planner from available project information.

Cost performance is defined as the degree to which the general conditions promote the completion of a project within the estimated budget (Bubshait & Almohawis, 1994). Salter & Torbett (2003) indicated that cost variance was the most common technique used to measure design performance. It is not only confined to the tender sum, but the overall cost that a project incurs from inception to completion, which includes any costs arise from variations, modification during construction period and the cost arising from the legal claims, such as litigation and arbitration. It can be measured in terms of unit cost, percentage of net variation over final cost (Chan & Tam, 2000). Cost variance is a very important factor in measuring project performance because it indicates how much the project is over or under budget. Georgy et al., (2005) suggested the element of cost to measure the performance of engineering projects. Hence, in this article, cost variance is calculated by the variance between the actual cost and the budgeted cost of a project.

Clients' satisfaction is regarded as a function of comparison between an individual's perception of an outcome and its expectation for that outcome. In the construction industry, client's satisfaction has remained an elusive and challenging issue for some considerable time. Dissatisfaction is widely experienced by clients of the construction sector and may be caused by many aspects but is largely attributable to overrunning project costs, delayed completion, inferior quality and incompetent service providers including contractors and consultants (Chan et al., 2001).

Terziovski & Power (2007) suggested that it is five times more expensive to develop a new construction client than to maintain an existing one and companies could increase their profits by almost 100 per cent by retaining just 5 per cent more of their clients. Client's satisfaction is therefore a fundamental issue for construction participants who must constantly seek to improve their performance if they are to survive in the global marketplace. In the construction industry, the measurement of client's satisfaction is often associated with performance and quality assessment in the context of products or services received by the client (Soetanto & Proverbs 2004). Usually the client's requirements are to get construction needs translated into a design that specifies characteristics, performance criteria and conformance to specifications, besides to get the facilities built within cost and time.

II. LITERATURE REVIEW

The issue of shortening construction time, reducing cost and improving production performance has engaged both practitioners and researchers for a long time. The studies include motivation and productivity investigation as well as the analysis of planning and scheduling technique. Project time delay means a time overrun either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project (Hamzah et al., 2011).

Poor site management can cause project delay and effect productivity. A lot of research efforts have been made to study delay causes in different countries (Kumaraswamy & Chan 1995). Bordoli & Baldwin (1998) were found that weather and labor supply to be major causes of delays. Poor risk management, poor supervision, unforeseen site conditions, slow decision making involving variation, and necessary variation works are the principle delay factor in Hong Kong (Daniel & Mohan 2002).

The contractors' satisfaction with the employer and consultants was tested with regard to overall performance, the quality of the tender documents and specifications, efficiency, openness and transparency of the contract procurement and the management of variation orders and claims. (Leung et al, 2004). The best overall employer categories were public corporations and public private partnerships with an average satisfaction level of 83% followed by provincial departments with 82%. The worst overall performance was achieved by the private sector and district councils, with a satisfaction level of 79%. Bearing in mind that a score of 80% means satisfied, then the lowest score achieved is of no concerned (Yang & Wang 2003)

The average overall performance of the agents, in the eyes of the contractors, was slightly lower than the performance of the employers. The contractors were satisfied with the quality of the documentation and specifications, but the private sector and national departments received a slightly lower score of 78%, and district councils the lowest score of 77%. The contractors were satisfied with the procurement of the tenders. The contractors' satisfaction levels were definitely lower for the management of variation orders (VO's) and claims. The national departments received the lowest scores of 73% for VO's and 71% for claims. (Holt et al., 1994)

Contractors were requested to indicate their

overall satisfaction level with their materials suppliers, the ability of the suppliers to keep to their quoted and agreed upon delivery schedules and whether the materials delivered on site complied with the specifications. Only the materials suppliers of building projects received an overall performance score of slightly less than 80% (satisfied). The problem was their capability to stick to the agreed upon delivery schedules (77% to 78%) and not with the quality of the materials delivered, as the scores received for materials delivered as per specification were above 80%. (Luu & Sher 2006).

The materials suppliers' data was also evaluated in terms of the contractors' financial grade. There is a tendency for the higher financially graded contractors (7 to 9) to be less satisfied with their materials suppliers' performance. The problem experienced was not with the quality (specification) of the materials, but with the delivery capability of the suppliers. Their projects were larger and it is likely that suppliers could not keep up with the larger orders placed (Albino & Garavelli 1998).

III. CONSTRUCTION PROJECT AND PERFORMANCE

Success of construction projects depends mainly on success of performance. Many previous researches had been studied performance of construction projects. Dissanayaka and Kumaraswamy (1999) remarked that one of the principle reasons for the construction industry's poor performance has been attributed to the inappropriateness of the chosen procurement system. Reichelt and Lyneis (1999) remarked three important structures underlying the dynamic of a project performance which are: the work accomplishment structure, feedback effects on productivity and work quality and effects from upstream phases to downstream phases. Thomas (2002) identified the main performance criteria of construction projects as financial stability, progress of work, standard of quality, health and safety, resources, relationship with clients, relationship with consultants, management capabilities, claim and contractual disputes, relationship with subcontractors, reputation and amount of subcontracting. Chan & Kumaraswamy (2002) stated that construction time is increasingly important because it often serves as a crucial benchmarking for assessing the performance of a project and the efficiency of the project organization. Cheung et al (2004) identified project performance categories such as people, cost, time, quality, safety and health, environment, client satisfaction, and communication. It is obtained by Navon (2005) that a control system is an important element to identify factors affecting construction project effort. For each of the project goals, one or more Project Performance Indicators (PPI) is needed. Pheng & Chuan (2006) obtained that human factors played an important role in determining the performance of a project. Ugwu & Haupt (2007) remarked that both early contractor involvement (ECI) and early supplier involvement (ESI) would minimize constructability-related performance problems including costs associated with delays, claims, wastages and rework, etc. Ling et al (2007) obtained that the most important of practices relating to scope management are controlling the quality of the contract document, quality of response to perceived variations and extent of changes to the contract. It was recommended for foreign firms to adopt some of the project management practices highlighted to help them to achieve better project performance in China.

IV. CRITERIA FOR THE SELECTION OF CONSTRUCTION PROJECT CONTRACTOR

Contractor evaluation is often performed by industry professionals using their accumulated experience and judgment. There are variations in the amount of effort expended in the process, often without an understanding of how such variations influence the project outcome. An important step in evaluation is to examine the contractor's system for handling project information regarding work tasks. The contractor's approach to safety and what actions it takes to achieve desired results should be closely scrutinized. (Atkinson, 1999).

Many factors should be considered during the contractors' qualification screening. The following list includes most of the key components that should be examined when conducting a contractor qualification. (1) Financial standing, such as financial stability, turnover, profit, obligations, amounts due, and owned financial funds. (2) Technical ability, such as experience, plant and equipment, and personnel. (3) Management capability, such as past performance and quality, quality control policy, quality management system, project management system, experience of technical personnel, and management knowledge. (4) Quality, safety, senior management, including experience, tenure with firm, and division of responsibilities. (5) Current projects/backlog, including number, size, and location of projects, percent of capacity being utilized, and status and expected completion, past failures in completed projects, number of years in construction, past client relationships and cooperation with contactors (Salter & Torbett., 2003).

One way to collecting the data necessary to perform contractor evaluations is to conduct questionnaires. But in this way, contractors will be tempted to answer in a way that puts them in the best light. For instance, one commonly used questionnaire

asks contractors if safety is a priority in their business. (Georgy et al., 2006). The key to a successful methodology is to develop an objective form, from which a database can be built that allows for fair comparisons of contractors. The form should be easy to use. Anyone on the bid evaluation team should be able to conduct the assessment and compare the results (Lee 1998). Furthermore, owners must carefully analyze the data submitted by contractors. It is not prudent to ask the contractor to provide answers about the viability and completeness of its program and then simply rely on those answers when drawing conclusions about the effectiveness of its efforts. (Lim & Mohamed., 2000). Objective information needs to be obtained and, more importantly, mechanisms for verifying the accuracy of the data need to be developed before any conclusions can be drawn (Biazzo & Bernardi 2003).

V. ANALYSIS OF THE CONTRACTOR IN THE CONSTRUCTION PROJECT

Project construction must be managed in an effective manner. The demands from clients, competition, and regulatory agencies have been growing rapidly (Andi & Minato 2003). These challenges present a paradox: few of these demands directly contribute to the physical construction of the project. However, a failure to properly manage them can lead to problems for the entire project and construction team. The selection of a proper construction contractor increases chances of successful completion of a construction project. It can also fulfill the client goals, and keep the schedule of the cost, time and quality. So it is extremely critical to select an appropriate contractor in the process of construction management (Terziovski et al., 2003)

The selection of construction contractors are very often conducted during tendering. Tendering indeed gives a client a choice in awarding contract a company which proposes the lowest price and short construction cycles, but usually they do not allow to precisely evaluating a tenderer. At the same time there are more and more procedures in which the decisive criterion of choosing a tender is the price. In recent years, most clients made use of such a method.

(Willis & Willis 1996). On the other hand, the research results show that the cheapest tenderers often have problems with completing the project. Accepting the lowest price is the basic cause of the project completion problems because very often lowering the price means lowering the quality. It is true in some cases. The above conditions make that it is especially important to properly evaluate the contactor's capabilities. We analyzed in this paper the frameworks applied in the selection of construction project contractors, and summarized the criteria for selecting a suitable contractor. (Kometa et al., 1995).

It is complicated to select a suitable contractor. Bid evaluation is one of the major challenges that face owners and consultants in the public and private sectors. Nevertheless, there are objective means to gauge the ability of a contractor to properly manage the business aspects of the construction project (Georgy et al., 2005). Some models and frameworks have been created to evaluate contractors' bids and select the most appropriate one.

The evaluation can be done beforehand with a prequalification method to ensure the quality of contractors. Facing the owner's scrutiny regarding its competency to handle the business aspects of the operation during prequalification allows the contractor to focus on the specifics of the construction project once it has passed through prequalification and been short-listed. This also allows the owner's bid evaluation team to focus only on the specific elements of the project, without being distracted by the other business considerations. (Soetanto & Proverbs 2004).

In the simplest meaning prequalification is a before tendering procedure which allows to choose the most appropriate candidates from amongst those declaring willingness to participate in the tendering. The aim of prequalification is often not only contractor competence evaluation but also limitation of potential bidders. In such a case it is necessary not only to judge whether the contractor fulfills the basic criteria, but also to what degree they are fulfilled. Not all criteria are equally important for the client. The basic issue is assigning the right weights to the criteria. (Kumaraswamy & Thorpe 1999).

However, there is also a defect of the prequalification method. Time will necessarily pass between when the contractor is qualified and when it submits its bid. Things within the firm could change. This problem can be corrected with an update of the qualification data during the bid. The problem with performing contractor assessments during bidding is that it adds steps to the bid evaluation process. It requires evaluating both the contractor's business competency and its qualifications as a builder in the same process. In practice, prequalification can be a form of "registering" the contractors capable of completing given tasks. (Daniel et al., 2002).

Contractors are usually grouped depending on some chosen factors, like possessing specialist equipment to perform a given type of works. The following groups of criteria have been suggested: (1) Responsiveness, promptness, realism, completeness. (2) Meeting deadlines, correctness and valid information, totality in providing information. (3) Responsibility, obeying the law and complying with local government regulations, standards and bylaws,

quality system, safety system. (4) Competence, recourse (financial, machinery, plant and equipment, human resources), experience, constraints. (Ugwu & Haupt 2007).

Atkinson (1999) conducted a research in the UK. They selected 80 contractor firms. The firms were divided into three categories (large, medium and small) depending on the annual turnover. The respondents were asked to give the number of contracts in which they carried out prequalification. The following results were obtained: small firms – 31%, medium firms – 48%, large firms – 72%. Thus, the highest percentage of contracts preceded by prequalification was pointed by large firms.

VI. CONCLUSION

Construction projects and their success are closely related to contractors. They start their main duties when the project reaches the construction or execution stage where the actual work of the project is accomplished. This research reports the statistical results of a survey aimed at collecting perceptions of construction practitioners, in post construction evaluation, about the contractor impact on the success of a project.

Framework for the improvement of the construction process has been very effective in achieving significant improvements in several construction projects. The framework has been developed from repeated experiences of supporting construction companies and projects in their improvement efforts. The use of a structured framework provides systematic information gathering about the construction process and a sequence of logical steps based on a general problem solving approach that increases the potential of a successful improvement project. This approach allows repeatability and reliability of improvement efforts that can be fed back with experiences and lessons learned from previous projects.

In addition to the framework used for improvement, there are some requirements that are necessary for achieving good results. One of them is obtaining commitment of all the people involved in any improvement effort. Without their support and participation it is not possible to achieve improvements. A second important requirement is to carefully plan the implementation of improvement actions. This stage is by far the most difficult and complex one and should be seriously studied. Within the framework it is very important to select the appropriate tools and methods to carry out the improvement activities. Experience plays a very important role in this respect.

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