

Affecting on Contract Administration in Government Construction Projects

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Abstract

This research aims to study the factors, which affect contract administration in Thai government construction projects. It concentrates on contract administration under the Regulations of the Prime Minister on Procurement B.E. 2535 (RPMP. (B.E.2535)), which is problematic in construction projects. The project management of the private sector was also studied and assessed alongside government methodologies. The research was conducted by using mixed methodologies, both quantitative and qualitative. The study concludes the factors that affect the government's project contract management are both public and private sectors internal influences. The problem is caused by personnel, documentation, and the work processes; primarily occurring before the auction procedure, RPMP. (B.E. 2535) its self is not a direct hindrance. Construction management is in private sector control and to be effective it must carry out the recognized project start-up protocols. The government contract administration should be managed using the PDC model, which should improve continuity and flexibility in both stages: before bidding and construction.

Keywords: Affect; Contract administration; Government; Construction; Project Management

INTRODUCTION

The construction industry is part of a country's overall economic indicator. The configuration of the construction industry consists of many factors that have an effect on developing countries. In Austria, the construction industry has a direct impact on economic and social development of the country, representing 10 % of GDP and 10% of the gains that would result in a GDP increase of 2.5% [1]. The Chinese government has given high priority to the construction industry, and rapid developments over the last 30 years have improved management techniques within organizations, increased construction project productivity, created mechanisms for procurement and competition by increasing the efficiency of construction projects. Also, generated technological and project management innovation, enhanced efficiency and effectiveness in the management of construction projects, resulting in China's development

progress [2]. The construction industry in Thailand is considered vital to the country, according to the results of the government procurement Fiscal Years 2012-2014 the government has invested a total of 1,058,996.11 million baht in construction procurement [3]. From the above-mentioned investments it can be seen that investment in the government construction sector is important for developing the countries, additionally it also stimulates the economy [4]. The overall trend in the construction industry of Thailand during the year 2015 was quite sluggish due to delayed bidding for government projects. However, in 2016 there was a surge in infrastructure construction projects to achieve the target of 3.8% GDP, to compensate for the economic and export sector slowdown. Moreover, the method used for project preparation was PPP Fast Track, this reduced the steps in the procurement process [5]. An analysis of government policies to stimulate the Thai economy shows the government has taken measures to expedite the annual budget spend by focusing on infrastructure investment in construction projects of three departments: Department of Highways, Department of Rural Roads, and the Royal Irrigation Department. Expediting the payments of government projects to stimulate the overall economy of the country is extremely important. The factors that contribute to the success of a project are construction contract management in accordance with the plan, but if the contract management make any mistakes it will result in a project delay.

For government construction projects and the contract administration of these projects, adhering to the Regulations of the Prime Minister on Procurement B.E. 2535(RPMP (B.E.2535)), includes all the steps from project concept to completion. The terms of the regulations requires that the government department that wants to build are responsible for the start-up processes prior to construction commencement and the contractor is obliged to comply with these regulations. In the implementation of the regulations, the people involved in the various operational stages could be from different groups of people. In fact, all parties of the project management team must use the document during the construction process. But several times during construction there have been problems regarding the definition of the documents required, this result in conflicts at work and affects many aspects of contract management. The government and

the private sector have different targets in the management of construction projects, hence good construction management of contract processing is particularly required.

In addition, for success in contract management, the government contract administration must be coupled with the private sector administration of the required construction project. Project managers need to be knowledgeable of the contract, construction project management, contract administration and project management. In general, the construction project management process will be an ongoing relationship and relate to employers, contractors and supervisors. The participation of each party will vary according to the function of each group, which is involved in the construction project. However, the steps of the operation remain similar. The first step to start the process is to determine the construction project plan; all parties are involved in the preparation of the contract documents, which makes it possible to plan the construction contract administration and project management. [6] mentioned "The preparation of the contract and documentation is an extremely important step. Preparation of clear contract guidelines, accuracy and consistency of the contractual document, is useful when a conflict occurs. Modifications or additional agreements to achieve a complete and appropriate construction employment can be agreed post approval of the construction project plan."

OBJECTIVS

This research aim is to study the factors which affect the contract administration in a government construction project and the contract administration under (RPMP. (B.E.2535)), which is the perceived problem in construction projects. Additionally, to study the project management of the private sector to supplement the government contract administration in order to reduce any negative impact and offer solutions to improve the contract management of government construction projects.

THEORETICAL BACKGROUND

General construction projects were slowed down. Studying the sources of these effects [7] showed the factors affecting construction companies in Turkey. The factors can be divided into seven groups: contract, time, value, quality, humans, communication, and risk management, each group has 36 factors [8]. There are 99 factors of construction delay categorized into nine groups in Lithuania [9].

In Greece, the construction contract patterns were studied according to nine criteria: price fluctuation, varied scope of work, varied operations, values, time conditions, qualities, personnel qualifications, contract complexity and claim conditions. It was found that unit priced contracts were more appropriate for managing complexity than fixed price contracts [10]. Procurement, services and public private partnerships (PPP) were studied. In Nigeria, there were problems regarding using the mentioned contracts to develop public utilities because of unclear public policies and lack of

knowledge regarding contract principles [11] The goal of biddings is to set the lowest price, this affects the construction times and quality control. Hence, the construction cost, time, and warrantee period must be considered [12].

Regarding public contract management in Thailand, the employer must follow the RPMP. (B.E. 2535). Thus, construction contract managers must ensure that contractors comply with the contracts, relevant documents and regulations by checking the construction plans, receipt and withdrawal of monies, follow up penalty notifications and payments, and the extension of construction time. Most public related contracts followed the attachments of the regulations. Construction management involves many fields and it is studied domestically and internationally [13]. The decision making options were studied by analyzing the risks from the options in order to maximize benefits [14]. Mathematical models were applied to create the best options. Countries in the European Union tried to standardize construction contracts. In Romania, contracts under Romanian laws were studied in order to improve the contracts [15]. The three important components were introduced: clear conditions, dispute solutions and flexibility. In the Czech Republic, Civil Code 2012, Civil Code 1964 and Commercial Code were studied [16]. The responsibilities and defect warranties were stated in a new law.

Construction contracts are tools for specifying the rights and duties of stakeholders as well as stating the intentions of the parties. There are various activities in construction projects including installation, repair, demolition and construction [17]. The activities and stakeholders affect construction projects. It is difficult to integrate the components because the relationships among the stakeholders as well as scopes of works are unclear. In the United Kingdom, the stakeholders were divided into five groups: constructors, designers, lawyers, employers and users. However, decision making is difficult because the duties of each group are unclear. Hence, the construction flexibility and criteria were required.

[17] mentioned that construction contracts in the United States follow many standards such as ICE 6 (Institution of Civil Engineers of Contract 6th Edition, 1991), JCT80 (Joint Contracts Tribunal Standard Form of Building Contract, 1980 Edition), IFC84 (Joint Contracts Tribunal Intermediate Form of Building Contract, 1984) and MW80 (Joint Contracts Tribunal Minor Works Form of Building Contract, 1980). Construction risks were also mentioned. That is, the finance of the project owners affected the main and sub-contractors. Complaints about time and payments usually occur. Since the contractors need cost efficiency and speed, it is difficult to measure construction qualities.

RESEARCH METHODOLOGY

This research uses mixed methodologies including qualitative, quantitative, documentation and description. In-depth interviews and questionnaires were used for collecting data from the stakeholders. Statistical analyses were used in order to identify relationships and reliabilities were also tested. The conclusions are presented in the Descriptive Research.

A. Qualitative Research & Quantitative Research

The in-depth interview was developed from relevant documents and studies. The content validity was tested by consulting with three experts in construction contract and law compliance.

The structured interview and questionnaire were developed from relevant documents and studies about the factors affecting public construction contracts. The interval and Likert scales with five levels (i.e. 5 = the highest level and 1 = none) were used. The content validity was tested by consulting with three experts and then administering it with 20 samples. The reliability was analyzed by using Cronbach's method developed from the KR-20 formula of Kuder-Richardson.

$$\alpha = \frac{N}{N-1} \left(1 - \frac{\sum s_i^2}{s_t^2} \right) \alpha = \frac{N}{N-1} \left(1 - \frac{\sum s_i^2}{s_t^2} \right) \quad (1)$$

where:

α = the coefficient of the measurement tool

s_t^2 = the variance of the scores from all items

$\sum s_i^2$ = the total variance of the score of each item

N = the number of all items.

The non-purposive sampling method was used. The samples were divided into public employee, private employee and stakeholder parties. The number of traders within the public sector who were juristic persons registered in the e-GP system was 43,433. This included juristic persons, limited companies and public limited companies. The number of these entities was 23,158 [3]. The number of samples was specified [18]. The causes of the construction delays in Egypt were studied according to the following formula.

$$n_o = \frac{p \times q}{v^2}, n = \frac{n_o}{1 + \frac{n_o}{N}} \quad (2)$$

Where:

n_o = the estimated value of the initial samples

p = the proportion of the target population

$q = 1 - p$

v = the error of the samples

N = the number of the total population

The percentage of v [18] was 10%. The minimum number of samples was 24.87. Since there were three sample groups, the number of total samples was 75. The descriptive statistics included mean, standard deviation, variance and relative importance index (RII).

$$RII = \frac{\sum_{i=1}^5 W_i X_i}{AN} \times 100\% \quad (3)$$

Where:

W_i = the effect measurement criteria (1-5)

X_i = the number of the answers for each criteria

A = the highest criteria

5N = the number of all questionnaires.

For improving the contract management, the severity index (SI) was used.

$$SI = \frac{\sum_{i=1}^5 W_i X_i}{AN} \times 100\% \quad (4)$$

Where:

w_i = the efficiency improvement criteria (i.e. 1-5)

X_i = the number of the answers for each criteria

A = the highest criteria

5N = the number of all questionnaires.

The data were collected from the questionnaires and interviews. The completeness and validity of the data were checked by using the triangular method in terms of data, researcher and theory. The conclusions are using descriptive from interview and data from field data analysis, comparing the synthesis of research articles, petitions, past decisions, and The Attorney General's decision supports the rationale.

RESULTS AND DISCUSSION

A. Affection to Contract Administration in Government Construction Projects

The factors affecting Contract Administration in Government Construction Projects, the top five ranked results are shown in Table 1.

Table 1: Rank of factors affecting in Contract Administration

Factors affecting in Contract Administration	Skewness	Mode	SD.	RII (%)	Rank.by Top 5
Quality					
Roles and duties of the stakeholders.	-0.424	5	1.273	78.76	1
Preparation of the technical requirements of the materials.	-0.734	4	1.188	74.43	2
Clear scopes and objectives of constructions.	-0.569	5	1.384	73.20	3
Construction techniques.	-0.505	4	1.195	72.16	4
Constructor selection.	-0.506	4	1.031	77.55	5
Time					
Lack of workers.	-1.296	5	1.000	85.57	1
Slow decision making.	-0.945	5	1.040	81.03	2
Defects caused by the contractors.	-0.716	5	1.030	79.59	3
Construction planning.	-0.934	5	1.230	78.97	4
Construction changes.	-0.683	5	1.030	78.14	5
COST					
Design problems.	-0.970	5	1.117	79.18	1
Construction changes.	-0.771	5	1.074	78.97	2
Constructors' faults.	-0.806	4	1.023	78.56	3
Lack of workers.	-0.871	5	1.163	77.73	4
Additional tasks not stated in the contracts.	-0.802	5	1.142	77.32	5

The above mentioned factors are pre-contract factors affecting the management during the construction period, since the construction must be conducted in accordance with the documentations and requirements. This is consistent with a study about public budgets [19] and another study about minimum quotations [20]. The construction periods and qualities were affected by faults of contractors who did not understand the details of the tasks. Another factor is coordination. This is consistent with other studies summarizing the factors of employers before quotations and during constructions [21], [22].

1) Factors affecting construction management for quality control: There are fourteen factors affecting the quality of construction management. There are three contract management factors and two external factors. The results, the top five from the ranking are:

- a) The roles and duties of the stakeholders (RII = 78.76%). This is consistent with a study in Egypt [8].
- b) The preparation of the technical requirements of the materials (RII = 74.43%). There were problems of unclear requirements as studied in Turkey [7].
- c) The clear scopes and objectives of constructions (RII = 73.20%). There were problems of unclear scopes causing construction delay for the Suvarnabhumi Airport Rail Link [23].
- d) Construction techniques (RII = 72.16%). This was caused by the lack of experience of the employers and contractors [24].
- e) The contractor selection method (RII = 71.55%). This is consistent with the delays found in Egypt [18].

2) Factors affecting construction management for time control: The factors related to construction management problems in terms of time were as follows. There were six documentary factors, sixteen contract management factors and eight external factors. The top ranked five from the results are:

- a) Lack of workers (RII = 85.57%).
- b) Slow decision making (RII = 81.03%). This complies with another study [8]. The factors of delay were changes by the taskmaster(s) and multiple consideration processes [25].
- c) The constructors' faults (RII = 79.59%). These were caused by problems in the teams [8], [26].
- d) Construction planning (RII = 78.97%). This occurred with both employers and constructors during construction design and initial construction planning [18], [24].
- e) Construction changes (RII = 78.14%). This factor is an important problem in terms of time. This is consistent with many studies [27]-[29].

3) Factors affecting construction management for cost control: The factors affecting construction management in terms of costs are as follows. There are six documentary

factors and eleven construction management factors, and nine external factors. The top ranked five from the results are:

- a) Design problems (RII = 79.18%).
- b) Construction changes (RII = 78.97%).
- c) Constructors' faults (RII = 78.56%).
- d) Lack of workers (RII = 77.73%).
- e) Additional tasks not stated in the contract (RII = 77.32%).

These five factors directly affect costs [7]. The most important factor of company costs in Malaysia was the design and documentary factor, while the second most important factor was changes required by the owners [30].

B. Contract administration under the Regulations of the Prime Minister on Procurement B.E. 2535

The contract administration under the Regulations of the Prime Minister on Procurement B.E. 2535 is not specific. The details are as follows.

1) Personnel:

a) Since employment committees set the general requirements in order to provide recruitment flexibility, there were gaps in contract management. Different committees had different understanding of the background of the construction projects. They were not well informed prior to the meetings because these were not their main duties. Public construction management was affected by the scarcity of public officers with professional construction knowledge. It is suggested to obtain the supports from relevant professional foundations and is consistent with a study about contract dispute resolutions for engineers who were not suitable as middlepersons and making inappropriate resolutions [31].

b) Regarding the taskmaster(s), it was found that they were very important for the public construction management, since they were the ones controlling and solving problems. Hence, they must be qualified and comply with the ministries' regulations on engineering professions and control engineering (B.E. 2550) and those of the Council of Engineers. By considering the scopes of their duties and professional management, they are considered as the construction controllers [32].

In this study, it was found that the Regulations of the Prime Minister on Procurement does not obstruct public construction management. On the other hand, the regulations provide opportunities for public officers and permanent employees from both internal and external organizations. However, there were problems about the scarcity of the public officers with expertise and qualities required for proficient construction management. Moreover, the assigned workers did not participate in the pre-procurement processes. Hence, they did not understand the background details of the projects. These duties were also additional duties to their normal employ, thus they could not comprehensively control the tasks. This may cause consideration problems and approval delays as

summarized in a study about disputes regarding public construction management.[25].

2) *Contract and Documentation:* The Regulations of the Prime Minister on Procurement regarding contracts and attachments does not directly obstruct public construction management. Nevertheless, the management was indirectly affected by the procedures of the regulations. Disputes would not be found if the contract documentations were not questionable. The construction periods should be stated in the documents and can be amended if there is any procurement defect without affecting quantities and construction values. The amendments must be consistent with the construction techniques.

For incorrect contract documents caused by the procedures of the regulations, the mentioned procedures require coordination among various officers before procurements. The compliance with objects, plans, lists, specific requirements, quantities and prices were not examined. The guidelines for contract document preparation and selection were concluded in order to reduce the mentioned risks [33].

3) *Procurement Process:* The procurement of the public sector according to the regulations of the Officer of the Prime Minister do not obstruct public construction management. However, there were two concerns.

Firstly, short bidding periods might be caused by inappropriate planning. The managerial policies must be promptly used. This is consistent with a study about the activities of the public sector before constructions [19]. Secondly, the lowest bid prices were valued by the public sector. This is consistent with a study about bidding focusing on price, time and warrantee [12].

In general, the regulation of the Officer of the Prime Minister on Procurement does not cause direct obstacles. However, the regulations caused indirect obstacles. The objectives of the regulations are to promote transparency and fair competitions and to prevent corruption. Nevertheless, the regulations apply the principles of the public sector and those of Civil Laws. Consequently, this is unfair for the private sector [34]-[37]. The main causes of public construction management problems are the complex regulations [38].

C. Principles private sector management promote to contract administration of the government

The goals of the public construction management are to meet the construction requirements within the specified periods and to control the construction costs according to the law, engineering requirements and customer needs. This leads to six management steps [32]. It was found that all six steps are relevant and continuous. If any error occurs in any step, then it will affect the following step(s). This complies with a study about the changes in the construction of the transportation system in the Netherlands because of technical requirements [39]. To successfully conduct private construction projects,

the project costs are important [40].

Most public construction management problems occur during the first, second, third and fourth steps. This is consistent with a study about the factors of the success of the projects [41].

D. Guidelines for improvement of government contract management

To improve the construction management, there are two parts (i.e. pre-contract and construction processes). In the first part, the scopes of the projects must be clearly specified according to the requirements. Since organizations have limited engineering knowledge, errors might be found [21], [41]. The following nine items must be considered during the design and procurement processes. Second, there are five guidelines for efficiently managing construction contracts as shown in Table 2, that shows a separate guideline for each step in the process. The listing is by the sequential steps in the construction process not by the SI value.

Table 2: Guidelines for improvement of government contract management

Improve the construction management in Government projects	SI. (%)
<i>Design and procurement processes</i>	
Pattern and item preparations and examinations must be consistent.	80.00
Construction quality must be consistent with the construction value.	80.82
The construction technique must meet the construction principles.	82.06
The project plans must meet the construction principles.	79.18
The project values must meet the construction principles.	77.53
The payment periods must be clearly specified.	75.88
The contracts must state the size and details of the construction projects.	82.27
The contracts must be amended according to the tasks of each project.	78.35
The definitions of the special tasks and amendments must be clearly stated.	75.67
<i>Construction contract processes</i>	
The additions of the duties of the taskmasters must comply with the professional scopes of the Engineering Institute of Thailand.	75.46
The stakeholders of the projects must understand the inspection system according to professional standards.	84.44
Reasons to extend the construction periods must be clearly stated.	74.02
Additions of the coordination process must be considered.	72.37
Extensions of the coordination periods must be considered.	72.99

CONCLUSIONS

The main components of efficient and effective construction management are personnel, documentation and contexts. To solve problems, the contexts must be checked. To promote flexibility, transparency must be maintained. To accustom personnel, support from professional organizations must be obtained. Hence, to improve the management guidelines, the public sector must improve the whole system according to the PDC model as shown in Figure 1.

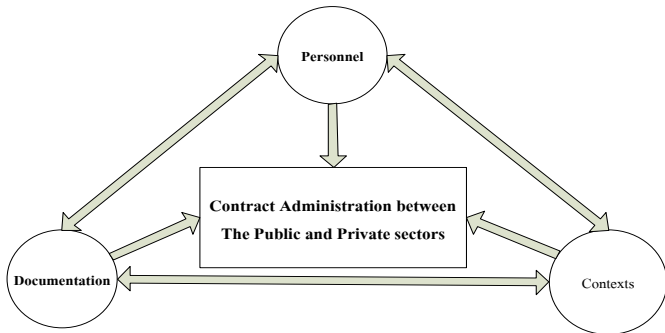


Figure 1. Personnel Documentation Contexts Model

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