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Competency Level Evaluation for Construction Management in Southeast Asian Countries

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Abstract: Recently, countries in the South-east Asia are making efforts to enhance the construction industry system and introduce the construction management system. However, it is challenging to apply construction management in site due to lack of technology and professionals for CM. This can result in frequent safety accidents, cost overrun, schedule delay, etc. Therefore, it is necessary to carry out a clear evaluation of the overall situation regarding the level of technology and required competency. The objective of this research is to investigate on which management skills and items for CM are required to improve the construction management skills in South-east Asian construction industry. As a result of the questionnaire, most of the officials selected that the design phase and the construction phase are important works, and the engineers evaluated activities during the bidding phase, the design phase and the construction phase as important works for construction management. However, in most of the results, it was observed that the current competency of Vietnam construction is insufficient compared to the evaluated importance of the skills. This can be explained by the fact that they are not capable of managing construction projects effectively as compared to the importance. The results can help to realize the inadequate aspects of local construction industry, which will be the basis of improvements. Also, it is expected to be supportive to improve construction management in the countries and also provide indicators related to work stage or technology that should be acknowledged when establishing the advancing strategy for Southeast Asian countries in the future.
Key words: Construction Management, Competency Evaluation, South-east Asia, International Construction Market

1. INTRODUCTION

1.1. Research background

In recent years, diversification of overseas market is being demanded due to external factors such as the oil prices, and interests on Southeast Asia countries have rapidly increased. GCPOE (2013) expects to see a booming construction market in Southeast Asia's emerging markets due to increasing demand

for infrastructures according to a growth of population including young people and urbanization phenomenon [2]. In addition, Global Insight (2015) estimates that the Southeast Asian construction market will grow by nearly $420 billion, which is about 5% increase compared to last year [1].

Along with these global circumstances, south-east countries are also trying to adopt construction management system for efficiently managing construction project and to improve the existing poor construction management [4]. However, Southeast Asian countries lack the ability to manage the construction site due to the lack of professional manpower, technology, and skill, thus resulting in poor quality and frequent safety accidents [5]. Therefore, the main objective of this study is to investigate the required construction management technique to apply CM in Southeast Asian countries. Among the Southeast Asian countries, this study addresses on Vietnamese construction industry because Vietnam, which has excellent growth potential and domestic cooperation conditions, has been considered as a preferred country for CM application [7]. The result of the research can be used as a key factor for the improvement of the construction industry and application of CM in the corresponding country. Furthermore, it is expected to be used as a guide for securing competitiveness for entering into the countries.

1.2. Research process

Based on literature reviews and interviews with specialists, this research has extracted the essential tasks for construction management. By using the extracted tasks, this research constructs the questionnaire to evaluate the importance and the present industry's capability for conducting construction management. The surveys were sent to public officials and engineers employed in the construction industry. From the evaluation results, this study identifies the essential construction management skills which are needed to carry out construction project management in Southeast Asian countries in terms of necessity and importance. Finally, this study proposes key items to be focused when construction companies expand into Southeast Asia. The surveys were focused on Vietnamese construction industry which is developing recently.

2. Literature Reviews

2.1. Status of the Vietnamese Construction Market

In Vietnamese construction industry, there are various construction-related laws, including various contents such as site investigation, planning, design, investment, project management, construction, supervision and inspection, and cost management [3]. However specific contents such as standard procedures and documents for CM Implementation are very deficient. In actuality, Vietnam construction law and enforcement ordinances regulate tasks related to CM [5]. However, they have focused on quality management, and the other managements are regulated schematically without specific methods, procedures, etc. In addition, lack of experts to carry out construction management and lack of experience in large scale construction management make it difficult to carry out construction management [7].

In the case of complex projects such as high-rise buildings requiring high-level skills, the foreign construction companies have mainly performed construction, even if the local companies participate in the projects [5]. This is because the Vietnamese local construction companies have a certain level of technology. However, they are insufficient to conduct advanced technologies and knowledge for CM such as cost management, schedule management, design management, safety management and environmental management. Because most of the Vietnamese construction companies are small and lack of economical funds. In addition, due to lack of equipment, they participate in construction in limited conditions. Thus, they mainly engaged in small-scale construction requiring only simple technology.

2.2. Advancing Status of Foreign Construction Companies on the Vietnam Market

In Vietnamese construction, foreign investment in major residential and commercial facilities has increased. According to data published by the United Nations, Vietnam has been ranked as a country with a high potential for urban growth in the future, and the urbanization rate is estimated to be 33.6%

by 2015 [8]. Urbanization in Ho Chi Minh City and Hanoi City are expected to lead the increasing demand for various residential and commercial facilities [7]. It will increase demands for construction management due to the large-size and complexity of the projects in order to effectively manage the projects [6]. Therefore, it is necessary to understand what kind of management is urgently needed among various construction management skills. This can serve as a strength for the construction company in entering into Vietnam construction market.

According to the analysis of the data published by Engineering News Record (2015), a total of 58 companies entered the local construction [9]. By nationality, China have reached the largest number of enterprises with 19, followed by 12 from Japan, 10 from Korea and 3 companies from France, Italy, and the USA, respectively [9]. A total of 103 companies were advanced in the engineering field. By nationality, the US had the largest number of companies with 27, followed by 12 from Korea, 11 from Japan, 8 from China, and 6 from France [9]. The result of the examination information shows that the Chinese companies have the most advancement in the construction field. This is because the most of the local construction has been carried out through the support of the loan of China [5]. On the other hand, in the engineering field, US companies account for a high proportion of local market advancement, because engineering field requires a considerable level of technological expertise, and US companies are highly likely to have superior competitiveness in the local market.

3. Evaluation of Competency and Importance regarding CM

3.1. Extracting Key Items for the Construction Management Evaluation

This study extracts key items for construction management through interviews with experts in order to evaluate an ability for construction management of Vietnam construction industry. The derived management items consist of essential items.

Table 1. Number of contract and cost

Project process and Competency			
Project plan stage (A)		**Bidding plan stage (C)**	
A1	Ability to project understanding	C1	Ability to set construction condition
A2	Ability to feasibility study	C2	Ability to facility specification definition
A3	Ability to establish of procurement strategy	C3	Ability to establish project management plan
A4	Ability to set project plan	C4	Ability to estimated cost selection
A5	Ability to stakeholder management	C5	Ability to contracting strategy
A6	Ability to coordination and consultation	C6	Ability to selection of contractors
Design stage (B)		**Construction stage (D)**	
B1	Ability to selection of design specification	D1	Ability to understanding of the contract book
B2	Ability to design examination	D2	Ability to understanding of technique and procedure
B3	Ability to technical examination	D3	Ability to determine construction progress
B4	Ability to environmental assessment	D4	Ability to change of design
B5	Ability to determine design process	D5	Ability to construction quality management
B6	Ability to design quality management	D6	Ability to safety management

Based on the items, this paper constructs a questionnaire, which is composed of two phase; (1) importance and competence evaluation phase, and (2) necessity and urgency evaluation phase of the CM. As illustrated in Fig. 1, the questionnaire includes 37 questions containing 26 questions for importance and competence and 11questions for necessity and urgency.

The questionnaires are sent to the engineers and officials having various experience in the Vietnam construction and are returned 46 responses, public officials (19 people) and construction engineers (27 people). The response ratio was about 73 percent.

■ Meaning of Indicator

- 1. Importance : Assessment of how much important that corresponding competency is for the success of a construction project.
  1-point : Not important at all. 7-point : Very important competency that must be needed.
- 2. Performance : Respondent's corresponding competency level on-hand.
  1-point : Does not have corresponding competency at all. 7-point : Have corresponding level of competency that can be applied to work right away.

Project Process & Competency			Definition	Importance Low<----------->High							Performance Low<----------->High						
Project Plan Stage (A)	A-1	Ability to Project Understanding	Contents of project (Including technical perspective), understanding ability such as needs, scope, etc.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	A-2	Ability to Feasibility Study	Project feasibility analysis skill considering business purpose and conditions	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	A-3	Ability to Establish of procurement strategy	Understand pros and cons of key procurement methods and skill that can establish appropriate procurement strategy for corresponding business	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	A-4	Ability to Set Project Plan	Skill that can establish detailed business plan including budget & schedule	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	A-5	Ability to Stakeholder Management	Understand stakeholder's role and responsibility and skill that can mediate their interest	1	2	3	4	5	6	7	1	2	3	4	5	6	7
		Ability to															

Fig. 1. Sample of the questionnaire

3.2. Evaluation Results

This section describes the result of the questionnaires. As shown Fig. 2, the public officials evaluated that CM tasks such as B2 (Design Examination), B1 (Selection of Design Specifications), C6 (Selection of Contractors), D5 (Construction Quality Management), D3 (Determine Construction Progress), D6 (Safety Management), B3 (Technical Examination), D1 (Understanding of the contract book) are important. In addition, it is observed that construction engineers evaluated CM tasks such as A4 (Set-up Project Plan), A6 (Coordination and Consultation), C3 (Establish project management plan), C4 (Estimated cost selection), D2 (Understanding of construction techniques and procedures), D6 (Safety Management as essential tasks.

Both the officials and engineers considered B2, D5, and D8 as important tasks, and it is comprehensively observed that tasks in the bidding stage, design stage and construction stage are important.

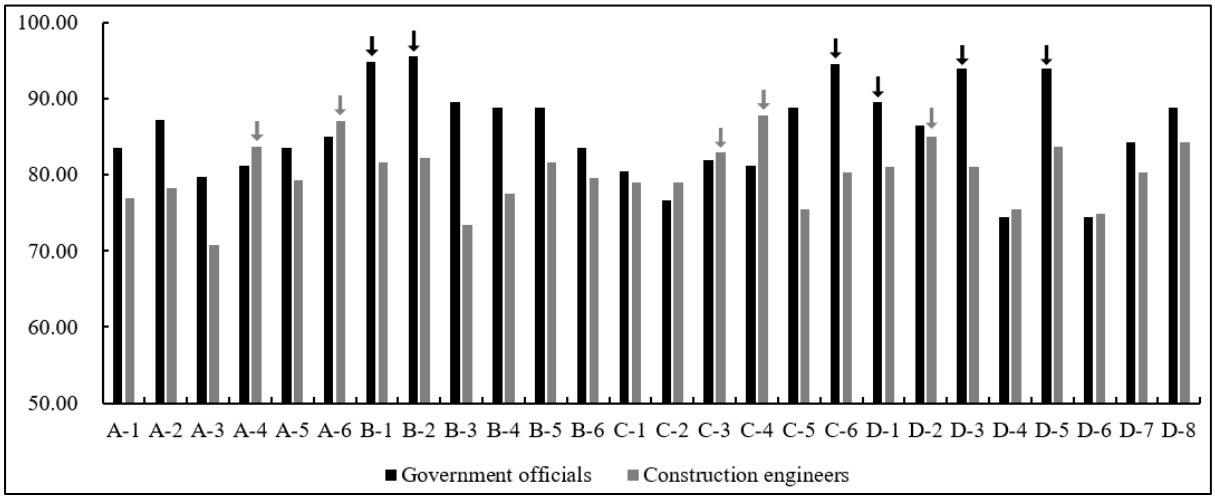

Fig. 2. CM Competency Evaluation in terms of Importance

As shown in Fig. 3, in the evaluation regarding performance, the officials evaluated that they are good at the following management tasks such as D1(Understanding of the contract book), D2(Understanding of construction techniques and procedures), D3(Determine Construction Progress), D4(Change of design), D5(Construction Quality Management), D8(Inspect completion). Also, construction engineers consider that they are excellent in conducting tasks such as A6(Coordination and consultation), B2(Design Examination), D1(Understanding of the contract book), D2(Understanding of construction techniques and procedures), D5(Construction Quality Management), D8(Inspect completion).

In contrast, they thought that competency such as A1(Understand the subject project), A2(Feasibility Study), A4(Set-up Project Plan), A5(Stakeholder Management), C2(Facility Specification Definition & Demand), C3(Establish project management plan). Meanwhile, construction engineers evaluated that they have lower ability in areas such as A1(Understand the subject project), A2(Feasibility Study), A3(Establish procurement strategy), B4(Environmental Assessment), B6(Design Quality Management), D4(Change of design). In common, both the officials and engineers evaluated that they have a weakness in the tasks during the project plan stage.

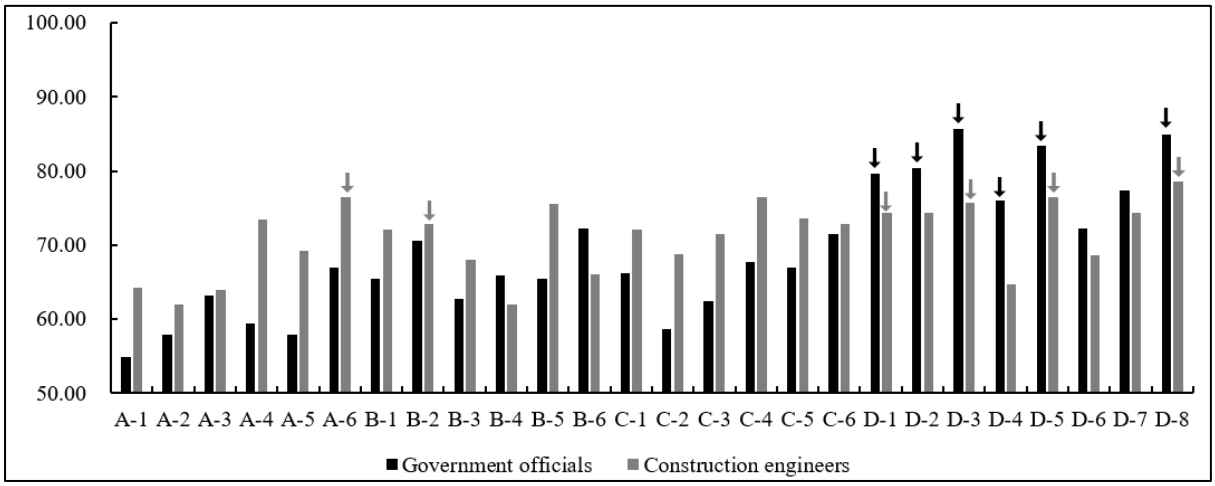

Fig. 3. CM Competency Evaluation in terms of Performance

In addition, this study conducted gap analysis between evaluated importance and performance as presented in Fig. 4. As a result, officials thought that most tasks related to CM are not performed well enough when compared with their importance, while tasks such as D4(Ability to Change of design), D6(Ability to Safety Management), D7(Ability to Information Management), D8(Ability to Inspect completion) are performed quite well. In contrast, Construction engineers evaluated that importance and competence are insufficient for most tasks.

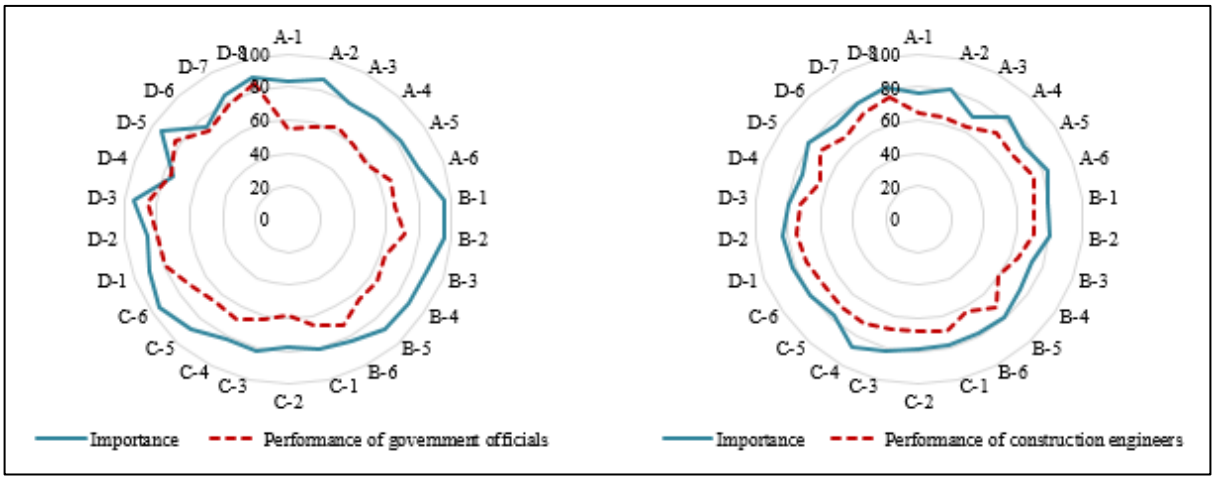

Fig. 4. Gap Analysis between Importance and Performance

Fig. 5 presents the result of evaluations regarding necessity and urgency of CM management skills. As a result, most construction management skills have been found to be necessary to successfully carry out construction projects. In particular, it is observed that construction management skill such as process management and design managements were selected as the most urgent technique because changes in design and schedule may occur frequently the most.

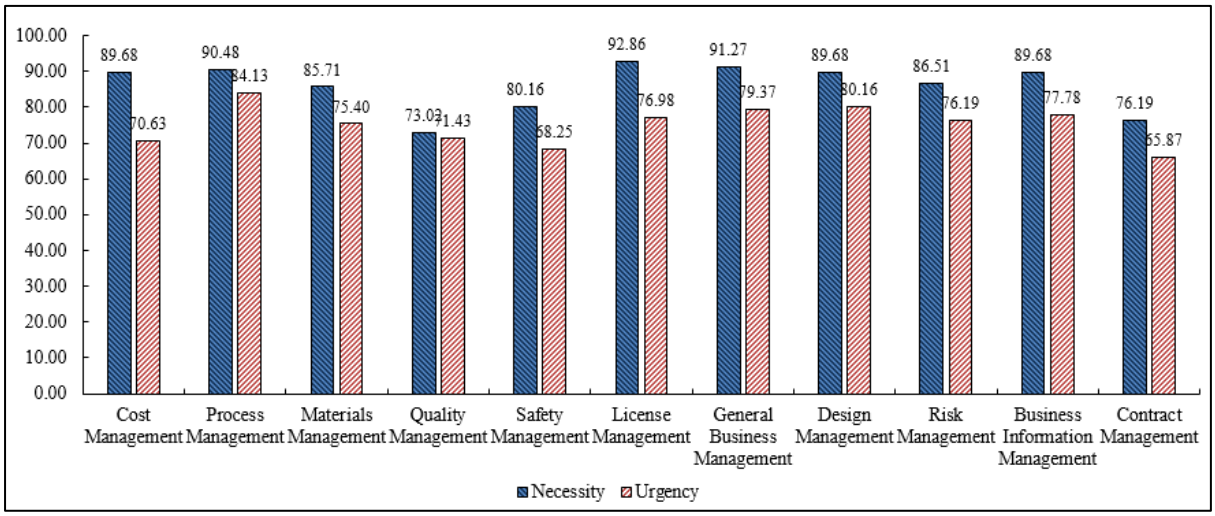

Fig. 5. CM Techniques Evaluation in terms of Necessity and Urgency

Conclusions

Recently, Southeast Asian countries attempt to improve the ability for managing construction projects. However, there has been difficulty in adopting construction management because they do not have systematic management methods or procedures. In accordance with the circumstance, a lot of problems such as poor quality, accident, cost overrun and schedule delay has occurred. Thus, this paper investigated on which management techniques are necessary to apply construction management in the Southeast Asian countries focusing on Vietnam construction industry. To this, surveys for the investigation are constructed and were sent to engineers and public officials which are associated with construction.

The results of surveys show that the officials and engineers considered B2, D5, and D8 as the most important tasks, and it is comprehensively observed that tasks in the bidding stage, design stage, and construction stage are important. However, they considered that Vietnam construction has weakness in tasks such as A1(Understand the subject project), A2(Feasibility Study), A4(Set-up Project Plan), A5(Stakeholder Management) at the project planning stage. Also, most construction management skills have been confirmed to be needed for conducting construction projects. Among, management skills such as process management, design management, general business management, and business information management are urgent to efficiently perform construction management.

The result of the research can be used as a key factor for the improvement of the construction industry and application of CM in the Vietnam construction industry, and also it is possible to investigate the competency and importance for CM in other Southeast Asian countries by using the constructed survey. Furthermore, results of this study can be used as a guide for securing the competitiveness of companies seeking to enter into Southeast Asian countries.

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