

A STUDY ON THE IMPROVEMENT OF POST-EVALUATION ITEM FOR PERFORMANCE MEASUREMENT IN THE BUILDING CONSTRUCTION

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Abstract

The construction industry in South Korea is experiencing great changes: it is becoming developed on a larger scale, specialized to a high degree and rapidly incorporating with other industries. This development has resulted in higher demand of construction industry. Accordingly, the transparency and an objective method of evaluation in the process of projects in the construction industry are gaining more importance. Clients' and customers' needs also require more specific objective evaluation to find whether their projects are successfully performed or not. This study aims to discuss problems on the current post-evaluation items including the qualitative item analysis such as customer satisfaction. Moreover, this paper suggests the improved ways in which enable the application of the effective evaluation system to the construction industry.

Keywords : Construction industry, Performance Measurement, Post-Evaluation , Evaluation Items, Effect Factor

1. Introduction

1.1. Background and Purpose

The construction industry is becoming developed on a larger scale, specialized to a high degree and rapidly incorporating with other industries. A need for the selection of an objective evaluation indicator and its transparency is being highly recognized in the

construction business. These two factors are necessary to measure how successful the project with various people who are involved is. In addition, strategic and well-organized management system for prediction and integration is gaining importance through all phases of a project such as plan, design, procurement, construction, testing and post-construction management. It has caused an application of the performance measurement, a strategic benchmark tool, and used to reduce inefficiency and to boost competitiveness in the construction business.

The current performance measurement system only evaluates five construction phases such as ‘pre-design phase’, ‘design phase’, ‘contract and procurement phase’, ‘construction phase’ and ‘post-construction phase’. However, the performance measurement of the construction industry in which many participants are involved needs to be more efficient and systemic compared to other industries. Therefore, the performance measurement is needed in the phase of not only an execution of the construction but also ‘post-construction’ management.

This study includes the qualitative evaluation items and analyzes the problems in the current evaluation system, which is composed of evaluation criteria, items and methods. It also suggests the improved ways to apply to construction projects effectively on the premise that reliable post-evaluation system is hardly found in the construction industry.

1.2 Methods and Ranges

It is actually not possible to suggest evaluation items covering all the character of construction projects. The reason is that the large scale of the process and uncertainty with its various and complex aspects in the construction business.

Therefore, this study limits the evaluation items available for the construction companies.

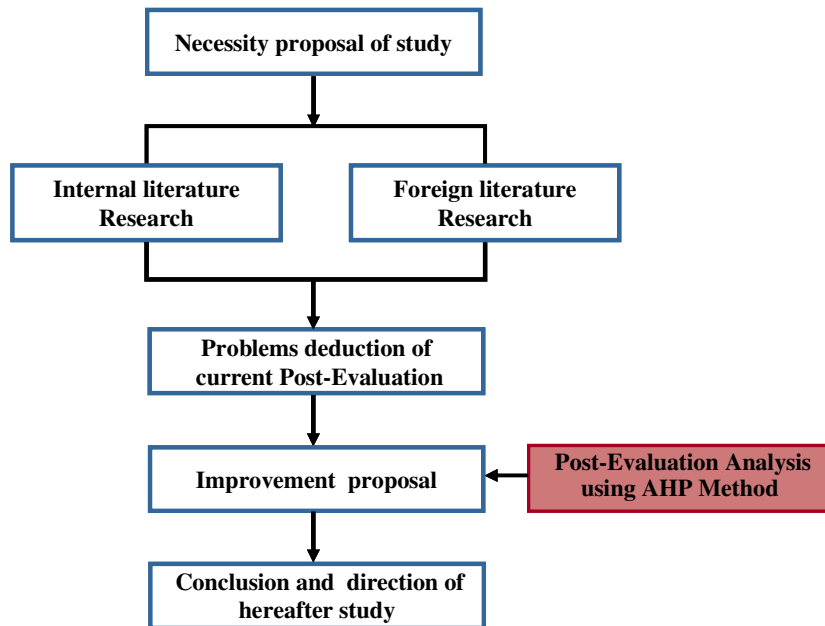


Figure 1. The flow of study

The study employed the following methods.

- 1) It researched both Korean and foreign literature reviews and discussed the current post-evaluation system in the construction industry.
- 2) It revealed the problems of the current post-evaluation items based on researched literature review
- 3) It surveyed construction professionals to find and suggest the improved measurements on the current post-evaluation system based on 2)
- 4) It brainstormed 3) and suggested the way of access to the study on the post-evaluation system in the future

As you can see [Figure1], this paper employed Korean and foreign literature, review and systemically researched and designed surveys. This study suggested the improved measurement of the post-evaluation items in the construction industry.

2. Theory of Performance Measurement

2.1. Definition

In a broad term, performance measurement is the review process of a construction company's past decision-making. Its purpose is to help the future decision-making of the company through the review process. In a narrow term, performance measurement is such an effective tool to focus on the core evaluation factors of the completed project. In addition, performance measurement compares between the completed project from some of the industry's most reputable firms and a project from the client in detail. Thus, it can be applied to improve the result of the project through the process.

2.2 Analysis on the process of performance measurement in the construction industry

In order to get a successful business result, performance measurement on the post-evaluation should employ employee strategic process. After setting up the post-evaluation strategy, the next step is to establish the goal of evaluation items and put it into practice. The performance measurement also selects items which need to be focused and controlled according to the client's business strategy. Then, it evaluates those items in organized ways. If the result fails to meet its strategy and requirement after the performance measurement, performance measurement analyses the cause of failure and gets feedback. Then, the factor develops a core-competence with the revised action to raise the outcome of the business. The performance measurement should be a permanent process not a temporary one. The business result and performance data during the performance measurement are integrated and interpreted through the strategic learning process. Finally, they affect the future strategy setting up process. [Figure 2]

2.3 Direction of Performance Measurement

Performance measurement enables benchmarking for the growth of business by measuring the level of performance. To measure the performance, it compares with other successful performances for the development of the business according to the business strategy. Therefore, the proper direction of performance measurement needs to consider features of construction in connection with the business strategy.

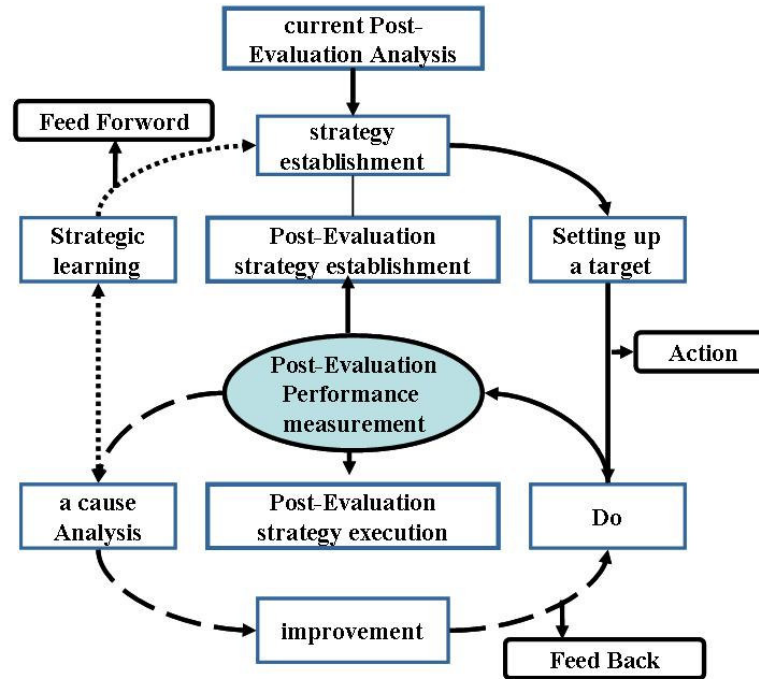


Figure 2. Process of Performance measurement

3. Trend of Performance Measurement in Domestic and Foreign Construction Industry

3.1 Domestic construction industry

3.1.1 Trend of Performance Measurement in Domestic Construction Industry

In Korea, the construction industry has been growing quantitatively because of its aggressive advances into overseas construction market and the Korean government's housing policy. Moreover, visions and goals such as 'construction industry promotion build up plan' have recently been promoted by the government while new strategic growth focused on competitiveness is gaining interests among the industry. However, there are a few problems in the construction performance. First, the specific performance measurement indicator or skills for the construction industry are hardly found in Korea. Currently, the finance or overall management system in the construction business are used as indicators to measure performances in not only the construction industry but all industries including the manufacturing industry.

The government, the industry and universities recognized the need for the performance measurement indicator and skill and have developed and actively studied on them.

3.2 Trend of the Performance Measurement in Foreign Construction Industry

3.2.1 The United States

The Construction Industry Institute(CII) is a consortium of owner, engineering, contractor, and supplier firms from both the public and private arenas to enhance the business efficiencies. CII is operating the Benchmarking & Metrics(BM&M) program, the performance measurement system for engineering productivity. A goal of the BM&M program is to provide and apply 'Best Practice' to the construction industry as well as to improve the value of project. Besides, BM&M program provides quantitative information to the construction industry and helps its continuous performance with 'Best Practice'. It also suggests performance standard through a continuous performance measuring on the construction industry and provides BM& M toolkit to assist member companies' performance. Even though BM&M program is a commercial one only for member companies, the continuous performance measurement by BM& M enables a better performance of the member companies. A constant also contributes to prove the effects of 'Best Practice'.

3.2.2 The United Kingdom

Rethinking Construction, construction innovation, which addressed the needs of performance measurement, was initiated by the report of the Construction Task Force chaired by Sir John Egan in 1998. Under Rethinking Construction, the construction industry, its clients and the government are working together and putting 'Best Practice' into practice. The aim of Rethinking Construction is to reduce inefficiency and unpredictability of productivity in the UK construction industry. Another goal is to increase the performance and profitability. The ultimate target of Rethinking Construction is to improve competitiveness of the UK construction industry both in the UK and in foreign countries. The UK authority developed Key Performance Indicators(KPI) to measure the performance on the projects and the organization in the overall construction industry. Clients use KPI to assess which supplier's performance is best for them whereas each supplier use KPI to benchmark, reflect its strength and weakness and applies KPI to set a long-term goal. Currently, the KPI framework consists of seven main groups: time, cost, quality, client satisfaction, change orders, business performance and health and safety. Within these groups, a range of indicators are developed. In addition, five key stages have been identified throughout the lifetime of a project: 'Commit to Invest', 'Commit to Construct', 'Available for Use', 'End of Defect Liability Period', 'End of Lifetime of Project'.

The system for the development of performance measurement in Korea and foreign countries are shown in the [Table 1] below.

Table 1. Developed case of performance measurement system in construction industry

Division	A research institution	Purpose of Performance measurement	Year	Source
Foreign Case	Rockwater Co. Case	Strategic plan and operation activity in Construction Companies	1993	HBR Vol.7(15)
	BM&M of CII	Raise the performance through benchmarking in Construction industry	1997	BM&M Summary Report
	Overseas Paper	Delivery guide through the ecomparison of delivery method efficiency	1998	J.of CEM, Vol.124(6)
	KPI working group of DERT	Raise the performance through construction innovation in construction industry	2000	KPI Report
Domestic Case	Korea National Housing Corpration	Strategic plan and operation activity in Construction Companies	2001	Korea National Housing Corpration
	LG Construction	Strategic plan and operation activity in Construction Companies	2003	Strategic Co. Mgmt. seminar of construction industry
	Efficiency comprehensive countermeasures of Public construction works	Focus on cost financial effect of Public Works	2004	KSCE
	KICEM	CM mersurement system developmentfor promoting the CM in Korea	2005	CODIL

4. Post-evaluation in Construction

4.1 Definition

The lexical meaning of Post-Evaluation is to assess the value of the performance after completing a project to compare with the initial objectives of the performance. The post-evaluation in the construction is an evaluation system to measure whether and how much the goal of the construction project has been reached compared to the initial objectives. Also, it helps analyzing changes and effects after construction. Therefore, the Post-Evaluation is an important process to provide clients with useful information in the future through its analysis and evaluation. The process also can be used as a resource of pre-evaluation process in the future construction. [Figure 3]

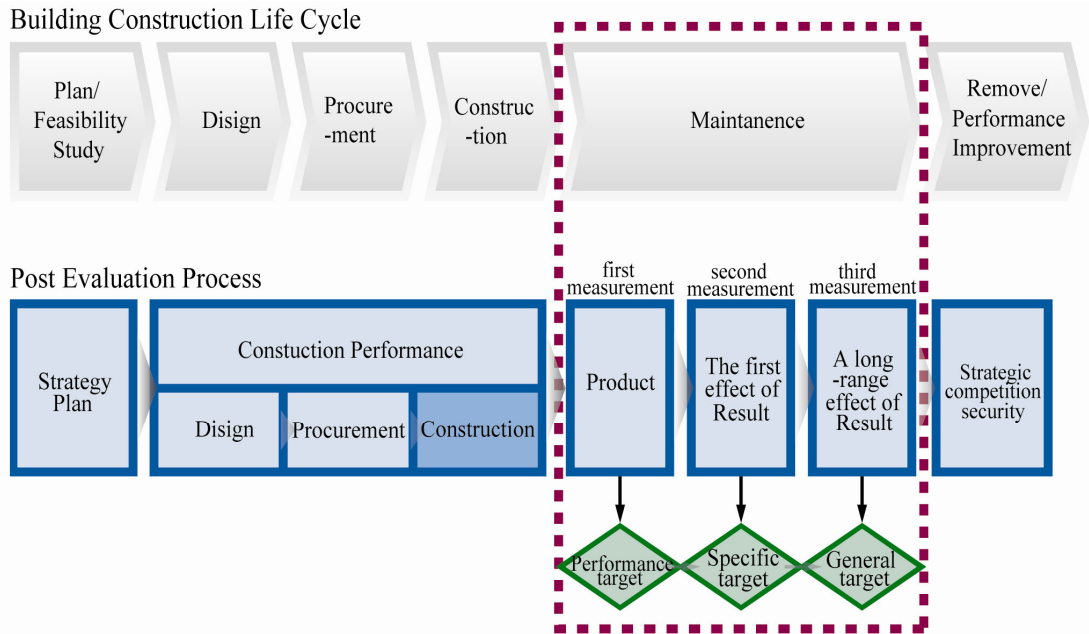


Figure 3. Post Evaluation Process

4.2 Limitation of the current performance measurement system and a need for the introduction of post-evaluation system

In current studies, the current performance measurement system has been developed and executed through various kinds of performance indicators and criteria of the construction projects. For example, CII in the US and the KPI in the UK are representative performance measurement systems. However, they have been limited to evaluate quantitative performance in the phase of project execution after the completion of the project. This limitation is possible to cause problems such as defective construction cases or lead to a failure in detecting problems in early stage and in taking a measure to solve the problems. Worse still, the performance measurement in the phase of the maintenance and management to use the building has not been effectively carried out. The reason is that the performance measurement system has been limited to only assess the execution phases from pre-design phase to post-construction.

The objective of the performance measurement is more focused on reaching the goal of the clients, who use the building, a result of the construction, and boost their satisfactions rather than merely checking how much the goal has been achieved by measuring the business, organization and the result in the phase of execution.

The current post-evaluation system in the construction industry in Korea needs to be improved because it has not been well executed while the system is gaining the importance. To solve the problem of the current post-evaluation system, first, the framework in the performance measurement needs to be analyzed. Second, the collection of the post-performance measurement results on the bodies, social and economic environment of the construction in which spends tremendous cost and long period of time is also needed. As a consequence, post-evaluation items need improvement as above.

4.3 Situation and Problems of Current Post-Evaluation System

The lack of the comprehensive post-evaluation system in the construction industry in Korea has resulted in the release of a mere evaluation data : the settlement or simple post-evaluation. The most of the evaluation items focuses on cost and it reflects that the construction company's first priority is cost saving policy and its evaluation. This finding shows that most construction companies lack understating of the importance in the post-evaluation system. Therefore, construction companies need to recognize the significance in the introduction of an expansive and balanced evaluation items for the competitiveness and the bright future of the industry.

5. A Need for Improved Post-evaluation Items

Post-evaluation item not only measures performance of construction projects but also plays a role as a very important evaluation system in that it affects business performance: The effect can change user's performance, work priority, and its thinking towards the evaluation. Therefore, items in the post-evaluation system should consider many selection criteria and principles in consideration of its effects on those factors. For example, various kinds of evaluation items can be made based on the client's strategy, goal, evaluation groups and evaluation indicators. As a result, a selection of objective item is a key to a successful post-evaluation.

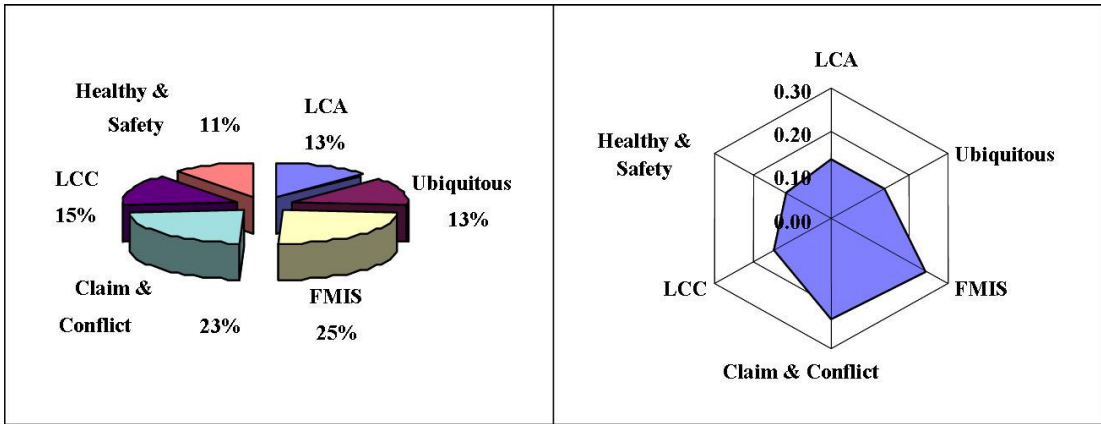
6. Conclusion and Further Study

A goal of the post-evaluation in the construction industry is to predict problems and control them to achieve improvement for efficient construction in the future. To fulfill the goal, it is necessary to meet client's requirements and collect information on past status and current situation of clients. Accurate performance measurement requires choosing evaluation items and improving them according to an appropriate theory.

Therefore, this study selected post-evaluation items, which can be applied to the construction industry, and compared with the current items. We studied them based on the premise that current post-evaluation system cannot effectively contribute to the industry with many defects. This paper interviewed construction experts and surveyed the priority of the items.

The result of the survey on the priority in the post-evaluation system by AHP was as follows: 25 percent for FMIS, 23 percent for claim and dispute, 15% for LCC, 13% for LCA, 13% for Ubiquitous and 12% for Health and Safety.[Figure 4]

The current items have more inclined toward the evaluation of cost and its achievement of initial goal. However, the construction industry is requiring systemic evaluation items in line with the current evaluation system in the age of an information-oriented society. As a consequence, this study suggested developing a new post-evaluation performance measurement system. It can be achieved by a continuous study on objective evaluation items through the findings of the effect factor which affects the evaluation based on selected items and the undertaking of expert interview surveys.



	A	B	C	D	E	F	Importance
A	1,00	1,00	0,56	0,57	0,90	1,21	0,13
B	1,00	1,00	0,56	0,57	0,90	1,21	0,13
C	1,79	1,79	1,00	1,05	1,68	2,00	0,24
D	1,74	1,74	0,95	1,00	1,63	1,95	0,23
E	1,11	1,11	0,60	0,61	1,00	1,32	0,15
F	0,83	0,83	0,49	0,51	0,76	1,00	0,11
Total	-	-	-	-	-	-	1,00

Measurement Item	Comparative importance		
A	0,13	D	0,23
B	0,13	E	0,15
C	0,24	F	0,11
A	LCA	D	Claim & Conflict
B	Ubiquitous	E	LCC
C	FMIS	F	Healthy & Safety

Figure 4. Analysis through AHP

7. Acknowledgment

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