# PROCESS FOR LOCALIZING AND APPLYING PDRI TECHNIQUE -BASED ON A PROJECT DEFINITION RATING INDEX-

**[1]SIMHEE HONG, [2]JUNGHO YU**

Kwangwoon University
E-mail: hshgl9786@kw.ac.kr, myazure@kw.ac.kr

**Abstract**- Risk management at early stage of a construction project, is known as an effective method expected various benefits about costs and schedule. The Project Definition Rating Index(PDRI) by the Construction Industry Institute(CII) is one of the method defined project scope for reducing risks. In addition, the PDRI is verified by pilot projects for achieving benefits by a risk management. To use this method, However, we have to consider some of the aspect about applying the object. Because each countries guideline is different for performing construction. Therefore, This study is suggested four considerations to apply the PDRI and a process guideline for using PDRI in local situation. This method will enable to improve the development of the PDRI Process for reflecting domestic situations in various countries

**Keywords**- Risk management, Project Definition Rating Index(PDRI), Project scope, The early phase of project

## I. INTRODUCTION

### *A. Background and Objective*

Risk management at an early stage of a project is as an effective method that provides various benefits. The Project Definition Rating Index (PDRI) by the Construction Industry Institute (CII) helps to define a project scope and reduce risks. In addition, PDRI is a verified method for achieving beneficial risk management. According to the CII report, there was a positive deviation for cost and schedule generated from projects that applied for verification. Building projects achieved a deviation of 6% and 16%, while industrial projects occurred garnered an approximate 8% deviation [1]. A pilot study in domestic practices also confirmed positive deviations of the same level [2]. Therefore, this method is expected to yield positive effects.

This approach to risk management, however, still has limitations when applied to local situations. There are four considerations that require further development: 1) separation of phase and location of gateway, 2) index, 3) scoring weight, and 4) other considerations. First, “A separation of phase and location of gateway” is considered for domestic construction performance guidelines. The guidelines for each country are different. It is necessary to verify the location of a gateway and the logic of the PDRI index step. This is important when considering whether or not to use an item. Second, for the “PDRI index” it is necessary to consider the content of the index. Certain content may not fit the domestic situation, and it is necessary to recalibrate a revised index in accordance with local guidelines. Third, the “scoring weight” needs to consider the score distribution for each index according to various weights. These various considerations need to be validated for each project, situation, and country. Therefore, this study reviews the domestic situation, and proposes a process applicable to Korea.

### *B. Scope and Methodology*

1. The scope of risk

Risk is defined as being negative and reflects a possible loss for a project or situation. In some cases, however, it is also defined as an opportunity. In other words, risk can contain both threats and opportunities at the same time [4]. To give up risk in a project may also result in giving up opportunities for some larger benefit. Thus, in order to achieve effective risk management, appropriate risks should be identified based on project objectives.

Risk is largely divided into two parts. One is “risk that cannot be managed” and the other is a “risk that can be managed [5].” The first is a “pure risk” or “risk that is known, but not understood.” It is caused by external factors and is dealt with through insurance instead of special management techniques. The second is an “internal risk” that can be managed using project management techniques. This kind of risk is caused by internal factors in a project. Therefore, this study is limited in scope to internal risk.

2. The scope of project

PDRI is applied to three fields: 1) Industrial, 2) Building, and 3) Infrastructure. PDRI-Industrial and PDRI-Infrastructure include mostly facilities such as industrial plants and infrastructures. In Korea, industrial projects account for a small proportion at about 10-15% [6]. Thus, PDRI-Industrial and PDRI-Infrastructure are not within the scope of this research. The Building field can be further classified into three groups: residential, commercial, and industrial.

## II. DEFINITIONS IN CONSTRUCTION INDUSTRY INSTITUTE(CII) REPORT

### *A. FEP (Front End Planning)*

Front-End Planning (FEP) is defined as "the process of developing strategic information to identify risks and determine the resources needed to mitigate those risks [7]."




**Fig. 1 Front-End-Planning in CII**

In other words, FEP is a generic process that can improve potential project success by: 1) defining risk, and 2) removing a defined risk. Thus, this study defines FEP as a step that needs to be finalized before the project range is created.

### *B. PDRI(Project Definition Rating Index)*

The Project Definition Rating Index (PDRI) is defined as "a powerful and easy-to use tool that offers a method to measure project scope definition for completeness [3]" This study refers to a checklist that is used to define the project scope for managing risks in the FEP phase. This checklist is composed of a large range (Section), a middle range (Category), and a small range (Element).

**Table 1 The separation of PDRI-Building index**

| | Section | Category |
|---|---|---|
| PDRI-Building (2009) | Section Ⅰ Basis of Project Decision | A. Project Strategy<br>B. Owner/Operator Philosophies<br>C. Project Requirements |
| | Section Ⅱ Basis of Design | D. Site Information<br>E. Building Programming<br>F. Building/Project Design Parameters<br>G. Equipment |
| | Section Ⅲ Execution Approach | H. Procurement Strategy<br>J. Deliverables<br>K. Project Control<br>L. Project Execution Plan |

For example, building projects fit in the large category, "Section Ⅰ basis of project decision" is made up of "the information necessary for understanding the project objectives," and Completion of Section Ⅰ is determined by the degree of being fulfilled in the project [3]. "Section Ⅱ basis of design" is made up of "space, site, and technical design elements that should be evaluated to fully understand the basis for design of the project [3]." Finally, "Section Ⅲ execution Approach" is defined as "elements that should be evaluated to fully understand the requirements of the owner's execution strategy [3]."

## III. SUGGESTIONS FOR PROJECT DEFINITION RATING INDEX (PDRI) PROCESS

### *A. Outline*

Changes are proposed for three aspects of PDRI: 1) separation of phase and location of gateway, 2) PDRI Index content, 3) scoring weight. Importantly, items are identified that can or cannot be applied domestically from the index. After this step, organize the information in order to adjust the PDRI for Korean domestic application.

### *B. Considerations for process development*

1. Separation of phase and location of gateway

First, it is necessary to ensure the adequacy of a separation of phase and whether to perform or not to perform this in a domestic construction guideline. If it isn't necessary to perform the guideline, it can be added or removed from the Index and procedures for construction. Next, it should be compared to the logic within the PDRI checklist regarding setup to the existing gateway or setting the separated phase to a desired position in the guideline.

2. Index and PDRI logic

The needs at each stage of the index like <Figure 2> are considered. "SECTION Ⅰ basis of project decision" was confirmed as consideration for information on feasibility and the concept phase corresponding to categories A, B, C.

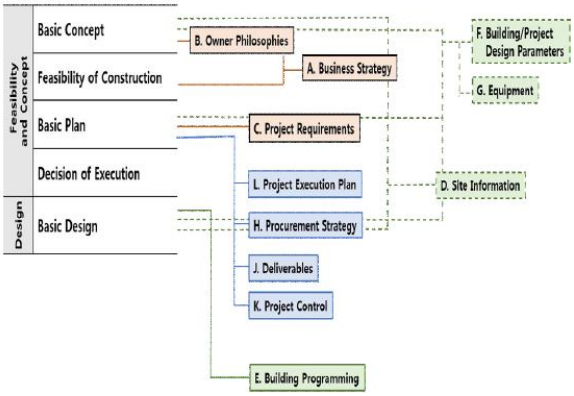



**Fig. 2 A classification of PDRI index according to guideline in Korea**

"SECTION Ⅱbasis of design" wasn't confirmed as information necessary in the domestic phase of project determination. In the pre-design steps, there was no information for Site, except about a planned construction site. It was found that there was only information that confirmed the format and a land survey overview of the main structures. The reason for this is related to the domestic execution method. Korea generally applies a Design-Bid-Build (DBB)

method. This is usually executed on the owner who does not determine a building plan. Executions are drawn up without having defined project content and range. Problems from this contract cause many conflicts in the construction phase. Therefore, it needs to be considered in this section.

"SECTION □ execution Approach" reflects whether considerations have been made about the information in this step that corresponds to categories L, H, J, K.

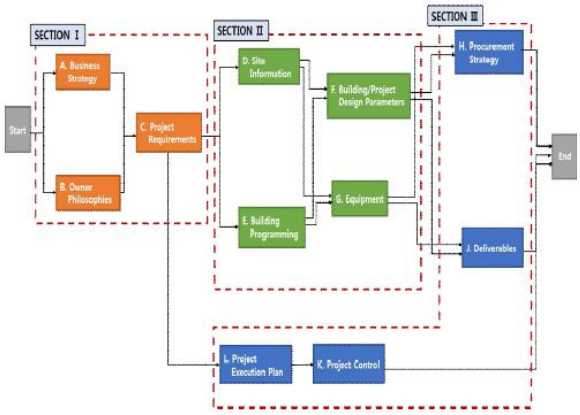



**Fig. 3 The logic of PDRI category**

The existing PDRI logic can be summarized as <Figure 3>. After consideration of 'Category c. project requirements,' it is divided to start a check of SECTION Ⅱ, SECTION Ⅲ contents. Accordingly, when assuming that revised phases based on domestic construction procedures, it is necessary to check the entries for SECTION Ⅱ with the basic plan for construction.

## CONCLUSION

In Korea and also other countries, PDRI requires some adjustments to fit with local construction guidelines in each country. First, the output of the construction procedures should be arranged based on relevant domestic guidelines, and correspond to the existing logic of PDRI. Based on this information, it is necessary to utilize a revised index. These changes should be verified by appropriate professionals. Future work can further investigate detailed information about the validation process and procedure.

This study is significant in making a contribution to the development of the PDRI Process so as to reflect domestic situations in various countries. Three different points items were reviewed as examples of revision necessary for domestic use. A process was proposed to develop guidelines. This study contributes to a process development point of view when applying PDRI techniques.

## ACKNOWLEDGEMENTS

This research was supported by Basic Science Research Program though the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (NRF-2014R1A2A205006437)

## REFERENCES

[1] CII, "PDRI: Project Definition Rating Index – Industrial Projects", Implementation Resource 113-2, Version 3.2, 2009
[2] Korea Institute of Construction Engineering and Management (KICEM), "Schedule Risk Management at the Pre-construction Phase of Projects", Oct. 2004
[3] CII, "PDRI: Project Definition Rating Index – Building Projects", Implementation Resource 155-2, Version 3.2, 2009
[4] Chris Chapman and Stephen Ward, "Project Risk Management : Processes, Techniques and Insights", Second edition, 2003
[5] Dongyeal Lee, "Study on Developing Risk Analysis and Management Model During Entire Construction Phase", 2010
[6] National Statistical Office (NSO), 2016
[7] CII, "Assessment of Effective Front End Planning Process", Research Summary 268-1a, Dec. 2013

★★★