

CONTINUOUS IMPROVEMENT PLAN OF BUSINESS PROCESS IN CONSTRUCTION COMPANY

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ABSTRACT

Lean management has traditionally been adopted by manufacturing industries to improve operations through the identification and elimination of all forms of waste. The construction industry has also adopted this philosophy, primarily in the field of projects. In order to increase a company's competitiveness and productivity, lean management is needed in the enterprise business process as well as in the field. The intent of this study is to explore a method of introducing lean management which continuously improves enterprise business processes. We have adopted the five fundamental concepts (specify value, identify the value stream, flow, pull, and perfection) of lean management as an approach, and applied BPM (Business Process Management) to continuously improve business processes. An example is presented to illustrate how lean concepts were applied to the actual budget process of Korean construction companies.

KEY WORDS

Lean Management, Enterprise Business Process, BPM, Continuous Improvement

INTRODUCTION

Lean management has traditionally been adopted by manufacturing industries to improve operations through the identification and elimination of all forms of waste. Eiji Toyoda and Taiichi Ohno of the Toyota Motor Co. and Shingo Shingo established the lean production philosophy in response to the deficiency in human, material, and financial resources (Emiliani 1998). This system also has been implemented in other manufacturing industries, such as the automotive, the aerospace, the moulding (Womack and Jones 1996), the plastic (Moore 1999), and the environmental service industry (Ball and Maleyeff 2003). Since 1993, the construction industry has also adopted this philosophy. Through the academic IGLC (International Group for Lean Construction), many researchers have presented their studies every year, but most of the articles have predominantly appeared to be applicable in the field of projects. As work in the field has improved, the business processes in the enterprise area must also be improved in order to sustain market competitiveness and increase value. This can be accomplished by the lean management concept. Moreover business process problems, such as overlapping work, redoing work, communication gaps, inflexible processes, and obscure processes, have the possibility of being solved by lean management. In spite of expected effects, researchers are not studying this area.

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This article suggests a continuous improvement plan that can satisfy customer's value and eliminate waste in the enterprise business process. In order to explore the applicability of lean management principles in the enterprise business process, we have used the five fundamental concepts (specify value, identify the value stream, flow, pull, and perfection) of lean management as a stable and proved approach. In addition, we have applied BPM (Business Process Management) as a new method to constantly improve the elimination of waste in the enterprise business process.

In order to conduct a pilot case, the actual budget process was selected by researching and conducting a survey of Korean construction companies. Following this, we defined the value of this process and analyzed the current process flow to identify waste; and we subsequently provided a systemized value creating flow to reach perfection.

FIVE CONCEPTS OF LEAN MANAGEMENT

Five fundamental concepts have been established to define the philosophy and implementation of lean management: (1) specify value; (2) identify the value stream; (3) flow; (4) pull; and (5) perfection (Womack and Jones 1996).

Customers must provide the definition of value, which is how the customer determines whether or not the provided service satisfies their needs. Once the desired value by the customer has been appropriately specified, the value stream, consisting of all actions (encompassing problem-solving, engineering design, administration, information management, and physical transformation tasks) required to produce value, must be accurately identified (Ball and Maleyeff 2003). At this phase, all actions that may not create customer value will be identified and removed.

The concept of flow is then applied to the new value stream to enhance the efficient improvement of value through the operational stage. The newly created value stream can be used to shift from a push system to a pull system. In other words, this system can accommodate the production of the good or service in response to customer demand. The final fundamental concept in lean management is continual striving to achieve perfection through radical and incremental improvement efforts. These five concepts can provide a substantial lean management framework that can be implemented by the business processes of construction companies.

PROCESS & PROCEDURE

First of all, in order to apply lean management concepts to construction companies' business processes, the differences between work which is fulfilled in the field of projects and work undertaken by the head office should be defined. It is important to separate the definition of procedure and process. A procedure is the procedural progress of activities; a process is a set of recurring activities that produce something of value for a customer. For example, a procedure is a task flow that consists of activities, such as stamping, welding, assembly, and inspection. Whereas a process is a support workflow that helps business performance, such as product planning, product development, product planning, production management, and sales planning. Another difference is that a process consists of a business process flow and data flow, not material flow. Although processes coexistent with procedures in real working conditions, this study is aimed at processes that are performed in the head office.

BPM AS A TOOL FOR BUSINESS PROCESS

BPM (Business Process Management) as a business management philosophy that has been discussed since the mid-1990s. Reengineering meant “starting all over, starting from scratch,” but, process management builds on, and transforms what already exists (Smith and Fingar 2002). It improves products and services through a structured approach to performance improvement; one that centres on systematic design and management of a company's business processes. BPM has enhanced business agility, flexibility, visualization, control, and accountability, enabling the business process to be streamlined, and redundancies to be eliminated. The principle of BPM is similar to the goals of lean management; to create value and aim at continuous improvement. Table 1 presents the definition and principles of BPM.

Table 1: Definition (Sinur and Bell 2003) and principle (Chang 2005) of BPM

Definition	BPM is the general term for the services and tools that support explicit process management (such as process analysis, definition, execution, monitoring and administration) including support for human and application-level interaction.
Principle	<ol style="list-style-type: none"> 1. Business Processes are organizational assets that are central to creating value for customers. 2. By measuring, monitoring, controlling, and analyzing business processes, a company can deliver consistent value to customers and has the basis for process improvement. 3. Business Process should be continuously improved. 4. Information technology is an essential enabler for BPM.

Although existing Value Stream Mapping (VSM) is a suitable method to illustrate the process of business and manufacturing (Rother and Shook, 1999), we adapted the new method, BPM, as a tool to reduce waste and increase value. We selected BPM because it can easily establish a web based system, and efficiently support enterprise business processes. BPM has six main functions, which are as follows:

Table 2: Functions of BPM

Functions	Contents & Benefits
Process performance management	Process performance monitoring, control, analysis, improvement, and waste control. Satisfy the KPI(Key Performance Indicator) of an organization
Process automation	Workflow model, Bottleneck analysis, Automatic effect verification, Minimize overlapping works and other errors, Reduce the process cycle-time
Knowledge management based process	Automatically store and supply knowledge. Maximize the relationship between work and knowledge. Provide a basis of knowledge creation. Prevent mistakes.

Process management	Effective management and monitoring
Process visualization	Process sharing and increase improvement participation. Simplify the deployment of processes
Process change management	Rapidly accommodation the process change requirement

APPLICATION OF LEAN MANAGEMENT FOR THE CONTINUOUS IMPROVEMENT OF A CONSTRUCTION COMPANY

In order to introduce lean management, first a business process should be selected for testing. In order to select an appropriate process, we conducted a survey to research 11 construction companies from Korea’s TOP 20 general contractors. As a result of the survey, ‘The Actual Budget Process’ was selected. Then, we specified the value of actual budget control, identified current business processes, defined and eliminated waste. In addition, we provided value creating flow to increase value by specifically mentioned functions of BPM.

SPECIFY VALUE OF THE ACTUAL BUDGET PROCESS

The actual budget process is a set of activities that consist of estimating the profit and loss of construction, budgeting, and managing to financially complete processes within terms of work and lower costs. The value of this process is “How to reduce waste in budgeting and complete the objective of increasing value for money.”

IDENTIFY THE CURRENT BUSINESS PROCESS

Value stream is used as a tool that encompasses all activities, relationships, and structures of a project, and as a basis to draw the future-state flow. Once the current business process has been identified, a detailed analysis may be conducted to determine sources of waste. The current actual budget process involves receipt of drawings, specifications, and estimated actual budgets; in addition to estimating actual budgets, and their approval & execution. Actual budgets are used as a reference for decision-making, cost management indexes, and material purchase indexes. Figure 1 presents typical business processes of controlling the actual budget.

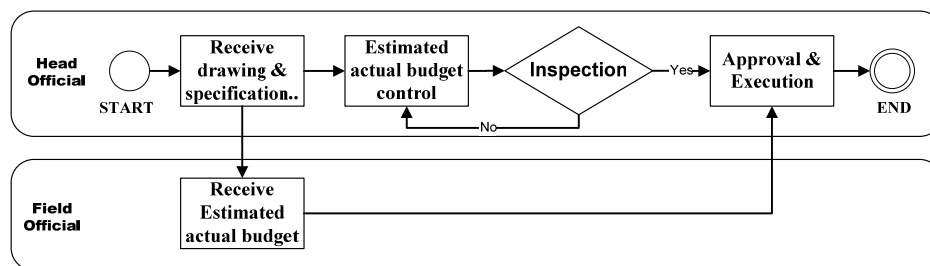


Figure 1: Current Business Process of an actual budget

DEFINE AND ELIMINATE WASTE IN THE ACTUAL BUDGET PROCESS

This process has sometimes been carried out by a field official or a head office official, or occurs when both field and office officials work together. In most cases, it is difficult to estimate the exact budget, due to insufficient time and expertise, obscure business process flows, and a high required earning rate standard. When this process

is performed, a lot of waste such as overlapping work, decision-making delays, incorrect data, and redoing work occurs. In order to solve these problems, we apply the functions of BPM to the actual budget process. BPM's functions connected with waste are as follows:

Table 3: Elimination of waste by BPM's functions

Waste of Actual Budget Process	Solution using Functions of BPM					
	F1	F2	F3	F4	F5	F6
Rework of budgeting				•		
Overlapping work				•	•	
Inaccurate orders and accounts			•	•		
Estimation differences between the field and office	•					
Delay in decision-making		•				•
Incorrect calculations	•		•			
Obscure business process flows					•	
Unnecessary inspections		•		•		
Insufficiency of actual data results			•			
Insufficient budget tracking	•				•	
Incorrect Data			•			

▪ Note: Functions of BPM

F1: Process performance management

F2: Process automation

F3: Knowledge management based process

F4: Process management

F5: Process change management

F6: Process visualization

VALUE CREATING FLOW BY BPMS

After discovered waste was eliminated, people in charge have to permanently manage the hidden waste or waste that may occur in the future. BPM is able to support all participants of the business process: systems, information, machines and people. And through resolving point-to-point integration problems, it unites the deployment of processes. Consequently, it can support fluid movement, as well as the management and flow of processes. Figure 2 presents the systematized value creating flow from the Business Process Management System (BPMS).

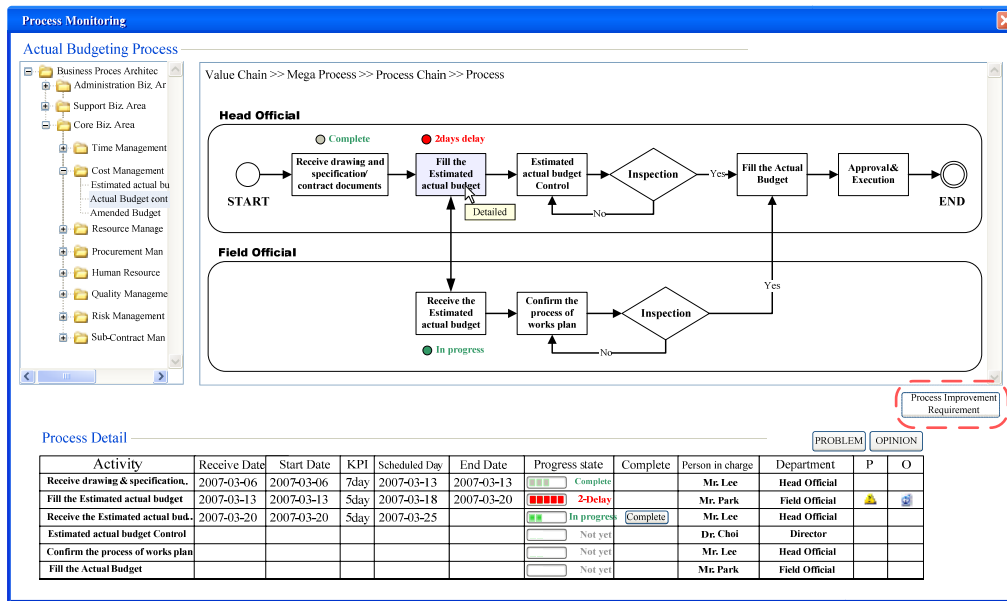


Figure 2: Systematized value creating flow through BPMS

PULL AND PERFECTION

When users access this system, they can gain an understanding of situations involving current chargeable activity, the previous and subsequent activities. Furthermore, users can identify the person in charge, note the average process cycle time, the frequency of activities, and detect any delayed activities. This system will enable the stakeholder to regulate the flow, initiate business activities, and ensure the process is in accordance with the established work scope and procedure. This is similar to a kanban system which utilizes a simple card to regulate the pull system, and can maintain an appropriate level of inventory items.

Furthermore, the BPM system is able to allow sufficient operational flexibility to accommodate specific demands. If someone finds waste or has an idea, he/she can request improvement through the process manager. Process visualization and voluntary improvement activities are able to help the enterprise business process advance to the level of “Perfection.”

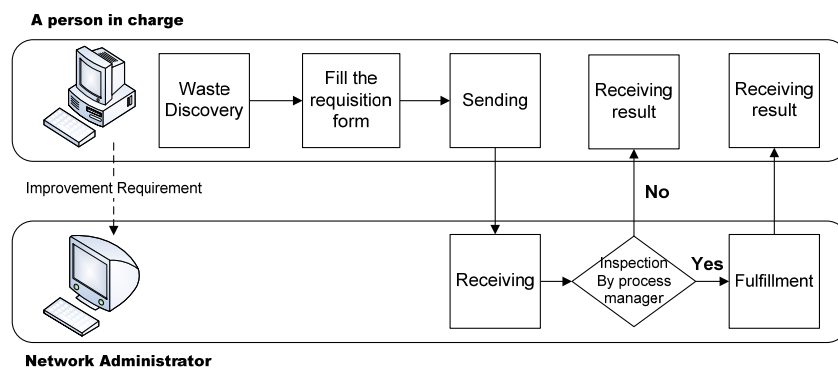


Figure 3: Step of Process Improvement Requirement

CONCLUSIONS

In this article, we suggested a continuous improvement plan that can satisfy customer’s value and eliminate waste in the enterprise business process. The lean management principle was used to identify value and the current actual budget

process, and to remove waste. We provided BPM which is connected with IT as a basis for lasting improvement. It showed us the probability of continuous improvement. Although we have only introduced BPM's six functions, other contents and functions of BPM do exist. Due to the study's focus, we could not describe the additional functions in this paper. In future studies, we will research more detailed methodology and apply it to the enterprise for actual verification.

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