

A FRAMEWORK FOR PRE-PROJECT PLANNING

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Construction organizations have to overcome many problems in order to achieve high quality performance. The complex nature of the industry can result in the lack of alignment of project objectives between participants. Effective pre-project planning can improve project performance. In order to improve pre-project planning tools need to be developed that enable activities during this phase to be measured, monitored and improved as well as improving the relationship between customer and supplier. These tools include project definition rating index (PDRI) and project alignment thermometer. Despite their success, these tools have limitations as they have been specifically designed for large industrial projects. The theory behind pre-project planning is discussed in this paper along with examples of pre-project planning tools that deal with cultural and process issues.

Keywords: pre-project planning, project alignment, PDRI, construction.

INTRODUCTION

Quality, cost and time are often adopted as primary performance measures on construction projects. Although there have been many attempts to improve performance, limited success has been achieved Egan (1998). One reason for this is the difficulty in focusing on just one performance measure and the need to take into account other interrelated factors. For example, reducing project schedule can seriously impact upon both performance and cost. In addition to the interrelated factors, the priority attached by different clients varies considerably. It is thus important to ensure that measures are clearly defined and established before project execution starts. However, few universally accepted methods of measurement exist and it is only now that performance benchmarks are being established. Early planning can significantly impact upon project outcome but clear targets must be agreed and established early on to enable the correct decisions to be taken at the right time. The aim of this paper is to discuss the importance of pre-project planning and highlight some of the tools that help improve this important phase. Improving pre-project planning is prerequisite for improving project performance.

RESEARCH AIM AND OBJECTIVES

The main aim of the research is to develop a framework that helps both clients and contractors improve the pre-project planning phase of construction projects. In order to achieve this aim, the research will:

- define project success;
- review the tools that improve project performance;

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- evaluate the current pre-project planning tools;
- develop a tool that evaluates pre-project planning phase; and
- validate the overall process.

The proposed framework will provide a practical comprehensive decision-making tool that helps solve problems that occur during pre-project planning with respect to project objectives. The framework will also provide tools for improving relationships throughout the supply chain. However, to improve the quality of pre-project planning, tools will also have to be developed that enable project performance to be measured and quantified. Such tools will have to take into account both cultural and process issues.

PROJECT LIFE CYCLE

To achieve its objectives, any project has to go through the various phases within the process characterized as the project life cycle. Different definitions have been provided for the project life cycle. For example, Morris's (1992) definition of project life cycle comprised five major phases:

- pre-feasibility and feasibility;
- design;
- conceptual;
- detailed; procurement; construction; and
- start-up.

Barrie and Paulson's (1992) definition comprised:

- conceptual and feasibility;
- engineering and design;
- procurement; construction; and
- start-up.

Austin and Neale's (1986) definition comprised:

- briefing;
- design;
- tendering;
- construction; and
- commissioning.

Their definitions are mainly restricted to building and civil engineering projects. Heisler's (1994) definition comprised the execution and the close out phase. The execution phase includes both design and construction, however, his definition is mainly associated with non-construction activities.

According to the Construction Industry Institute (1997), the project life cycle comprises four phases, they are namely:

- business planning or feasibility analysis;
- pre-project planning;
- project execution; and
- operation.

The first phase is sometimes called feasibility analysis rather than business planning. The second phase corresponds to the organize and select alternatives and is sometimes referred to as conceptual planning. The third phase, corresponds to the development of the project definition and decision-making is sometimes called detailed scope definition. The fourth phase, corresponds to the detailed design, procurement, construction and start up is sometimes called project execution (Gibson and Hamilton 1994). Each division is broken down into sub-divisions, which further define each phase in the life cycle of a project. This definition of project life cycle is more appealing since it is developed within the whole spectrum of construction and reflects the CII concern with pre-project planning phase.

DEFINING PRE-PROJECT PLANNING

According to Gibson *et al.* (1994), pre-project planning can be defined as “the process of developing sufficient strategic information for owners to address risk and decide to commit resources to maximize the chance for a successful project. The definition stated above clearly implies that pre-project planning is a process that requires a great deal of information to help identify the areas of risk as early as possible. The definition also relates the success of a project to the available resources. These resources can be technical or human. It also demonstrates that pre-project planning is an owner driven process. Gibson *et al.* (1994) explained that the pre-project planning phase occurs after business planning where the project idea is initiated and prior to the project execution. Gibson and Hamilton (1994) demonstrated that achieving project objectives in terms of time, cost and quality is closely related to the efforts spent during the pre-project planning phase. This view is also expressed by Sullivan *et al.* (1997) who emphasized that more time and effort devoted at this phase will increase the chance of a project being successful.

PRE-PROJECT PLANNING PROCESSES

Pre-project planning, as defined earlier, encompasses the processes that occur after the project idea has been developed which sometimes known as feasibility analysis. The Construction Industry Institute (1994) stated the major processes of pre-project planning as follows.

Organize for pre-project planning comprises:

- select the team responsible for ensuring that pre-project planning based on skills and experience;
- draft charter which defines the team’s responsibilities; and
- prepare pre-project planning plan based on the charter and available resources. This includes documenting the methods and time schedule for completing the pre-project planning activities to be performed by the team.

Select project alternatives comprises:

- analyse existing technology to meet the owner’s requirements;
- evaluate sites in terms of strengths and weakness to meet owner’s needs;
- prepare conceptual scopes and estimates by gathering the required information in a format that allows any future comparison based on project objectives; and
- evaluate alternatives by looking at the available options and select the best.

Detailed scope definition comprises:

- analysing project risks;
- document scope design;
- define project execution plan;
- establish project control guidelines; and
- compile project definition package.

Several important implications flow from this generic view of the pre-project processes. It is mainly owner focused. The processes and principles are not specific, but can be applied to any company with certain modifications.

THE SIGNIFICANCE OF PRE-PROJECT PLANNING

Most construction projects begin with the recognition of the need for a new facility. This often occurs long before the start of design and construction. The pre-project planning phase includes the development of the concept of the project, including the basic decision of selecting the concept that will be used for the execution of work. Pre-project planning is critical to achieving project goals; it provides important outputs to the remaining project processes such as engineering and construction.

The pre-project planning phase also represents the most important point in the project life cycle. It is the stage that has the most influence on the outcome of a project. It is during this phase that crucial decisions regarding project scope are made. These early decisions regarding the project's scope will be a major influence on the project's cost and schedule. Planning is a process of decision-making, however, it is necessary to make decisions throughout the project life cycle. Ahuja (1994) explained that planning is most effective when it is performed early in the project and the impact of decisions made early is usually greater than those made during later stages. Gibson and Dumont (1996) revealed that the ability to influence overall project cost is greatest at the beginning of the project where expenditures are relatively low.

KEY PLANNING ISSUES

In order for pre-project planning to be effective, several key elements must be clearly defined, for example, The Construction Industry Board (Construction Industry Board 1997) stated that client briefing must be discussed in more detail. Equally, the risk elements must be defined, measured and assessed (Oberlender 1993). The scope of works must also be clearly defined. The Project Execution Plan (PEP), which states how the project should be implemented, should be developed. The PEP should contain details of the procurement system that will be applied and the appointment to be made to the project team (Construction Industry Board 1997). These requirements must be considered during pre-project planning to reduce cost and schedule overruns.

Objective setting is an important key planning issue that has to be addressed during the pre-project planning. The objectives guide numerous decisions required throughout project life cycle. Several problems exist in the objective setting environment. The first potential problem is the process of blending the various sub-organizations into a consistent and stable set of well-defined project's objectives. A second potential area exists within the designer and the contractor organization in combining the corporate goals with the objectives of peculiar to each functional sub-organization. A third problem area is the potential for the project objectives of the

owner and the contractor to dissimilar or incomplete with each other in developing a single project strategy. Setting objectives requires the management team members, through active participation, to issue a formal statement of objectives.

PROJECT PLANNING TOOLS

In the 1960s and 1970s many project management tools and techniques focused on the implementation phase of the project life cycle. By the 80s the emphasis started to shift to focus more on the initial front end of the project which has the greatest opportunity to add value Burke (1999). Many project planning tools are available to help organize and execute project planning. Project planning tools allow teams to focus on the project and align their efforts toward the same objectives. Some of the tools that can help improve alignment are: risk analysis, quality control techniques, and scope definition checklists. In particular, the three tools discussed in this paper have a significant effect on team alignment and scope definition.

1. Agreement Matrix

Project teams that comprise people from different functional groups usually bring with them different values and goals. These values and goals can be in direct conflict with the values and goals of the team members from other functional groups since they have different priorities and expectations. Agreement among members is essential for any team to focus on the same objectives. Agreement can only be achieved through aligning project teams toward the same objectives to reduce conflict and disputes. Alignment is the process of incorporating all of the distinct priorities into a uniform set of project objectives. Project alignment is a measurement approach for determining the degree of alignment achieved on project team during pre-project planning.

Identifying and analysing project objectives and establishing them as guidelines for planning is important. One process for quantifying and analysing objectives is the process of evaluating, rating and plotting projects on a three dimensional matrix (Rowings *et al.* 1987). The matrix helps parties responsible for decision-making to integrate objectives into one set of project objectives. The agreement matrix is a good tool for identifying, prioritizing and communicating project objectives. The brief description of the tools is as follows.

The agreement Matrix is a tool for identifying, communicating and controlling project objectives. It helps project team address critical alignment issues and highlight the risk elements.

There are barriers to alignment that act as obstacles to creating and maintaining alignment during pre-project planning. The Construction Industry Institute (1996) summarized some key issues that impose a critical impact on teams, they include:

- lack of leadership;
- insufficient budget for pre-project planning;
- unclear roles and responsibilities of team members;
- authorizing the project execution before pre-project planning is incomplete;
- turnover of key team members;
- poor communication between team members;
- lack of a clear process for pre-project planning;
- lack of consensus regarding project goals; and
- leadership is unable to make objective decisions.

The CII developed a tool called alignment thermometer to help overcome the above stated issues.

The alignment Thermometer is a self-evaluated survey designed for use during pre-project planning of the project. It is used to determine whether the team is focusing on the issues and processes that have a critical impact on team alignment. It provides a quick measure of team disagreement and assesses in identifying potential areas of disagreement.

2. Project Definition Rating Index (PDRI)

Scope definition is an important aspect that must be improved during pre-project planning. Scope definition is “ the process by which projects are defined and prepared for execution” Gibson and Dumont (1996). The scope outlines the content of the project and how it will be prepared. It also explains the problems that a client may encounter and states how they will be solved Burke (1993). Scope definition occurs early on the project while changes in the scope occur throughout the project life cycle. This creates a need for scope control on projects. Lack of scope ranks high as a problematic area and frequent contributor to cost and schedule overruns (Smith and Tucker 1984). Scope definition was also found to be the most important variable affecting the quality of design and project success (Gibson and Dumont 1996).

PDRI is a tool designed to solve the problems of poor scope definition. It comprises 70 scope definition elements for evaluating the completion of scope during the pre-project planning phase. It is intended to serve as a best practices tool that provides numerous benefits to project team that include: a checklist for work planning; highlight the risk elements; monitor pre-project planning progress; help in communication of requirements between participants; and a benchmarking basis (Gibson and Dumont 1996).

TOTAL QUALITY MANAGEMENT

TQM is a management philosophy and a set of techniques and procedure that targets continuous improvement and total customer satisfaction. Saylor (1992) stated that “TQM is a philosophy that relatively absorbs earlier proven systems, tools and practices that will secure continuous improvement and total customer satisfaction”. Although there are many definitions of TQM, satisfying the customer needs is the main factor in all definitions given to TQM. It is therefore important to identify these needs early in the project life cycle. Being a philosophy, TQM accepts the tools that enhance continuous improvement. TQM includes ideas that participants should work together for a common goal that includes partnership with suppliers and customers (Oakland 1994). According to Saylor (1992), TQM principles are based on the following:

- orientation- customer satisfaction;
- emphasis-continuous improvement of quality;
- measurement- establish priorities and quantification;
- human resources- respect for employees and their ability to improve the quality business process;
- teamwork and leadership; and

- organization issues- company wide support of TQM principles, starting at top cross functional approach to managing business process.

Teamwork and Alignment

Teamwork and alignment are two distinctive and complementary concepts. Teamwork is an important factor in performance improvement. Latham (1994) suggested that the industry's problems could be overcome by using teamwork. Teamwork is more effective because groups are better than individuals at creating ideas and solving problems. The purpose of teamwork is to have all people involved in a process working to achieve a common goal. Alignment and teamwork both require clearly defined objectives. There is a clear distinction between the concepts. While teamwork reflects whether or not a team is working well together to achieve an objective, alignment reflects whether or not a team is working on the same objectives on a collaborative manner. The two concepts have many common aspects, but there are some differences. The Construction Industry Institute (1997) summarized these differences as follows:

- teamwork applies to groups that work together with good and close relationship. On the other hand, alignment can involve groups working apart but working toward the same overall project objectives; and
- good teamwork involves making group decisions by consensus after a thorough discussion. Whereas good alignment may also involve different individuals making decisions independently but focused on the same objectives.

Teamwork and Culture

Total Quality Management, with its focus on process and teamwork provides a link between improving performance and cultural issues. Egan (1998) identified five key drivers of change which need to be set for the construction industry at large. They include committed leadership, a focus on the customer, integrated process and teams, a quality driven agenda and commitment to people. According to Egan the way to improvement is to focus on the needs of the clients, develop techniques and skills and develop a culture based on trust and respect.

The human factor has proven to be an important issue effecting quality (Hamaza 1994). People are an essential element in achieving quality. They can cause quality problems by lack of an adequate briefing and lack of clearly defined objectives. Cultural issues such as attitudes, values, trust, behaviour and environment are important factors that affect alignment (Construction Industry Institute 1997). If behaviours can be aligned with the fundamentals necessary for TQM implementation, the likelihood of success is increased". The following elements of a TQM program that can be effected by the culture of the organization:

- relationships with internal and external customers and suppliers;
- providing support and encouragement for continuous improvement; and
- use of statistical analysis tools in managing the process.

Tjosvold (1999) identified three issues that act as a basic factor in determining the supply chain co-operative relationship, they are:

- the extent to which their goals are co-operative;
- strengthen co-operation goal; and

- develop effective ways of working built on co-operative goals.

Furthermore, TQM provides principles, tools and techniques for cultural change and continuous improvement. Benchmarking is one of the main tools of TQM as a means of cultivating continual improvement. It is a tool intended to help companies perform better.

DISCUSSION

This paper has discussed the importance of pre-project planning as well as the processes involved as revealed by the CII. The pre-project planning processes described in this paper are owner focused and not specific, rather they are generic processes that can be customized to suit any company. In addition, there is a great emphasis on teamwork as means of improving quality. Bennett *et al.* (1995) mentioned that “project organizations consist of teams whose work must be co-ordinated so their combined actions can achieve agreed objectives”. The emphasis on teamwork is also one of the principles of Total Quality Management (TQM). However, in order for teamwork to be effective, teams need to be aligned to avoid disputes resulting from differences in opinions among team members. Alignment tools are important during pre-project planning to help decision makers focus their attention toward their objectives rather than direct them to conflicts which affect the progress of the project. The CII have developed project planning tools that deal with both cultural and process issues and can help better understand what consists of good scope development and correspondingly the importance of alignment and communication among team participants.

Despite the success of these tools there are limitations. Among these limitations is that the tools mentioned have been mainly developed in the US and applied on very large projects. The fact that they are specifically designed for industrial projects leads to an important need to develop new tools that can be applied to other types of construction projects.

CONCLUSION

TQM is being increasingly applied to companies in the construction industry to solve quality problems. It is not enough to apply TQM to an organization. TQM has to be applied to the whole supply chain. TQM and similar management philosophies have not focused on the complete problem. The focus should be on how to lead people to develop a system that will be continually improving the construction product. Therefore, the achievement of total quality in construction is highly dependent on teamwork. The need to develop a better customer supplier relationship in the construction process supply chain is important to improve project performance. This can be reached by developing tools that take into account the cultural issues to help reduce the differences between project participants.

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