Critical planning processes for project success

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Introduction

The objective of this study is to identify specific Critical Success Processes (CSP) required for the planning phase of a project. The concept of CSP may be more focused, exact and practical to project managers, compared to the traditional CSF (Critical Success Factors) concept. The most significant research identifies CSF for project success was executed by Pinto and Slevin (1987). This research gave a valuable insight for project managers, while identifying ten critical success factors, among project mission, top management support, project plan, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication and trouble-shooting. However, this research is quite old and its conclusions are not specific enough for project managers. This research focuses on the planning phase of a project.

Project planning specifies a set of decisions concerning the ways that things should be done in the future, in order to execute the design for a desired product or service. The project manager is responsible for completing the project to the satisfaction of all relevant stakeholders. Therefore, he or she should not only make sure that actions are executed according to plan, but more importantly, that this plan is reliable and properly represents stakeholders' requirements.

In order to analyze the planning processes, a measurement tool is needed. Recently, a Project Management Planning Quality (PMPQ) model was introduced by Zwikael and Globerson (2004), to evaluate the quality of project planning processes. This model, briefly described in the next section, was used in the present research as the vehicle for the identification of CSP.

The Model

The Guide to the Project Management Body of Knowledge (PMBOK® Guide) (PMI, 2000) identifies planning processes, where one major planning product is generated by the end of each process. The extent of generating a planning product is easy to measure and therefore was used to express the extent with which a process is performed. The model consists of 16 major planning processes, which generate 16 products. For example, the major product that project managers generate as an output for the "scope definition" process is a WBS chart. These products were grouped according to the nine knowledge areas, identified by the PMBOK® Guide and are presented in Exhibit 1.

Knowledge Area	Planning Process	Planning Product
Integration	Project Plan Development	Project Plan
Scope	Scope Planning	Project Deliverables
	Scope Definition	WBS (Work Breakdown Structure) Chart
Time	Activity Definition	Project Activities
	Activity Sequencing	PERT or Gantt Chart
	Activity Duration Estimating	Activity Duration Estimates
	Schedule Development	Activity Start and End Dates
Cost	Resource Planning	Activity Required Resources
	Cost Estimating	Resource Cost
	Cost Budgeting	Time-Phased Budget
Quality	Quality Planning	Quality Management Plan
Human Resources	Organizational Planning	Role and Responsibility Assignments
	Staff Acquisition	Project Staff Assignments
Communications	Communications Planning	Communications Management Plan
Risk	Risk Management Planning	Risk Management Plan
Procurement	Procurement Planning	Procurement Management Plan

Exhibit 1: Sixteen Planning Processes and Products, by Knowledge Areas

Data Collection

Data for the model was collected via questionnaires, which were administered in 19 different workshops in Israel and to 11 organizations in Japan. Participants came from different industries, such as engineering, construction, software development, services, etc. Altogether, 425 project managers completed the questionnaire. A

questionnaire was included in the final analysis, if at least 80% of its data had been completed. Using the above criterion, 358 questionnaires remained for the final analysis.

Participants were requested to evaluate the use intensity of the 16 planning products outlined in Exhibit 1. This was reported by using a scale ranging from 1 (low use intensity) to 5 (high use intensity). The following four project success indices were also collected: Cost overrun and schedule overrun, measured in percentages from the original plan; technical performance and customer satisfaction, measured on a scale of one to ten (1 representing low technical performance and low customer satisfaction, and 10 representing high technical performance and high customer satisfaction).

Results

The objectives of this section are to identify the most critical success planning processes and compare their relative importance to their actual use by project managers.

A process may be considered as ‘critical’ for a project success if its impact is greater than most of the other planning processes. Therefore, we will identify these processes by comparing their relative impact on project success. First, the relative impact on project success, and therefore importance, of each process was calculated. A multi-variable regression was calculated using 16 planning processes (as independent variables) and project success measure (as the dependent variable). For each run of the regression analysis, the linear coefficients (beta) were used to evaluate the importance of a planning process on a project success variable. Then, the 16 planning processes were ranked by their impact on project success. This calculation was repeated for all four-project success indices. Exhibit 2 ranks 16 planning processes for each project success measure, sorted by the “schedule overrun” ranking.

Success Measure / Planning Process	Impact on Project Success - Ranking			
	Schedule Overrun n=171 R^2=0.17 F=0.015	Cost Overrun n=144 R^2=0.25 F=0.002	Technical Performance n=190 R^2=0.23 F<0.001	Customer Satisfaction n=189 R^2=0.15 F=0.030
Activity definition	* 1	* 1	** 1	5
Organizational planning	2	7	4	4
Schedule development	3	2	13	3
Cost budgeting	4	5	9	9
Quality planning	5	9	5	8
Project plan development	6	3	3	1
Scope planning	7	6	6	14
Scope definition	8	12	11	13
Communications planning	9	10	7	2
Activity sequencing	10	8	14	10
Staff acquisition	11	14	* 2	6
Procurement planning	12	4	12	12
Cost estimating	13	15	10	11
Activity duration estimating	14	13	8	7
Risk management planning	15	11	15	16
Resource planning	16	16	16	15

* p<0.05; ** p<0.01

Exhibit 2 – Ranking Critical Success Planning Processes in Israel

In order to identify a critical success process, a proper definition must be developed. In this paper, a critical planning process is one that has a significant impact on at least one project success measure. In other words, a critical process is one that is ranked among first three processes for at least one success measure. According to the above definition, six planning processes are defined as critical ones - “definition of activities to be performed in the project”, “developing a project plan”, “organizational planning”, “schedule development”, “staff acquisition” and “communications planning”. It is interesting that critical planning processes are included in three project knowledge areas, namely “schedule”, “human resource” and “communications”. Out of these three knowledge areas, project managers in practice and literature focus mainly on schedule.

As can be seen from Exhibit 2, “activity definition” has the greatest impact on project success, since it is ranked as the most impacting process on three project success measures. This process has lower impact on the “customer satisfaction” success measure, since the customer is not directly influenced by the exact definitions of activities in a project. This means that proper identification of a project's activities is one of the most critical planning processes to be performed by the project manager. This finding makes a lot of sense, since if an activity is left out during the planning phase, its late inclusion afterwards may cause a strong negative impact on various aspects, such as scheduling and required budget.

“Schedule development” has a great impact on three out of four project success measures. This process has a direct impact on schedule overrun, since it involves the planning of start and end dates for each activity of a project. This process has indirect impact on the satisfaction of the customer (who is affected by the duration of the project) and on project cost (which is impacted by project duration as well). The “schedule development” process may have a limited impact on technical performance, due to the fact that the time the activities are performed doesn't affect its performance.

Another critical process in Exhibit 2 is “project plan development”. This process involves the development of a formal plan for the project, which is based on the integration of several planning processes related to duration, time, cost, risk and others. It has a great impact on all project success measures.

Another low impact process is “risk management planning”. Of late, this process has been frequently quoted in the project management literature, but it is rarely performed in a formal manner (Raz, Shenar, & Dvir, 2002). According to this research, the relative impact of risk management planning on project success is low, compared to other important processes the project manager has to execute during the planning phase of a project. Risk planning has a significant positive correlation only with the project's cost overrun. This means that project risk planning is probably perceived as a cost containment tool, rather than a comprehensive technique for dealing with all aspects of the projects.

Exhibit 3 introduces seven CSP in Japan. These CSP include scope definition, activity duration estimating, resource planning, staff acquisition, quality planning, risk management planning and cost estimating.

Success Measure / Planning Process	Schedule Overrun n=83 R^2=0.27 F=0.12	Cost Overrun n=83 R^2=0.29 F=0.08	Technical Performance n=83 R^2=0.22 F=0.32	Customer Satisfaction n=83 R^2=0.45 F<0.001
Scope Definition	* **1**	* **1**	**1**	** **2**
Activity Duration Estimating	**2**	15	16	12
Resource Planning	**3**	12	**2**	7
Cost Budgeting	4	8	13	10
Staff Acquisition	5	6	5	** **1**
Quality Planning	6	**3**	6	15
Project Plan Development	7	9	4	4
Organizational Planning	8	5	10	8
Activity Definition	9	7	12	9
Procurement Planning	10	13	11	14
Communications Planning	11	10	8	5
Risk Management Planning	12	4	**3**	6
Cost Estimating	13	**2**	9	**3**
Activity Sequencing	14	14	14	13
Schedule Development	15	11	7	11
Scope Planning	16	16	15	16

P<0.05; ** P<0.01

Exhibit 7 – Ranking of Impact of Planning Processes on Project Success in Japan

It is interesting to note that in comparison with CSP found in Israel, we can identify a new series of critical processes. In other words, six out of the seven CSP are not included in the results found in Israel and therefore are unique to the Japanese industry. The six unique CSP in Japan are:

1. Scope definition and quality planning – since the quality of the project is very important in Japan, it is required to exactly describe the specifications of the product and to plan quality processes to ensure its quality.
2. Activity duration estimating, resource planning and cost estimating – In order to ensure the cost of a project, it is necessary to plan the duration of each task, the amount of labor required and its planned cost.
3. Risk management planning – a process which is not yet well developed and should be taken into consideration.

We may identify that in Israel human resource and communications planning were found to be CSP. In Japan these knowledge areas are well implemented in the P2P project management methodology and therefore the focus should be pointed to cost and quality planning.

The identification of critical success processes emphasizes the “desired use” of each process. It is expected that project managers will invest more efforts in critical planning processes, rather than in non-critical ones. The next section will analyze this expectation by calculating the “actual use” of each process.

Actual Use of Planning Processes

In the questionnaires, every project manager was asked to report the extent with which planning processes were performed in his projects, on a scale of 1 to 5. The average extent scores for each planning process were calculated and are presented in Exhibit 4.

Planning Process	Extent of use - ranking	
	Japan	Israel
Schedule development	1	4
Cost estimating	2	13
Activity duration estimating	3	1
Scope planning	4	3
Scope definition	5	8
Activity definition	6	2
Organizational planning	7	6
Project plan development	8	5
Activity sequencing	9	10
Resource planning	10	7
Cost budgeting	11	11
Staff acquisition	12	9
Quality planning	13	14
Procurement planning	14	12
Communications planning	15	16
Risk management planning	16	15

Exhibit 4 – The "Actual Use" of each Planning Process

As can be seen from Exhibit 3, the planning process with the highest extent of use in Israel - "activity duration estimating"- is followed by "activity definition", "scope planning" and "schedule development". It is interesting to note that the first four planning processes are needed for the use of any project management software as a support for planning. Even the third process, "scope planning", is required for schedule planning, since "activity definition" is a result of "scope planning". In advance, "scope planning" is materialized through a software package via the assignment of the WBS code. Therefore, one may conclude that planning processes, which produce outputs required for generating a proposed project schedule via a software package, are used more intensively then other processes.

Using the logic specified above, planning processes with the lowest extent of use, such as "risk management planning" and "communication planning" are not required as inputs for formal tools such as software packages. Another possible reason for

their low extent of use may be due to the lack of a relatively simple formal template to aid in implementing those processes. In Japan, project managers pay more attention to scope planning and definition and processes related to schedule planning.

Summary

In this paper we ranked 16 planning processes according to the “desired intensity” and “actual intensity”. A comparison between these two measures may help us identifying those planning processes that receive too little attention, when compared to their impact on project success. Processes that are ranked as highly impacting project success, but are ranked low in extent of use, indicate that project managers do not perform them frequently enough.

For example, the “quality planning” process, which has a moderate impact on project success in Israel and was found to be a CSP in Japan, has a very low use extent by project managers in both countries. This means that although the importance of this process, project managers do not use it often enough.

One may assume that project managers intuitively sense the importance of each process. However, there are some major differences between the importance of a process and its extent of use. Project managers do not distribute their efforts according to the potential impact that each process may have on project success.

In some processes, project managers tend to overestimate the importance of the process and spend too much effort in executing it, while in other crucial processes, they tend to spend too little effort. Project managers tend to execute easier processes more frequently, although they have a lower impact on project success, i.e. “activity duration estimating”. Generally speaking, project managers tend to

spend more time on planning processes of a technical nature, since they are easy to perform. However, some of these processes don't contribute as much to project success as the ones that require a more conceptual treatment.

The same results were found for “resource planning”. This process, which is included in the “Cost” knowledge area, supports project managers in estimating the amount of labor required to complete each activity. According to the above finding, too much relative energy is consumed by this process, compared to its low impact on project success. Project managers may not take into account the likelihood that the amount of work an activity requires will change during execution, making the first estimation less valid.

On the other hand, the extent of use of the processes “communications planning” and “quality planning” is ranked significantly lower as compared to its importance on project success. The explanations for the above findings may be lack of efficient tools and know-how which is not as developed as the know-how for some of the other processes.

Finally, the impact of the “risk management planning” process on project success was found to be surprisingly low, in spite of the perceived importance of this process as claimed by many authors (i.e. Williams, 1995; Simon, 1997). This finding may explain the low use extent of this process, as reported by many studies (Raz et. al., 2002; Couture & Russett, 1998; Mullaly, 1998; Ibbs & Kwak, 2000, etc.). On the other hand, this finding raises some questions regarding the great importance that project management literature has lately attributed to this process.

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