PROJECT MANAGEMENT

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ABSTRACT

Effective and efficient Project Management is vital for future prosperity and driving sustainable economic growth. Properly delivered projects underpin the nation’s economic prosperity, providing both primary and secondary benefits to industry and the public.

In any organization, past experience plays a key role in improvement and management. How effectively past experience can be leveraged depends on how well this experience is captured and organized to enable learning and reuse. Systematically recording data from projects, deriving lessons from it, and then making the lessons available to other projects can enhance this reuse. In this paper we discuss the approaches for organizing and using past experience and how they are employed in a large software house which has been assessed at level 5 of the CMM and also provides a platform for sharing the knowledge gained through a review of best practice case studies within public sector. Knowledge sharing in this way will enhance the nation’s ability to deliver high-quality projects.

INTRODUCTION

The Commonwealth, working with the states and territories, is committed to the delivery of high-quality projects and driving continuous improvement in this arena. This can be achieved through the identification of best practice processes and behaviors in planning, procurement and delivery of projects.

While successful delivery of key Project deliverables is vital to Commonwealth, state and territory governments, it should be recognized that there are risks associated with all project delivery. The potential cost of failure to deliver any of the key project components (cost, quality, safety or schedule) is an inherent risk.

An organization is a cohesive entity that has some mission or defined goals. The organization (or the people in it) performs some tasks to achieve these goals. Knowledge helps perform these tasks better, faster, cheaper. The main goal of knowledge management is to help reduce cost, reduce cycle time, or improve quality through the effective use of knowledge. In an organization which is in the business of software development, as the main assets are the intellectual capital, knowledge
management is particularly important. Knowledge can be external, i.e. which is produced by people outside the organization. This type of knowledge resides in books, journals, magazines, etc. Knowledge can also be internal, i.e. the knowledge that is created primarily within the organization, largely through experience and experimentation. Generally, the goal of knowledge management within an organization is to manage the internal knowledge of the organization (creation of which uses external knowledge.) Leveraging experiential knowledge is the focus in the experience factory model, and is envisaged at the higher levels of the capability maturity model. In this paper we also focus on the management of internal knowledge, particularly the knowledge that is useful in project management, i.e. use of which can make project management more effective.

Suppose in a software organization, there exists a “super” project manager who consistently executes projects successfully, whose estimates are generally on target, and who seems to avoid the “fire fighting” mode most of the time. Clearly, this project manager has acquired the knowledge to properly perform the various tasks associated with project planning and execution through experience.

Project Management Information Systems (PMIS) are software applications that help managers track projects from their conception to their execution. They provide them with pertinent information and collaborative tools.

PROCESS SPECIFICATION AND PROCESS ASSETS

A process-oriented approach for project execution forms the foundation, the backbone, of any knowledge management system. Without defined processes for executing different tasks, it is not even possible for a project manager to ask the question “how can I use past experience to perform this task better?” This is because implicit in this question is the existence of some method which the project manager is to use and which he wants to improve! Hence the centerpiece of any IT management system for project execution is the processes defined to perform different tasks in a project.

And what is a process? Technically, a process for a task is comprised of a sequence of steps that should be followed to execute that task. For an organization, however, the processes is recommended for use by its engineers and project managers are much more than a sequence of steps—they encapsulate what the engineers and project managers have learned about successfully executing projects. Through the processes, which cover engineering as well as project management tasks, the benefits of experience are conferred to all, including a newcomer in the organization. These processes help managers and engineers emulate past successes and avoid the pitfalls that lead to failures. Hence, processes are the main means of packaging and reusing past knowledge.

For an organization, the standard processes that have to be followed by a project have to be properly specified and documented. Different approaches are possible to precisely and succinctly specify a process which are as follows.

1. **Overview** - a brief description of the stage
2. **Participants** - all the participants that take part in executing the various activities in the stage
3. **Entry Criteria** - the pre-requisites that must be satisfied before this stage can be started
4. **Inputs** - all the inputs needed to execute the stage
5. **Activities** - list of all activities (sometimes also important sub-activities) that are performed in this stage

6. **Exit Criteria** - The conditions that the outputs of the stage must satisfy in order to consider the stage as completed

7. **Outputs** - all the outputs of the stage

8. **Measurements** - all the measurements that must be done during the execution of the stage

9. **Special Verification**

10. **References**

With a specification like this for each stage, the dependence between stages is explicitly specified in the form of entry criteria. The order in which the stages are presented in the process definition is merely for documentation convenience. Note that this specification captures past experience not only about the sequence of steps that should be used, but also about entry and exit criteria that should be satisfied, what measurements to take, what outputs should be produced, etc.

![Fig. 1: Process and Process assets](image-url)
**PROCESS DATABASE**

The process database (PDB) is a repository of process performance data from projects, which can be used for project planning, estimation, analysis of productivity and quality, and other purpose. The PDB consists of data from completed projects and forms the quantitative knowledge about experience in project execution. As can be imagined, to populate the PDB, data is collected in projects, analyzed, and then organized for entry into the PDB. Many high maturity organizations have some form of process database. Here we discuss what the PDB in general. We do not discuss how measurements are done in projects.
Overall, the data captured in the PDB can be classified into the following categories:

- Project characteristics
- Project schedule
- Project effort
- Size
- Defects

**Fig. 3: Process database and closure analysis**

**BODY OF KNOWLEDGE**

Though the processes and process assets capture experience related to how different tasks should be done, they still leave information that cannot be generalized or “processized”. For example, specific information about how to use a particular tool, how to “get around” some problem in a new compiler, how to tune an application, etc. It is hard to put process-assets like framework for such knowledge. To capture this type of un-structured knowledge, some other mechanism is needed. This system is called as Body of Knowledge (BOK) which is used to encapsulate experience.

**CONCLUSION**

The main purpose of Project management is to leverage past experience and lesson learned from the organization to improve the execution of new projects. To achieve this objective, the knowledge have to compile and organize internal knowledge such that it resides in systems and is available for use by project managers. Consequently, the key elements of building knowledge are collecting and organizing, making it available through systems, and reusing it to improve the execution of projects.
REFERENCES

7. W. Humphreys, Managing the software process, Addison-Wesley, 1989.