INFORMATION MANAGEMENT: STRATEGY, SYSTEMS, AND TECHNOLOGY

THE ROLE OF PROJECT MANAGEMENT IN KNOWLEDGE MANAGEMENT

Ralph L. Kliem

INSIDE
Basics of Knowledge Management and Project Management; Work Breakdown Structure; Controlling and Leading Projects

INTRODUCTION

Knowledge management (KM) involves collecting, organizing, and distributing knowledge that is accumulated over a period of time for the purposes of improving and increasing a company’s competitive edge. This knowledge is more than mere facts and data. It is information and experience collected and applied to achieve the overall goals of a company.

Surveys by IT research firms reveal the popularity of KM. For example, a survey of 500 professionals by the Delphi Group revealed that more than 50 percent of the respondents have begun implementing KM, and more than 80 percent saw it as a major contribution to their companies.1 Dataquest Inc. estimates that KM will grow from a $2.7 billion market in 1997 to a $5 billion one in the year 2000.2 Several advantages have been attributed to KM, and include:

• dealing with “gray” situations with greater confidence
• encouraging greater collaboration among employees
• identifying best practices
• improving the capacity for product and process innovation
• increasing the competencies of existing employees
• minimizing the negative impacts of employee turnover
• responding cost-effectively to rapidly changing environments

PAYOFF IDEA

A KM project is implementing knowledge management disciplines, tools, and techniques to build a system that will achieve specific goals and objectives. The challenge, of course, is to collect, organize, and distribute knowledge to achieve the goals and objectives that are often as vague as the definition of KM. This can lead to scope creep and overlooking customer wants and, ultimately, wreak havoc on cost, quality, or schedule performance. The challenge, then, is to ensure that KM projects are completed in a timely, efficient, and effective manner. Project management is the way for doing just that.
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The vagueness surrounding KM, in general, manifests itself via a survey of 100 IT managers by Informationweek. Forty-five percent of the respondents said that their IT management did not have a clear understanding of KM or did not know; 56 percent of the respondents said of the company’s senior management did not know. All this leads to one simple conclusion: the opportunity for knowledge management projects ending in failure is great.

The challenge, then, is to ensure that KM projects are completed in a timely, efficient, and effective manner. Project management is the way for doing just that.

PROJECT MANAGEMENT

Project management is applying concepts, tools, and techniques for completing projects on time and within budget while simultaneously meeting the customer's needs. It requires implementing four basic processes of project management:

1. Planning is deciding in advance what a project will accomplish, determining the exact steps to accomplish it, and identifying when to begin and end each step.
2. Organizing is using resources efficiently and effectively while executing the plan.
3. Controlling is determining how well the plans are being implemented.
4. Leading is motivating people to achieve the goals of a project.

KM makes an excellent candidate for project management, considering the track record of other information technology (IT) projects. Most projects fail for a variety of reasons, including:

- incremental expansion of scope
- lack of meaningful schedules
- miscommunications
- poor teaming
- poor understanding of requirements
- unrealistic estimates
- unrealistic plans
- vague definition of goals
Of course, the list is endless. The point is that KM projects are prime candidates for applying project management. Coupled with the results of the past and vagueness surrounding knowledge management, project management becomes even more imperative for project success.

Planning
Planning involves performing these critical steps:

- preparing a statement of work (SOW)
- developing a work breakdown structure (WBS)
- estimating time and costs
- preparing schedules
- performing risk management

Preparing a Statement of Work. Also called a SOW, this document is a contract between the project manager building the KM system and its recipient, or customer. From a KM perspective, the customer is often within the user community and the project team comes primarily from the IT organization.

Considering the vagueness surrounding KM, a SOW makes good sense and can preclude a host of misunderstandings surrounding the functionality of a KM system and responsibilities for performing specific tasks. A well-written, definitive SOW provides a meaningful basis for planning a KM project. A typical SOW consists of the elements shown in Exhibit 1.

Developing a Work Breakdown Structure. Also called a WBS, the work breakdown structure is a top-down, general-to-specific hierarchical listing of components of a KM system and their respective tasks to complete. An effective WBS reaches a level of detail that enables development of a meaningful schedule, makes valuable assessments of progress, and ensures completeness of the tasks. A heuristic is that the lowest level of tasks in a WBS cannot exceed 80 hours to complete, or the equivalent

<table>
<thead>
<tr>
<th>Element</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>The purpose and scope of the system</td>
</tr>
<tr>
<td>Constraints</td>
<td>The cost for developing and implementing the KM system and its date of</td>
</tr>
<tr>
<td></td>
<td>completion</td>
</tr>
<tr>
<td>Responsibilities</td>
<td>Responsibilities for knowledge capture and tool selection</td>
</tr>
<tr>
<td>Requirements</td>
<td>Customer providing subject matter experts</td>
</tr>
<tr>
<td>Deliverables</td>
<td>Repository, training, documentation</td>
</tr>
<tr>
<td>Signatures</td>
<td>Project manager, project champions, customer's requirements</td>
</tr>
</tbody>
</table>

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of two weeks of work for a full-time equivalent. A sample portion of a WBS is presented in Exhibit 2.

**Estimating Time and Costs.** The real value of a definitive WBS is its use in estimating the time and costs for a KM project. It provides the level of granularity that allows for “rollups” to different levels of tracking and monitoring.

The estimating for time should involve the application of the three-point estimate. This approach can reduce the dramatic influences of extreme optimism and pessimism that often accompany estimates. Hence, the three-point estimate reduces the tendency to exaggerate. The best approach for applying this estimating approach is having the individuals who perform the tasks do the estimating. The people assigned, however, are often not available, so the project manager must make the initial estimates. Regardless, the three variables for each task to consider are the:

1. most pessimistic, which is the time required to complete a task under the worst conditions
2. most optimistic, which is the time required to complete a task under ideal conditions
3. most likely, which is the time required to complete a task under normal conditions

The three variables are plugged into a formula to derive the expected time:

\[ \text{Expected time} = \frac{\text{Most Pessimistic} + 4 \times \text{Most Likely} + \text{Most Optimistic}}{6} \]

**Example:**

\[ \frac{144 \text{ hours} + 4(60) + 50}{6} = 72.33 \text{ hours} \]

The expected time is then adjusted by a percent to account for interruptions, absences, and other nonproductive times not related to performing the tasks:

**Example:**

\[ 72.33 \times 1.07 = 77.39 \text{ hours} \]

After estimating, the estimator for each task translates the revised expected time into flow time to develop schedules. The time is normally divided into eight-hour units:

**Example:**

\[ \frac{77.39}{8} = 9.7 \text{ days} \]
EXHIBIT 2 — A Sample WBS

Knowledge Management System

- Training 1.0
- Knowledge Repository 2.0
- Application Tools 3.0
- Testing 4.0
- Documentation 5.0

Knowledge Access 2.1
Knowledge Capture 2.2
Knowledge Organization 2.3
Knowledge Architecture 2.4
Knowledge Distribution 2.5

- 2.3.1 Determine ways to catalogue knowledge
- 2.3.2 Determine how to filter knowledge for specific requirements
- 2.3.3 Develop indexing schema
- 2.3.4 Identify linkages among knowledge components
With time estimates, the project manager can then calculate costs using the hours. Often, a burdened rate is used for labor and indirect costs that may be added to the task.

**Preparing Schedules.** The combination of the SOW, WBS, and estimates provides the basis for developing a meaningful, integrated schedule for the KM project. The SOW provides the mandatory dates; the WBS provides the listing of the tasks to perform; and the estimates provide the length of time to perform each task.

The schedule is first developed by identifying the dependencies, or logical sequence, among the tasks and then applying the flow times for each one. The eventual result is the calculation of four dates for each task:

1. early start, which is the earliest time that a task can start
2. early finish, which is the earliest time that a task can finish
3. late start, which is the latest time that a task can start
4. late finish, which is the latest time a task can finish

The above dates are important because they not only indicate the flexibility available for starting and completing tasks, called float, but, in toto, identify the critical path. The critical path in the network diagram is the longest path, following from left to right, and does not allow for flexibility in the schedule. A slide in the critical path will, consequently, result in a slide in finishing the project on time. **Exhibit 3** is part of a network diagram for a KM project.

**Performing Risk Management.** Because KM projects face many variables, risk management is absolutely essential. Like all projects, some risks have a higher probability of occurrence and a greater level of impact than others. The project manager who performs a risk management can increase the likelihood of project success by identifying the necessary measures that need to be established to respond to certain risks affecting cost, schedule, and quality. Here are some risks that many KM projects can face and that can impact cost, schedule, and quality:

- failure to obtain management buy-in
- failure to tie the KM system into the overall strategic direction of the company
- inability to get employees to share knowledge
- lack of detailed requirements
- lack of integration among development tools

**Organizing**

Having good plans is necessary but of little use without an infrastructure to execute them. A project infrastructure consists of many elements, such
EXHIBIT 3 — Part of a Network Diagram for a KM Project

Legend
ES = Early Start  EF = Early Finish
LS = Late Start  LF = Late Finish
→ indicate critical path

- Collect knowledge elements from subject matter experts 2.3.1
  - ES = 1/15  EF = 1/10
  - LS = 1/7  LF = 1/12

- Determine ways to catalogue data 2.3.1
  - ES = 1/13  EF = 1/17
  - LS = 1/14  LF = 1/18

- Determine how to filter knowledge for specific requirements 2.3.2
  - ES = 1/13  EF = 1/17
  - LS = 1/14  LF = 1/18

- Develop indexing schema 2.3.3
  - ES = 1/13  EF = 1/17
  - LS = 1/14  LF = 1/18

- Identify linkages among knowledge components 2.3.4
  - ES = 1/13  EF = 1/21
  - LS = 1/13  LF = 1/21

- Determine tool for knowledge access 3.1
  - ES = 1/22  EF = 1/28
  - LS = 1/22  LF = 1/28
as a team organization, responsibility matrix, project manual, meetings, and software.

**Team Organization.** Assembling a group of people and calling it a team are not enough. Structure is necessary to capture the energy and synergy created and to channel both in the right direction. Because KM is still in its infancy and requires the participation of many specialists, it is important to identify clear responsibilities and reporting relationships. A simple organization chart, such as the one shown in Exhibit 4, can help clarify responsibilities and reporting relationships.

**Responsibility Matrix.** The WBS and resource allocation provide the basis for constructing a responsibility matrix. The matrix is a chart that shows the relationship of the work to be done and the participants on the project. The advantages of the matrix are that it communicates responsibilities for performing specific tasks and identifies their levels of involvement. Project managers can elect to parse out the matrix, meaning that a person receives only that portion of the tasks he or she is responsible for completing, or it can be distributed in its entirety to everyone. Exhibit 5 is an example of a responsibility matrix.

**Project Manual.** Everyone on a project needs access to certain data to complete it successfully. If the information is not readily available, participants consume time and energy finding it and, consequently, reduce their efficiency and effectiveness. One way to ensure the availability of the necessary information is to create a project manual in electronic or hard copy form. Exhibit 6 is an outline of a typical project manual.

**Meetings.** For a KM project, there are three basic types of meetings: checkpoint review, status review, and staff. Checkpoint review meetings are held at a major milestone point in the schedule, such as capturing knowledge from subject matter experts. The purpose is to determine how well the project progressed, what went and did not go well, and whether to proceed. Status review meetings are held regularly. The purpose is to collect and assess status on the performance of the project of cost, schedule, and quality basis, such as meeting a major milestone date in the schedule. The staff meeting, too, is held regularly with the project team and selected invitees. The purpose is to discuss issues and share information, such as technical challenges in building the KM system.

**Software.** As a project increases in size, so does the complexity in managing it. Good software can help deal with complexity. Software might include a spreadsheet, a word processing program, or a sophisticated project management package such as Microsoft Project for Windows and Primavera Project Planner. It is important to note, however, that project
EXHIBIT 4 — A Simple Organization Chart

- Wanda Klein
  Chief Knowledge Officer

- David Wailin
  Project Manager

- Terri Smith
  Administrator

- Irwin Smythe
  Knowledge Architecture
  (lead)

- Roger Dynsand
  Knowledge Analysis
  (lead)

- Cindy Heindal
  Knowledge Tools
  (lead)

- Nancy Agare
  Subject Matter Expertise
  Liaison
  (lead)
### EXHIBIT 5 — Example of a Responsibility Matrix

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Smith</th>
<th>Watson</th>
<th>Henricks</th>
<th>Garcia</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3.1 Determine ways to catalogue knowledge</td>
<td>P</td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3.2 Determine how to filter knowledge for specific requirements</td>
<td></td>
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<td></td>
<td>S</td>
<td>S</td>
<td>P</td>
</tr>
</tbody>
</table>

**Legend**
- P = Primary
- S = Secondary
software will not guarantee success but can help achieve success. Regardless of the type or size of a project, if the project manager does not know how to use the software or populates databases with bogus data, then the likelihood of success drops dramatically. Software must be applied in a manner that maximizes payback and minimizes waste.

Controlling
Regardless of the thoroughness of a plan, exercising control is absolutely necessary to bring a KM project to a successful conclusion. Controlling involves performing these four fundamental actions:

1. status collection and assessment
2. tracking and monitoring
3. contingency planning
4. replanning

**Status Collection and Assessment.** Having a plan in place is one thing; executing it efficiently and effectively is another. Status collection is gathering data on cost, schedule, and quality and then transforming that data into information — that is, something meaningful. The information is then used to assess progress to date vis-à-vis the plan. The key activities for assessing performance are identifying and evaluating variance. Variance is the difference between what should happen up to a point in time and what has actually occurred. A negative assessment is typically
one that misses a key schedule date or cost target; a positive assessment is meeting a key schedule or cost target.

For KM projects, status and assessment are critical. The ambiguity of project goals requires keeping a pulse on performance by raising two key questions: where are we and are we going in the right direction? Answering these two questions will decrease the likelihood of having a runaway project.

**Tracking and Monitoring.** Good status collection and assessment require looking at the past and anticipating the future. Tracking is looking at past performance; that is, what has occurred. Monitoring is looking into the future using the past. Both tracking and monitoring provide the link between the past and future to understand how well the project is progressing. Both, closely intertwined with status collection and assessment, are very important for KM projects because they help answer two more fundamental questions: where have we been and where are we heading?

**Contingency Planning.** Good risk management requires good contingency planning; that is, developing ways to respond to specific scenarios. Contingency plans offer several advantages, to include responding in a proactive rather reactive way to a given situation, furthering progress according to plan, and instilling in team members a confidence in the eventual success of the project. Obviously, not all scenarios can be identified in advance and under certain circumstances that can require the next activity — replanning.

**Replanning.** Sometimes, nothing can be done other than to replan the project. That requires developing a new SOW, WBS, estimates, schedules, and reorganization. A severe budget cut or a technological snafu may require overhauling everything. The best contingency planning in the world will not make a difference. Replanning, however, should not occur unless absolutely necessary because it may mean a large loss in investment of time, money, and energy. As a project moves down its lifecycle, the losses become larger.

**Leading**

In its basic form, leading is motivating people to achieve the goals and objectives of a project by:

- providing a vision
- communicating
- maintaining direction
- motivating
• being supportive
• building a team

Leading actually occurs throughout the life cycle of a project. It is required during planning, organizing, and controlling.

**Providing a Vision.** Without a vision, a KM project is heading for disaster. A vision is a description of what will be in the future. It gives a sense of purpose and direction. The SOW provides the basis for generating a vision because it describes the final result of the project. The challenge for developing a vision and keeping people focused on it is a particular challenge to KM projects. Knowledge management in general is a vague concept, and the description of the elements in a KM system can be difficult due to the changing, multifaceted technology it involves and the business environment in which it finds itself.

**Communicating.** The best vision and plans mean little if no one knows about their existence and any changes to them. Project managers are at the hub of a KM project, thereby serving as the communications center for a project. Their use of tools, such as the project manual and status review meetings, enable and enhance communicating. However, good communication must be ongoing and widespread to prove useful.

On a KM project, communication is absolutely critical. The involvement of many specialized disciplines and representatives from various organizations necessitate that communication continues. Otherwise, project failure is inevitable because the opportunities for operating “in the dark” and going in different directions increase. Everyone must follow the same vision and plan.

**Motivating.** People on a project must be emotionally committed to the vision of the project or they will not provide a significant contribution. It becomes even more important, especially in a matrix environment, because the project manager lacks any functional control over people. The difficulty in motivating is further complicated by the subject matter. Project managers on KM projects, therefore, must continually keep the fire burning among their team members.

**Being Supportive.** KM projects require extensive coordination when using tools and applying knowledge. These projects face many obstacles that can impede project success — from obtaining hard-to-find software to political interference. Leadership necessitates supporting the team’s needs to achieve success. Because KM projects are by nature lengthy and complex undertakings, project managers must facilitate task execution.
Building a Team Atmosphere. As the complexity of projects increases, so does participation in the number of disciplines and people. KM projects are no exception. An effort is required not just to assemble specialists, but also to encourage commitment toward cooperation in achieving the vision. Project team, sponsor, and customer must work together and have ownership in the project’s outcome.

KM IS THE FUTURE
From reading IT literature, it is safe to predict that interest in KM will grow. More and more companies are building KM applications that will play an integral role in their performance. As the number of KM systems increase, so will the challenges in implementing a successful KM project. Like other IT development projects of the past, KM projects will produce some great results — but also some equally great disasters. It is the desire to achieve the former and avoid the latter that project management will play an important role in building KM systems.

Notes
2. Interactive Week, December 8, 1997.

Ralph L. Kliem is president of Practical Creative Solutions, Inc., a Redmond, Washington, consulting and training firm. He can be reached at 75377.2623@compuserv.com, or by phone at (425) 556-9589.